Moving Mountains

The Power of Movement in Nature to Reach the Peak of Well-Being

- Dr. Melissa Sundermann,DO,FACOI,DiplABLM

DISCLOSURES

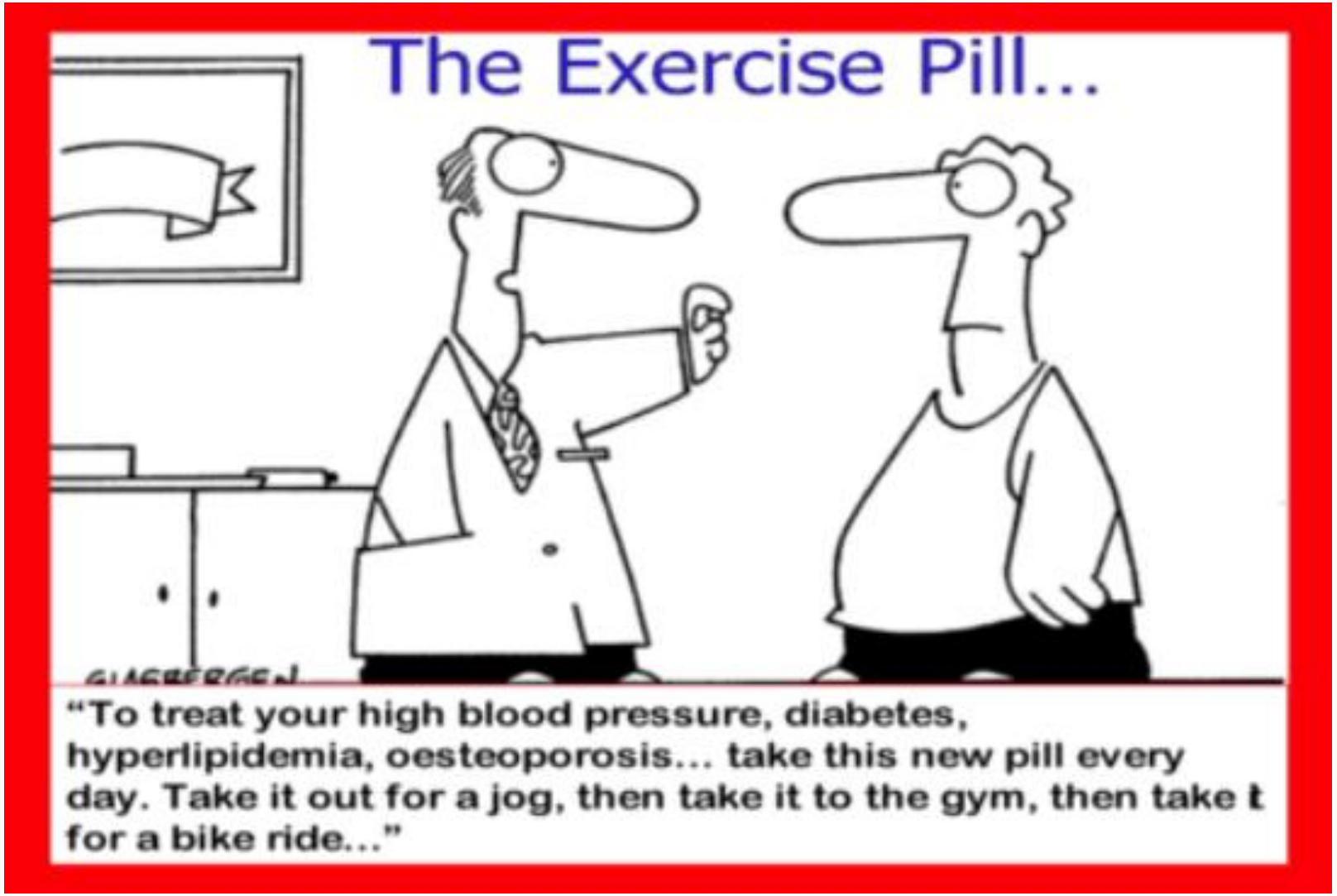
NOTHING TO DISCLOSE

Learning Objectives

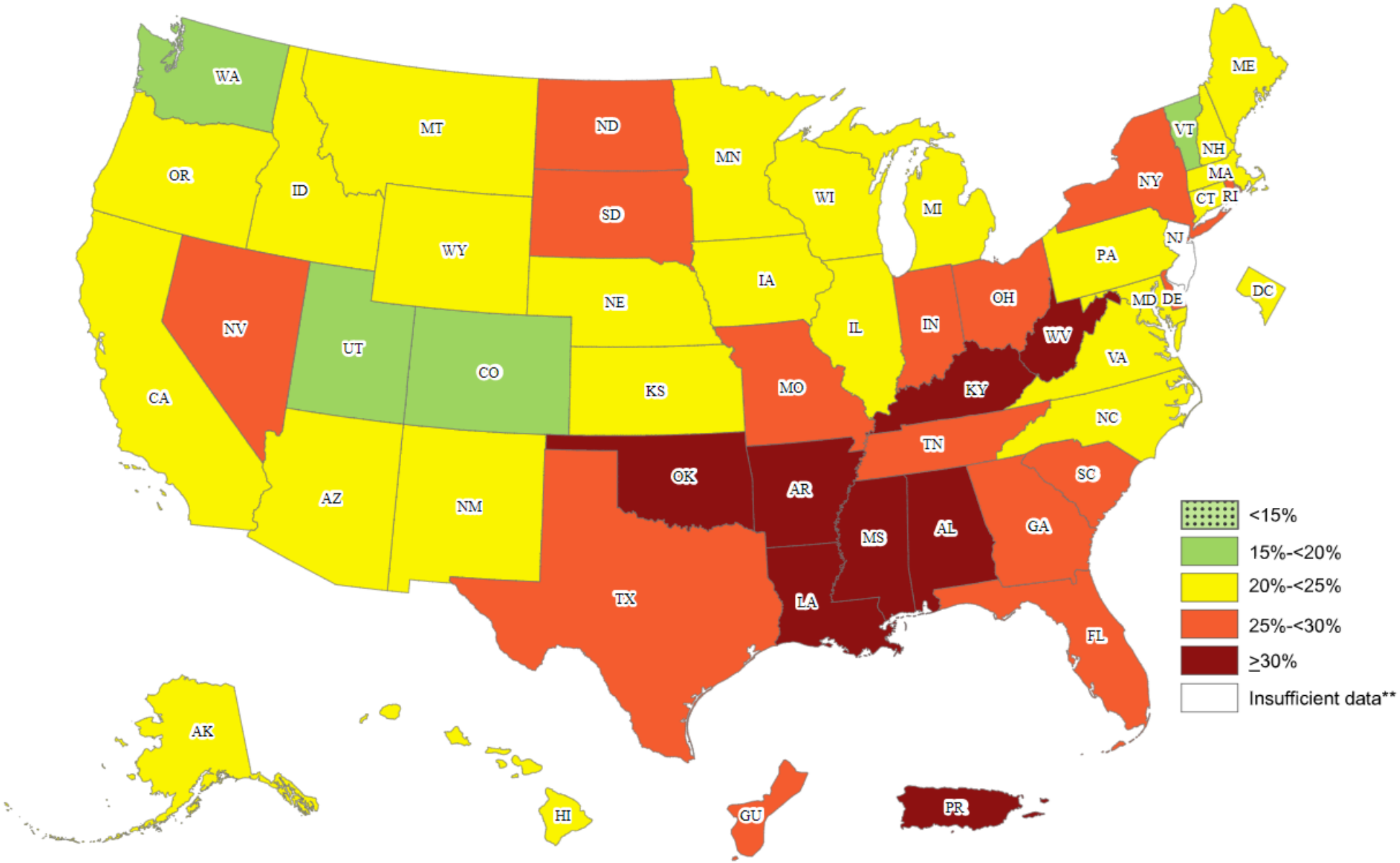
Demonstrate	Demonstrate the potential benefits of Movement with regards to Physical and Mental Health
Share	Share evidence supporting the role of Nature and Healing
Provide	Provide tools to help engage patients to achieve more time spent Outdoors

Simple, Powerful Therapy

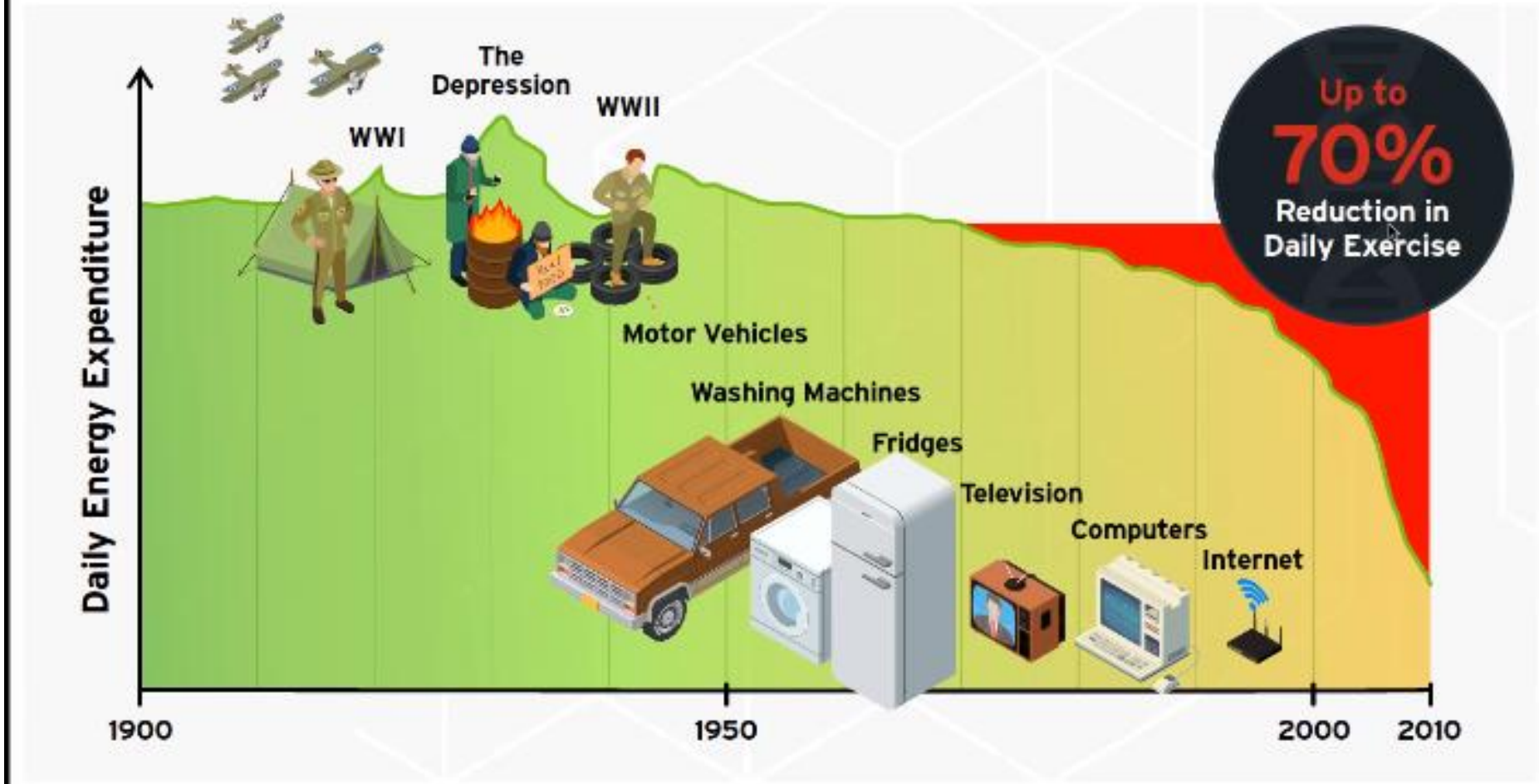
- **NUTRITION**: Choose predominantly whole, plant-based foods that are fiber-filled, nutrient dense, health-promoting and disease-fighting
- **SLEEP:** Lack of, or poor-quality sleep can lead to a strained immune system. Identify and alter environmental habits that may hinder healthy sleep
- **EXERCISE:** Regular and consistent physical activity is an essential piece of an optimal health equation
- **SUBSTANCE USE:** The well-documented dangers of any addictive substance use can increase risk for many cancers and heart disease
- **STRESS MANAGEMENT:** Identify both positive and negative stress responses with coping mechanisms and reduction techniques for improved wellbeing
- **SOCIAL CONNECTION:** Being connected to others is essential to emotional resiliency and overall health


The Exercise Pill...
"To treat your high blood pressure, diabetes, hyperlipidemia, oesteoporosis... take this new pill every day. Take it out for a jog, then take it to the gym, then take it for a bike ride..."

Prevalence of Self-Reported Physical Inactivity* Among US Adults by State and Territory, BRFSS, 2017–2020



Source: Behavioral Risk Factor Surveillance System



Vogels et al. (2004). Int J Sports Med.

