

STATE OF THE ART
REVIEWS

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Blue Zones: Lessons From the World's Longest Lived

Abstract: *What began as a National Geographic expedition, lead by Dan Buettner, to uncover the secrets of longevity, evolved into the discovery of the 5 places around the world where people consistently live over 100 years old, dubbed the Blue Zones. Dan and his team of demographers, scientist and anthropologists were able to distill the evidence-based common denominators of these Blue Zones into 9 commonalities that they call the Power 9. They have since taken these principles into communities across the United States working with policy makers, local businesses, schools and individuals to shape the environments of the Blue Zones Project Communities. What has been found is that putting the responsibility of curating a healthy environment on an individual does not work, but through policy and environmental changes the Blue Zones Project Communities have been able to increase life expectancy, reduce obesity and make the healthy choice the easy choice for millions of Americans.*

Keywords: Blue Zones; Power 9; Life Radius; Vitality Compass; Longevity; Health; Dan Buettner

The Danish Twin Study¹ established that only about 20% of how long the average person

lives is dictated by our genes, whereas the other 80% is dictated by our lifestyle. In 2004, Dan Buettner, CEO of Blue Zones LLC, was determined to uncover the specific

might explain longevity. They found that the lifestyles of all Blue Zones residents shared 9 specific characteristics. These are called the Power 9.

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aspects of lifestyle and environment that led to longevity. By teaming up with National Geographic and the National Institute on Aging, Dan and his team, found the 5 demographically confirmed, geographically defined areas with the highest percentage of centenarians (Loma Linda, CA, USA; Nicoya, Costa Rica; Sardinia, Italy; Ikaria, Greece; Okinawa, Japan; seen in Figure 1). These 5 areas were located using epidemiological data, statistics, birth certificates, and other research. These areas were dubbed *Blue Zones*, where people reach age 100 at 10 times greater rates than in the United States. Once these areas were established, they sent in a team of anthropologists, demographers, epidemiologists, and researchers to identify the lifestyle characteristics that

Power 9

To make it to age 100, it seems that a person must have to win the genetic lottery. However, many individuals have the capacity to make it well into the early 90s and largely without chronic disease. Blue Zones uncovered 9 evidence-based common denominators among the world's centenarians that are believed to slow this aging process.

1. *Move naturally.* The world's longest-lived people do not pump iron, run marathons, or join gyms. Instead, they live in environments that constantly nudge them into moving without thinking about it. They grow gardens and do not have mechanical conveniences for house and yard work.

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Figure 1.

Blue Zones (reprinted with permission from Dan Buettner).



2. *Purpose.* The Okinawans call it *Ikigai* and the Nicoyans call it *plan de vida*; for both, it translates to “why I wake up in the morning.” Knowing your sense of purpose is worth up to 7 years of extra life expectancy.
3. *Downtime.* Even people in the Blue Zones experience stress. Stress leads to chronic inflammation, associated with every major age-related disease. What the world’s longest-lived people have that others do not are routines to shed that stress. Okinawans take a few moments each day to remember their ancestors; Adventists pray; Ikarians take a nap; and Sardinians do happy hour.
4. *80% Rule.* *Hara hachi bu*—the Okinawan 2500-year old Confucian mantra said before meals reminds them to stop eating when their stomachs are 80% full. The 20% gap between not being hungry and feeling full could be the difference between losing weight or gaining it. People in the Blue Zones eat their smallest meal in the late afternoon or early evening, and then, they do not eat any more the rest of the day.
5. *Plant slant.* Beans, including fava, black, soy, and lentils, are the cornerstone of most centenarian diets. Meat—mostly pork—is eaten on average only 5 times per month. Serving sizes are 3 to 4 oz, about the size of a deck of cards.
6. *Wine @ 5.* People in all Blue Zones (except Adventists) drink alcohol moderately and regularly. Moderate drinkers outlive nondrinkers. The trick is to drink 1 to 2 glasses per day (preferably Sardinian Cannonau wine), with friends and/or with food. And no, you cannot save up all week and have 14 drinks on Saturday.
7. *Belong.* All but 5 of the 263 centenarians interviewed belonged to some faith-based community. Denomination does not seem to matter. Research shows that attending faith-based services 4 times per month will add 4 to 14 years of life expectancy.
8. *Loved ones first.* Successful centenarians in the Blue Zones put their families first. This means keeping aging parents and grandparents nearby or in the home (it lowers disease and mortality rates of children in the home too.). They commit to a life partner (which can add up to 3 years of life expectancy) and invest in their children with time and love. (They’ll be more likely to care for aging parents when the time comes.)
9. *Right tribe.* The world’s longest lived people chose—or were born into—social circles that supported healthy behaviors. Okinawans created *moais*—groups of 5 friends that committed to each other for life.

