

Is Healthy Aging Possible? Lessons from “Blue Zones” and Long-Lived Individuals

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Abstract

Patients often ask for advice about what things will help them maintain excellent health in old age. There is a large industry of anti-aging products that are heavily marketed, most of which are unproven and some that are dangerous. Compression of morbidity studies have shown us that healthy aging is occurring at a population level. Studies of centenarians have not yet yielded much information useful to an individual patient. Indeed, it may be harmful to follow the lifestyle of an individual long-lived person and unreasonable to expect the same longevity results. Epidemiologic study of long-lived populations (known as “Blue Zones”) yields some interesting lessons that may be more useful to individual patients and communities.

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Case: Molly is a 70 year old healthy woman who is greatly worried about getting older. Her mother lived to age 99 and died in a nursing home after a long slow decline from advanced dementia. She is terrified the same fate will befall her and asks what she can do to age healthily. She confesses to you that on the advice of a friend, she went to a naturopathic anti-aging clinic, where she was advised to start on growth hormone, “bioidentical” testosterone, estrogen, and progesterone. The cost for the program was \$25,000 per year for these treatments along with several other vitamins and minerals she could only get from that clinic.

As a geriatrician, I am frequently asked by patients like Molly, “Doc, have you found the fountain of youth yet?” The first known best-seller book on aging with health intact was *Discorsi Della Vita Sobria (The Art of Living Long)*, published by Luigi Conaro in 1550. He wrote an oft-quoted line in that book, “He who would eat much must eat little, for by eating less he will live longer, and so be able to eat more.” Since that time, the global anti-aging industry has grown to >\$200 billion per year and is projected to grow to \$275 billion by 2020¹. How do we protect our patients from the anti-aging quacks? Is healthy aging possible? Is healthy aging already occurring? What lessons can we learn from long-lived individuals and long-lived societies that might give our patients better advice than the magic pills and potions offered?

Healthy Aging Is Already Happening: The Compression of Morbidity

Life expectancy was essentially flat for thousands of years. In Neanderthal times, life expectancy at birth was about 33. Much of this was driven by infant and early childhood mortality. This average life expectancy at birth stayed flat for many hundreds of years. Advances in sanitation, nutrition and the industrial revolution led to the next rise in life expectancy mainly by reducing infant mortality, and average life expectancy reached 48 by 1900. Immunizations and advances in medicine and continued public health efforts led to a 60% rise in life expectancy over the next 100 years, to 78.7 years at birth. This rise in life expectancy into old-age led some scientists to raise concerns that if life expectancy kept rising, but we were not successful at reducing morbidity we would have a “failure of our success.”² The rise in life expectancy would not be welcome as older people would end up spending their last years of gained lifespan in poor functional status and poor health. In 1980, Dr. James Fries coined the term “compression of morbidity” and described the need to compress morbidity by focusing efforts on delaying the onset of disease rather than just increasing longevity. In 2003, he was able to do a study to show that we indeed have been succeeding in doing this in recent years. From 1982 to 1999, the National Long Term Care Survey showed that disability in those over age 65 actually decreased over this period of time by 2% per year while life expectancy went up more slowly at 1% per year thereby “compressing morbidity.”³

Three “Simple” Things to Do

So what factors are related to increasing the “healthspan?”⁴ A longitudinal study of over 1,700 University of Pennsylvania alumni who graduated in 1940 and were intermittently surveyed from 1962 to 1994 to see if three

simple factors could predict longevity free of disability: not smoking, having a lower body-mass index (BMI), and exercising.⁵ Participants were put into one of three groups based on these three risk factors (low, medium, and high risk). The disability score for those who were in the low-risk groups for these factors was **half** of the higher risk group in the one to two years prior to death. Could it really be as simple as eating right, exercising, and not smoking? At minimum, we should give our patients this simple but hard to follow advice.

Lessons from Long-Lived Individuals

To find additional factors that might lead to health and longevity, researchers have turned to studying the longest lived of these individuals. There are many more very long-lived individuals than there used to be, and indeed being a centenarian (living to 100) is no longer “special.” There are at least 75,000 centenarians in the United States currently. Hallmark sold greater than 85,000 “You’re 100” birthday cards in 2015. There are now even studies of a very rare group, the “supercentenarians” who live to over 110 (only about 1 in 1000 of those that live to 100). Only about 40 people are confirmed to have lived to beyond 115. Jeanne Louise Calment is the oldest person to have lived, with a confirmed lifespan of 122 years and 164 days. She is an example of the limitations of applying the study of people with exceptional longevity to populations of younger people. She smoked until she was 117, was fond of chocolate (up to 1 kilogram a week), cake, and ice cream and ascribed her longevity to eating lots of olive oil. If we recommended all of these things (particularly smoking) to all of our patients, we would certainly worsen their health. As Dan Buettner writes, “When it comes to the science of living longer, centenarians can no more tell us how they reached 100 than a seven-foot man can tell us how he got to be so tall.” Genetics certainly plays a large role, as does epigenetics and environmental factors. It is estimated that 300-700 genes may influence longevity.⁶ The bottom line is that there is no specific gene that is the “fountain of youth” and all studies show significant variation for whatever factor or gene studied.