ACSM and CDC Recommendations

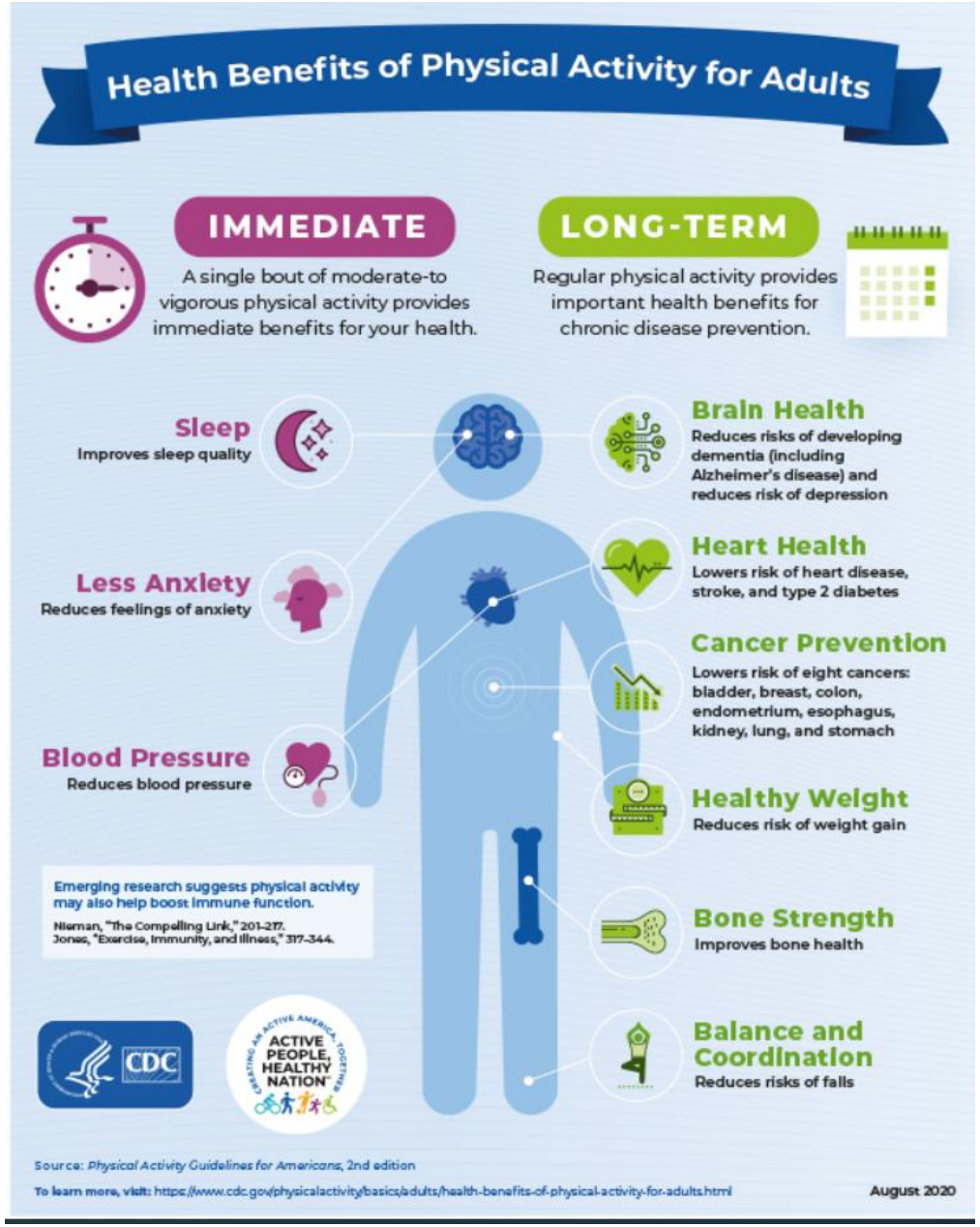
150 minutes of moderate-intensity aerobic activity every week

2X per week Muscle-strengthening activities on 2 or more days a week that work all major muscle groups

ExeRxcise is Medicine® On Campus

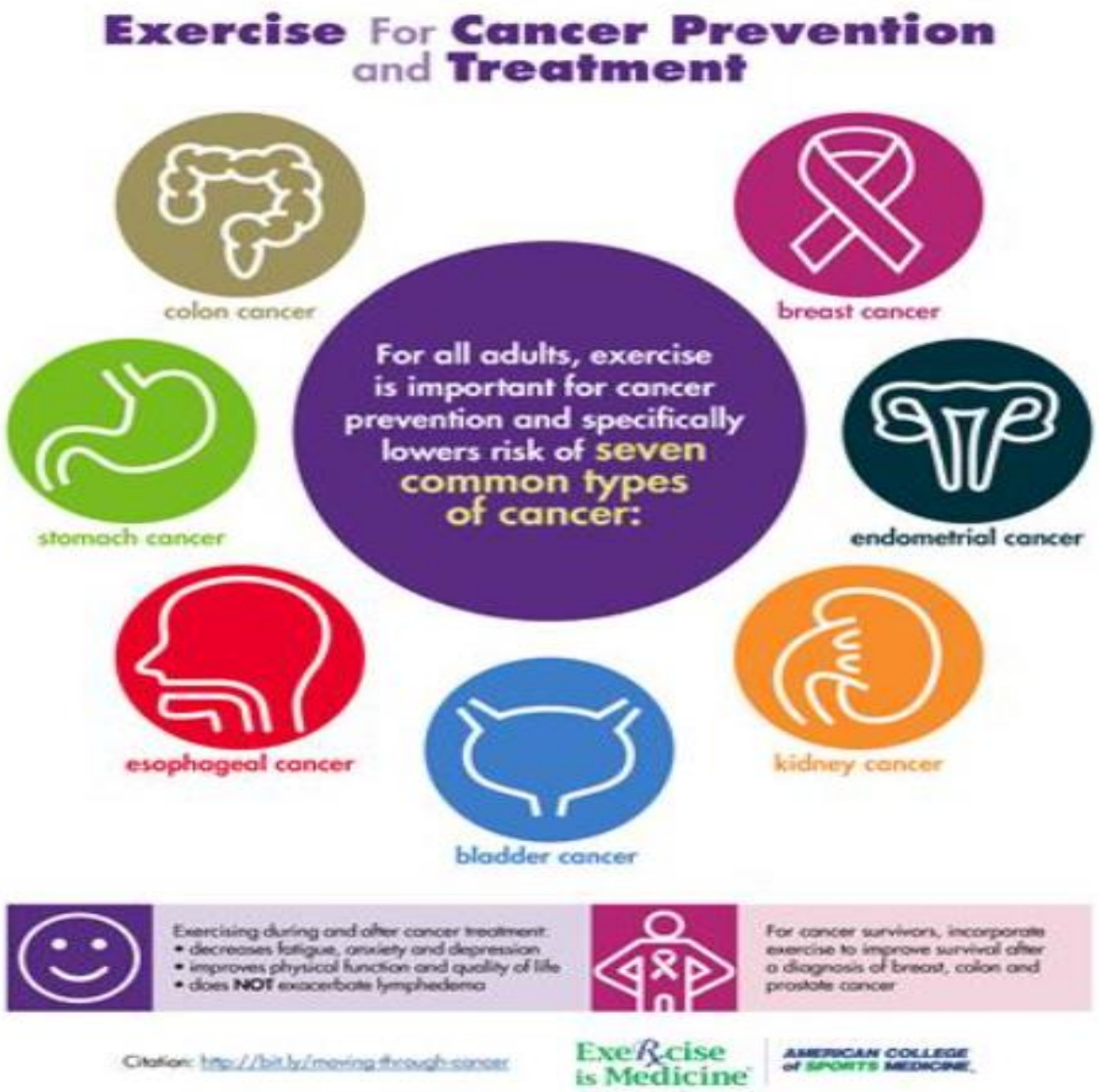
Drexel University

https://www.acsm.org/read-research/trending-topics-resource-pages/physical-activity-guidelines



Health Benefits of Exercise

- SLEEP QUALITY
- DECREASED ANXIETY
- REDUCES BLOOD PRESSURE
- LOWERS RISK OF HEART DISEASE, CVA, DM2
- LOWERS RISK OF CERTAIN CANCERS
- HELPS MAINTAIN HEALTHY BMI
- IMPROVE BONE HEALTH
- REDUCES RISK OF DEMENTIA


Exercise For Cancer Prevention and Treatment
colon cancer
breast cancer
For all adults, exercise is important for cancer prevention and specifically lowers risk of seven common types of cancer:
stomach cancer
endometrial cancer
esophageal cancer
kidney cancer
bladder cancer
Exercising during and after cancer treatment:
• decreases fatigue, anxiety and depression
• improves physical function and quality of life
• does NOT exacerbate lymphedema
For cancer survivors, incorporate exercise to improve survival after a diagnosis of breast, colon and prostate cancer
Citation: http://bit.ly/moving-through-cancer
ExeRcise is Medicine
AMERICAN COLLEGE of SPORTS MEDICINE

JAMA Internal Medicine | Original Investigation

Prospective Associations of Daily Step Counts and Intensity With Cancer and Cardiovascular Disease Incidence and Mortality and All-Cause Mortality

Borja del Pozo Cruz, PhD; Matthew N. Ahmadi, PhD; I-Min Lee, MBBS, ScD; Emmanuel Stamatakis, PhD

IMPORTANCE Recommendations for the number of steps per day may be easier to enact for some people than the current time- and intensity-based physical activity guidelines, but the evidence to support steps-based goals is limited.

OBJECTIVE To describe the associations of step count and intensity with all-cause mortality and cancer and cardiovascular disease (CVD) incidence and mortality.

DESIGN, SETTING, AND PARTICIPANTS This population-based prospective cohort study used data from the UK Biobank for 2013 to 2015 (median follow-up, 7 years) and included adults 40 to 79 years old in England, Scotland, and Wales. Participants were invited by email to partake in an accelerometer study. Registry-based morbidity and mortality were ascertained through October 2021. Data analyses were performed during March 2022.

Supplemental content

RESULTS

Population-Based Prospective Cohort Study, Data from the UK Biobank, Adults 40-79 years old in England, Scotland and Wales

79,500 Individuals, followed for a mean of 7 years

Participants were measured by wrist accelerometer devices for Daily Step Count and Cadence-Based Step Intensity (incidental vs purposeful)

Findings Suggest that up to 10,000 Steps Per Day May be Associated with a Lower Risk of Mortality, Cancer and CVD Incidence

Steps Performed at a Higher Cadence may be associated with additional Risk Reduction

Meta-Analysis > PLoS One. 2021 Feb 25;16(2):e0247039. doi: 10.1371/journal.pone.0247039. eCollection 2021.

Association between physical activity and changes in intestinal microbiota composition: A systematic review

Viviana Aya [1], Alberto Flórez [2], Luis Perez [1], Juan David Ramírez [1]

Affiliations + expand

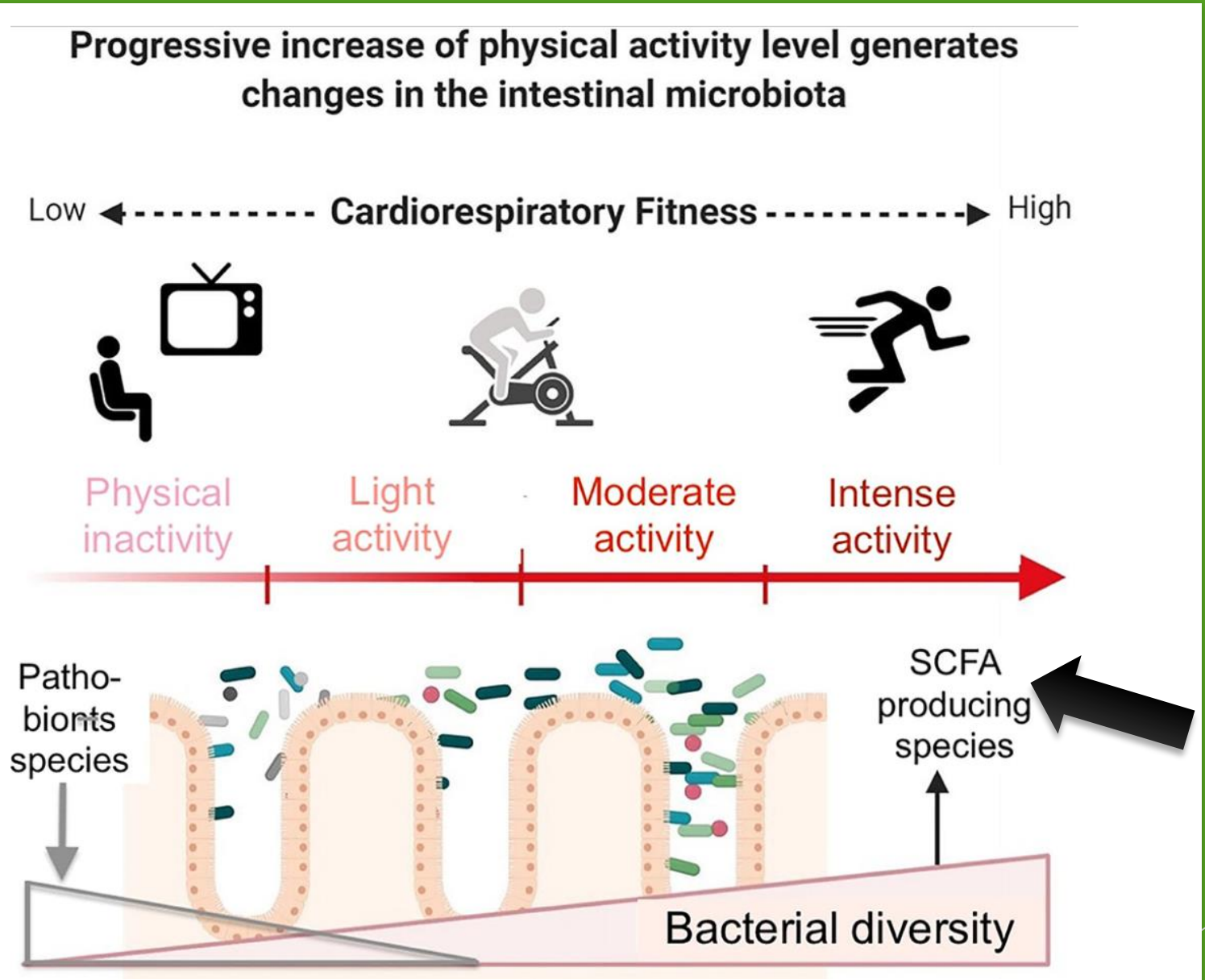
PMID: 33630874 PMCID: PMC7906424 DOI: 10.1371/journal.pone.0247039

Free PMC article

Abstract

Introduction: The intestinal microbiota comprises bacteria, fungi, archaea, protists, helminths and viruses that symbiotically inhabit the digestive system. To date, research has provided limited data on the possible association between an active lifestyle and a healthy composition of human microbiota. This review was aimed to summarize the results of human studies comparing the microbiome of healthy individuals with different physical activity amounts.

Methods: We searched Medline/Ovid, NIH/PubMed, and Academic Search Complete between August-October 2020. Inclusion criteria comprised: (a) cross-sectional studies focused on comparing gut microbiome among subjects with different physical activity levels; (b) studies describing human gut microbiome responses to any type of exercise stimulus; (c) studies containing healthy adult women and men. We excluded studies containing diet modifications, probiotic or prebiotic consumption, as well as studies focused on diabetes, hypertension, cancer, hormonal dysfunction. Methodological quality and risk of bias for each study were assessed using the Risk Of Bias In Non-randomized Studies-of Interventions tool. The results from cross-sectional and longitudinal studies are shown independently.


