Mindful Climate Action

mind-body trainings for eco-wellness

Bruce Barrett MD PhD, Dept Family Medicine & Community Health

Cathy Middlecamp PhD, Nelson Institute, Office of Sustainability

University of Wisconsin - Madison

Wisconsin Lakes Partnership Convention
Water Action Volunteers Symposium
April 12th, 2019

Mindful Climate Action

www.fammed.wisc.edu/mca/

Image courtesy of Jason Vargo 2016

sustainability

www.myhealthylivingcoach.com/find-happiness-can-improve-health/

Eco-Wellness

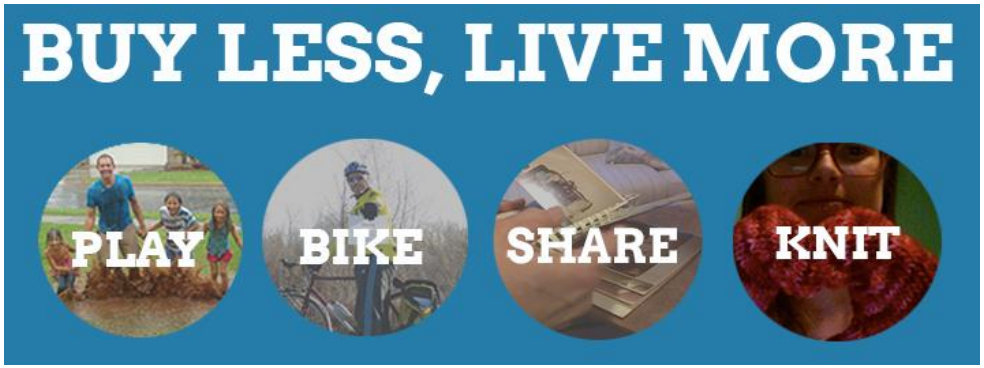
Today's talk will be about

Mindfulness trainings

for **Co-benefits** of

Mind-Body Health

& Sustainability Behaviors



http://www.fairforallguide.com/2014/12/23/buy-less-live-more/

www.zifflaw.com

Mindful Climate Action - Core team

- **Bruce Barrett MD PhD -** Team leader, Family physician, Researcher
- **Cathy Middlecamp PhD –** Professor, Nelson Institute, Office of Sustainability
- **Margaret Mooney MPA –** Earth science educator, Meteorologist, CIMSS/SSEC
- **Maggie Grabow PhD –** Post-doctoral fellow, Environmental health researcher
- **Alex Converse PhD –** Physicist, Data analyst, Mindfulness researcher
- **Mary Checovich MS –** Project manager, Researcher
- **Tom Bryan -** Graduate student, Nelson Institute Environmental Studies
- **Elisa Torres PhD –** Professor, Univ Mississippi Medical Cntr, Exercise & mental health
- **Roger Brown PhD** – Statistician, Methodologist
- **Cristalyne Bell MS** – Research assistant, Family Medicine & Community Health
- **Kristi Rietz OTR-L –** Mindfulness teacher, Wellness program manager
- **Carmen Alonso PhD –** Mindfulness teacher, Psychotherapist
- **Beth Wortzel PhD –** Mindfulness teacher, Psychotherapist
- **Amie Heeter –** Mindfulness teacher, Yoga instructor
- **Susan Andrae PhD -** Assistant Professor, Kinesiology
- **Markus Brauer PhD -** Professor, Department of Psychology
- **Simon Goldberg PhD** – Assistant Professor, Counseling Psychology

Mindful Climate Action - Advisors

- **Richard Davidson PhD** - Director, Center for Investigating Health Minds
- **Jonathan Patz MD MPH-** Professor, Director, Author IPCC
- **Jon Temte MD PhD –** Clinician, Researcher, Professor
- **Katherine Bonus MA** – Founder, UW Mindfulness Program
- **Michele Brogunier MD** – Physician, Member PSR
- **Julia Yates MSSW –** Clinical social worker, Psychotherapist
- **Dick Smith JD LLB –** Retired Judge, Member Citizens Climate Lobby
- **Tia Nelson –** Director of Climate Program, Outrider Foundation, Madison WI
- **Nancy Wong MBA PhD** – Chair & Professor, Consumer Science & Retailing, SoHE
- **Mike Berners-Lee** - Director, Small World Consulting, England

Business & Community Partners

Goodman Community Center

www.goodmancenter.org

UW Health

2017 Practice Greenhealth ENVIRONMENTAL EXCELLENCE AWARDS

Northside Planning Council • A community development corporation •

https://northsideplanningcouncil.org/

Promega

www.promega.com

EDGEWOOD COLLEGE

Sustainability Leadership Program

SOCIAL INNOVATION & SUSTAINABILITY LEADERSHIP GRADUATE PROGRAM

FIRST UNITARIAN SOCIETY

www.fusmadison.org

sustainability

2016

MDPI

Concept Paper

Mindful Climate Action: Health and Environmental Co-Benefits from Mindfulness-Based Behavioral Training

Bruce Barrett [1,*], Maggie Grabow [1,2], Cathy Middlecamp [3], Margaret Mooney [4], Mary M. Checovich [1], Alexander K. Converse [5], Bob Gillespie [6] and Julia Yates [1]

sustainability

2018

MDPI

Article

Mindfulness and Climate Change Action: A Feasibility Study

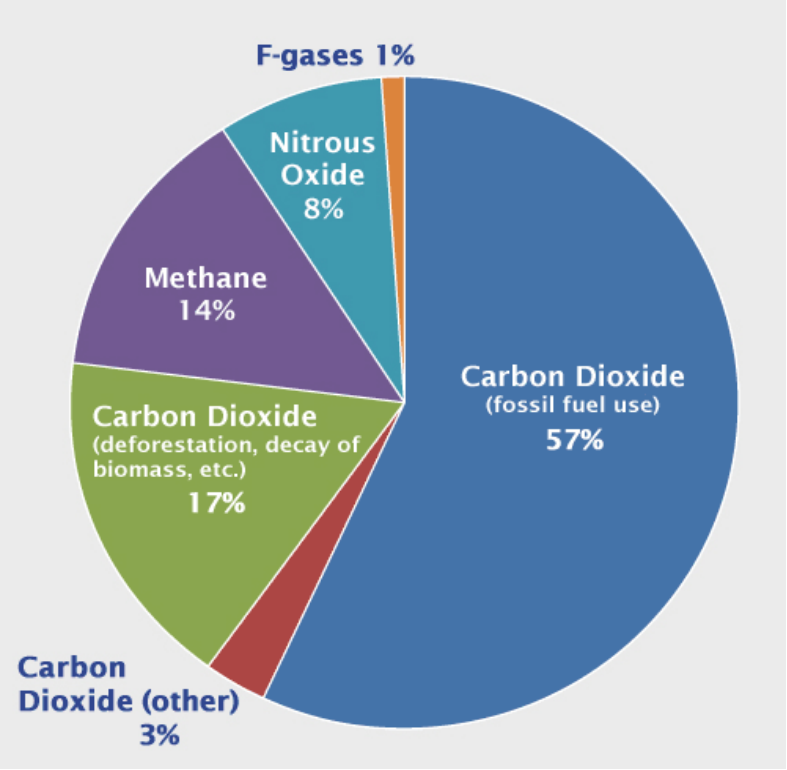
Maggie Grabow [1,2], Thomas Bryan [3], Mary M. Checovich [1], Alexander K. Converse [4], Cathy Middlecamp [3], Margaret Mooney [5], Elisa R. Torres [6], Samuel G. Younkin [2] and Bruce Barrett [1,*]

Low carbon Happiness, Health & ell-being are possible

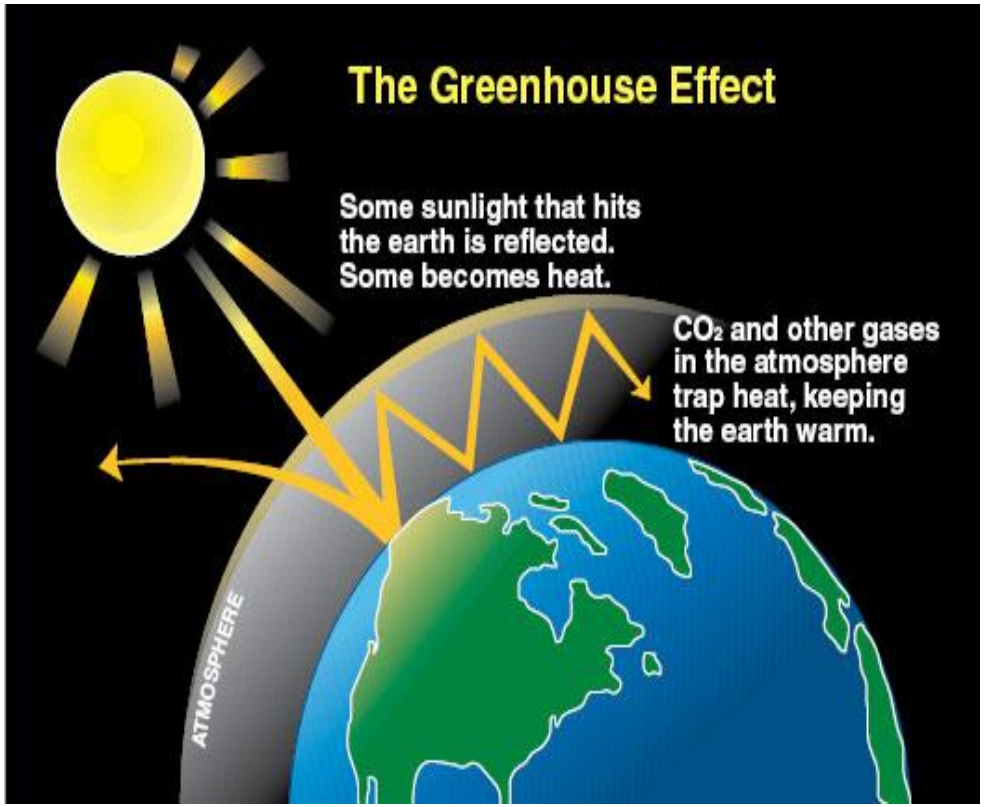
Hypothesis: **People can be happy & healthy without over-consumption of high carbon goods & services**

Method: **Enhanced awareness & understanding of physical sensations, emotions, thoughts, and behaviors using mindfulness-based practices, will help to break unhealthy cycles, leading to greater health and happiness, and to lower carbon footprints**

