

Welcome to this week's presentation and conversation
hosted by the
Canadian Association for the Club of Rome,
a Club dedicated to intelligent debate and action on global issues.

PaRx: a prescription for patient and planetary health.

Our speaker today is Dr. Melissa Lem, a family physician, Director of PaRx (Canada's national nature prescription program powered by the BC Parks Foundation), and President of the Canadian Association of Physicians for the Environment (CAPE). A leader in nature and health, her work has appeared in media including the CBC, Vancouver Sun, Toronto Star, Montreal Gazette, The Narwhal, and National Observer. One of her priorities is knowledge translation. Nature prescriptions are being written by healthcare professionals from Scotland to Japan to USA. Rightly so: from improved blood pressure and immune function to reduced stress and ADHD symptoms, the evidence is growing about the health benefits of green time. In 2020, the BC Parks Foundation launched PaRx, Canada's national nature prescription program, which has spread to all ten provinces. Today, Dr. Lem will discuss research highlights from the body of knowledge on nature and health, present an overview of PaRx and its influence, and reveal how prescribing nature can improve both patient and planetary health.

The presentation will be followed by a conversation, questions, and observations from the participants.

CACOR acknowledges that we all benefit from sharing the traditional territories of local Indigenous peoples (First Nations, Métis, and Inuit in Canada) and their descendants.



Website: canadiancor.com

Twitter: [@cacor1968](https://twitter.com/cacor1968)

YouTube: [Canadian Association for the Club of Rome](https://www.youtube.com/channel/UC...)



PaRx
A Prescription
for Nature



Social Prescribing

"A means of connecting patients to a range of non-clinical services in the community to improve their health and well-being"

- WHO

Allows provision of more holistic, person-centred care

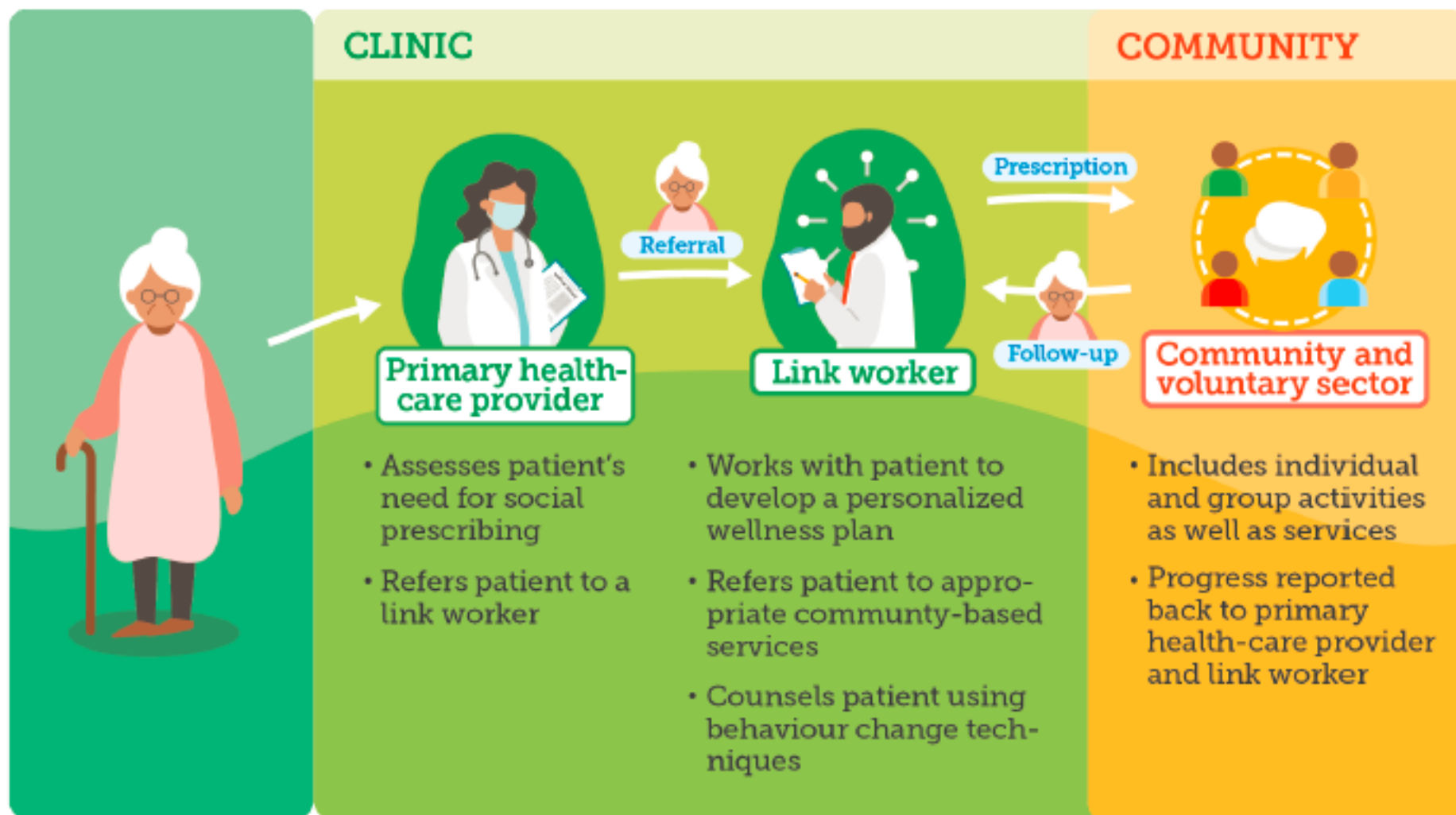
Empowers patients to take care of their own health and well-being → Reduces stress on health systems