Progressive increase of physical activity level generates changes in the intestinal microbiota
Low
Cardiorespiratory Fitness
High
Physical inactivity
Light activity
Moderate activity
Intense activity
Patho-bionts species
SCFA producing species
Bacterial diversity

Exercise dramatically reduces Alzheimer's disease incidence

Exercise – how much? 30 min/day 5d/week - moderate levels

→ ~40% reduced risk

Gomes-Osman et al *Neurology* 2018
Guure et al *BioMed Res Int* 2017
WHO guidelines 2019
Jia et al *BMC Geriatrics* 2019

THE ROLE OF EXERCISE

Improves blood flow to the brain

Improves mood, social connectedness & confidence

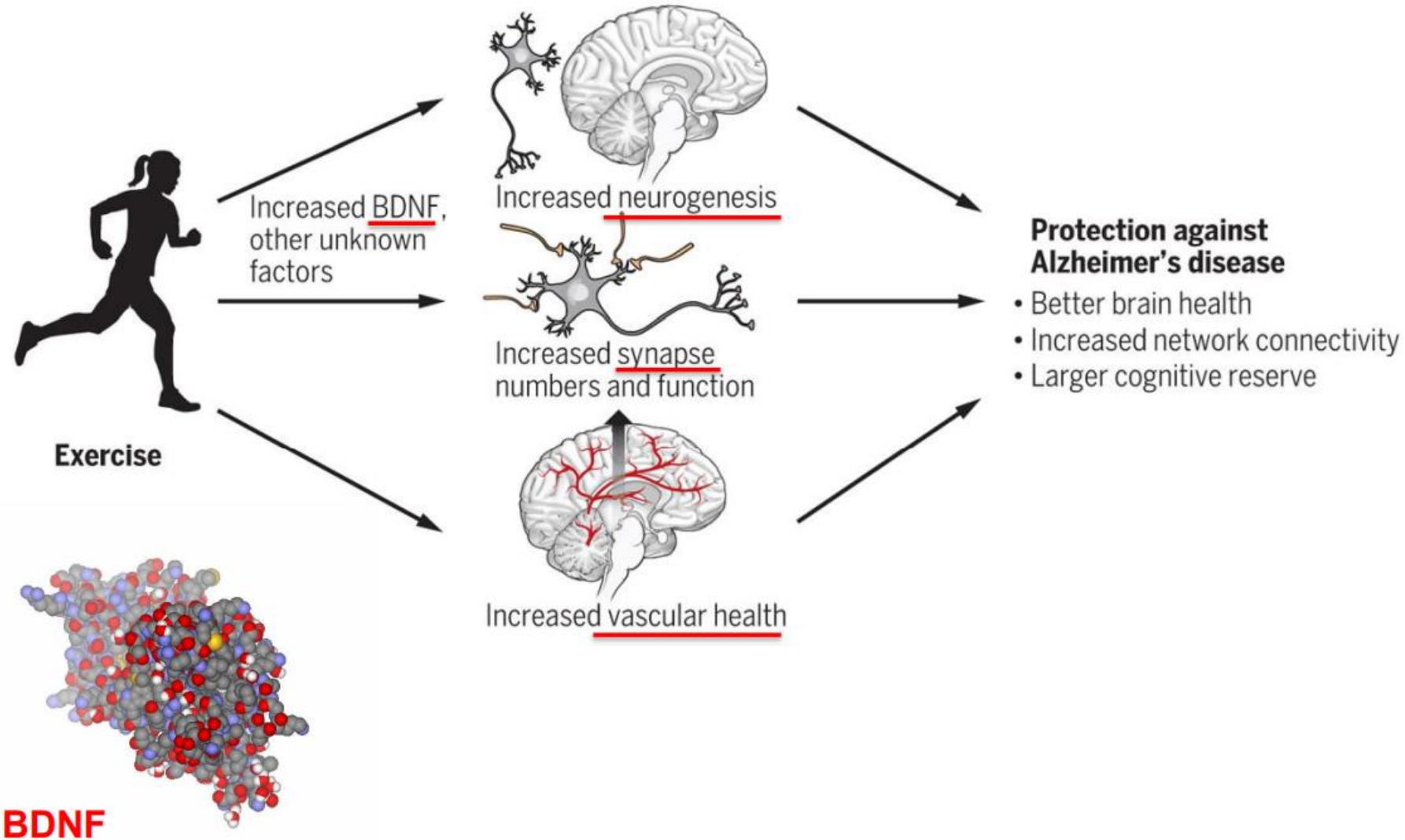
Increases levels of brain-derived neurotrophic factor for improving memory & learning

Increases connections between nerves

Reduces risk factors of dementia

Improves mental performance & learning

How does exercise protect against Alzheimer's?



BDNF
(brain-derived neurotrophic factor)

Spire-Jones and Ritchie *Science* 2018

September 6, 2022

Association of Daily Step Count and Intensity With Incident Dementia in 78 430 Adults Living in the UK

Borja del Pozo Cruz, PhD[1]; Matthew Ahmadi, PhD[2]; Sharon L. Naismith, PhD[3]; et al

» Author Affiliations | Article Information

JAMA Neurol. Published online September 6, 2022. doi:10.1001/jamaneurol.2022.2672

Editorial Comment

Related Articles

Key Points

Question Is there a dose-response association of daily step count and intensity with incidence of all-cause dementia among adults living in the UK?

Findings This cohort study of adults assessed with wrist-worn accelerometers found that accruing more steps per day was associated with steady declines in dementia incidence risk, up to 9800 steps per day, beyond which the benefits upturned. The dose associated with 50% of maximal observed benefit was 3800 steps per day, and steps at higher intensity (cadence) were associated with lower incidence risk.

- Taking More Steps Per Day: Associated with Lower Risk of Incident All-Cause Dementia
- Optimal Dose was ~9800 Steps/Day
- Intensity/Cadence of Stepping Resulted in Stronger Associations
- Minimum Dose of 3800 Steps/Day can reduce Dementia risk

Health Benefits of Nature

“Unofficial 7TH Pillar of Lifestyle Medicine

DAILY EXPOSURE TO NATURE/FRESH AIR

How Much Time Do We Spent Outdoors?

The Average American spends 93% of their Indoors

87% of time is spent Inside Buildings

6% of time is spent Inside Automobiles

THIS IMPLIES ONLY 7% OF TIME IS SPENT OUTDOORS!

Klepeis, Nelson, Ott et al. The National Human Activity Pattern Survey, J Expo Sci Environ Epidemiol 11, 23-252 (2001)

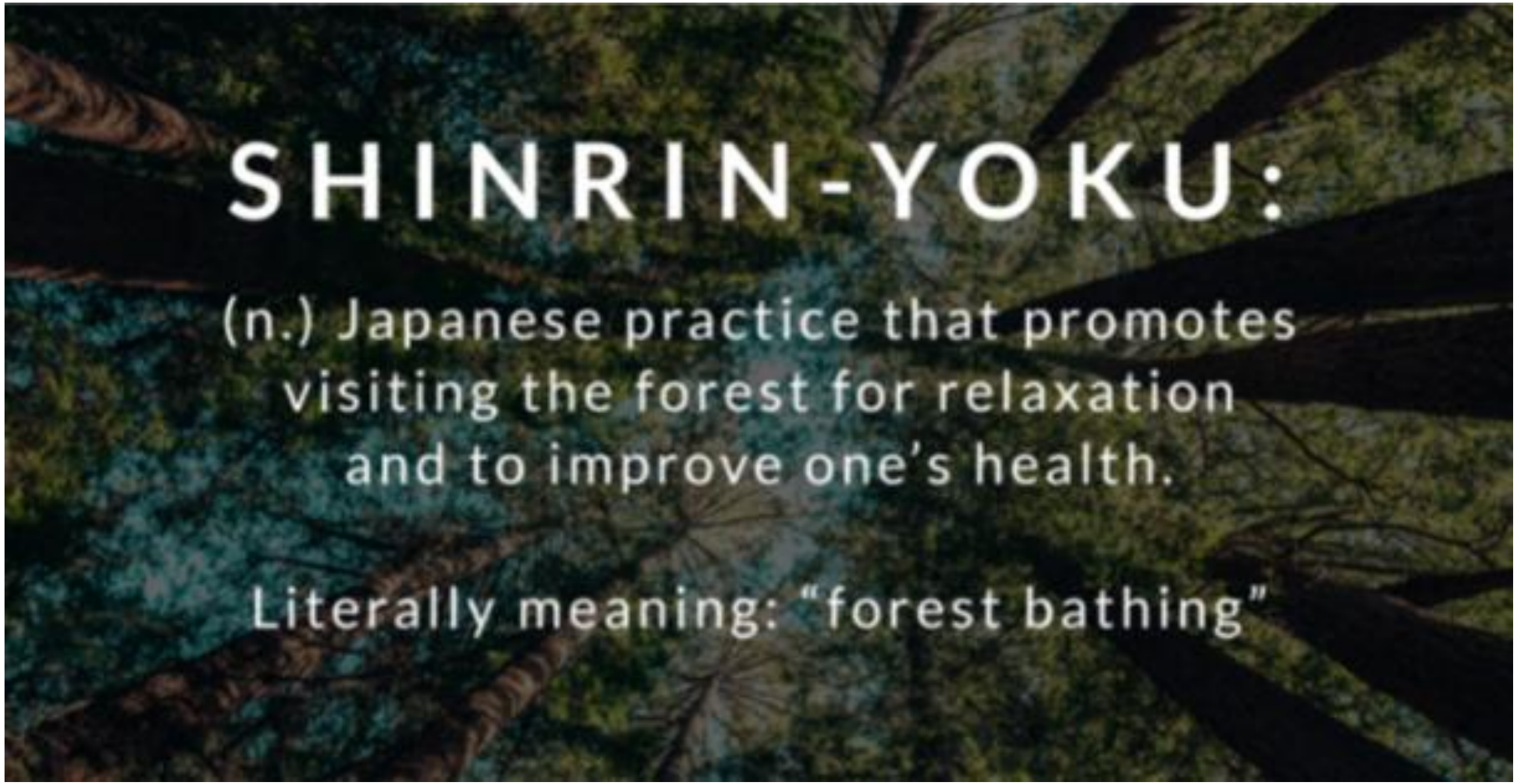

Rx

WHY IS THIS MY FAVORITE PRESCIPTION?

- COST

- SIDE EFFECTS

- DURATION


SHINRIN-YOKU:
(n.) Japanese practice that promotes visiting the forest for relaxation and to improve one's health.
Literally meaning: "forest bathing"

What is Forest Bathing (Shinrin-Yoku)?

- Shinrin in Japanese means “Forest” and Yoku means “Birth”
- “Shinrin-Yoku” means bathing in Forest Atmosphere
- Taking in the Forest through our Senses
- Not necessarily exercise, hiking or jogging
- Simply being in Nature and Connecting with Nature through our Senses of Sight, Hearing, Taste, Smell and Touch

Background of Shinrin-Yoku

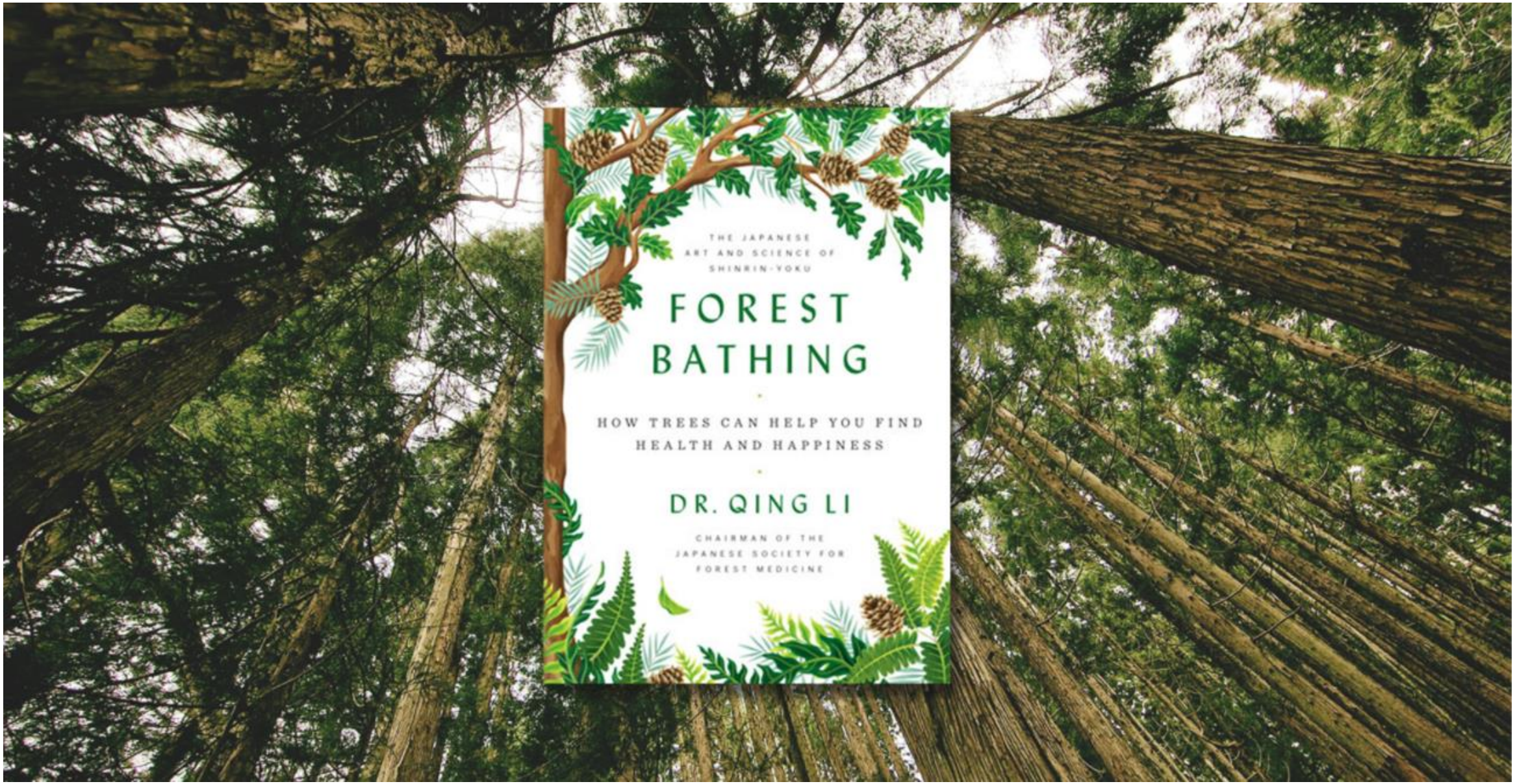
In 1982, National Health Program in Japan was proposed for Forest Bathing by the Forest Agency of Japan

Main idea and goal was to Reduce Stress in Workers

2004-Forest Agency of Japan organized a Project Team to Investigate the Effect of Shinrin-Yoku on Human Health

1.5 Million Dollar Initial Project

One of the Key Members was Dr. Qing Li

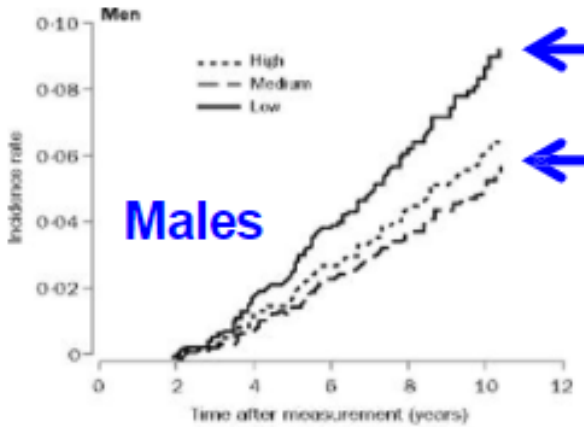

THE JAPANESE
ART AND SCIENCE OF
SHINRIN-YOKU
FOREST
BATHING
HOW TREES CAN HELP YOU FIND
HEALTH AND HAPPINESS
DR. QING LI
CHAIRMAN OF THE
JAPANESE SOCIETY FOR
FOREST MEDICINE

Research work of Dr. Qing Li: Relationship between Shinrin-Yoku and Immune Function

- It is well known that the Immune System including Natural Killer(NK) cells plays a vital role in the Defense against Bacteria, Viruses and Tumors
- Already has been shown that Stress Inhibits Immune Function
- ?? Could Forest Environment (Shinrin-Yoku/Forest Bathing) Reduce Stress
- Dr. Quin Li speculated that Forest Environment (Shinrin-Yoku) may have a Beneficial Effect on Immune Function by Reducing Stress

Relationship between incidence rate of cancer and NK activity

Incidence rate of Cancer



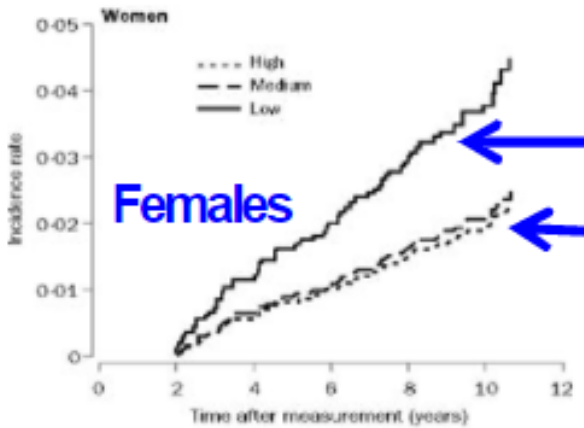
People with lower NK activity

People with higher NK activity

People with lower NK activity show higher incidence rate of cancer, whereas people with higher NK activity show lower incidence rate of cancer in both males and females.