Greenhouse Gases

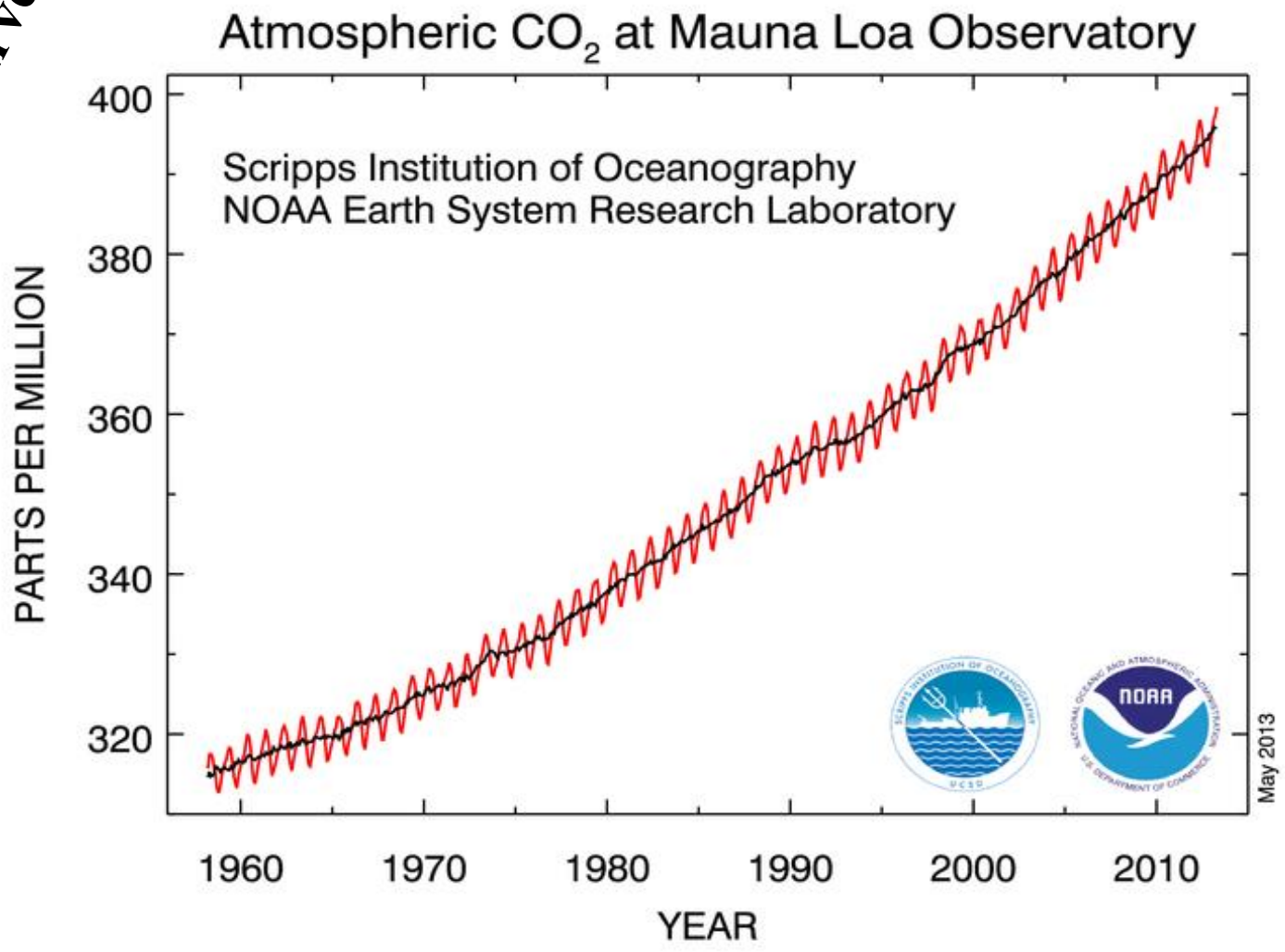


http://www.epa.gov/climatechange/images/ghgemissions/GlobalGHGEmissionsByGas.png



http://www.ecy.wa.gov/climatechange/images/greenhouse_effect2.jpg

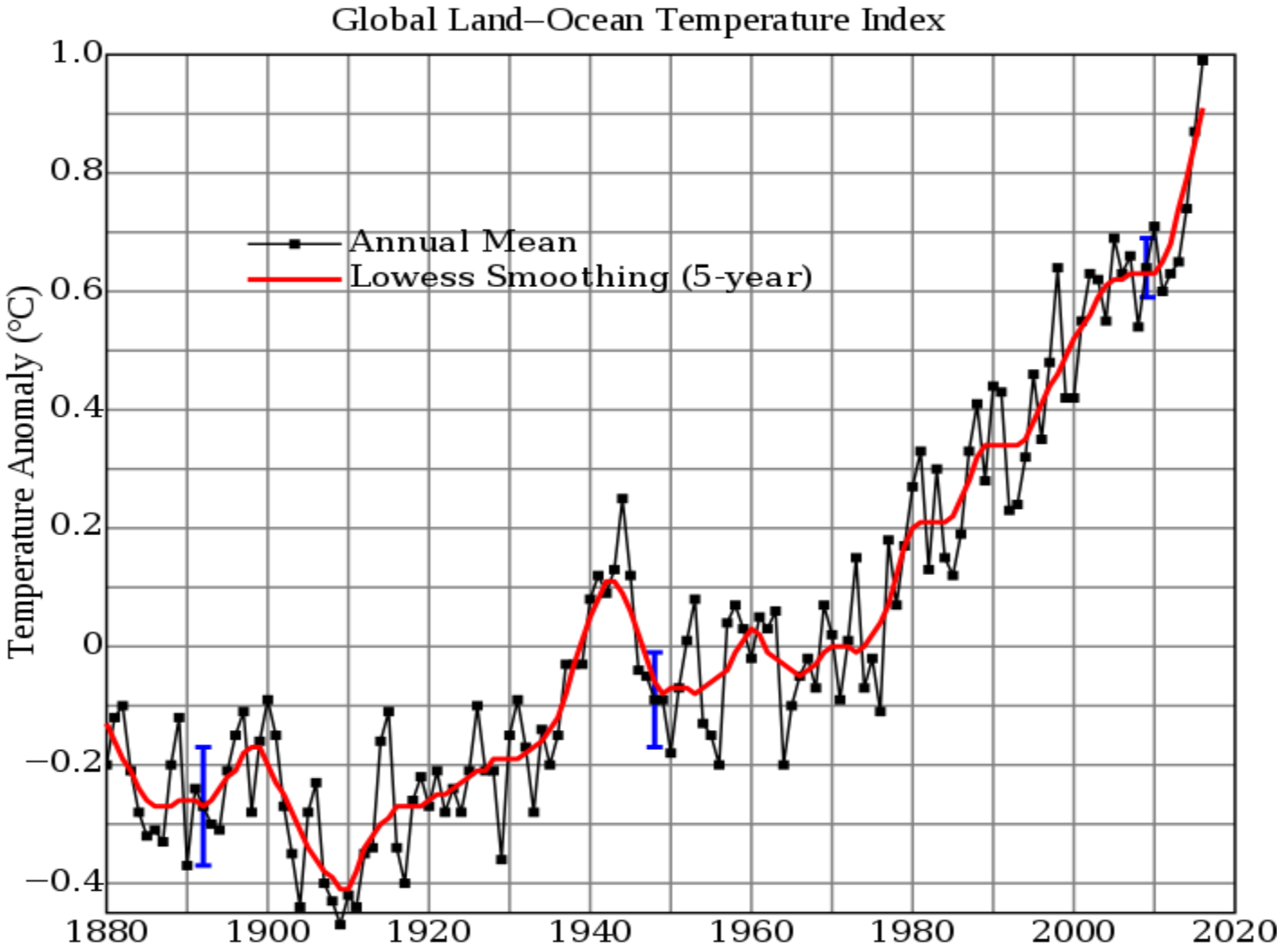
‘The Keeling Curve’



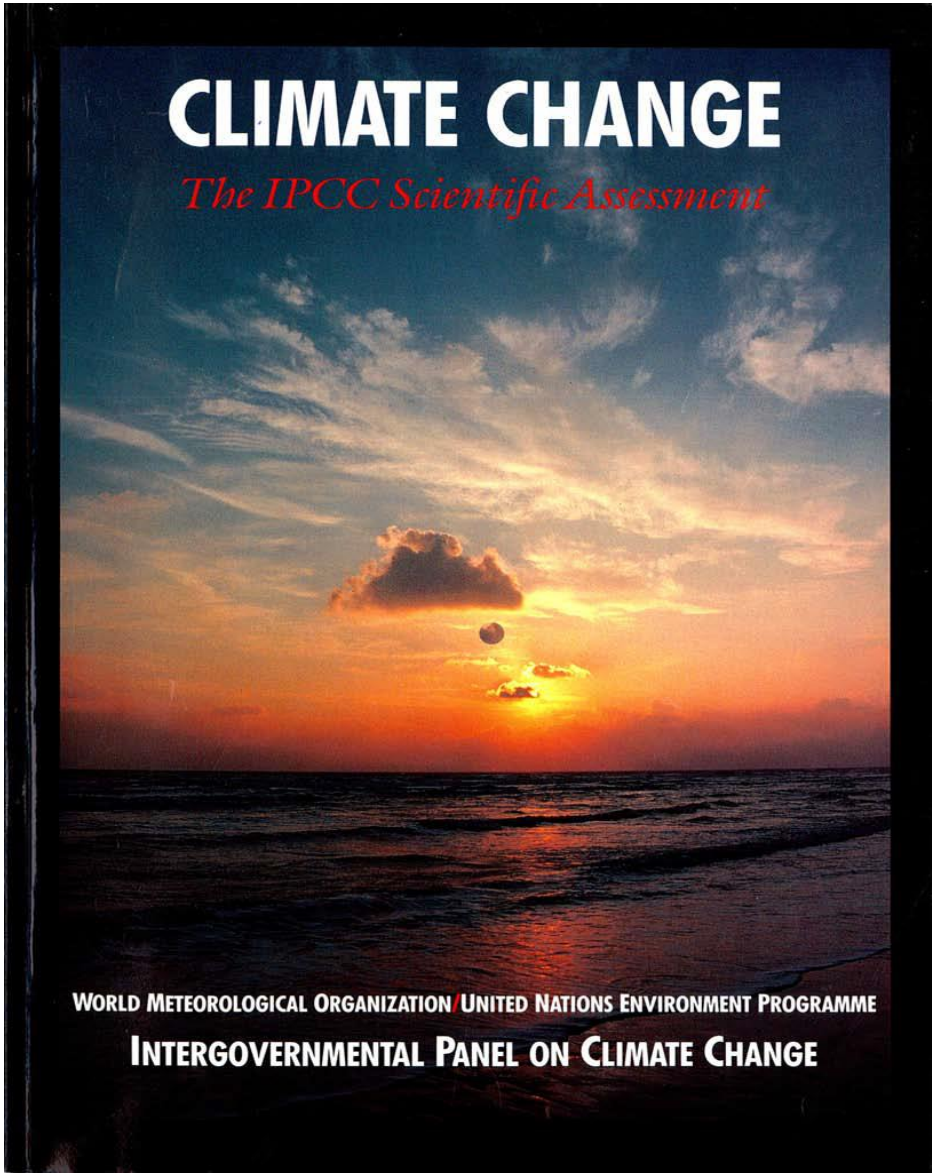
http://www.esrl.noaa.gov/gmd/ccgg/trends/

Charles David Keeling (April 20, 1928 – June 20, 2005)

Average Temperatures of Earth's Surface are Up ~1.0 ºC (1.8 º F)



https://commons.wikimedia.org/wiki/File:Global_Temperature_Anomaly.svg



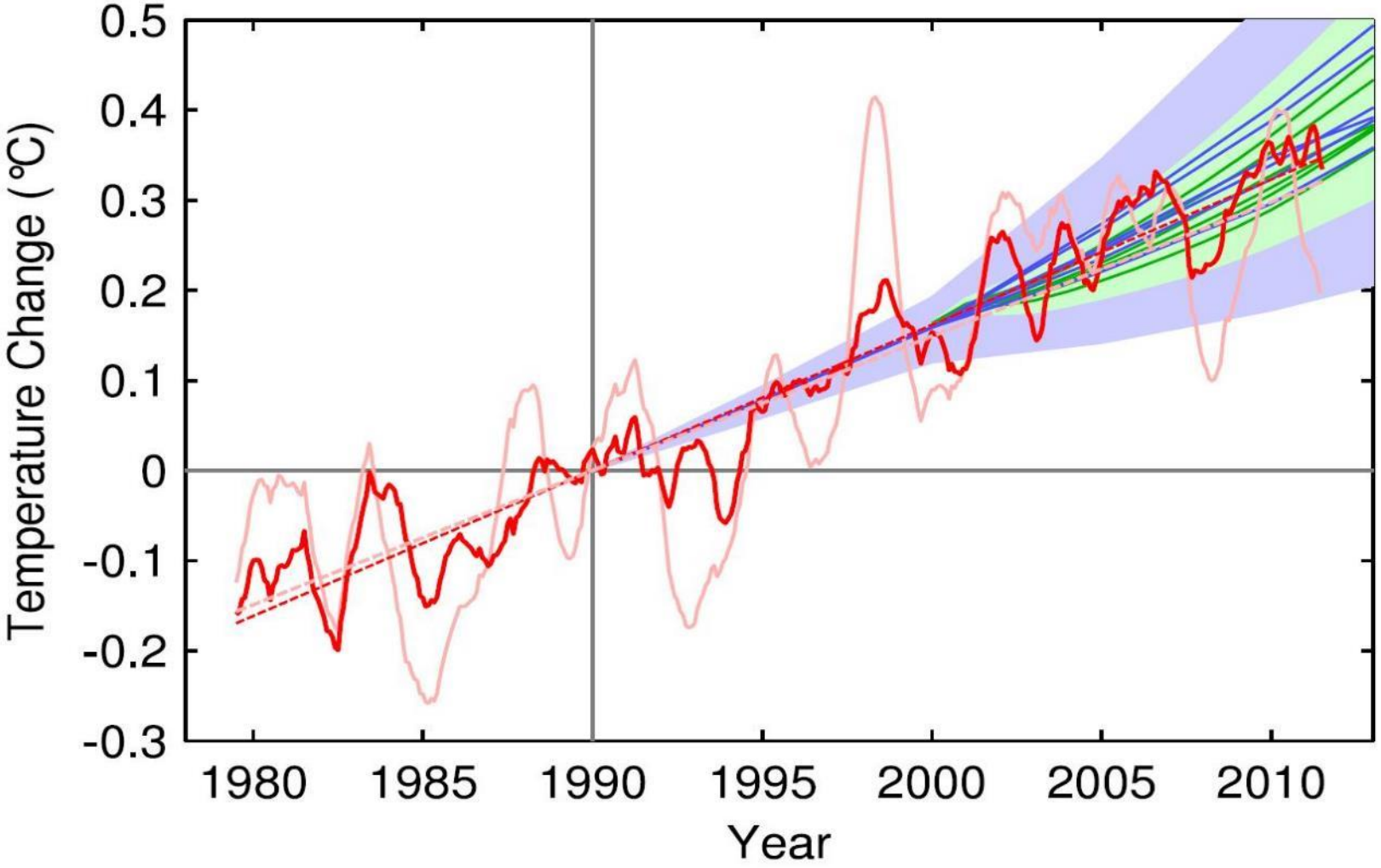
Climate Change:
The IPCC Scientific Assessment

1990

Report prepared for Intergovernmental Panel on Climate Change by Working Group I

J.T. Houghton, G.J. Jenkins and J.J. Ephraums (eds.).
Cambridge University Press, Cambridge, Great Britain, New York, NY, USA and Melbourne, Australia
410 pp.

Observed & adjusted temperatures relative to 1990,
with models from IPCC (Intergovernmental Panel on Climate Change)



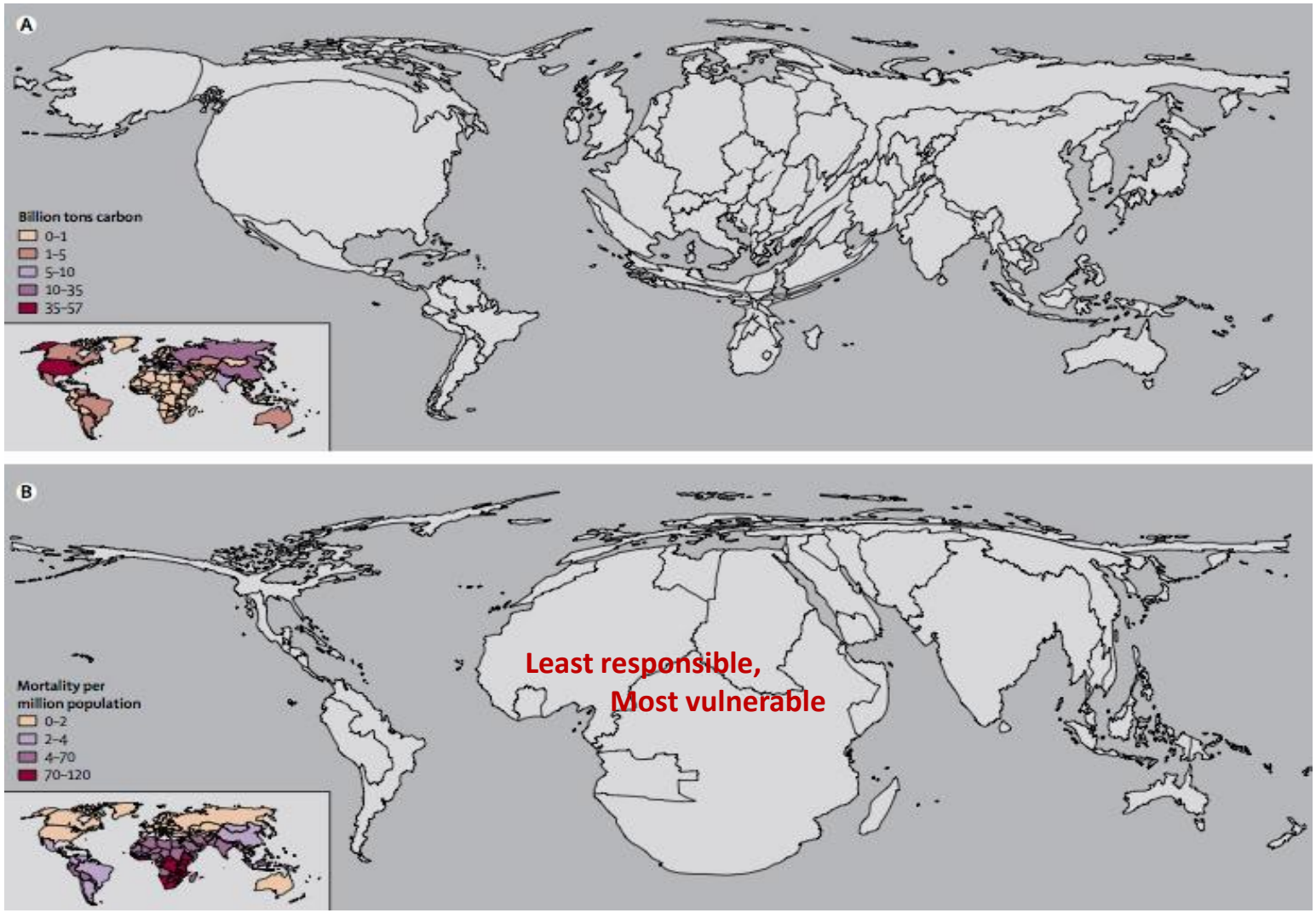
Comparing climate projections to observations up to 2011.
Rahmstorf, Foster & Cazenave *Envir Research Let* 2012

According to a recent poll by the
Yale Program on Climate Change Communication

- 73% of Americans think global warming is happening, an increase of 10% since March 2015
- 62% understand that global warming is mostly human-caused
- 69% say they are at least “somewhat worried” about global warming
- 46% say they have personally experienced the effects of global warming
- 14% think it’s too late to do anything about it

Leiserowitz AM et al. Climate change in the American mind: December 2018. New Haven, CT: Yale University and George Mason University, 2018.