Research from the Framingham Studies² shows that smoking, obesity, happiness, and even loneliness are contagious. So the social networks of long-lived people have favorably shaped their health behaviors.

Blue Zones

Sardinia

Located off the coast of Italy, Sardinia is home to the world’s longest-lived men. This community of shepherds walk 5 mountainous miles a day or more. This natural movement provides all the positive cardiovascular benefits you might expect and also has a positive effect on muscle and bone metabolism without the point pounding of running marathons. The classic Sardinian diet is plant based, consisting of whole-grain bread, beans, garden vegetables, and fruits. Meat is largely reserved for Sundays and special occasions. Sardinians drink wine moderately. Cannonau wine has 2 or 3 times the level of artery-scrubbing flavonoids as other wines. Moderate wine consumption may help explain the lower levels of stress among men.

Okinawa

Home to the world’s longest-lived women, these South Pacific islands offer many secrets to longevity. The Okinawa tradition of forming a *moai* provides secure social networks. These safety nets lend financial and emotional support in times of need and give their members the stress-shedding security of knowing there is always someone there for them. In Okinawa, at age 5, children are put into these committed social networks. One specific *moai* that Dan discovered had been together for 97 years; the average age of the group is 102. They meet every day to drink sake and gossip. If one of them does not show up, the other 4 put on their kimonos to walk across the village to check on their friend. Okinawans also attribute their longevity to the old Confucian mantra said before meals *Hara Hachi Bu*, which reminds them to stop eating when 80% full, so they do not overeat. They also hold a strong sense of purpose in their family. One centenarian described the feeling of

holding her great great grandchild as “Jumping into heaven.”

Loma Linda

This Adventist community in California outlives the average American by a decade. Taking their diet directly from the Bible they consume a vegan diet of leafy greens, nuts, and legumes. They recognize the Sabbath and downshift for 24 hours every week. Many of the Adventists are still very active into their late 90s; Dr Ellsworth Wareham, who is 95 years old, was told that a contractor wanted \$6000 to build a privacy fence in his yard. Instead of paying the contractor he decided to do it himself. After 3 days of work he ended up in the hospital, but Ellsworth was not on the table, he was the surgeon performing the open-heart surgery, one of 20 surgeries performed that month. Similarly, Marge Jetton age 105 woke up every morning at 5:30 AM read her Bible, had a breakfast of slow cook oatmeal, nuts, and dates with soymilk and a prune juice shooter. She would then ride her stationary bike for 30 minutes and get in her Cadillac and drive to her volunteer jobs for 7 different organizations.

Nicoya

Nicoyans spend just 15% of what America does on health care and are more than twice as likely than Americans to reach a healthy age of 90 years. Faith and family play a strong role in Nicoyan culture. So does *plan de vida*, or reason to live, which helps Nicoyan elders maintain a positive outlook and active lifestyle. Nicoyans eat little to no processed foods but plenty of antioxidant-rich tropical fruit. But they also have 1 unique secret: calcium- and magnesium-rich water, which wards off heart disease and promotes strong bones.

Ikaria

People on this tiny Aegean island live 8 years longer than Americans do. They experience 20% less cancer, half the rate of heart disease, and almost no dementia. Ikarians eat a variation of the Mediterranean diet, with lots of fruits and vegetables, whole grains, beans, potatoes, and olive oil. Ikarians also downshift with a midafternoon break.

Figure 2.

Life radius (reprinted with permission from Dan Buettner).



People who nap regularly have up to 35% lower chances of dying from heart disease. It may be because napping lowers stress hormones or rests the heart. One Ikarian in particular, Stamatis Moraitis, moved to America when he was 22 years old to pursue the American dream. He was a painter, and immediately started having success, bought a house, married, and had 3 kids. At the age of 66 years, he developed terminal lung cancer. Instead of dying in America, he decided to move back to Ikaria and moved in with his parents. He started breathing the air, drinking the wine, and eating a Mediterranean diet. After a few months, he planted a garden not planning on ever getting to harvest the vegetables; 37 years later he has a vineyard producing 200 L of wine a year. His secret he says? “I just forgot to die.”

Medical

Obesity and diabetes are running rampant in the United States. Currently, the culture is focused on adhering to different diets and exercise programs. It has been found that these are not sustainable changes. Within the first 7 months of a diet, more than 90% of individuals will have given up. There is a similar decline when it comes to adherence to gym memberships; after just 2 years, the number of attendees will

have dropped by 70%. It is clear that there is no quick fix, but there must be small changes to the environment to see long-lasting health changes.