From these findings, you can find the importance of NK cells for human health.

Incidence rate of Cancer



Cumulative incidence rates of cancer by cytotoxic activity of peripheral-blood lymphocytes among men and women
Categorised by tertiles. Men—low: <42%; medium: 43–58%; high: >58%. Women—low: 34%; medium: 35–51%; high: >51%.

People with lower NK activity

People with higher NK activity

Kazue Imai, et al.

Lancet 2000; 356: 1795–99

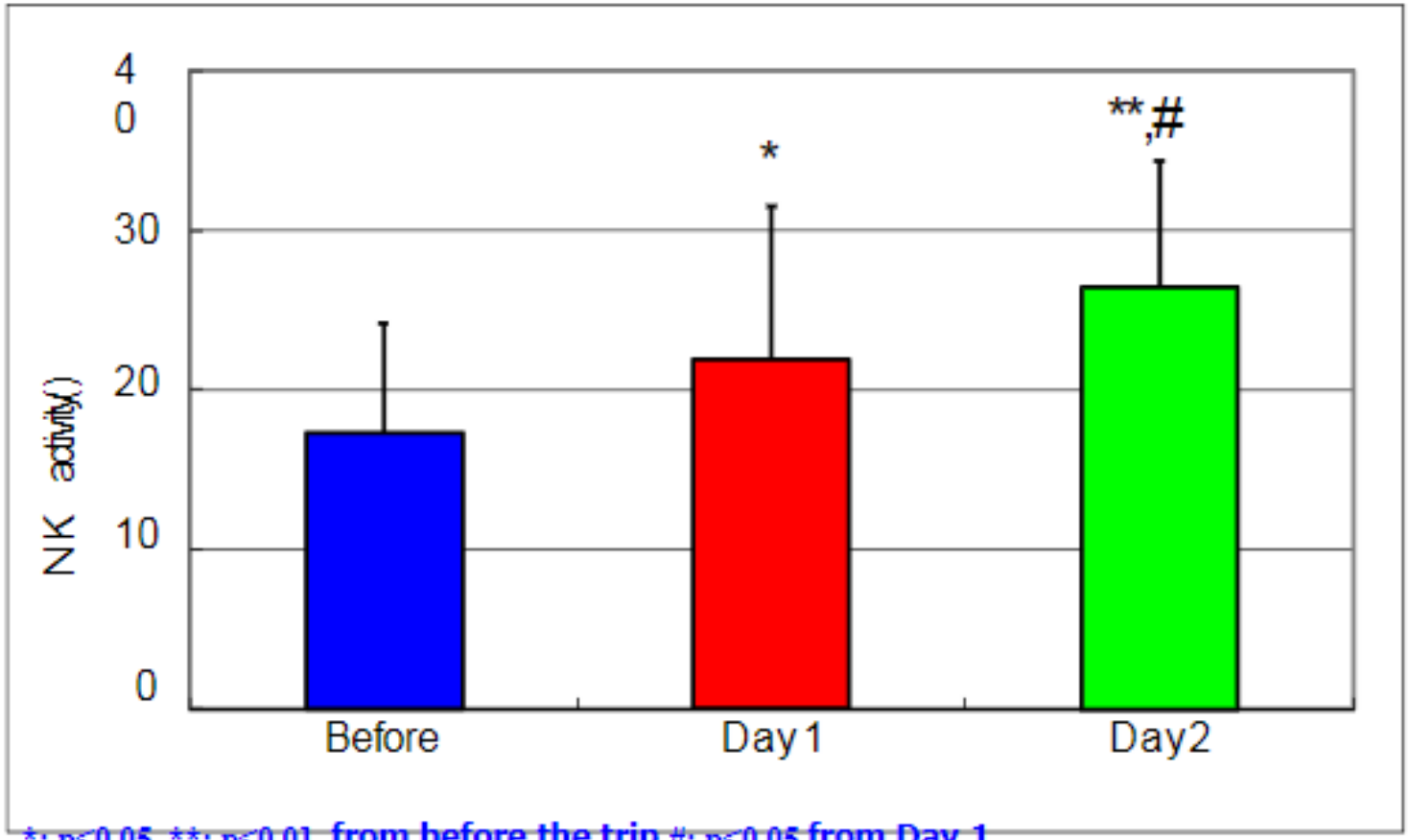
Subjects: 3625

Periods of follow-up 11 years

1st Forest Bathing Study in Japan/World

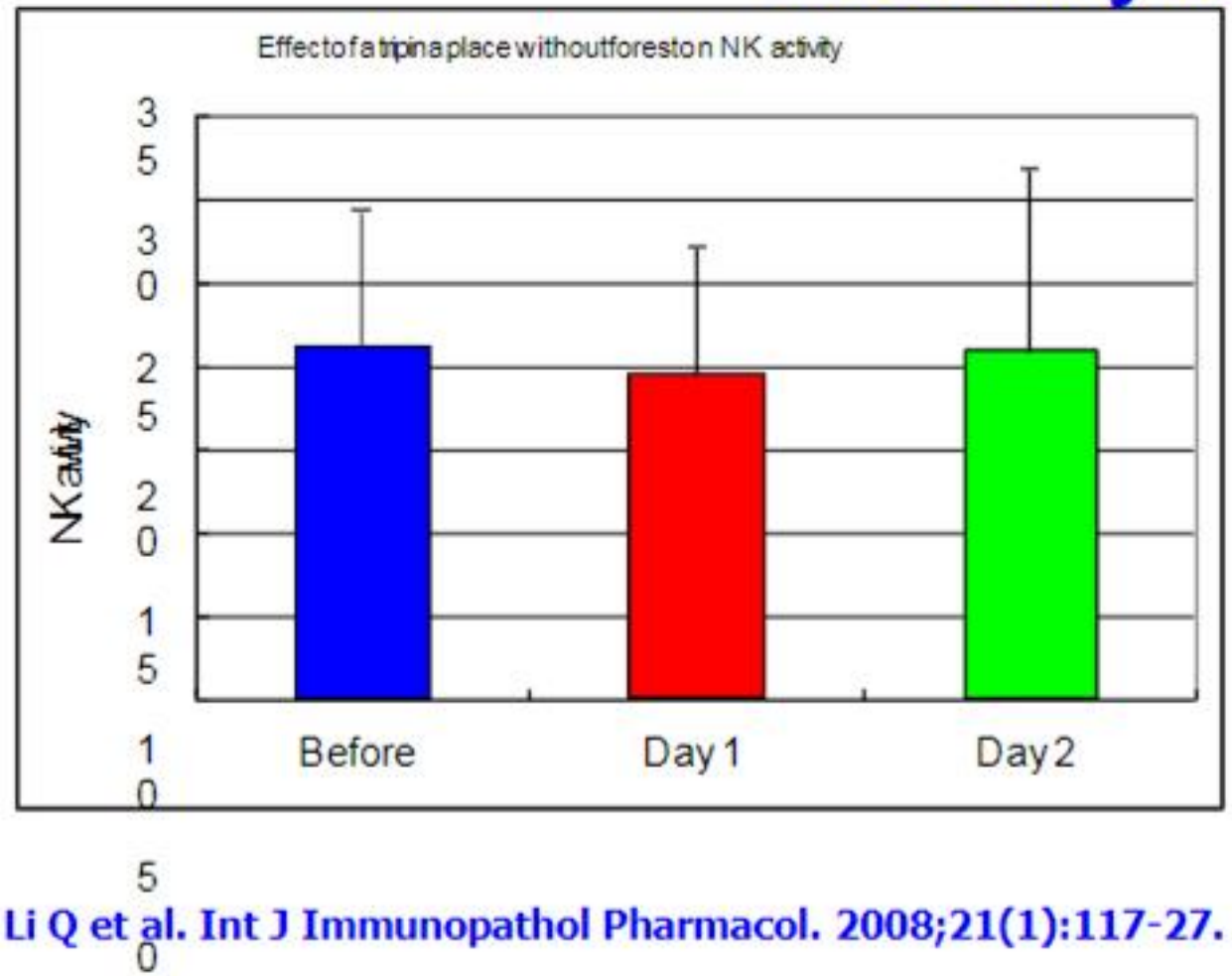
- 2005, Dr. Quin Li, Iiyama City, Ngano
- Li Q er al. Forest enhances human natural killer activity and expression of anti-cancer patients, Int J Immunopathol Pharmacol. 2007; 20(2):3-8
- Subjects taken to Forest for 2 Days

Shinrin-yoku significantly enhances human NK activity in males



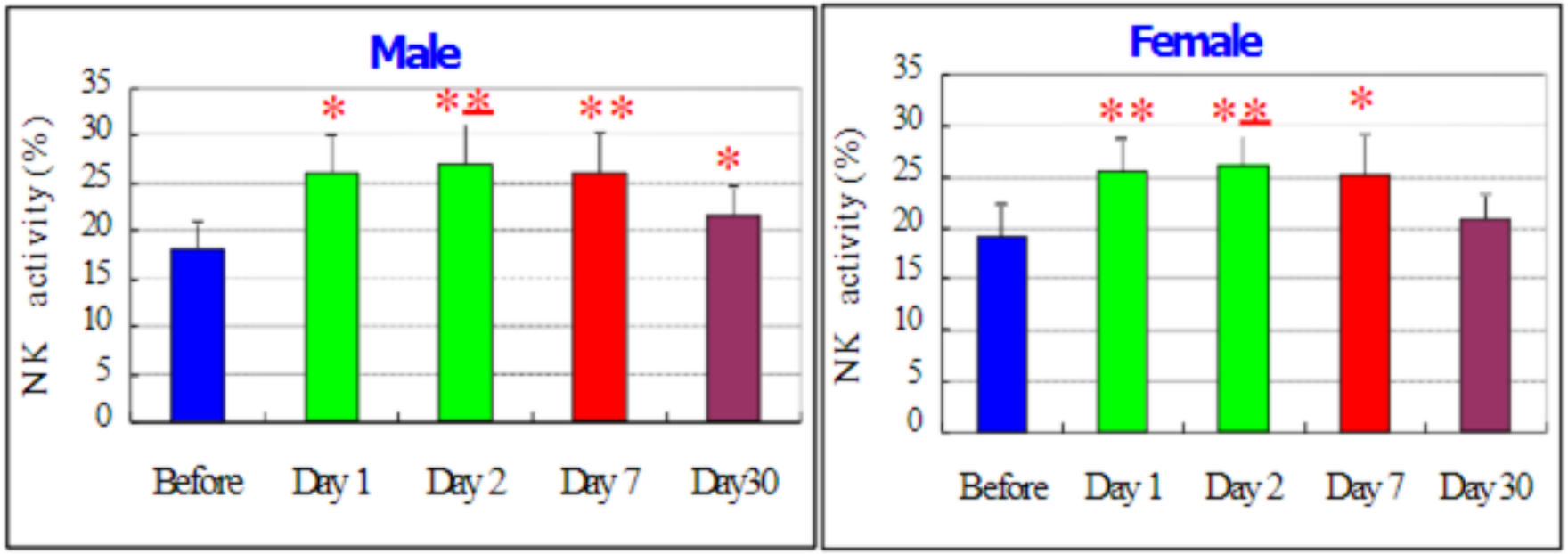
*: p<0.05, **: p<0.01, from before the trip #: p<0.05 from Day 1

A trip to a place without forest does not enhance human NK activity in males



Li Q et al. Int J Immunopathol Pharmacol. 2008;21(1):117-27.

Shinrin-yoku increased NK activity and this effect lasted for 30 days in both males and females



*: p<0.05, **: p<0.01, from before the trip

Li Q et al. Int J Immunopathol Pharmacol. 2008;21(1):117-27.
Li Q. et al. J Biol Regul Homeost Agents 2008;22(1):45-55.