Billions of tons of carbon emitted 1950-2000



Mortality consequences of global warming & climate change

J. A. Patz, H. Gibbs, J. Foley, J. Rogers, and K. Smith. Climate change and global health: Quantifying a growing ethical crisis. *EcoHealth 4:397-405, 2007.*

You can always count on Americans to do the right thing

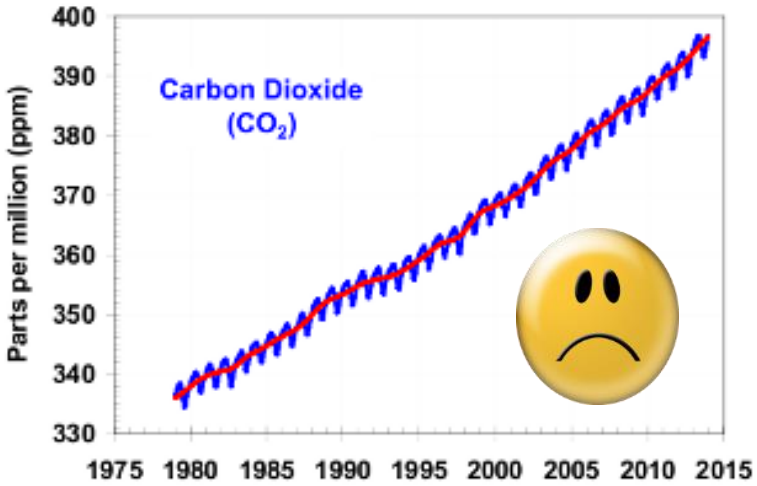
- after they've tried everything else.

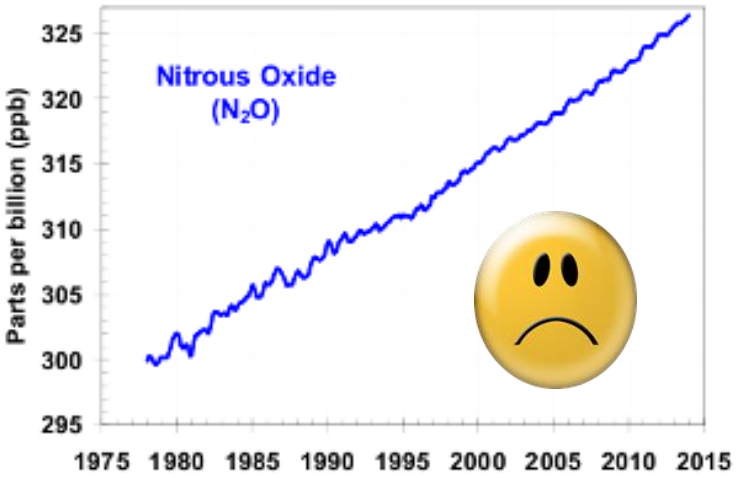
Winston Churchill

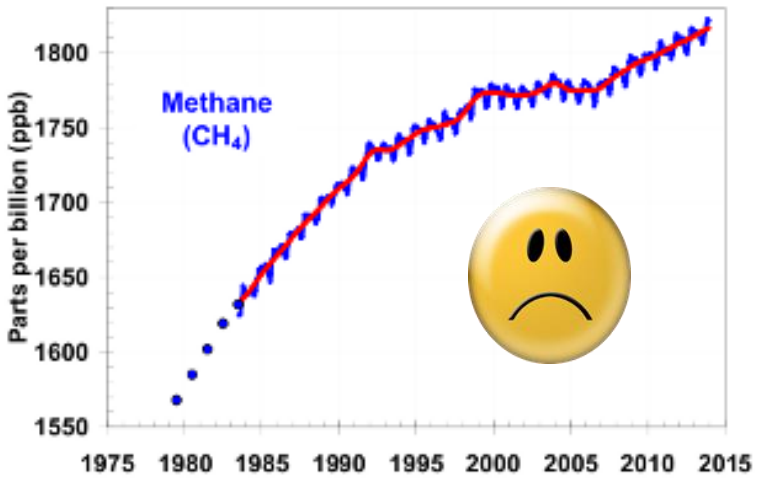
http://www.brainyquote.com/quotes/quotes/w/winstonchu135259.html

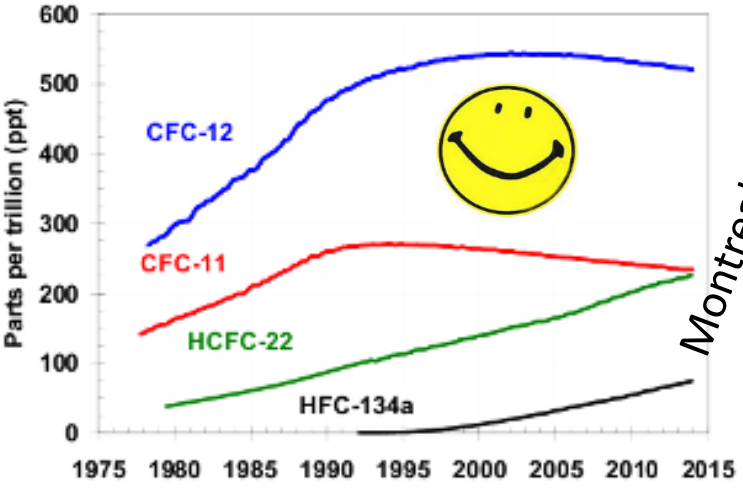
- **"The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years."**

IPCC Working Group 1. Summary for policy makers. September 27, 2013.



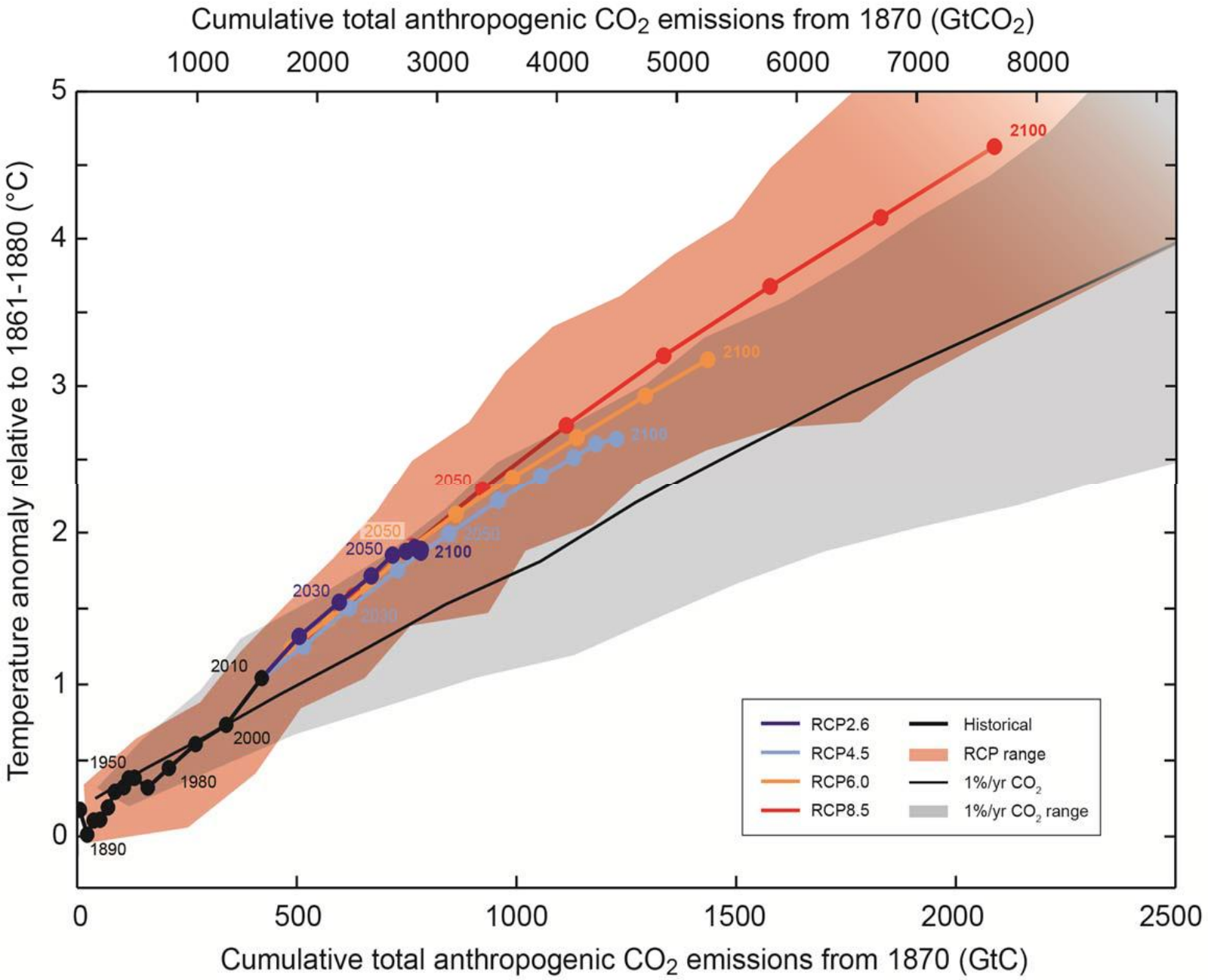






Montreal Protocol 1987

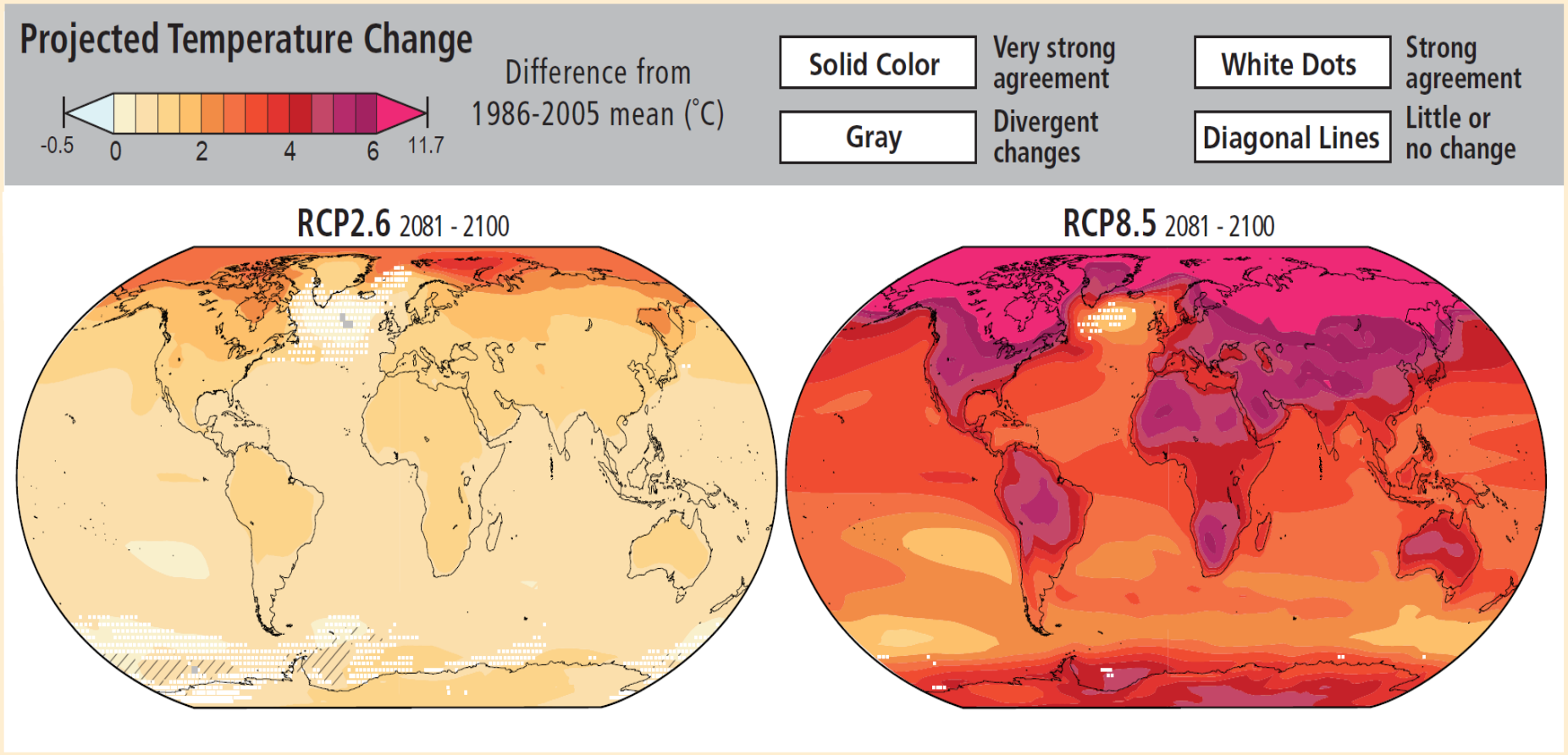
http://www.esrl.noaa.gov/gmd/aggi/aggi.html