Life Radius

Research shows that individuals spend about 90% of their lives within 5 miles of their home, known as the Life Radius, seen here in Figure 2. To engineer an environment where longevity ensues, Blue Zones worked with researchers to create a blue print to optimize the Life Radius. The team started by analyzing what individuals can do for themselves. Individuals can engineer their kitchen, so they eat about 100 fewer calories and engineer their home, so they burn a couple of hundred extra calories through physical activity. This is done through small changes such as putting a bowl of fruit on the counter, serving food at the stove and not on the table, using hand tools for yard work, and many more. In every community, 80% of people want to change their health habits. By creating social networks of these health conscious people, it encourages healthy living and gives people a sense of purpose.

Then, the researchers looked at places within the life radius. There are 115 evidence-based design tweaks and policies that can be put in place, so that when people show up to school, work,

church, stores, and restaurants they are mindlessly nudged to eat less and move more. These tweaks include things such as standing desks at work, removal of vending machines in schools, no breadbaskets at restaurants, safe walking paths, and encouraging *moais*.

According to the Centers for Disease Control and Prevention, the best investment on health is through policy. By creating environments where fruits and vegetables are most accessible over fast food, a dramatic decrease in obesity is seen. If there are 6 or more fast food restaurants within half a mile of an individual's home, they are 40% more likely to be obese than if there are less than 3. By putting policies in place to limit the number of fast food restaurants and putting regulations on smoking, policy makers can see a drastic increase in health. If streets are walkable and bikeable, parks are cleaned up, and the active option is the easy option, physical activity of the entire population can rise by 30%.

Albert Lea

In 2008, Dan and the Blue Zones team finalized the blue print for Life Radius. They had to make sure that it could be applied to an American city. Buettner and his team interviewed 5 cities to be the pilot project, and they picked Albert Lea, MN, a town of 9000 people. The team first went in and listened to the organizations to find what they needed. They brought in Dan Burden who works with communities across the country to create more walkable environments. Albert Lea wanted to widen Main Street and up the speed limit. Blue Zones convinced them to build a walking path around their lake instead. The path is now packed 11 months out of the year with individuals walking. The sidewalks throughout the community were connected, so people could walk from their homes to downtown without having to walk through fields or busy intersections.

Grocery store and restaurant pledges were created to help individuals change the way they eat. Restaurants were required to offer 3 plant-based entrées.

When a sandwich was ordered, the customers automatically got fruit instead of fries. By using different adjectives rather than the "healthy choice," individuals were more likely to choose the best option. Grocery stores created healthy checkout isles, so that instead of candy bars and soda greeting people in the checkout, they saw fruit, water, and healthy snacks.

Schools signed Blue Zones pledges. They do not sell candy for fundraisers, and there was no candy for good grades. Based on a University of Minnesota study calculation that prohibiting eating in hallways and classrooms would occasion a 11% per year drop in student body mass index (BMI), the project convinced schools to adopt the policy. Then, 25% of the community signed a personal pledge that they would take steps toward a healthy lifestyle.

After about a year and a half, there was a 3.2-year bump in life expectancy; the community lost a combined weight of 7280 pounds; and health care costs dropped by 40%.

Blue Zones Expansion

After seeing the results in Albert Lea, Blue Zones began interviewing larger cities to take on. The beach cities of Los Angeles were chosen.³ Blue Zones worked with city planners to make the streets built for humans instead of cars. The rate of smoking went down by 30%; BMI went down by 14%; and people reported healthy behaviors.

From there, Blue Zones moved into Iowa with the same strategy; 10 cities were chosen.⁴ Smoking went down by 8.8%, and healthy eating went up by 10.5%. Then, Blue Zones started working in Fort Worth, TX, and Kauai, HI, and are now in 27 cities across the United States.

Vitality Compass

In association with the University of Minnesota Public Health Department, Dan and his team created the Vitality Compass, named the Best Online Tool for Retirement and Longevity by the *Wall Street Journal*. This tool has users answer lifestyle and background questions based

on the Power 9 teachings of Right Outlook, Move Naturally, Eat Wisely, and Belong; it then calculates their biological age, overall life expectancy, healthy life expectancy, and the years they are gaining/losing because of their habits. It then gives the users 12 customized recommendations to help them live longer and better. This is a useful tool to take initially as a baseline test, then try out some of the specific lifestyle recommendations, and 3 to 6 months later, take the quiz again.

Recommendations include reducing salt intake, joining a faith-based community, quitting smoking, improving attitude, and many more.

Summary

Blue Zones started as a way of discovering the healthiest lifestyles that lead to vitality and longevity. Now, 12 years after the start of this massive project, Blue Zones is a way to design the healthiest lifestyles possible for individuals and for entire communities. The goal for Blue Zones is to not only make the healthy choice the easy choice, but also the unavoidable choice.

Authors' Note

To join the Blue Zones mission, contact Info@bluezones.com. More information about the project can be obtained at <https://communities.bluezonesproject.com/>. The authors disclose the following conflicts of interest: Dan Buettner is the CEO of Blue Zones and Sam Skemp works at Blue Zones as Program Manager. **AJLM**

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