Environ Health Prev Med (2010) 15:18–26
DOI 10.1007/s12199-009-0086-9

SPECIAL FEATURE

The Trends on the Research of Forest Bathing in Japan, Korea and in the World

The physiological effects of *Shinrin-yoku* (taking in the forest atmosphere or forest bathing): evidence from field experiments in 24 forests across Japan

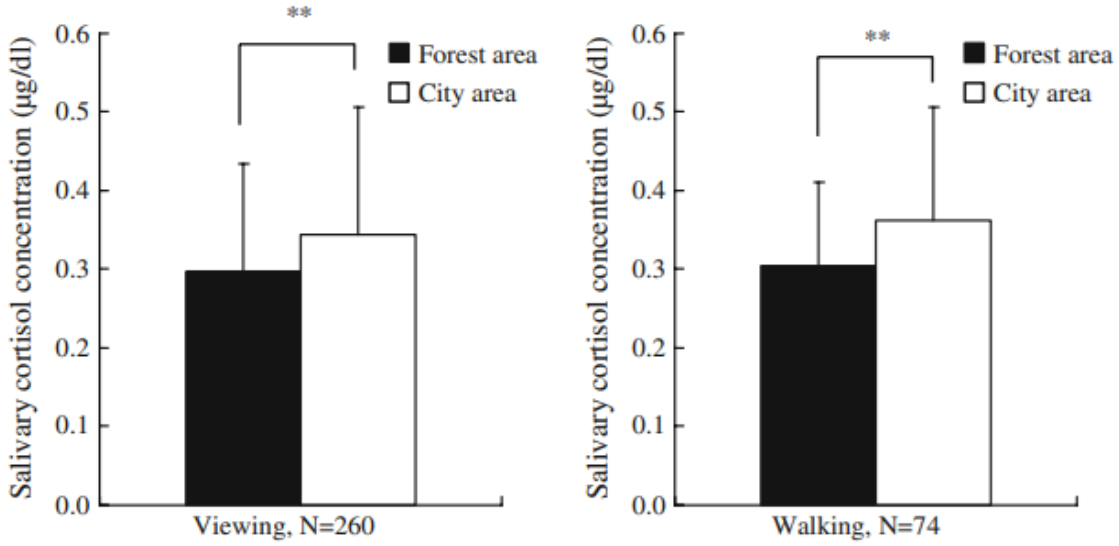
Bum Jin Park · Yuko Tsunetsugu · Tamami Kasetani · Takahide Kagawa · Yoshifumi Miyazaki

Received: 18 July 2008 / Accepted: 6 April 2009 / Published online: 2 May 2009

Abstract This paper reviews previous research on the physiological effects of *Shinrin-yoku* (taking in the forest parasympathetic nerve activity, and lower sympathetic nerve activity than do city environments. These results will con-

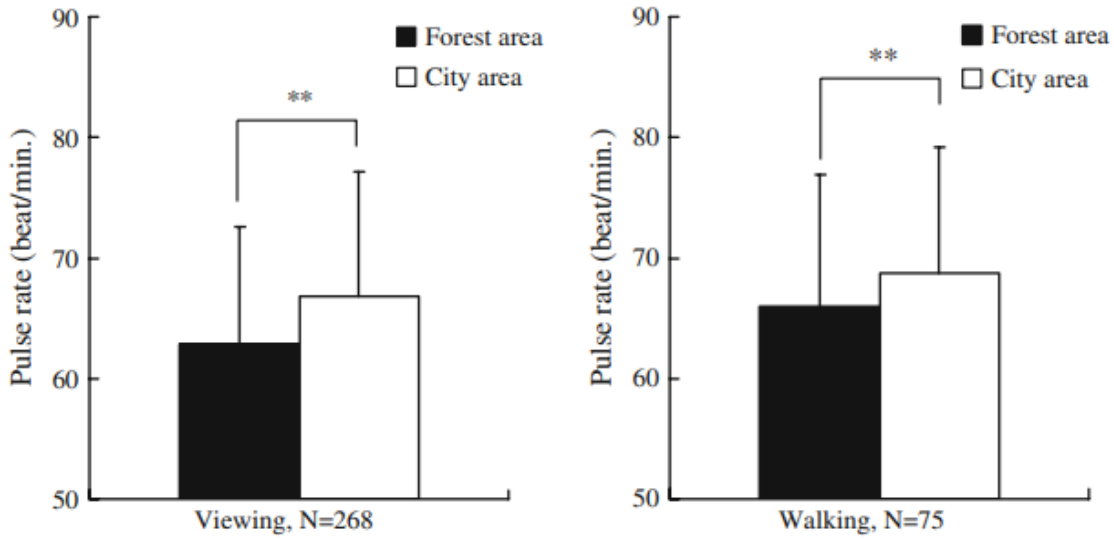
- Field Experiments 24 Forests Across Japan
- Each Experiment 12 Subjects (280 Total)
- 1st Day: 6 Subjects in Forest, 6 Subjects in Urban
- Sat for 15min, Walked for 15min
- 2nd Day: Crossover, Each group sent to different environment
- Measured: Salivary Cortisol, Blood Pressure, Pulse Rate

Fig. 2 Change in salivary cortisol concentration after forest viewing and walking. Mean ± standard deviation (SD); ** $p < 0.01$; p-value by t test



Change in Salivary Cortisol

Fig. 3 Change in pulse rate after forest viewing and walking. Mean ± SD; ** $p < 0.01$; p value by t test



CHANGE IN PULSE RATE

Fig. 4 Change in systolic blood pressure after forest viewing and walking. Mean ± SD; ** $p < 0.01$; * $p < 0.05$; p value by t test

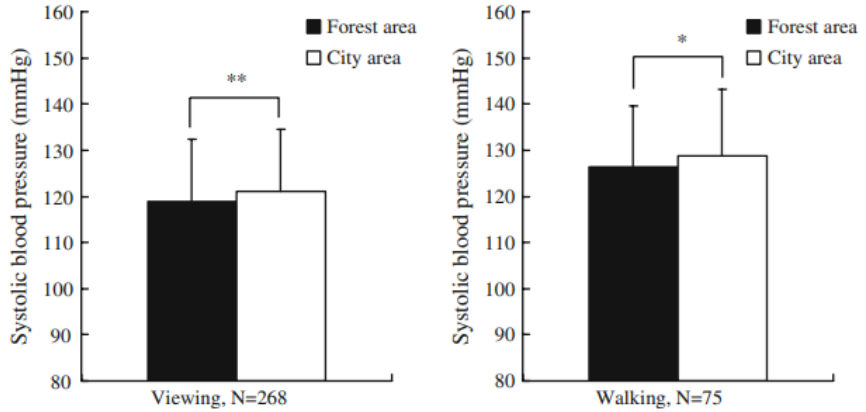
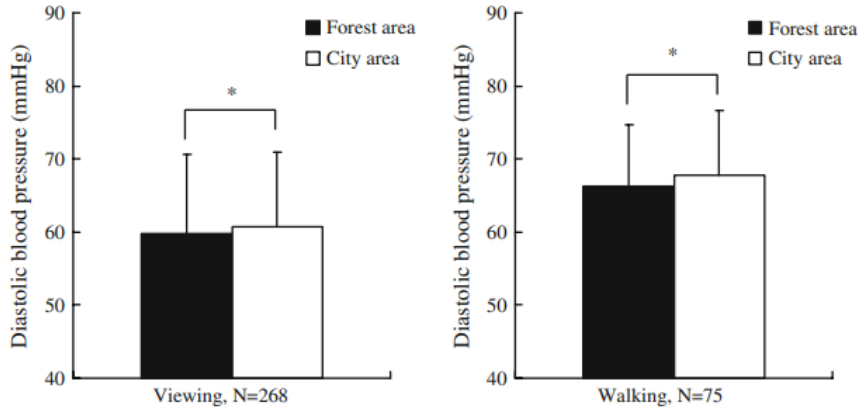


Fig. 5 Change in diastolic blood pressure after forest viewing and walking. Mean ± SD; * $p < 0.05$; p value by t test



CHANGES IN BLOOD PRESSURE

ORIGINAL RESEARCH article

Front. Psychol., 04 April 2019 | https://doi.org/10.3389/fpsyg.2019.00722

Urban Nature Experiences Reduce Stress in the Context of Daily Life Based on Salivary Biomarkers

 MaryCarol R. Hunter[1*], Brenda W. Gillespie[2] and  Sophie Yu-Pu Chen[3]

[1]School for Environment and Sustainability, University of Michigan, Ann Arbor, MI, United States
[2]Consulting for Statistics, Computing, and Analytics Research, University of Michigan, Ann Arbor, MI, United States
[3]Department of Biostatistics, University of Michigan, Ann Arbor, MI, United States

Stress reduction through contact with nature is well established, but far less is known about the contribution of contact parameters – duration, frequency, and nature quality. This study describes the relationship between duration of a nature experience (NE), and changes in two physiological biomarkers of stress – salivary cortisol and alpha-amylase. 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. During an 8-week study period, 36 urban dwellers were asked to have a NE, defined as spending time in an outdoor place that brings a sense of contact with nature, at least three times a week for a duration of 10 min or more. Their goal was compliance within the context of unpredictable opportunity for taking a nature pill. Participants provided saliva samples before and after a NE at four points over the study period. Before-NE samples

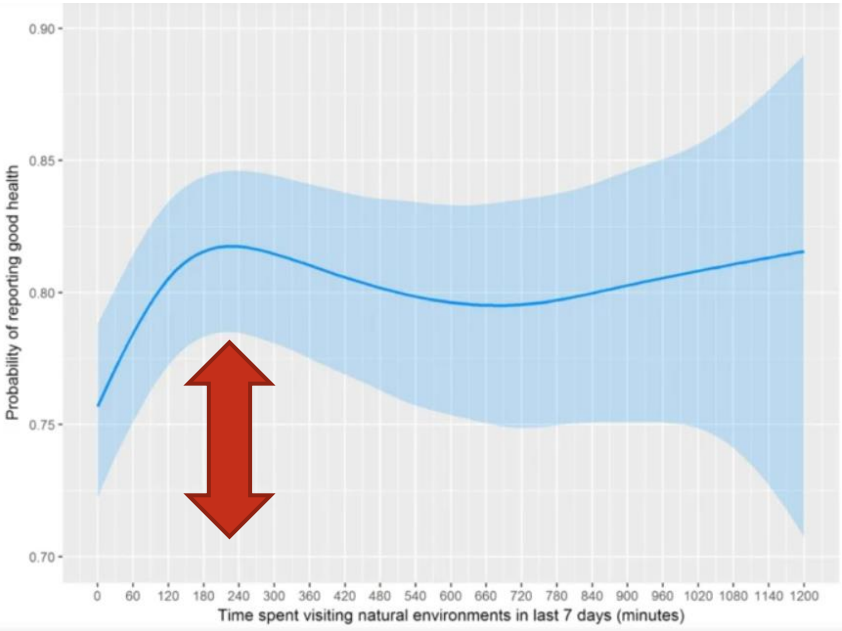
Effect		*n*	Beta	Standard error	*p*-value	% Cortisol drop/hour[A]
Intercept		110	−0.52	0.197	0.009	
Time of day (diurnal effect)		110	−0.125	0.0119	<0.0001	11.7%
Duration interval: length of NE (min) per quartile[B]	**NE frequency for each minute in the interval**	***n*/% of total sample**				**% Cortisol drop beyond diurnal effect[A]**
Q1: 7–14 min	1,2,1,2,5,7,7,3	28/25.5%	−0.0864	0.0561	0.13	8.3%
Q2: 15–20 min	5,2,8,1,6,5	27/24.5%	−0.0375	0.0572	0.51	3.7%
Q3: 21–30 min	4,1,3,2,6,4,3,1,1,5	30/27.3%	−0.2048	0.0545	0.0003	18.5%
Q4:>30 min	1,1,2,1,1,1,1,2,1,2,1, 1,1,1,1,1,1,2,1,1,1	25/22.7%	−0.1214	0.0600	0.045	11.4%

[A]Calculated as $e^{\text{beta estimate}} - 1$. [B]Reported in minutes, calculated as proportion of an hour. Mixed models of log cortisol levels as predicted by diurnal effects (time of day) using a linear function and by duration of a nature experience using a step function. The step function estimates are calculated for each quartile interval (Q) separately and are not cumulative. This model explains 26.7% of level-1 residual [repeated measure] variance, and 45.9% of level-2 [subject-level] variance, and 53.4% of level-3 [timepoint-level] variance.

Spending at least 120 minutes a week in nature is associated with good health and wellbeing

Mathew P. White, Ian Alcock, James Grellier, Benedict W. Wheeler, Terry Hartig, Sara L. Warber, Angie Bone, Michael H. Depledge & Lora E. Fleming

Scientific Reports **9**, Article number: 7730 (2019) | Cite this article



19,806 Participants

Surveyed over 7 days

Compared to No Nature contact past 7 days, likelihood of reporting Good Health or High Well-Being became significantly higher with Contact to Nature >/=120min

Positive Associations Peaked at 200-300mins per week (no further gain >300min)

Did not matter how 120min/week was achieved (one long vs several shorter episodes)

ARTICLE OPEN

Check for updates

How nature nurtures: Amygdala activity decreases as the result of a one-hour walk in nature

Sonja Sudimac[1,2,3]✉, Vera Sale[1,2] and Simone Kühn[1,2,4,5]

Since living in cities is associated with an increased risk for mental disorders such as anxiety disorders, depression, and schizophrenia, it is essential to understand how exposure to urban and natural environments affects mental health and the brain. It has been shown that the amygdala is more activated during a stress task in urban compared to rural dwellers. However, no study so far has examined the causal effects of natural and urban environments on stress-related brain mechanisms. To address this question, we conducted an intervention study to investigate changes in stress-related brain regions as an effect of a one-hour walk in an urban (busy street) vs. natural environment (forest). Brain activation was measured in 63 healthy participants, before and after the walk, using a fearful faces task and a social stress task. Our findings reveal that amygdala activation decreases after the walk in nature, whereas it remains stable after the walk in an urban environment. These results suggest that going for a walk in nature can have salutogenic effects on stress-related brain regions, and consequently, it may act as a preventive measure against mental strain and potentially disease. Given rapidly increasing urbanization, the present results may influence urban planning to create more accessible green areas and to adapt urban environments in a way that will be beneficial for citizens' mental health.

Molecular Psychiatry; https://doi.org/10.1038/s41380-022-01720-6

Birdsongs-Mental Health

- 295 Participants, 6 minute exposure to Sounds
- Impact of Hearing Birds vs Traffic Sounds
- Anxiety: Overall Improved with Birdsong
- Paranoia: Overall Improved with Birdsong
- Depression: Worsened with Traffic Sounds

Stobbe, E., Sundermann, J., Ascone, L. *et al.* Birdsongs alleviate anxiety and paranoia in healthy participants. *Sci Rep* 12, 16414 (2022). https://doi.org/10.1038/s41598-022-20841-0

Why Do People Love Forests?