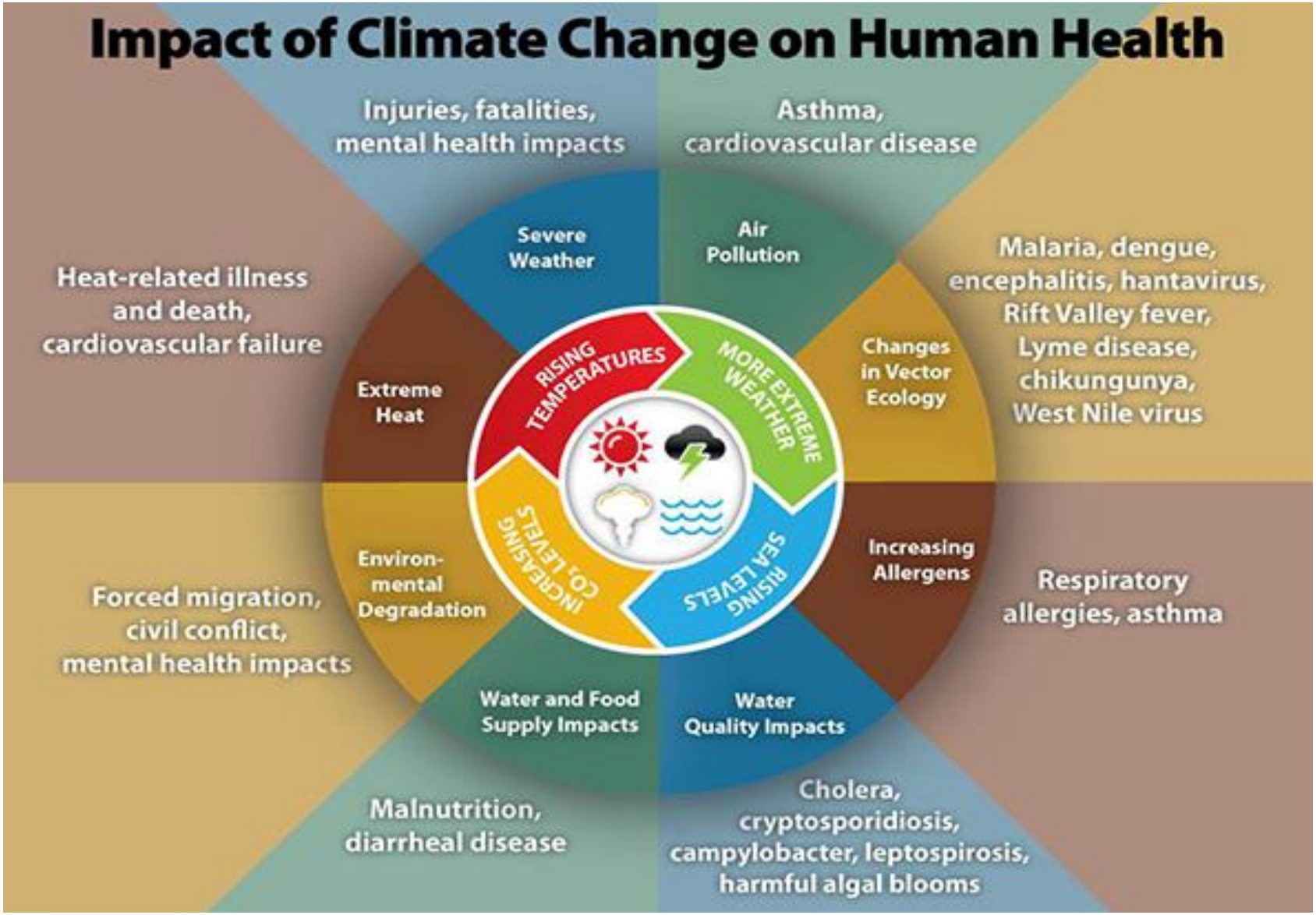
Best current predictive models from IPCC, September 27, 2013

Very low emissions

Business as usual = High emissions



Climate change 2014: Impacts, adaptation, and vulnerability
Intergovernmental Panel on Climate Change. IPCC Working Group 2.



https://www.cdc.gov/climateandhealth/effects/default.htm

World Health Organization

"Climate change is the greatest threat to global health in the 21st century."

"Health professionals have a duty of care to current and future generations. You are on the front line in protecting people from climate impacts - from more heat-waves and other extreme weather events; from outbreaks of infectious diseases such as malaria, dengue and cholera; from the effects of malnutrition; as well as treating people that are affected by cancer, respiratory, cardiovascular and other non-communicable diseases caused by environmental pollution."

WHO calls for urgent action to protect health from climate change

http://www.who.int/globalchange/global-campaign/cop21/en/

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

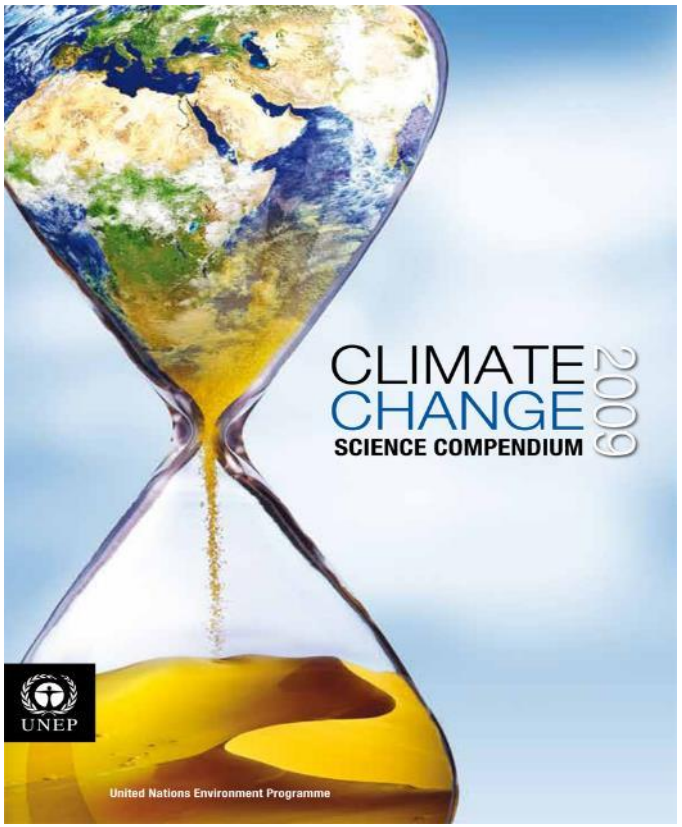
Review

Climate change, human health, and epidemiological transition

Bruce Barrett [1], Joel W. Charles, Jonathan L. Temte

University of Wisconsin School of Medicine and Public Health, Department of Family Medicine, University of Wisconsin–Madison, 1100 Delaplaine Street, Madison, WI 53715, United States.

https://aslathedirt.files.wordpress.com/2017/02/climate-health.jpg?w=636



www.unep.org/climatechange/adaptation/ScienceandAssessments

Climate Change

www.stockinvestor.com/30126/
sitting-investings-doom-gloom/

https://eraoflight.com/2018/07/14

Solutions

WELLNESS, HAPPINESS & LIGHT

https://happinessloveandlight.com/2016/07/05/
reconnecting-with-your-inner-light/

Patz Public Health Reviews (2016) 37:30
DOI 10.1186/s40985-016-0047-y

Public Health Reviews

EDITORIAL Open Access

Solving the global climate crisis: the greatest health opportunity of our times?

Jonathan A. Patz

Mitigation Co-benefit Opportunities

Special Communication

JAMA. doi:10.1001/jama.2014.13186
Published online September 22, 2014.

Climate Change
Challenges and Opportunities for Global Health

Jonathan A. Patz, MD, MPH; Howard Frumkin, MD, DrPH; Tracey Holloway, PhD;
Daniel J. Vimont, PhD; Andrew Haines, MBBS, MD

Co-Benefits = “win-win” scenario

Int J Public Health (2013) 58:305–311
DOI 10.1007/s00038-012-0422-5

REVIEW

Health co-benefits and risks of public health adaptation strategies to climate change: a review of current literature

June J. Cheng · Peter Berry

CLIMATE CHANGE

Clinical Medicine 2009, Vol 9, No 3: 212–13

The health co-benefits of climate change policies: doctors have a responsibility to future generations

Ian Roberts

SPOTLIGHT: CLIMATE CHANGE

How the low carbon economy can improve health

Health professionals are uniquely placed to guide the climate change conversation towards better policies that are good for the planet and for people, say **Andy Haines** and **Carlos Dora**

Andy Haines *professor of public health and primary care*[1], Carlos Dora *co-ordinator*[2]

[1]Departments of Social and Environmental Health Research and Nutrition and Public Health Intervention Research, London School of Hygiene and Tropical Medicine, London WC1E 7HT, UK; [2]Interventions for Healthy Environments Unit, Department of Public Health and the Environment, World Health Organization, Geneva, Switzerland

news & views

MITIGATION POLICY

Health co-benefits

Efforts to tackle climate change have met significant financial and political barriers that have been difficult to overcome. Research now shows that such measures are justified on grounds other than mitigation of climate change.

George D. Thurston

Plenaries

Health benefits of a low carbon economy

*A. Haines**

London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, London WC1H 9SH, United Kingdom

Implications of incorporating air-quality co-benefits into climate change policymaking

G F Nemet[1,2], T Holloway[1] and P Meier[3]

[1] Nelson Institute Center for Sustainability and the Global Environment (SAGE), University of Wisconsin–Madison, Madison, WI, USA
[2] La Follette School of Public Affairs, University of Wisconsin–Madison, Madison, WI, USA
[3] Energy Institute, University of Wisconsin–Madison, Madison, WI, USA

nature climate change

LETTERS

PUBLISHED ONLINE: 22 SEPTEMBER 2013 | DOI: 10.1038/NCLIMATE2009

Co-benefits of mitigating global greenhouse gas emissions for future air quality and human health

J. Jason West[1]*, Steven J. Smith[2], Raquel A. Silva[1], Vaishali Naik[3], Yuqiang Zhang[1], Zachariah Adelman[1], Meridith M. Fry[1], Susan Anenberg[4], Larry W. Horowitz[5] and Jean-Francois Lamarque[6]

What would happen if people walked & biked instead of drove, half of the time, for trips of 5 miles or less, in 11 metropolitan areas in the US midwest?

Maggie Grabow MPH PhD

Research

Air Quality and Exercise-Related Health Benefits from Reduced Car Travel in the Midwestern United States

Maggie L. Grabow,[1,2] Scott N. Spak,[1,3,4] Tracey Holloway,[1,4] Brian Stone Jr.,[5] Adam C. Mednick,[1,6,7] and Jonathan A. Patz[1,2,8]

[1]Nelson Institute, SAGE (Sustainability and the Global Environment), University of Wisconsin–Madison, Madison, Wisconsin, USA; [2]Department of Population Health Sciences, School of Medicine and Public Health, University of Wisconsin–Madison, Madison, Wisconsin, USA; [3]Now: Public Policy Center, University of Iowa, Iowa City, Iowa, USA; [4]Department of Atmospheric and Oceanic Sciences, University of Wisconsin–Madison, Madison, Wisconsin, USA; [5]School of City and Regional Planning, Georgia Institute of Technology, Atlanta, Georgia, USA; [6]Department of Urban and Regional Planning, University of Wisconsin–Madison, Madison, Wisconsin, USA; [7]Wisconsin Department of Natural Resources, Madison, Wisconsin, USA; [8]Global Health Institute, University of Wisconsin–Madison, Madison, Wisconsin, USA

Background: Automobile exhaust contains precursors to ozone and fine particulate matter (PM ≤ 2.5 μm in aerodynamic diameter; $PM_{2.5}$), posing health risks. Dependency on car commuting also reduces physical fitness opportunities.

Objective: In this study we sought to quantify benefits from reducing automobile usage for short urban and suburban trips.

Methods: We simulated census-tract level changes in hourly pollutant concentrations from the elimination of automobile round trips ≤ 8 km in 11 metropolitan areas in the upper midwestern United States using the Community Multiscale Air Quality (CMAQ) model. Next, we estimated annual changes in health outcomes and monetary costs expected from pollution changes using the U.S. Environmental Protection Agency Benefits Mapping Analysis Program (BenMAP). In addition, we used the World Health Organization Health Economic Assessment Tool (HEAT) to calculate benefits of increased physical activity if 50% of short trips were made by bicycle.

Results: We estimate that, by eliminating these short automobile trips, annual average urban $PM_{2.5}$ would decline by 0.1 μg/m^3 and that summer ozone (O_3) would increase slightly in cities but decline regionally, resulting in net health benefits of $4.94 billion/year [95% confidence interval (CI): $0.2 billion, $13.5 billion], with 25% of $PM_{2.5}$ and most O_3 benefits to populations outside metropolitan areas. Across the study region of approximately 31.3 million people and 37,000 total square miles, mortality would decline by approximately 1,295 deaths/year (95% CI: 912, 1,636) because of improved air quality and increased exercise. Making 50% of short trips by bicycle would yield savings of approximately $3.8 billion/year from avoided mortality and reduced health care costs (95% CI: $2.7 billion, $5.0 billion). We estimate that the combined benefits of improved air quality and physical fitness would exceed $8 billion/year.

Conclusion: Our findings suggest that significant health and economic benefits are possible if bicycling replaces short car trips. Less dependence on automobiles in urban areas would also improve health in downwind rural settings.

Key words: air pollution, BenMAP, bicycling, built environment, climate change, ozone, particulate matter, physical activity, urban design, vehicle emissions. *Environ Health Perspect* 120:68–76 (2012). http://dx.doi.org/10.1289/ehp.1103440 [Online 2 November 2011]

The current fossil fuel–based transportation system of the United States negatively impacts human health by increasing air pollution and automobile accidents and by decreasing physical activity. Here, we consider how replacing short automobile trips with bicycle transport might yield health benefits through improved air quality and physical fitness, with a focus on the upper midwestern United States as our study region.

Both ozone (O_3) and fine particular matter ≤ 2.5 μm in aerodynamic diameter ($PM_{2.5}$) in the ambient air exacerbate bronchitis and asthma and may contribute to cardiovascular mortality (Brunekreef and Holgate 2002). Asthma affects 8.2% of U.S. citizens, and an estimated 10 million adults have diagnosed chronic obstructive pulmonary disease (COPD) (Centers for Disease Control and Prevention 2009). In addition, recent estimates attribute 63,000–88,000 premature deaths per year due to $PM_{2.5}$ [U.S. Environmental Protection Agency (EPA) 2010c]. In the United States, on-road vehicles are responsible for about 26% of volatile organic compounds (VOCs) and 35% of nitrogen oxide (NO_x) emissions (U.S. EPA 2005c, 2005d). NO_x and VOCs combine to form O_3 and contribute to nitrate and secondary organic aerosols, important components of $PM_{2.5}$. Nearly 240 U.S. counties, with > 118 million total residents, exceeded U.S. EPA O_3 standards in 2011, and > 200 counties (> 88 million total residents) failed to meet $PM_{2.5}$ standards, in part because of pollution from short car trips (U.S. EPA 2011a, 2011b).

