Medicine, Human Wellness, and Ecology?

The healthcare workforce is always under duress and requires devotion to its own wellness. Paying attention to new developments in the science of medicine, as well as those developments occurring peripheral to the core of medical research, can challenge physicians in many ways. Getting back to the basics of improving human wellness is currently receiving a plethora of attention in the research community.

At our core, we all want to feel safe, be healthy, stay happy, and be able to live our lives with ease and minimal discomfort. In spite of other desires, at our core, these four are pivotal.

Some days we forget just how privileged we are in life and become preoccupied with our unmet higher desires. Appreciating these simple core areas and purposefully choosing to be happy helps minimize the times when we feel our other wants are not being met.

We often need to find supplementary activities and information to help us meet these core needs. Mounting evidence suggests that getting physically in touch with nature can improve our overall health and wellness.

The evolution of medicine as a profession and as a provision of services to people is fascinating. For centuries, the primary focus of medicine has been on the diagnosis and management of diseases. Most assuredly, the pace of change in the past 120–150 years has been

spectacular, and the capabilities for providing cures (or near cures) for numerous diseases is profound. Similarly, the pace of change with the advance of scientific research breakthroughs and the development of technologies moves along at a logarithmic scale. This duplicity of change, however, makes it attractive for the science of medicine to continue focusing on disease management and not on disease prevention.

Fortunately, the past decade has shown a gradual recognition and appreciation for the need to pay more attention to human wellness and disease prevention. What began with increased attention to so-called "alternative care" practices has now evolved into a full focus on human wellness, disease prevention, and even the fast-paced new focus on longevity. These budding areas of research and product development are filled with an extensive array of confusing literature and a variety of apostles.

The general public can be misled into excess spending on products based on marginal science. Popular magazines and many books are now profiling these benefits and helping readers collate the confusing sets of scientific evidence that are spread around in a variety of research disciplines and databases—not an easy accomplishment in the least, considering at recent count, there are nearly 500 scientifically published studies from around the world linking time in nature with better health.

For example, Dr. Qing Li, a professor at the Nippon Medical School in Tokyo, has demonstrated that trees and plants emit aromatic compounds called phytoncides that, when inhaled, can spur healthy biological changes in a manner similar to aromatherapy, which also has been studied for its therapeutic benefits. In his studies, Li has shown that when people walk through or stay overnight in forests, their blood often exhibits changes that are associated with protection against cancer, improved immunity, and lower blood pressure.[1]

Specifically, Li has studied natural killer immune cells, NK cells, that, like cortisol and hemoglobin, can be reliably measured in a lab-

oratory. It's been known for a long time that factors like stress, aging, and pesticides can reduce a person's NK count, at least temporarily. So Li wanted to learn if nature, which reduces stress, could also increase our NK cells and thereby help humans fight infections or cancer.

Li brought a group of middle-aged Tokyo businessmen into the woods in 2008. For three days, they spent a couple of hours each morning hiking. By the end of the three days, their blood tests showed their NK cells had increased 40%. Moreover, the boost lasted for seven days. A month later, their NK count was still 15% higher than when they started. In contrast, during urban walking trips of the same duration, NK levels didn't change. Li also has published results from similar studies with male and female subjects while expanding the variety and type of chemical compounds exposed to or being monitored.[2]

In a recent breakthrough study, Hunter, Gillespie, and Chen measured biomarkers of physiological stress—salivary cortisol and salivary alpha-amylase—to quantify the change in physiological stress in response to the duration of exposure to nature.[3] The use of cortisol and amylase as biomarkers is predicated on being able to separate the nature exposure effect from the natural daily shift in production.