Lessons from Long-Lived Societies

So if the centenarians and geneticists are not able to help us, perhaps we should turn to epidemiologists and demographers who have studied the long-lived populations of people across the world. These areas were named “Blue Zones” referring to the blue circles that demographers studying long-lived areas in Italy made on a map. In his bestselling book, *The Blue Zones*, Dan Buettner, colleagues from *National Geographic*, and leading demographers studied the following five long-lived populations⁷:

- Okinawa, Japan: home to the world’s longest lived women
- Sardinia, Italy: home to the highest percentage of men reaching age 100
- Icaria, Greece: home to the highest percentage of 90 year olds with 20% lower cancer and 50% lower heart disease rates, and low incidence of dementia
- Nicoya Peninsula, Costa Rica: the lowest middle age mortality and the most fit in old age
- Loma Linda, California: the longest lived population in the United states, with life expectancy 10 years greater than U.S. averages

The *Blue Zones* researchers found some shared things in these diverse societies across the globe. These include⁸: strong family ties, high levels of social engagement, less smoking, constant moderate intensity physical activity, semi-vegetarianism/pescatarian diet (low meat consumption), and higher consumption of legumes.

There are nine lessons advocated in the *Blue Zones* book from study of these 5 groups⁷:

1. Moderate, regular physical activity
2. *Hara Hachi Bu*: from a Confucian saying in Okinawa, “Stop Eating when 80% full”
3. Plant-based diet with limited (if any) meat
4. Moderate red wine intake
5. Having a sense of purpose/ “Have a reason to get up in the morning”
6. Stress reduction as a part of a daily routine
7. Engagement in spirituality or religion and having a sense of belonging
8. Putting family first
9. High social connectedness

There are communities across the world trying to implement the *Blue Zones* ideals into community design.⁹ The former meatpacking town of Alberta Lea, MN was able to reduce work absences by 20%, increase smoke-free

workplaces, encourage weight loss, and have an estimated 3.1 year increase in life expectancy over a 5 year period. One of my favorite programs from this community's efforts is the "walking school bus" program where older members of the community walk neighborhood children to school and back each day, providing exercise and social connectedness, not to mention saving money for the school system. The "Beach Cities" area near Los Angeles implemented a Blue Zones program from 2010 to 2015 resulting in a 15% drop in obesity, a 50% drop in childhood obesity, a 28% drop in smoking, and a 9% rise in exercise estimated to save \$12 million per year. The "Beach Cities" had 7% higher increase in "life satisfaction" compared to other parts of California over a 3 year period of time in a Gallup poll. The mayor of Fort Worth, Texas and the state of Iowa have also started "Blue Zones" initiatives.⁹

So, Is Healthy Aging Possible?

What answer do we give Molly who asked us to help her with healthy aging? Have we found the fountain of youth she is looking for? We can tell her that even with tremendous increases in longevity healthy aging is occurring, and people are living longer and healthier. It is unclear how the obesity epidemic will affect this trend over the coming decades, but these health effects may be balanced on population level with other innovations such as statin drugs for lowering cholesterol. We are likely to continue to compress morbidity faster than longevity gains. For individual patients like Molly, we must guide her away from the charlatans and "snake oil" salesmen selling the latest "fountain of youth" of hormones, vitamins, and quick fixes, and instead reinforce some simple truths:

- Eat less, move more!
- Don't smoke.
- Be engaged in the world around you.
- Have a reason to get up in the morning.
- Learn what things are worth worrying about and let the rest go.

These truths may not be so simple to implement for an individual person, but perhaps these are the true "fountains of youth."

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What lessons of Blue Zone living can our readers bring home? First of all, we have Blue Zone food guidelines, which offer a clear prescription for what we ought to be eating if we're interested in living to 100. Number two: we ought to take a hard look at our social networks. If your friends are sitting on the couch eating Doritos, there's about a 150 percent chance that you will be, too. The first American city where we took observations from the Blue Zones and applied them was Albert Lee, Minnesota. In so doing, we raised life expectancy by three years and brought health care costs down by 40 percent. That was the big high five moment. "Blue Zones" are areas in which people have low rates of disease and live longer than anywhere else. Here are their inhabitants' common lifestyle features. Antioxidants help prevent damage to DNA that can contribute to aging. Therefore, antioxidants may be important for longevity (37). A couple of studies have shown that drinking moderate amounts of red wine is associated with a slightly longer life (38). Older and younger people living together: In many Blue Zones, grandparents often live with their families. Studies have shown that grandparents who look after their grandchildren have a lower risk of death (57). A healthy social network: Your social network, called *moai* in Okinawa, can affect your health.