Transport-related inactivity, that is, the use of motorized transport rather than walking and bicycling, has been linked to increased mortality and decreases in healthy life years, with the greatest impacts on chronic diseases including heart disease, stroke, colon cancer, diabetes mellitus type 2, obesity, breast cancer, and osteoporosis [World Health Organization (WHO) 2002]. Carlson et al. (2009) estimated that 32.4% of the U.S. population is fully inactive (no moderate-intensity or vigorous-intensity physical activity lasting at least 10 min at a time), while only 33.5% is physically active, defined as 30 min/day with moderate-intensity activity, ≥ 5 days/week. In a recent Dutch study, Johan de Hartog et al. (2010) concluded that shifting from short car trips to bicycle trips would reduce all-cause mortality, with estimated reductions in mortality due to increased physical activity that were nine times greater than estimated increases in mortality due to increased pollution inhalation and traffic-related fatality estimates in the Netherlands.

In the United States, 28% of all car trips are ≤ 1.6 km (1 mi), which is the distance that a typical European would walk (European Commission 2001; Pucher and Dijkstra 2003). Another 41% of all trips are ≤ 3.2 km (2 mi), a distance that many Europeans would be as likely to bicycle as to

Address correspondence to M.L. Grabow, Nelson Institute for Environmental Studies, Center for Sustainability and the Global Environment, University of Wisconsin–Madison, 1710 University Ave., Madison, WI 53726 USA. Telephone: (314) 249-0471. Fax: (608) 265-4113. E-mail: grabow@wisc.edu

Supplemental Material is available online (http://dx.doi.org/10.1289/ehp.1103440).

We thank G. Allez and the two anonymous reviewers for their useful comments and suggestions and J. Sledge and S. Ventura (University of Wisconsin–Madison) for advice on urban geospatial approaches.

Research by M.G. and J.P. was supported by the U.S. Environmental Protection Agency (EPA) STAR program (grant R83275201O), Health Risks from Climate Variability and Change in the Upper Midwest: a Place-based Assessment of Climate-related Morbidity. M.G. was also supported by NSF grant DGE-0549407, an Integrative Graduate Education and Research Traineeship (IGERT) titled "Vulnerability and Sustainability in Coupled Human-Natural Systems." S.S., T.H., B.S., and A.M. were supported by U.S. EPA STAR grant R831860.

Contents of this article are solely the responsibility of the grantee and do not necessarily represent the views of the U.S. EPA.

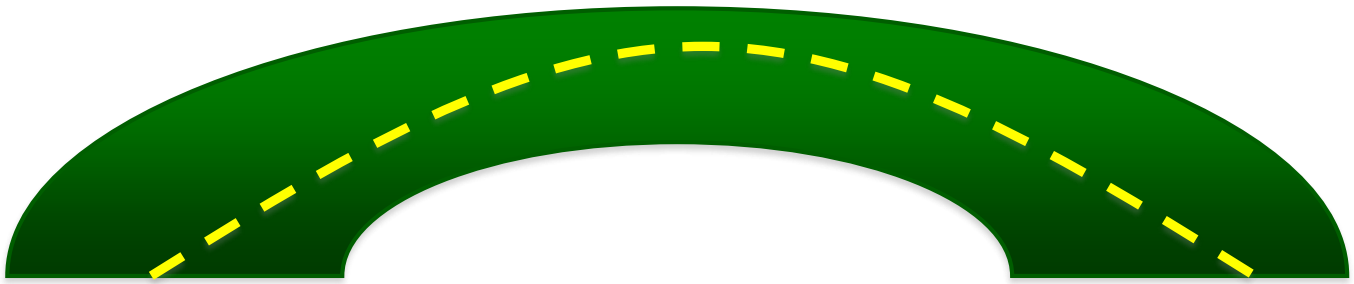
The authors declare they have no actual or potential competing financial interests.

Received 12 January 2011; accepted 5 October 2011.

Air Quality and Exercise-Related Health Benefits of Reduced Car Travel in the Midwestern United States

Grabow et. al

- Mortality declines regionally by 1,295 deaths/year
- Economic benefits exceeds $8.7 billion annually
- Health benefits in downwind rural areas
- Reduction greenhouse gases
- Small changes in air quality = Large health benefits



Current health impacts of fossil fuel combustion (main cause of climate change)

- **Outdoor air pollution** → 3.7 million deaths/yr – mostly from urban exposures
- **Indoor air pollution** → 4.3 million deaths/yr – mostly from inefficient biomass and coal cookstoves

Courtesy: J.Patz **&** D.Campbell-Lendrum, WHO

nature climate change

ARTICLES

PUBLISHED ONLINE: 24 AUGUST 2014 | DOI: 10.1038/NCLIMATE2342

A systems approach to evaluating the air quality co-benefits of US carbon policies

Tammy M. Thompson[1*†], Sebastian Rausch[1†], Rebecca K. Saari[2] and Noelle E. Selin[2,3]

Because human activities emit greenhouse gases (GHGs) and conventional air pollutants from common sources, policy designed to reduce GHGs can have co-benefits for air quality that may offset some or all of the near-term costs of GHG mitigation. We present a systems approach to quantify air quality co-benefits of US policies to reduce GHG (carbon) emissions. We assess health-related benefits from reduced ozone and particulate matter ($PM_{2.5}$) by linking three advanced models, representing the full pathway from policy to pollutant damages. We also examine the sensitivity of co-benefits to key policy-relevant sources of uncertainty and variability. We find that monetized human health benefits associated with air quality improvements can offset 26–1,050% of the cost of US carbon policies. More flexible policies that minimize costs, such as

"…health benefits…can offset 26-1050% of the cost of US carbon policies"

Slide courtesy J. Patz

World Health Organization

https://www.cfsd16.org/application/files/5914/7933/5866/FFO-Boosters-Policies.jpg

Mindful Climate Action

Our Goal:

To demonstrably influence behaviors to substantively reduce individual carbon footprints, and to do so in a way that fosters human health and happiness.

Mindfulness based stress reduction

MBSR

Pioneered by Jon Kabat-Zinn PhD
Center for Mindfulness in Medicine, Health Care
University of Massachusetts Medical School

Trans-theoretical Model of Change

Adapted from Prochaska and Di Clemente's cycle of change model.

https://image.slidesharecdn.com/prochaskaanddiclementes transtheoreticalmodelofchange-140210195150-phpapp02/

C. C. Diclemente and J. O. Prochaska. Self-change and therapy change of smoking behavior: a comparison of processes of change in cessation and maintenance. Addict.Behav. 7 (2):133-142, 1982.

J. O. Prochaska, C. C. Diclemente, et al. Criticisms and concerns of the transtheoretical model in light of recent research. Br.J.Addict. 87 (6):825-828, 1992.

J. O. Prochaska and C. C. Diclemente. Stages of change in the modification of problem behaviors. Prog.Behav.Modif. 28:183-218, 1992.

1

Climate Change *Deniers:*
Pre-contemplation

2

Climate Change *Acceptors:*
Contemplation

3

Climate Change *Supporters:*
Preparation

4

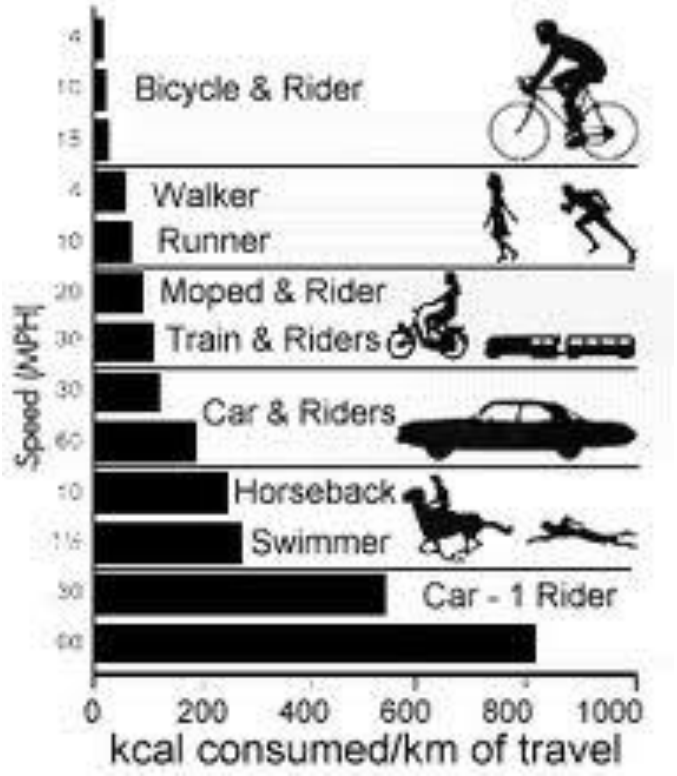
Climate Change *Activists:*
Maintenance

from Denial to Mindful Climate Activism

Table 1. Mindful Climate Action (MCA) weekly curriculum.

Week	MBSR Topic	Practices Learned	MCA Weekly Topic	Objective
1	Cultivating Beginner's Mind and Non-judging *(Simple Awareness)*	Mindful eating Breath Awareness Body Scan	Mindful Eating: Healthy and Sustainable Diets	Develop awareness of the varying environmental and health impacts of food
2	Cultivating Non-striving *(Attention and The Brain)*	Loving Kindness Meditation	Water Considerations for Sustainable Lifestyles	Learn and understand the many implications of a changing climate on water scarcity
3	Cultivating Acceptance *(Dealing with Thoughts)*	Mindfulness within movement Hatha Yoga Walking Meditation	Walking Meditation, Exercise, and Active Transport	Gain understanding of multiple benefits of active transportation and motivate participants to choose active modes of transport whenever possible
4	Cultivating Patience *(Stress: Responding* vs. *Reacting)*	Sitting meditation	Energy Conservation	Make connections between daily activities and energy use and understand the benefits of reducing energy consumption; Learn how to relate to both pleasant and unpleasant experiences
5	Cultivating Letting Go *(Dealing with Difficult Emotions/Sensations)*	Sitting meditation	Climate Connections Across Time and Space	Develop awareness of the connectedness of all living beings and ecosystems
6	Cultivating Trust *(Mindfulness and Communication)*	Compassion for the conditioned mind Mindful movement Part 2	Ethical considerations and observed inequities in the causes and consequences of climate change	Develop awareness of broader impacts of climate change on those least responsible
(retreat)		Mindful movement Sitting meditation Breathing Exercises Fast Walking Laughing Meditation Compassion		Foster contemplative insight and strengthen a sense of connectedness to other people and the world around us
7	Cultivating Forgiveness *(Mindfulness and Compassion)*	Sitting meditation with choiceless awareness (Metta) Loving Kindness meditation	Personal and Planetary Well-Being; Purchasing and Consumption	Understand concepts of desire and fulfillment, motivation, striving, purchasing, and the cycle of wanting and reward in context of actual need, temporary pleasure, and lasting happiness
8	Sustaining Practice in Times of Transition *(Conclusion)*	Self-directed yoga and mindful movement	Mindful Climate Learnings	Discuss how to keep the momentum of mindful climate action going in every-day lives; Reflect on the significance of always making sustainable choices