- -Quiet Atmosphere
- -Beautiful Scenery
- -Mild/Protected Climate
- -Clean Fresh Air in the Forest
- -Special Good Smell

BIOPHILIA

- Term originated 1973 by Erich Fromm (social psychologist). Also coined by E.O. Wilson
- Described as “The Passionate Love of Life and of all that is Alive; it is the Wish to further Growth, whether in a Person, Plant, an Idea or a Social Group”
- Innate Emotional Connection of Human Beings to Other Living Organisms
- Not only aids in Survival, but also broader Human Fulfillment
- Natural Environments are one of the few places to Experience All 5 Senses

How To Enjoy Forest Bathing

- Utilizing Five Senses
- Sense of Sight:Green Color, Forest Landscape
- Sense of Smell:Phytoncides, Fragrance
- Sense of Hearing: Forest Sounds, Bird/Animal Sounds
- Sense of Touch: Touching Trees, Moss, Foliage, Animals
- Sense of Taste: Eating foods (safe ones) from Forest, “Taste” the Fresh Air

Grounding Technique in Nature

5 THINGS YOU CAN SEE

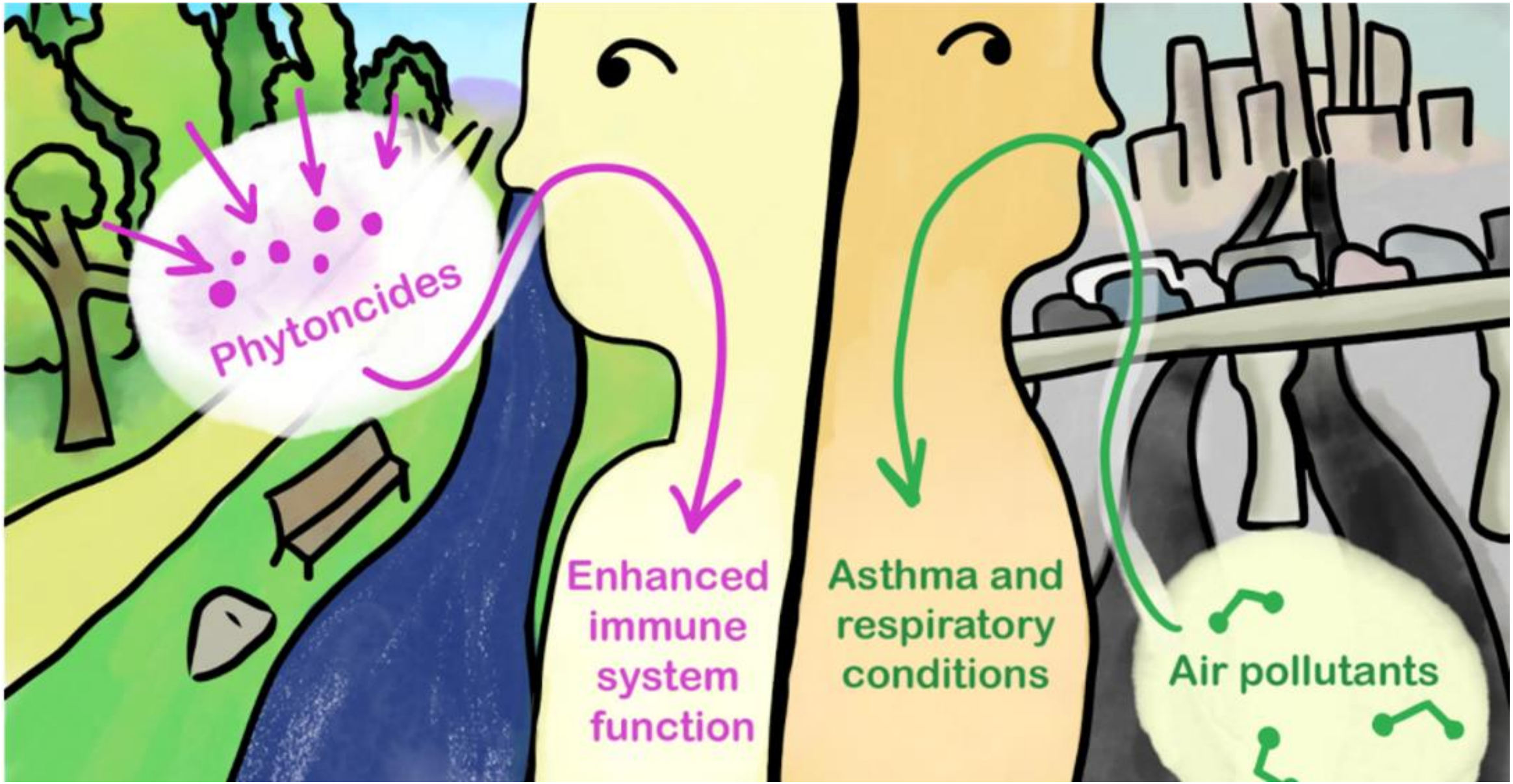
4 THINGS YOU CAN FEEL

3 THINGS YOU CAN HEAR

2 THINGS YOU CAN SMELL

1 THING YOU CAN TASTE


Plant meaning
Phyton
+
Sterilizing power
meaning
Cide
=
Phytoncide


Phytoncides
Enhanced immune system function
Asthma and respiratory conditions
Air pollutants

Effects of Phytoncides

- Stress Relief-Strengthens Immunity by Suppressing Cortisol/Stress Hormones (National Institute of Forest Science)
- Sedation and Freshening-Restores Energy by Treating Insomnia and Inducing Deep Sleep (National Institute of Forest Science)
- Improvement on Learning Ability and Concentration-Activation of alpha waves of Brain Improves Memorization and Concentration (Konkuk Graduate School of Biological Science)
- Strong Antimicrobial Properties-Restrain Legionella and MRSA (Chungbuk National University

Dr. Li wanted to further test exposure to Phytoncides

12 Subjects “locked” in Hotel Rooms for 3 Nights

Some Rooms were “rigged” with a Humidifier to Vaporize Stem Oil from Hinocki Cypress Tress

Other Rooms Emitted “Eau-De-Nothing”

Cyprus Sleepers experienced a 20 Percent INCREASE in NK Cells during their stay. Also felt less fatigued

Control Group saw NO changes

Li Q, Kobayashi M, Wakayama Y, Inagaki H, Katsumata M, Hirata Y, Hirata K, Shimizu T, Kawada T, Park BJ, Ohira T, Kagawa T, Miyazaki Y. Effect of phytoncide from trees on human natural killer cell function. Int J Immunopathol Pharmacol. 2009 Oct-Dec;22(4):951-9. doi: 10.1177/039463200902200410. PMID: 20074458.

Rivers, Oceans, Lakes, Ponds, Streams, Fountains

- BLUE SPACES FOR WELLNESS

Journal of Environmental Psychology
Available online 28 September 2022, 101876
In Press, Journal Pre-proof

Mechanisms underlying childhood exposure to blue spaces and adult subjective well-being: An 18-country analysis

Valeria Vitale [a, b], Leanne Martin [c], Mathew P. White [a, c], Lewis R. Elliott [c], Kayleigh J. Wyles [d], Matthew H.E.M. Browning [e], Sabine Pahl [a], Patricia Stehl [a], Simon Bell [f], Gregory N. Bratman [g], Mireia Gascon [h, i, j], James Grellier [c, k], Maria L. Lima [l], Mare Lõhmus [m], Mark Nieuwenhuijsen [h, i, j], Ann Ojala [n], Jane Taylor [o], Matilda van den Bosch [h, i, j, p, q] ... Lora E. Fleming [c]

- Examined the links between childhood exposure to blue spaces and adult well-being.
- Four alternative conceptual models were tested using data from 18 countries.
- Childhood exposure to blue spaces was associated with better adult well-being.
- The association was mediated by intrinsic motivations and recent nature visits.
- The pattern of associations was consistent in direction across countries.

NATURE EFFECTS ON THE GUT MICROBIOME

Impact of outdoor nature-related activities on gut microbiota, fecal serotonin, and perceived stress in preschool children: the Play&Grow randomized controlled trial

Tanja Sobko [1], Suisha Liang [2], Will H G Cheng [1], Hein M Tun [3 4]

Affiliations + expand

PMID: 33319792 PMCID: PMC7738543 DOI: 10.1038/s41598-020-78642-2

Free PMC article

Abstract

Due to rapid urbanization, children today have fewer opportunities to interact with nature and this may result in a greater risk for developing stress and depression. Outdoor nature-related activities can enhance general well-being. However, the underlying mechanisms are not fully delineated. Here we recruited 54 preschool children to participate in a 10-week structured nature-related "Play&Grow" program. Following the intervention, children were assessed for connectedness to nature and perceived stress levels using validated questionnaires. Moreover, fecal serotonin level and gut microbiota profiles were measured by ELISA and 16S rDNA amplicon sequencing, respectively. Children were significantly more connected to nature after the intervention. Their gut microbiota altered, especially by modulating the abundance of Roseburia and the fecal-serotonin level. Moreover, we also observed a reduction in the overall perceived stress, particularly in the frequency of anger among these children. This study is the first to demonstrate the impact of nature-related activities on gut microbiota, fecal serotonin and psychosocial behaviour of preschool children. However, further mechanistic studies are needed to confirm the functional role of gut microbiota in the association between connectedness to nature and improved psychosocial behavior.

RESULTS

- 54 Preschool age children
- 10 week Nature-Related structured “Play and Grow” program
- More significant Connection to Nature
- Decreased perceived overall Stress and Anger
- Alteration of Gut Microbiome:
  - Increase in Roseburia (produces Butyrate)
  - Increase in Fecal Serotonin Level

MOVEMENT + NATURE

Health Benefits of Movement in Nature

- Can Help Lower Blood Pressure and Stress Hormone Levels
- Reduce Nervous System Arousal
- Enhance Immune System Function
- Increase Self-Esteem
- Reduce Anxiety

Perceived Barriers to Movement/Exercise

- TIME
- FINANCIAL
- SAFETY/FEAR OF FALLING
- BODY IMAGE
- ACCESSIBILITY
- LACK OF MOTIVATION
- BOREDOM/NOT ENJOYABLE
- LACK OF COMPANION

HOW TO BREAKDOWN THESE BARRIERS

Forms of Movement in Nature

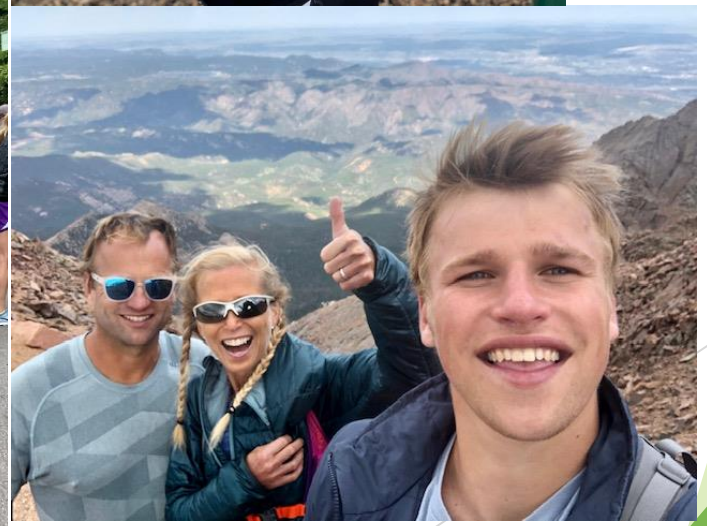
- WALKING/JOGGING
- GARDENING
- HIKING
- BIKING
- SWIMMING
- SKIING
- BIRD WATCHING
- YOGA/TAI CHI
- KAYAKING/CANOEING
- FISHING


BIRTHDAY GIRL


MICHIGAN
SOCCER


EPIC TIMING
FINISH
464


3498
3499



#JUMPINGFORJOY

The Blue Zones

THE HEALTH BENFITS OF GARDENING

Stress Relief

Gardening can help reduce the level of stress hormone Cortisol

Immunity Booster

Direct exposure to dirt and plants can help boost your immune sytem

Work Out

3 hours of moderate gardening could equal a 1 hour gym session

Bacteria Friends

Soil cointains a natural antidepressant that can make us happier

Green Diet

Those who grow veggies are more conscious about having a healthy diet

Brain Health

One study revealed that daily gardening can reduce risk of dementia by 36%

http://www.naturekidsinstitute.org/

Who:_____ Date:_____

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Dispense:

Refills:

Signature:_____

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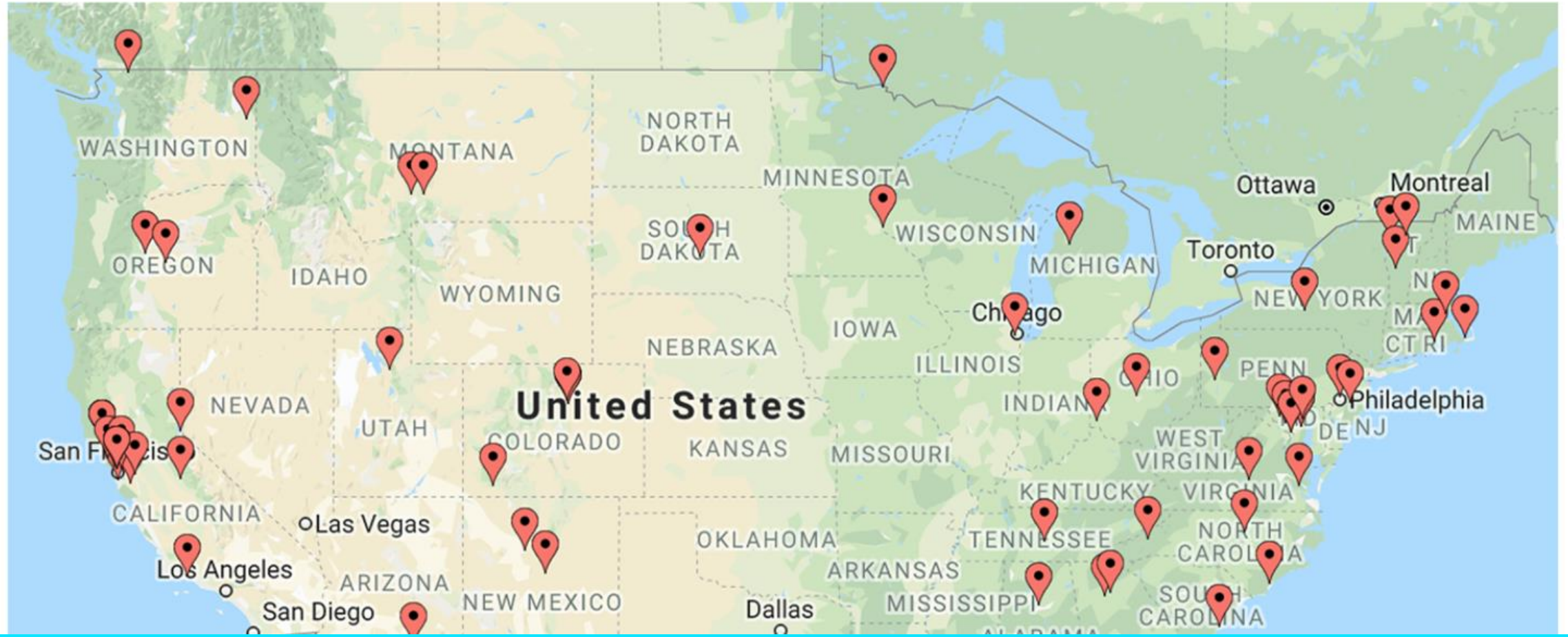
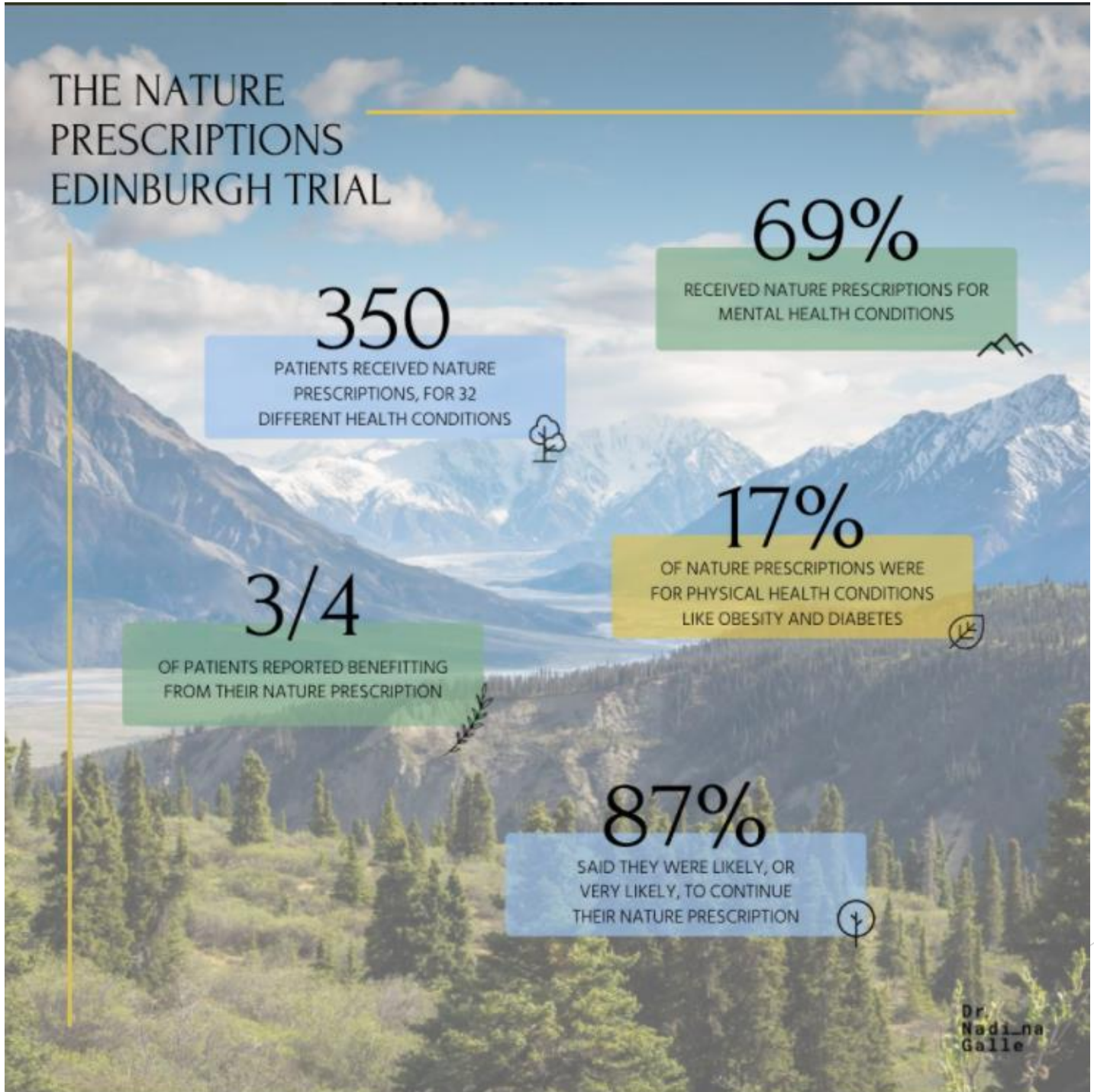
ParkRx