<https://www.who.int/publications/i/item/978929061976>

PaRx_X

Fig. 1.

Example of a social prescribing patient pathway built on the “holistic” model outlined by Husk and colleagues





WHAT MAKES CANADIANS SICK?

50%

YOUR LIFE

- INCOME
- EARLY CHILDHOOD DEVELOPMENT
- DISABILITY
- EDUCATION
- SOCIAL EXCLUSION
- SOCIAL SAFETY NET
- GENDER
- EMPLOYMENT/WORKING CONDITIONS
- RACE
- ABORIGINAL STATUS
- SAFE AND NUTRITIOUS FOOD
- HOUSING/HOMELESSNESS
- COMMUNITY BELONGING

25%

YOUR HEALTH CARE

- ACCESS TO HEALTH CARE
- HEALTH CARE SYSTEM
- WAIT TIMES

15%

YOUR BIOLOGY

- BIOLOGY
- GENETICS

10%

YOUR ENVIRONMENT

- AIR QUALITY
- CIVIC INFRASTRUCTURE



THESE ARE CANADA'S SOCIAL DETERMINANTS OF HEALTH #SDOH

In one word, describe
how you feel when you
are outside in nature.

calm
peaceful
peaceful
peaceful

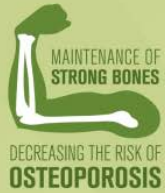
restored re-energized
fresh relaxed
grounded happy
peace safe
best wonderful
present

The joy of walking

- CAN BE DONE ALMOST ANYWHERE
- REQUIRES LITTLE EQUIPMENT OR TRAINING
- IS GREAT TO DO WITH A GROUP

Walking in nature promotes our wellbeing and the health of our natural environment.

Walking outside has been proven to provide physical health benefits such as:



WALKING PROVIDES A NATURAL RUSH OF ENDORPHINS, WHICH:

- Relieves Pain
- Enhances The Immune System
- Delays The Aging Process

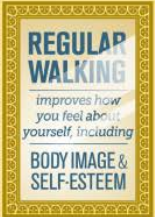
A DAILY WALK IN NATURE

Regular Use Of Natural Areas For PHYSICAL ACTIVITY Can Reduce The Risk Of Mental Health Problems By

can be as effective in treating mild cases of DEPRESSION as taking an ANTIDEPRESSANT



People Who Walk Regularly Report Feeling Less STRESSED OR NERVOUS



Improve Your Physical Wellbeing

Boost Your Mental Wellbeing

The Many Benefits of Being Active in Ontario's Green Space

moodwalks.ca

MOOD WALKS

Mood Walks supports the well-being of older adults who experience mental health issues through walking groups which visit Ontario's trails and conservation areas. For more information, or to get involved, please visit moodwalks.ca