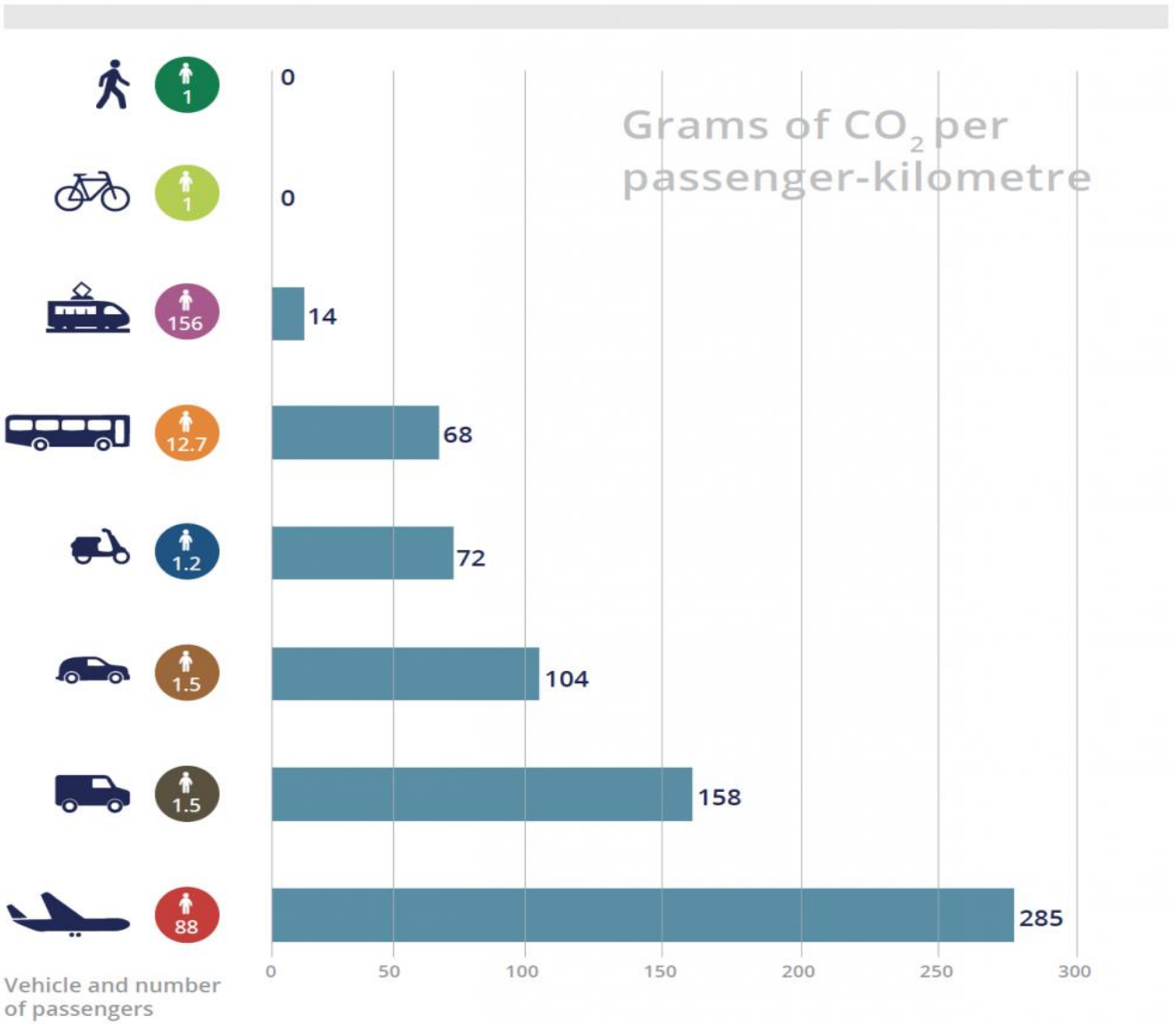
Drive less
Walk & bike more



www.theoildrum.com

www.zifflaw.com

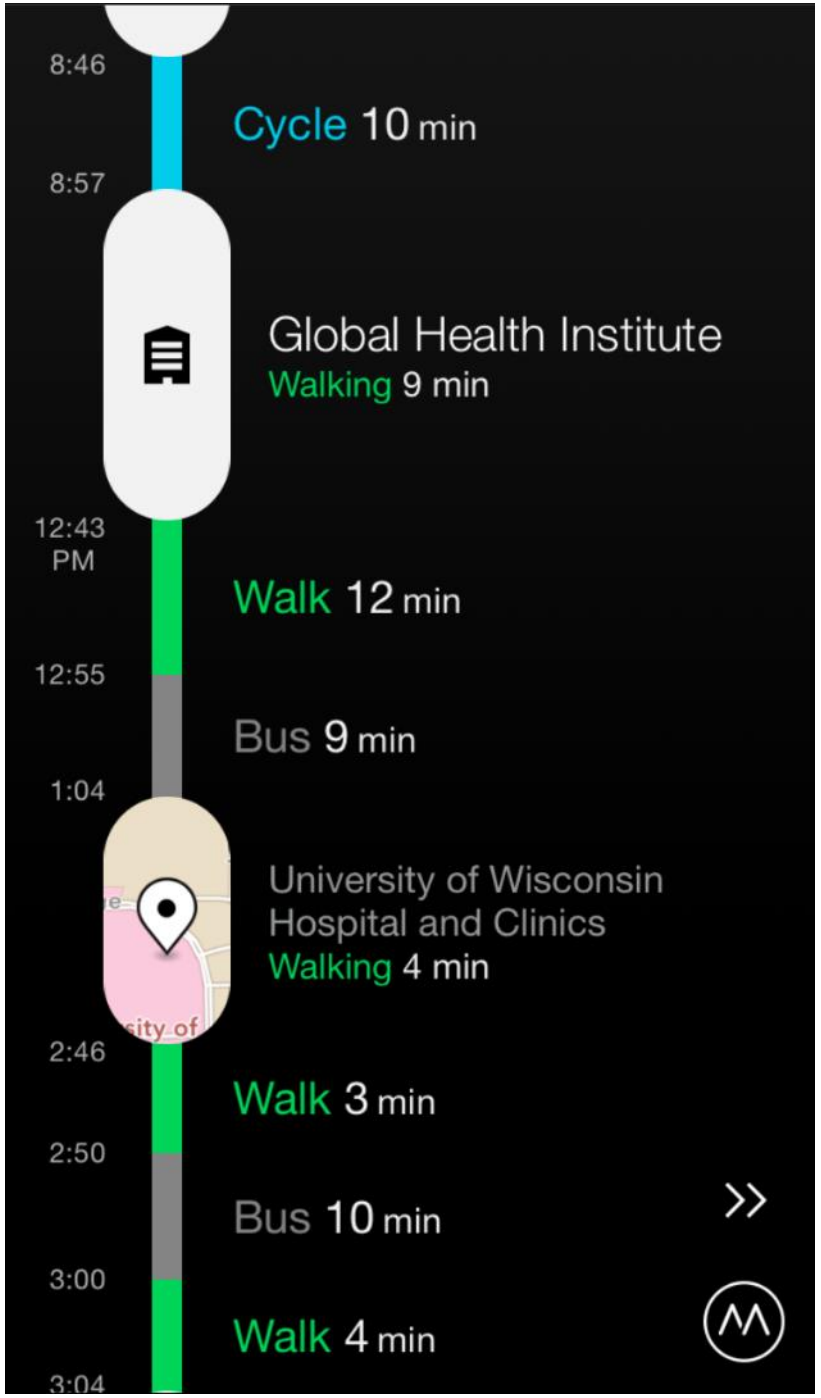
www.flickr.com



http://www.thaicyclingclub.org/en_US

MOVES App
Activity Storyline ➔

Travel Mode Distance Summary ➔



MOVES App Activity Map by Transportation Mode

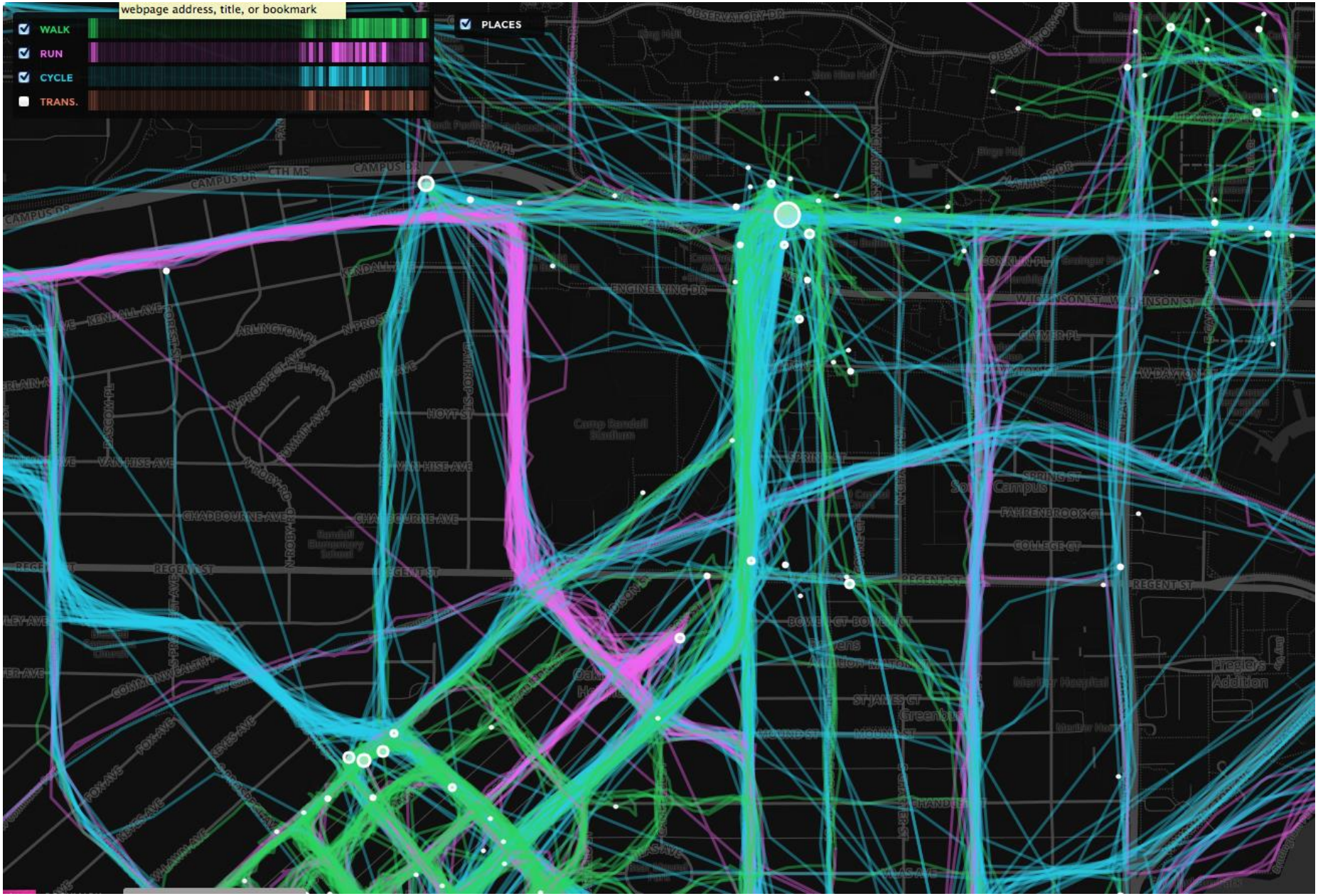


Table 2. MCA participant Moves app data (n = 5) descriptive statistics for the entire study period.

Mode	Unit	Mean	Median	SD	Min.	Max.
Walk	Hours/week	1.81	2.18	0.95	0.61	2.87
	Miles/week	1.55	1.75	0.86	0.48	2.42
	Average mph	0.84	0.80	0.07	0.79	0.95
Run	Hours/week	0.01	0.01	0.01	0.00	0.02
	Miles/week	0.02	0.02	0.02	0.01	0.04
	Average mph	2.01	2.01	0.42	1.71	2.32
Cycle	Hours/week	0.42	0.29	0.51	0.00	1.09
	Miles/week	1.28	1.14	1.45	0.01	2.82
	Average mph	3.11	2.93	0.61	2.60	3.97
Motor Vehicle	Hours/week	5.85	3.85	3.78	2.85	11.50
	Miles/week	93.96	82.89	62.74	34.72	185.17
	Average mph	19.33	13.45	16.35	7.21	48.05

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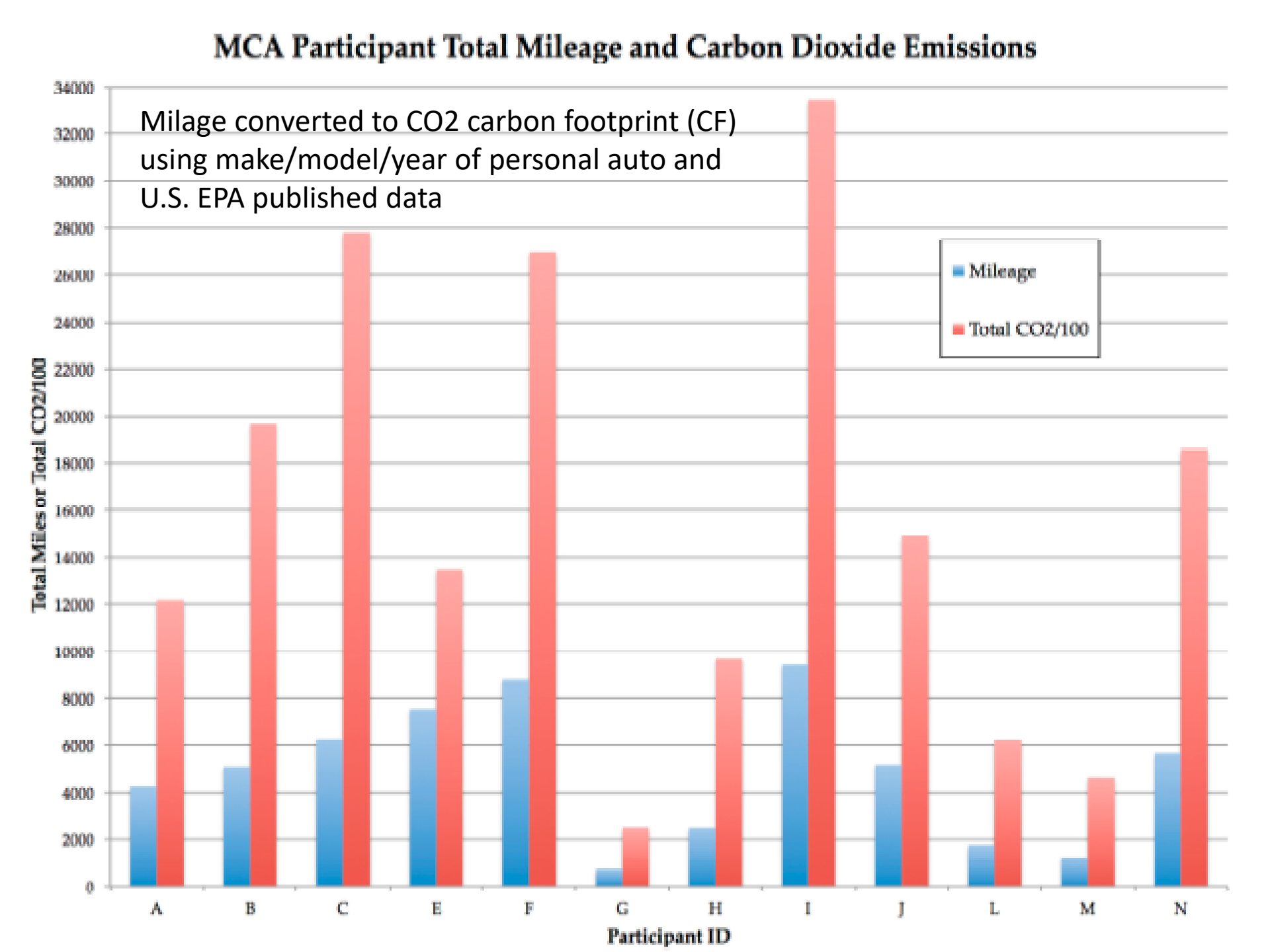
Article

Mindfulness and Climate Change Action: A Feasibility Study

Maggie Grabow [1,2], Thomas Bryan [3], Mary M. Checovich [1], Alexander K. Converse [4], Cathy Middlecamp [3], Margaret Mooney [5], Elisa R. Torres [6], Samuel G. Younkin [2] and Bruce Barrett [1,*]


MCA Participant Total Mileage and Carbon Dioxide Emissions
Milage converted to CO2 carbon footprint (CF) using make/model/year of personal auto and U.S. EPA published data
Mileage
Total CO2/100
Total Miles or Total CO2/100
34000
32000
30000
28000
26000
24000
22000
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
A
B
C
E
F
G
H
I
J
L
M
N
Participant ID