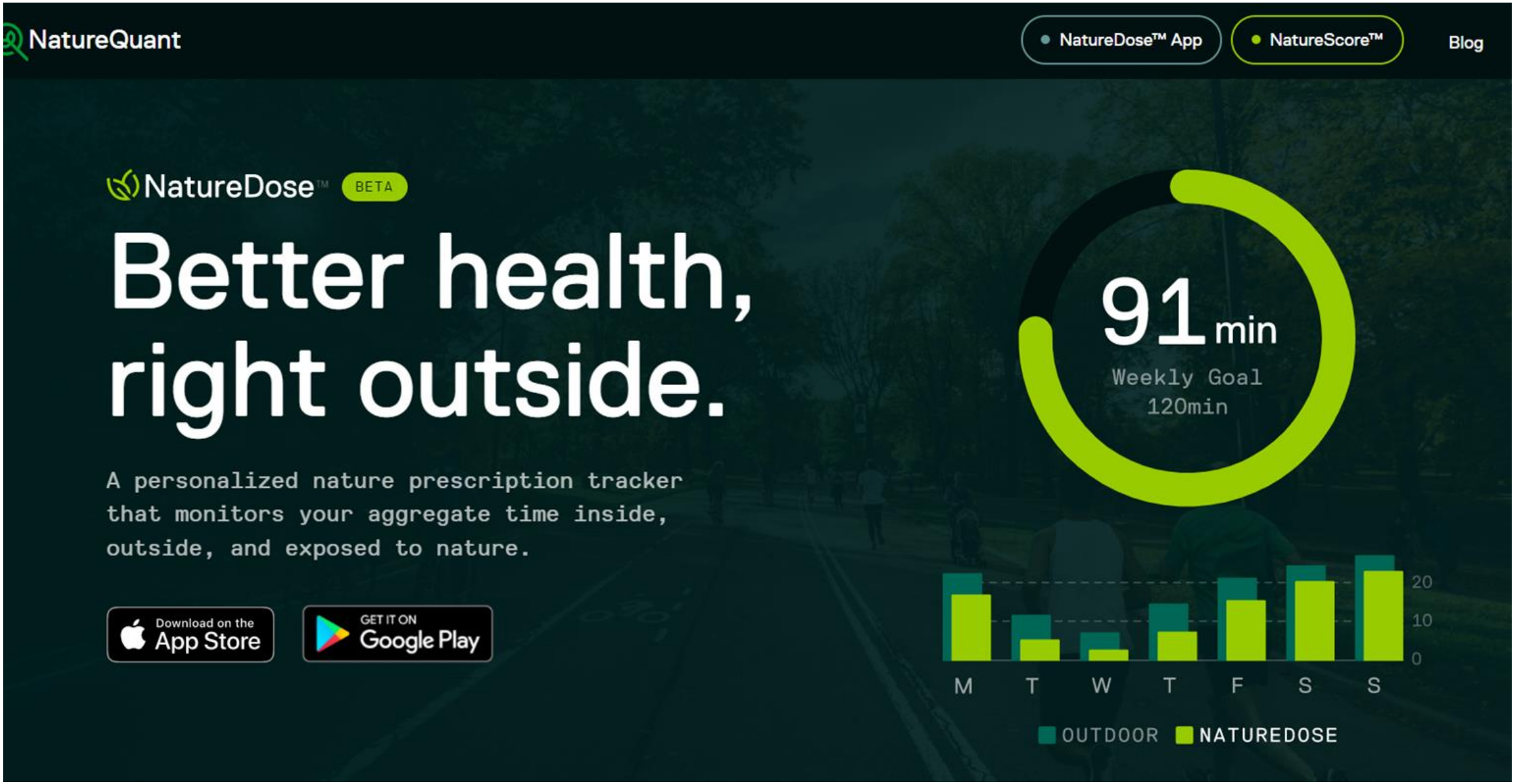
HOME ABOUT RESOURCES PROGRAMS CONTACT

Park Prescription programs are **everywhere**.

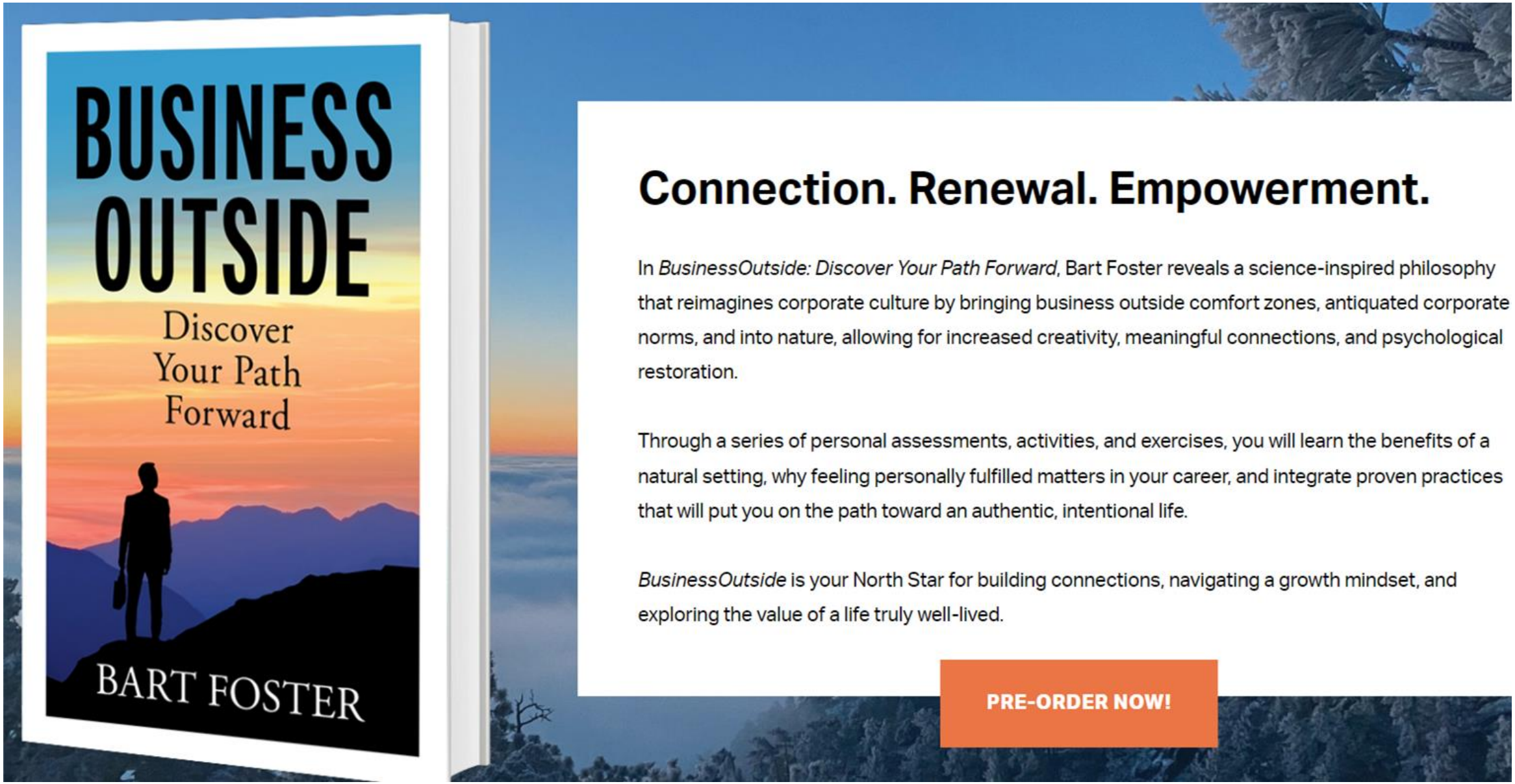




Nature Prescriptions | The RSPB



NatureDose™ - Personalized nature prescription tracker to help you optimize the benefits of time outdoors. (naturequant.com)



Connection. Renewal. Empowerment.

In *BusinessOutside: Discover Your Path Forward*, Bart Foster reveals a science-inspired philosophy that reimagines corporate culture by bringing business outside comfort zones, antiquated corporate norms, and into nature, allowing for increased creativity, meaningful connections, and psychological restoration.

Through a series of personal assessments, activities, and exercises, you will learn the benefits of a natural setting, why feeling personally fulfilled matters in your career, and integrate proven practices that will put you on the path toward an authentic, intentional life.

BusinessOutside is your North Star for building connections, navigating a growth mindset, and exploring the value of a life truly well-lived.

PRE-ORDER NOW!

Dose of Nature

Home | Who we are | What we do | Evidence | Support us | Contact us

What we do

We are a registered charity, set up to promote the mental health benefits of engaging with the natural world.