Both stress biomarkers indicated a reduction in stress in response to a "nature experience" (NE). An NE resulted in a 21.3% per hour drop in cortisol beyond that of the hormone's 11.7% diurnal drop. The NE efficiency per time expended was greatest between 20 and 30 minutes, after which benefits continued to accrue, but at a reduced rate. For salivary alpha-amylase, there was a 28.1% per hour drop after adjusting for its diurnal increase of 3.5% per hour, but only for participants who were least active, sitting or sitting with some walking. It is the first study to employ long-term, repeated-measure assessment and the first evaluation wherein study participants are free to choose the time of day, duration, and the place of a NE in response to personal preference and changing daily schedules.[3]

Building off this evolving scientific literature, Dr. Robert Zarr, a pediatrician in the Washington, DC, area, is credited with starting the nonprofit Park Rx America program (www.parkrxamerica.org) that is gradually realizing success and gaining momentum with increasing efforts to have physicians write actual prescriptions for their patients to spend time outdoors in parks close to their homes—and then facilitate their ability to do so.

Leaders like Anne O'Neill of the National Park Service and Diana Allen with the Healthy Parks Healthy People program helped launch pilot initiatives in 2011 and 2013. Many other initiatives have been, or are now becoming active, around the world as well. For example, in 2006, there was one single U.S. nature prescription program; by 2018, there were 71 programs in 32 states, and 17 states that actively use the Park Rx app.[4,5]

But here is a frustrating paradox: Morale in the healthcare workforce is under duress due to increasing pressures from increased productivity pressures, encroachment of the electronic health record, decreasing reimbursements for care, and residual debt load from training. Providers of healthcare also must pay attention to the same sets of issues with which they assist their patients; physicians must make changes to their professional and personal lives in order to be healthier. The environments where patient care is delivered also must change in order to improve the quality of life for the public and the healthcare workforce.

So how does ecology fit into this picture? The definition I found most appealing for ecology is this: " . . . it is a branch of biology that deals with the distribution, abundance and interactions of living organisms at the level of communities, populations, and ecosystems, as well as at the global scale. Ecology is a broad science encompassing many fields."[6]

But now for another disturbing paradox: When researching the topic of ecology in a variety of online databases and coupling the

term to other words like "medicine," "healthcare," "physicians," etc., what do you think shows up in those searches? Unfortunately, not much of anything!

The medical profession seems to be missing the opportunity to learn more about this area of critically important knowledge. However, it is always difficult to insert new or evolving topics into the medical school curriculum; and once out of medical school, fresh graduates have myriad issues and responsibilities to address as they gain specialty training and attempt to establish their clinical practices. So frankly, it is no wonder that peripheral topics such as ecology are not included in physicians' sphere of awareness during their professional lives.

As illustrated by the example of Park Rx mentioned earlier, however, we need strategies to increase medical professionals' awareness of the rapidly escalating importance of how we are affecting ecologies and, perhaps more importantly, how our ecology can positively affect humans and those who nurture and care for them. We still have much to learn.

By nature, physicians are high achievers. At our professional core, we all want to succeed in the science and art of medicine. We also want to continue moving toward mature approaches to true patient-centered care. These professional pursuits generally provide a great sense of satisfaction. However, at times, our evolving society and medical industry do not make it easy to remain optimistic, positive, and energized. For physicians, learning how to help ourselves, and how to continue better helping others, might be reframed in the context of broader societal challenges.

It is always appealing to simplify knowledge and theory, but we must recognize that we as human beings, living on this earth within the expanding awareness of our universe, are much more complicated when it comes to health, wellness, and longevity in the face of rapidly changing ecologies. Our challenges remain to create positive change and simultaneously to continue learning as best we can about

minimizing negative influences on our environments. As it turns out, keeping our lives simpler while also getting out into nature can actually provide profound benefits to our lives.

The medical profession is complex and often has difficulty adjusting to external influences beyond the sciences of traditional medical research. Yet the varieties of research outside current medical research are showing benefits to human health in a variety of ways—some quite simple, others still more complex. Consequently, medical profession education is a lifelong process of professional development that must now assimilate additional information streams into the mainstream of clinical care.

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