Psychosocial Health from Self-Report Validated Instruments

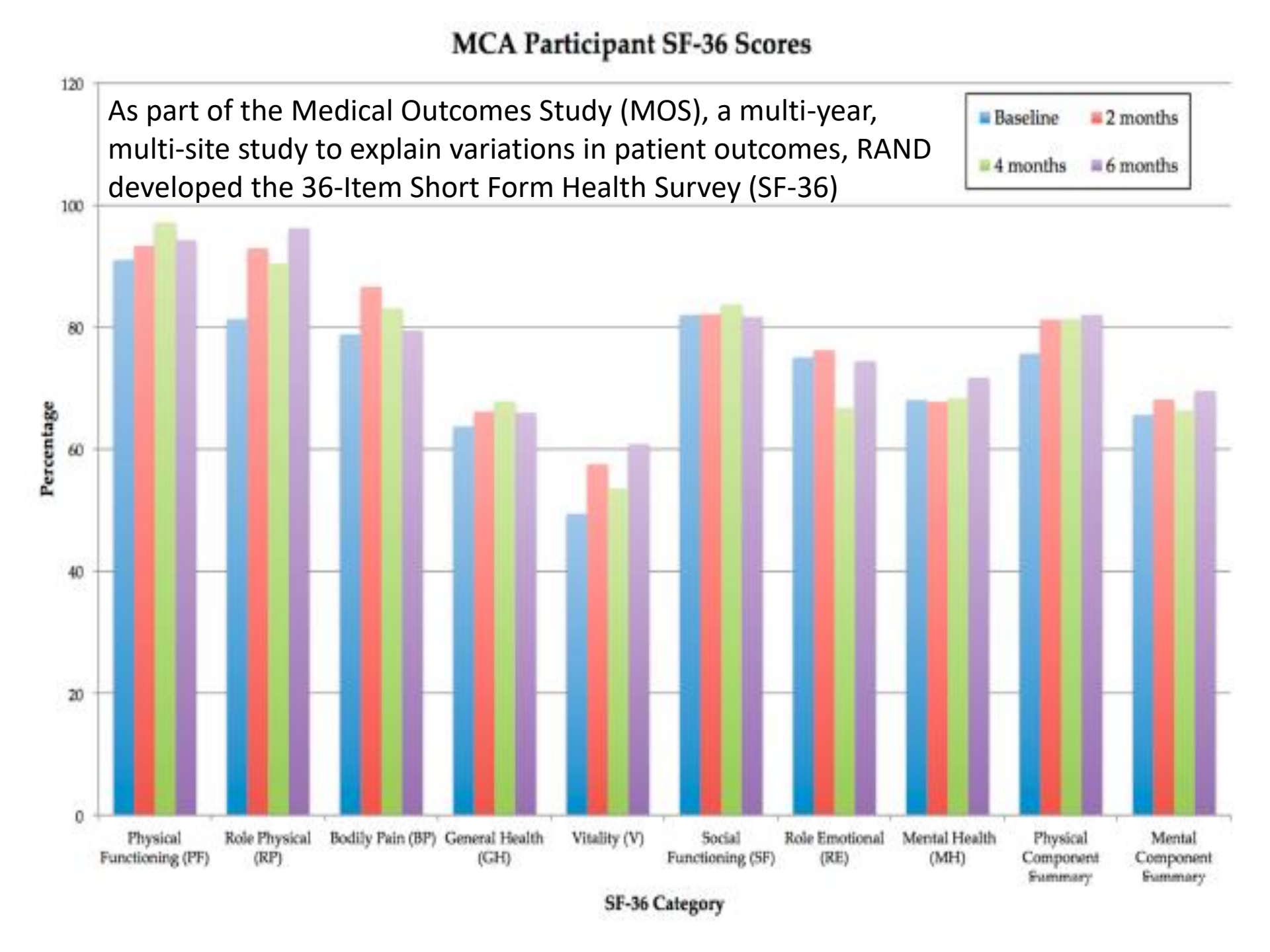
Depressive symptoms

Social support

Happiness

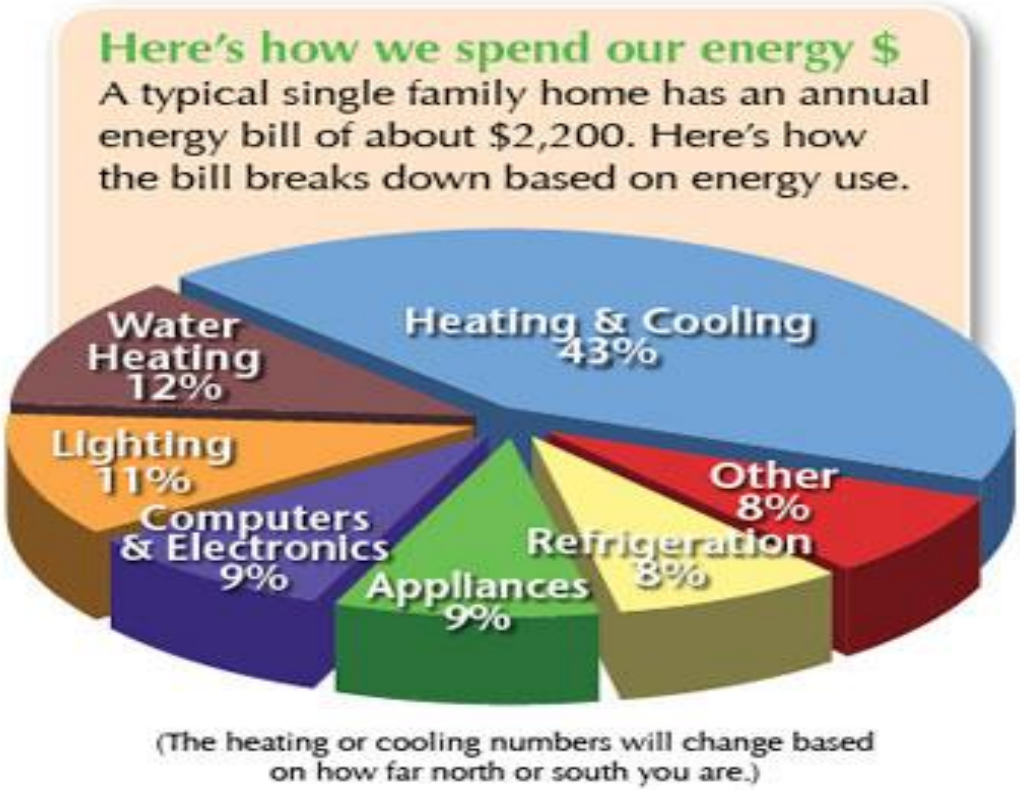
Perceived stress

		Month 0	Month 2	Month 4	Month 6
CES-D	*n*	16	13	12	13
	Mean	11.1	10.8	13.3	9.7
	SD	5.7	8.6	11.3	8.4
	Minimum	4.0	0.0	2.0	0.0
	Median	8.0	9.0	10.0	6.0
	Maximum	21.0	26.0	35.0	23.0
SPS-6	*n*	16	13	13	13
	Mean	21.5	23.5	23.2	24.1
	SD	3.7	3.8	4.2	4.2
	Minimum	15.0	14.0	15.0	14.0
	Median	22.0	24.0	24.0	25.0
	Maximum	27.0	29.0	28.0	30.0
PHI	*n*	16	14	13	13
	Mean	87.6	88.4	86.8	90.0
	SD	13.6	19.2	20.2	20.5
	Minimum	58.0	50.0	53.0	49.0
	Median	91.5	92.5	94.0	98.0
	Maximum	103.0	111.0	117.0	113.0
PSS-10	*n*	15	14	*	14
	Mean	16.2	13.8	*	12.0
	SD	5.3	6.1	*	5.2
	Minimum	8.0	5.0	*	3.0
	Median	16.0	13.0	*	13.5
	Maximum	27.0	25.0	*	20.0


MCA Participant SF-36 Scores
As part of the Medical Outcomes Study (MOS), a multi-year, multi-site study to explain variations in patient outcomes, RAND developed the 36-Item Short Form Health Survey (SF-36)
Baseline
2 months
4 months
6 months
120
100
80
60
40
20
0
Percentage
Physical Functioning (PF)
Role Physical (RP)
Bodily Pain (BP)
General Health (GH)
Vitality (V)
Social Functioning (SF)
Role Emotional (RE)
Mental Health (MH)
Physical Component Summary
Mental Component Summary
SF-36 Category

Personal & Household Energy Use

www.drenergysaver.com



Use your Thermostat To save energy

Sweaters and Long underwear in Winter

Shortsleeves and Shorts in Summer

Do you really need that air conditioner?

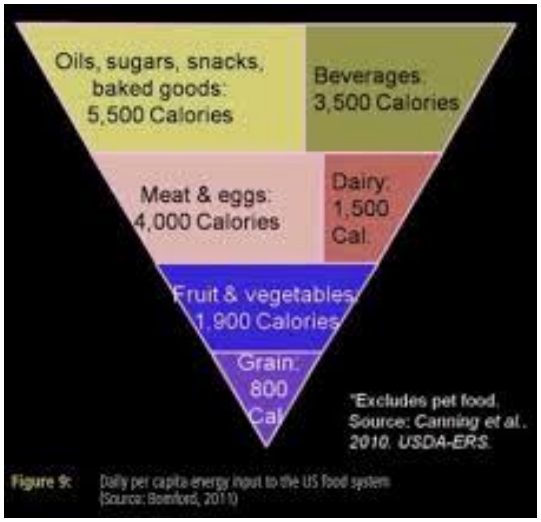
Madison Gas and Electric

www.pca.state.mn.us/news/
five-high-impact-actions-you-can-take

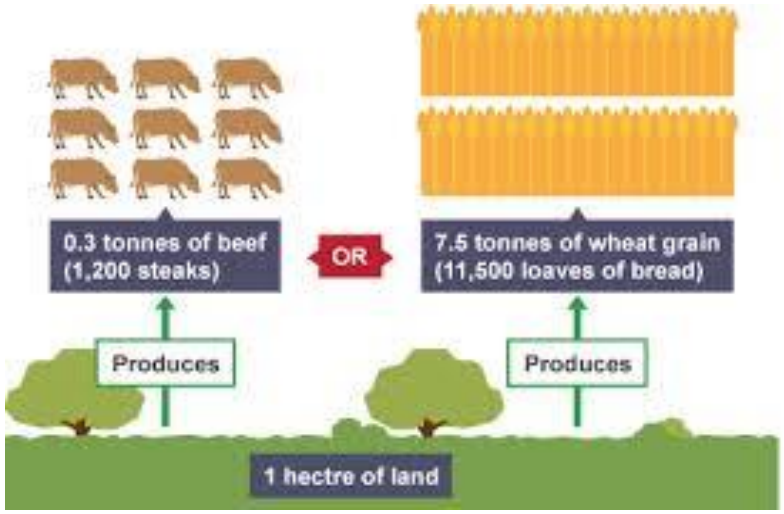
http://www.fairforallguide.com/2014/12/23/buy-less-live-more/

Eat lower on the food chain

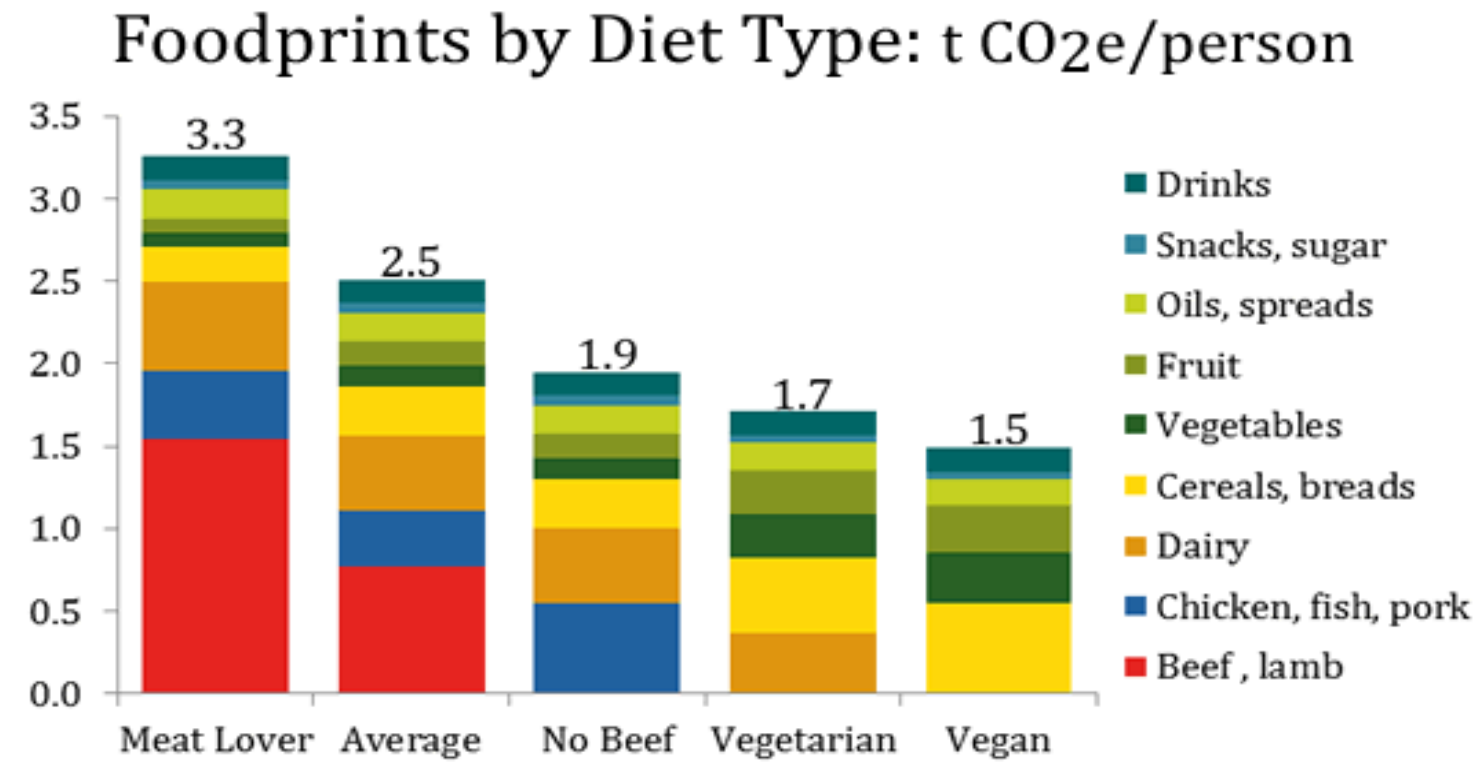
digestiondarryltan2h.blogspot.com



www.businessinsider.com



www.bbc.co.uk



Note: All estimates based on average food production emissions for the US. Footprints include emissions from supply chain losses, consumer waste and consumption.. Each of the four example diets is based on 2,600 kcal of food consumed per day, which in the US equates to around 3,900 kcal of supplied food.