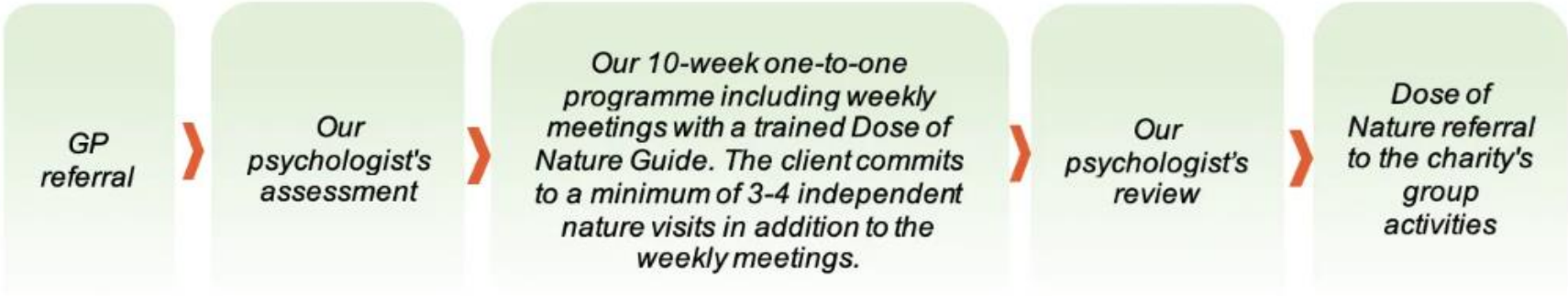
Contact us: info@doseofnature.org.uk

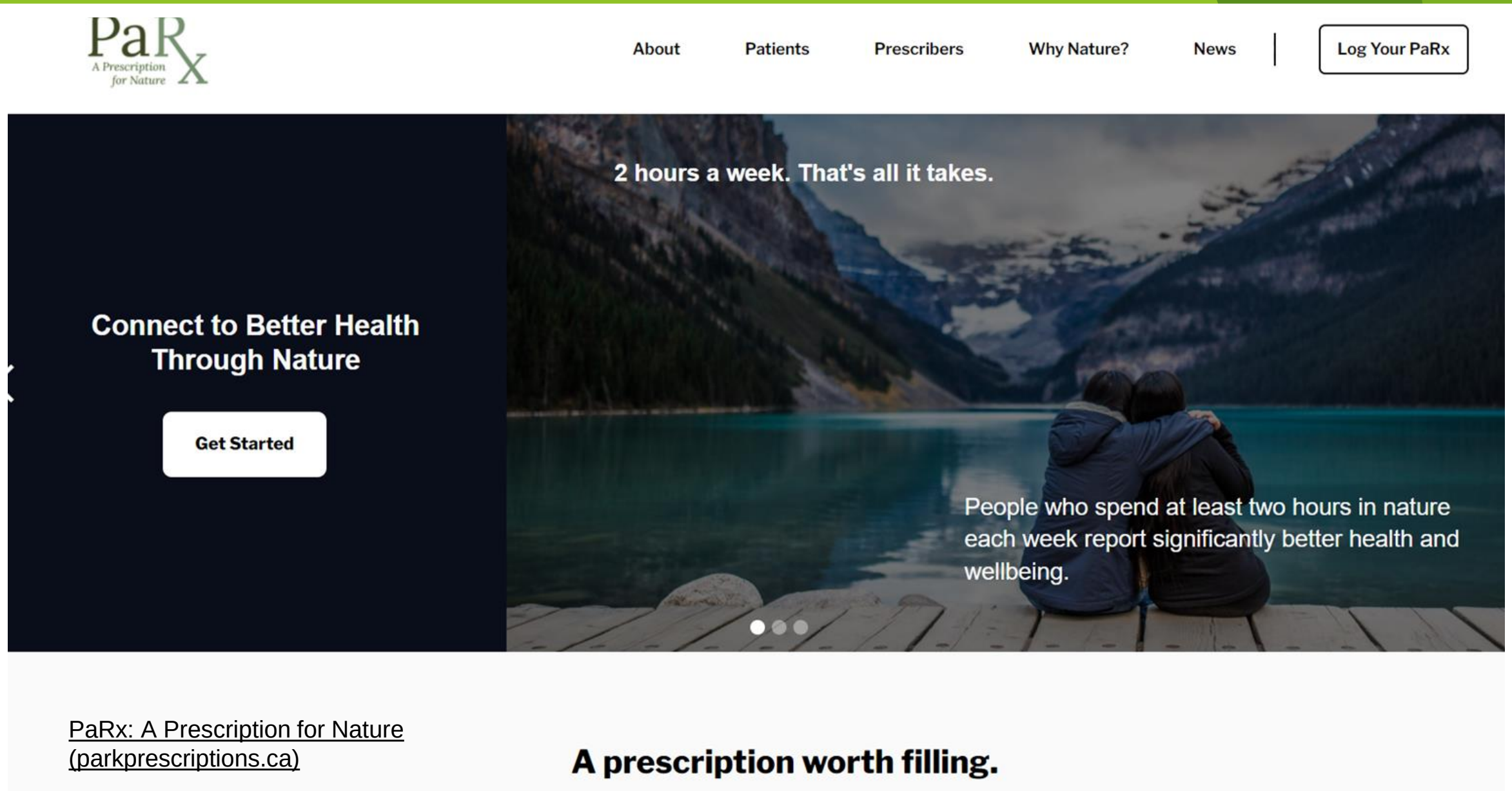
Follow us:

What is a Dose of Nature prescription?

A Dose of Nature prescription is a ten-week programme that introduces individuals to the mental health benefits of spending time in nature. It aims to inspire lifestyle changes that will have a significant and lasting impact on mental wellbeing. This is achieved through a combination of education, first-hand experience and practical and motivational support, led by a trained Dose of Nature Guide.

What does it involve?





PaRx: A Prescription for Nature (parkprescriptions.ca)

- Launched in November 2020
- Canada's 1st Nature Prescription
- Recommend spending a Minimum of 2 hours/week in Nature at least 20minute Intervals
- PaRX Medical Professionals can prescribe "Adult Parks Canada Discovery Pass"
- Pass covers Year-Long Admission to over 80 Destinations Across Canada

YOUR PASS to the PARKS

nps.gov

SENIOR PASS

The Lifetime Senior Pass gives seniors access to parks and public lands nationwide. On **AUGUST 28, 2017,** the cost of the Senior Pass will increase to **$80.**

YOUR DOLLARS AT WORK

37.6 MILLION

in estimated revenue from the senior pass will be used to enhance the visitor experience. with an emphasis on deferred maintenance, improved visitor facilities, and trail maintenance.

ALREADY HAVE A PASS?

Senior passes purchased before August 28, 2017 will be grandfathered in and are good for life.

ANNUAL VS LIFETIME

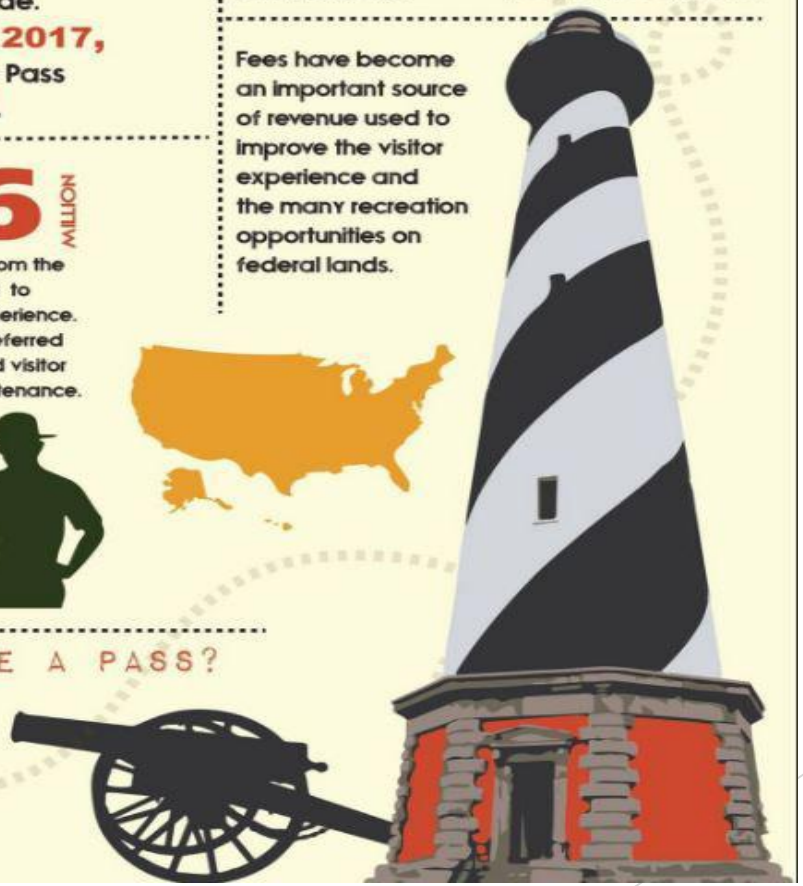
You can now purchase a $20 Annual Senior Pass. The Annual Pass is good for one full year from the date of purchase.

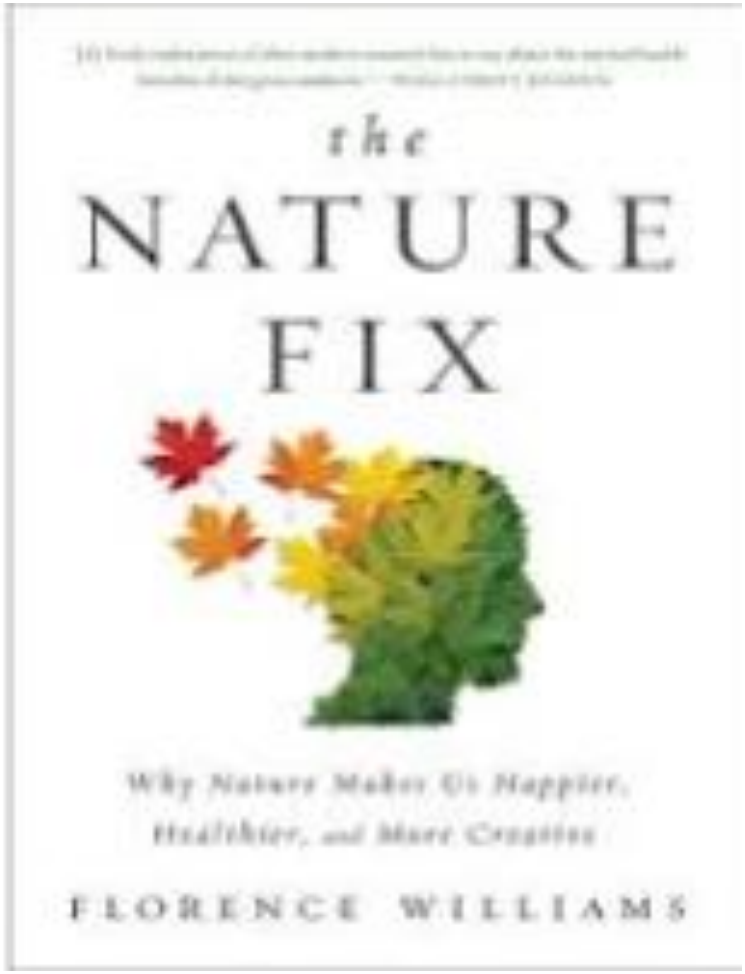
You can also purchase a $80 Lifetime Senior Pass. The Lifetime Pass does not need to be renewed.

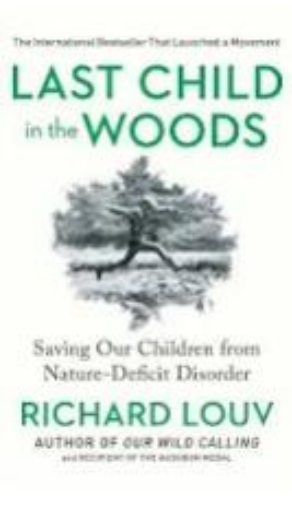
A Lifetime Senior Pass can be purchased anytime for $80.

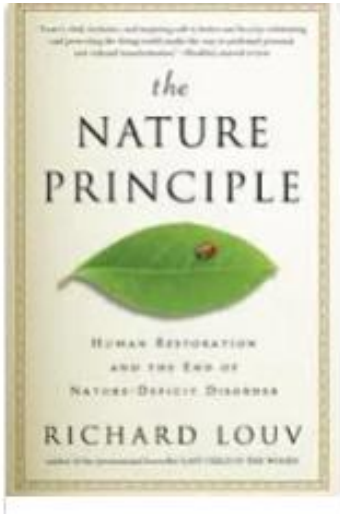
Four Annual Senior Passes may be exchanged for a free Lifetime Senior Pass.

Fees have become an important source of revenue used to improve the visitor experience and the many recreation opportunities on federal lands.




the
NATURE
FIX
Why Nature Makes Us Happier, Healthier, and More Creative
FLORENCE WILLIAMS


LAST CHILD
in the WOODS
Saving Our Children from Nature-Deficit Disorder
RICHARD LOUV
AUTHOR OF OUR WILD CALLING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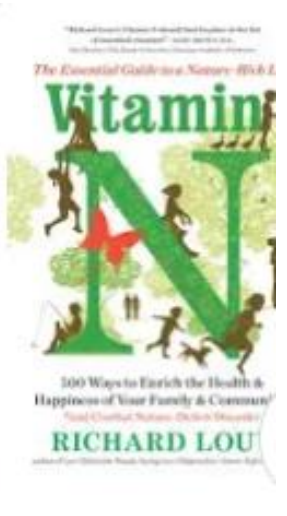
Vitamin
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Nature of Wellness Podcast

Dr. Mark A. Campbell

Throughout history, cultures around the world have turned to nature as a source of increased health and well-being. While science continues to support this connection, and more programs are emerging to help us understand it, humans

Show More

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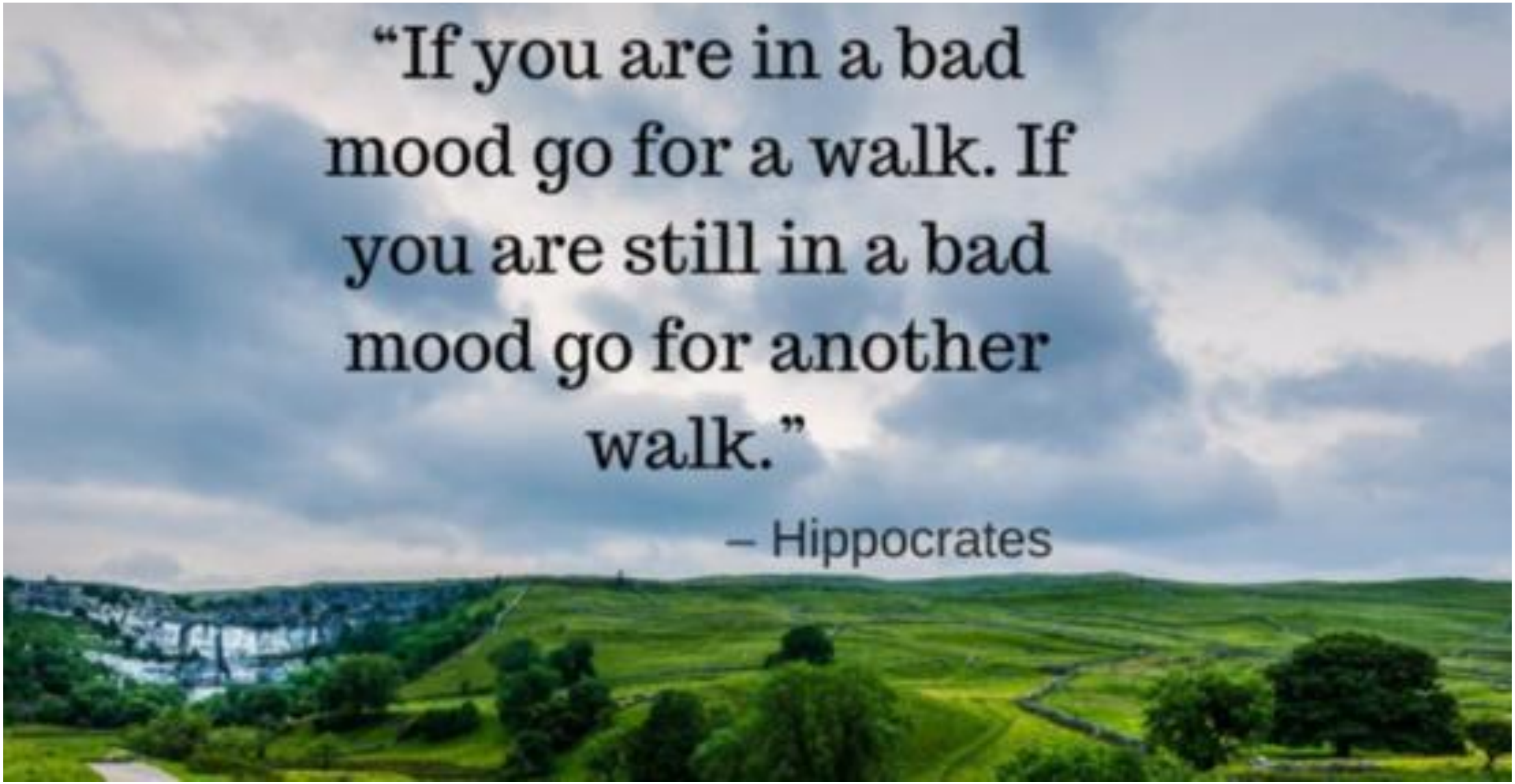
"Nature itself
is the best physician."
-Hippocrates.


"If you are in a bad mood go for a walk. If you are still in a bad mood go for another walk."
– Hippocrates

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