Sources: ERS/USDA, various LCA and EIO-LCA data

Shrink That Footprint

http://www.greeneatz.com/foods-carbon-footprint.html

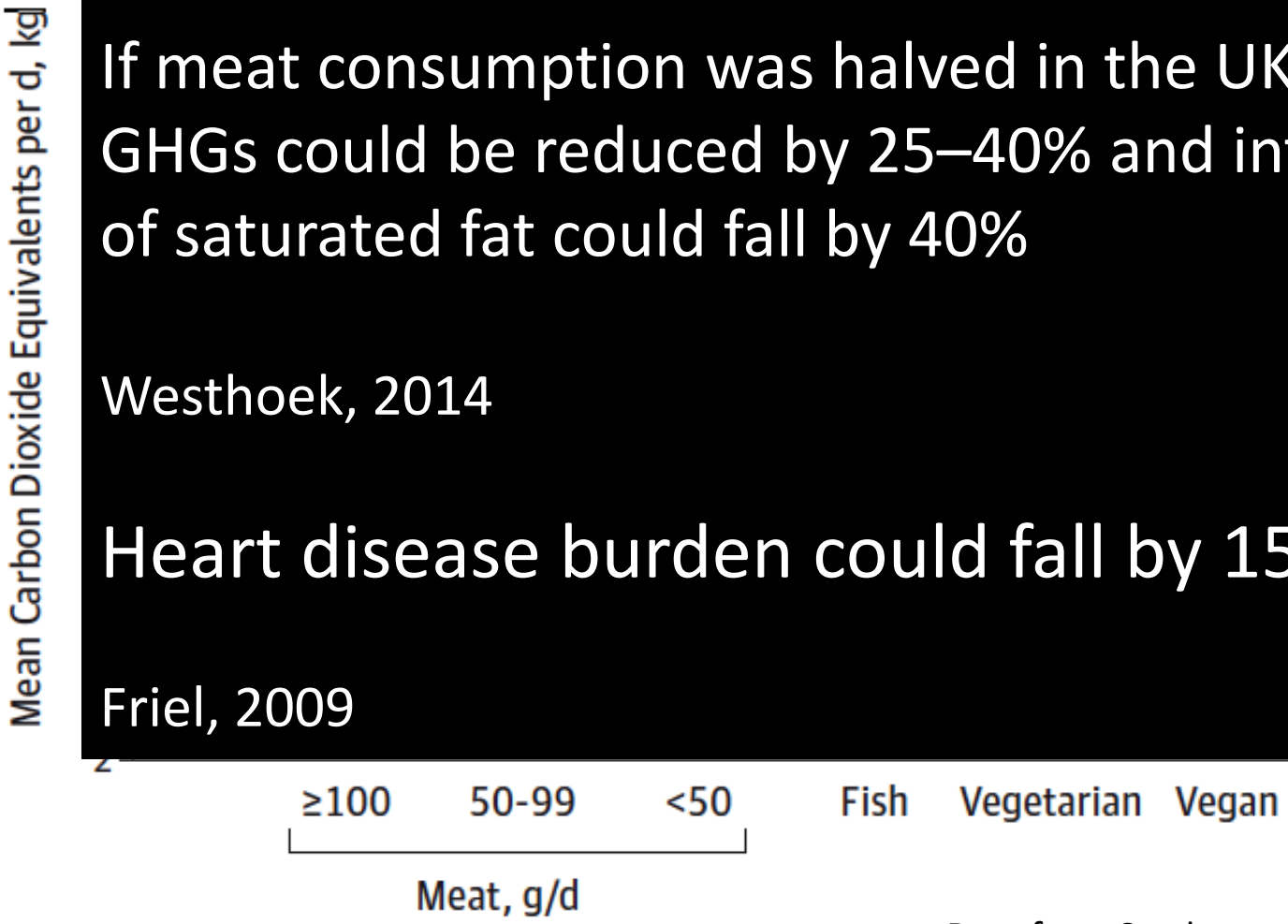
Diet and GHG Emissions

If meat consumption was halved in the UK, GHGs could be reduced by 25–40% and intake of saturated fat could fall by 40%

Westhoek, 2014

Heart disease burden could fall by 15%

Friel, 2009



Slide courtesy J. Patz

Data from Scarborough et al. 2014

Did you know that cow protein's C.F. is 36x greater than peas?

The two ingredients necessary to calculate an individual's dietary environmental footprint are:

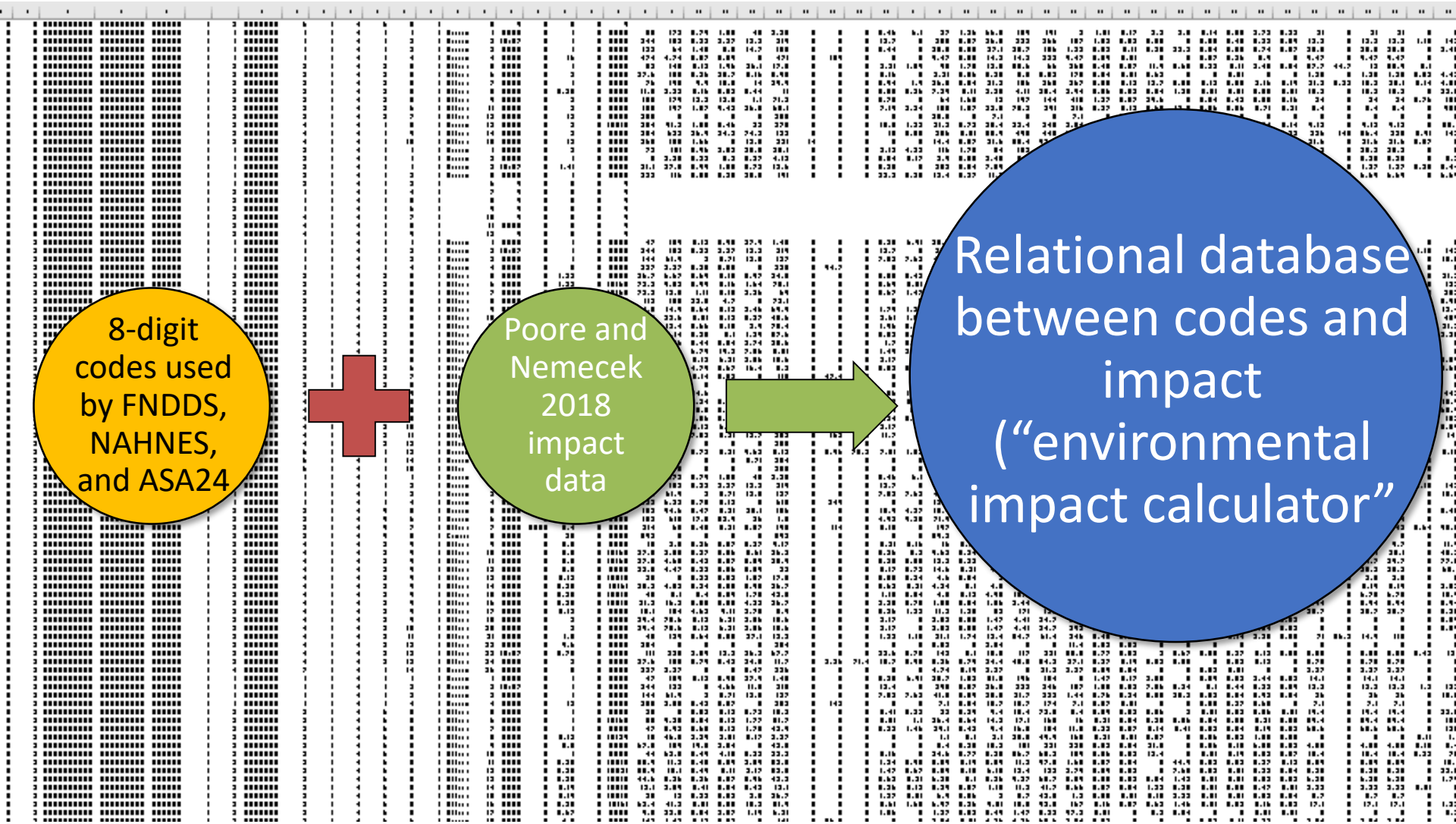
1) Food intake records (ASA24) with unique 8-digit food ID

2) Environmental impact data (Poore & Nemeck, 2018)

er **Tom Bryan** created an all-new
t calculator that tracks
with 7 eco-impact categories to
nvironmental impacts.

Making Data Matter!

MCA Environmental Impact Calculator



J. Poore & T. Nemecek. Reducing food's environmental impacts through producers and consumers. ***Science*** *360 (6392):987-992, 2018.*

Graduate student **Tom Bryan**'s calculator of

Carbon footprint using ASA24 data

T	Y	DY	DZ	EA	EB	EC
FoodCode	FoodAmt	Food_Description				
11112210	244	Milk, cow's, fluid, 1% fat				
63219000	123	Raspberries, raw, NS as to color				
92101000	473.6	Coffee, made from ground, regular				
51150000	52	Roll, white, soft				
83107000	27.6	Mayonnaise, regular				
24198700	76	Chicken patty, fillet, or tenders, breaded, cooked				
72116000	11.75	Endive, chicory, escarole, or romaine lettuce, raw				
31102000	100	Egg, whole, cooked, NS as to cooking method				
73410300	108	Sweet potato, french fries				
94100100	355.2	Water, bottled, unsweetened				
63149010	304	Watermelon, raw				
58106760	254	Pizza with meat and fruit, thick crust				
93101000	360	Beer				
51300110	72	Bread, whole wheat, NS as to 100%				
75506010	5	Mustard				
14109030	21.0945	Cheese, Swiss, reduced fat				
63101000	223	Apple, raw				

Unique 8-digit code from USDA FNDDS

Mass of food, in grams

M. Grabow, T. Bryan, M. Checovich, A. Converse, C. Middlecamp, M. Mooney, E. Torres, S. Younkin, and B. Barrett. **Mindfulness and climate change action: A feasibility study.** ***Sustainability*** 10 (5), 2018.

Table 1. Summary of the carbon footprints (kg CO_2e) of the nine participants with pre, during, and post ASA24 logs. The calculator used eco-invent and FoodCarbonScope as the data sources.

Participant	Baseline CF (kg CO_2e)	During MCA CF (kg CO_2e)	Follow-Up CF (kg CO_2e)	# of Items Logged
B	3.0	1.3	3.7	204
C	0.9	0.9	1.6	121
D	1.5	1.2	1.7	89
E	2.2	0.7	1.0	148
F	1.1	1.2	1.8	198
G	1.0	1.3	1.1	197
I	1.4	1.9	2.2	230
J	0.4	0.8	1.6	186
L	2.7	2.8	3.7	187
Group Sum	14.1	12.1	18.3	
Group Mean	1.6	1.3	2.0	
Group Median	1.4	1.2	1.7	
Group Range	2.6	2.1	2.6	

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Concept Paper

Mindful Climate Action: Health and Environmental Co-Benefits from Mindfulness-Based Behavioral Training

Bruce Barrett [1,*], Maggie Grabow [1,2], Cathy Middlecamp [3], Margaret Mooney [4], Mary M. Checovich [1], Alexander K. Converse [5], Bob Gillespie [6] and Julia Yates [1]

Scaling Up MINDFUL CLIMATE ACTION business plan

market MCA trainings to:

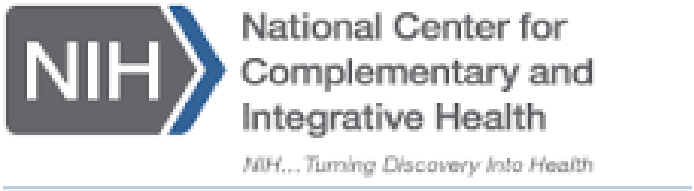
1) **Businesses** ↓energy costs ↓ absenteeism ↑ worker productivity

2) **Community** and **faith-based organizations** mission & moral mandate

3) **Educational institutions** educational mission & innovation

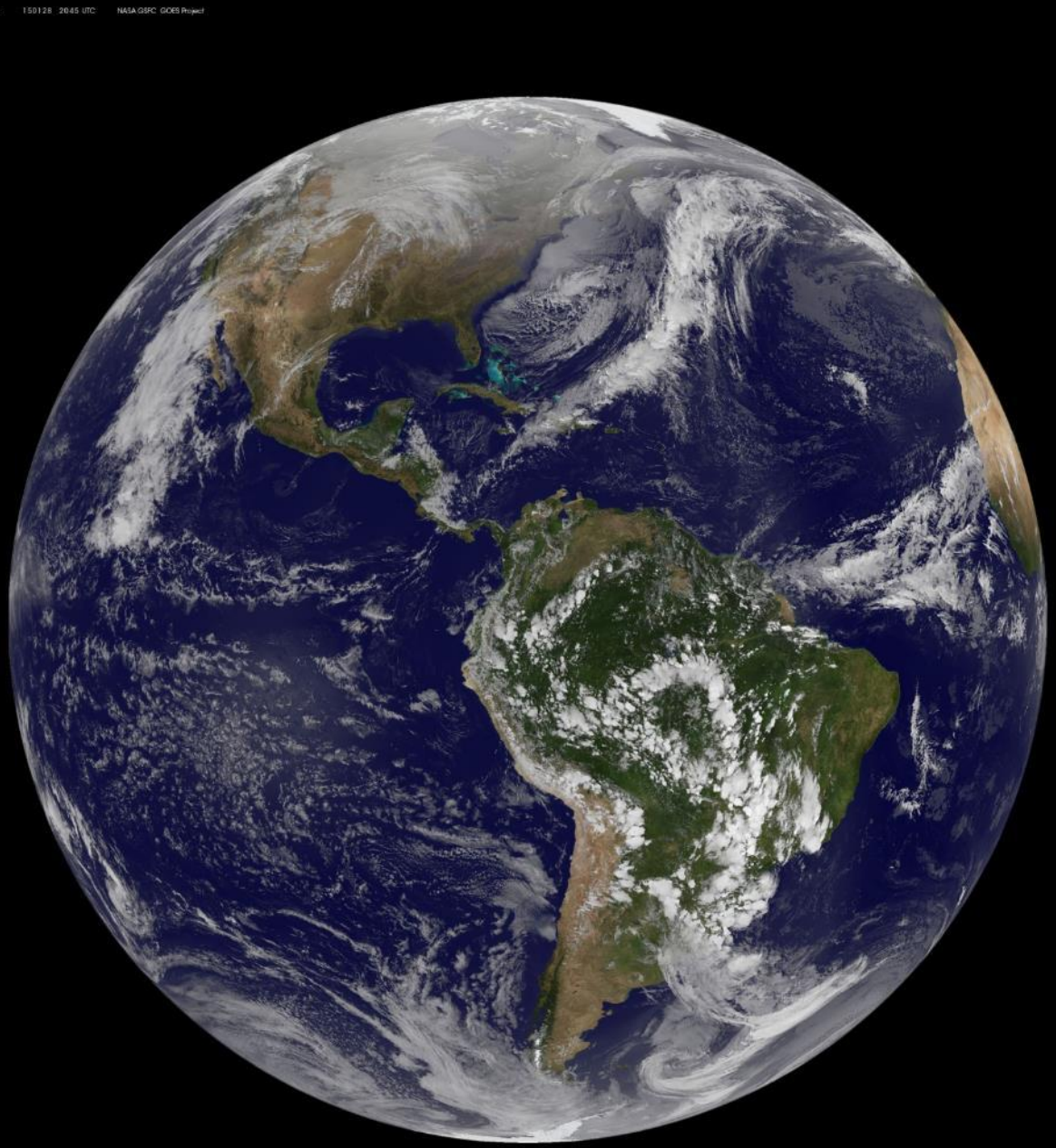
4) **General Public** in-person courses & web-based learning

http://yourstory.in/wp/content/uploads/2012/06



Potential future funders. . .

Expanding MCA Program



NASA
NOAA
UW CIMSS

http://goes.gsfc.nasa.gov/goescolor/goeseast/overview2/color_lrg/latestfull.jpg