Data on Nature and Health



Numerous studies have measured and analyzed the health impacts of accessible, abundant, and diverse nature. A few of the many finds are below:

The annual prevalence rate of 15 of 24 disease clusters was lower in living environments with more green space in a 1 km radius. The relation was strongest for anxiety disorder and depression. (3)

A study found that green views predicted a stronger sense of community and more social ties with neighbors. (1)

The average US employee spends 43 hrs/week at their workplace. Based on 2009 values, 90.3% of costs per sq. ft. at corporate offices are spent on salary, making employee well-being a valuable investment (4)

A view to nature, compared to either showing the same view or a curtained wall, found restorative effects from low-level stress to be significantly higher, based on heart rate recovery (4)

Symptoms of Attention Deficit Disorder (A.D.D.) in children were reported as significantly less after playing in natural areas outdoors (5)



Children on school grounds with a greater diversity of landscape and design are more physically active than those with asphalt or turf grass. (1)

Employees with views of trees and landscape took on average 11 fewer hours of sick leave per year (4)

Trees and vegetation provide shade, reduce the heat island effect and trap airborne pollutants, benefiting air quality (respiratory health) and cooling costs. They also filter groundwater, control erosion, and absorb water, which minimize stormwater runoff, flooding and pollution to our water systems. (1) Native plants require less chemicals and watering.

Measured using a mobile EEG headset, moving from built urban streets into urban green space showed real time excitement, engagement, drops in frustration, and increase in meditative calm. (1)

When people have views of nature or spend time in nature, they perform better on tasks that require focused attention (1)

Patients with views of nature recover from surgery more quickly and with fewer pain medications. (1)



Nature exposure benefits extend to hospital staff, whose alertness and well-being is crucial to patient health (4)

Psychological benefits of green spaces are enhanced with increased diversity of species. (2)



1. American Public Health Association, Policy and Advocacy. (2013, November 05). Improving Health and Wellness through Access to Nature [Policy Statement]. Retrieved from <https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/08/09/18/improving-health-and-wellness-through-access-to-nature>
 2. Fuller, R. A., Irvine, K. N., Devine-Wright, P., Warren, P. H., & Gaston, K. J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology Letters*, 3(4), 390-394. <https://doi.org/10.1098/rsbl.2007.0149>
 3. Maas, J., Verheij, S.A., de Vries, S., et al. Morbidity is related to a green living environment. *Journal of Epidemiology & Community Health* 2009;63:967-973.
 4. Browning, B., Garvin, C., Ryan, C., Kallianpurkar, N., Labruto, L., Watson, S., & Knop, T. (2012). The Economics of Biophilia: why designing with nature in mind makes financial sense (Publication). Retrieved <https://www.terrapi.in/brighgreen.com/report/economics-of-biophilia/>
 5. L.E. Keniger, et al. What are the benefits of interacting with Nature? *Int. J. Environ. Res. Public Health*, 10 (2013), pp. 913-935







SCIENTIFIC REPORTS

OPEN **Neighborhood greenspace and health in a large urban center**

Received: 08 February 2015

Accepted: 01 June 2015

Published: 09 July 2015

Omid Kardan¹, Peter Gozdyra², Bratislav Mistic³, Faisal Moola⁴, Lyle J. Palmer⁵, Tomáš Paus⁶
& Marc G. Berman^{1,7}

Study in Toronto combined:

- High-resolution satellite imagery
- Individual tree data
- Ontario Health Study data and self-reports of health perception

10 more trees/block affected health perception by:

- Increase in personal income of \$10,000/year
- Moving to a neighbourhood with \$10,000/year higher median income
- Being 7 years younger



Children With Attention Deficits Concentrate Better After Walk in the Park

Andrea Faber Taylor
Frances E. Kuo
University of Illinois, Urbana-Champaign

Journal of Attention Disorders
Volume 12 Number 5
March 2009 402-409
© 2009 SAGE Publications
10.1177/1087054708323000
<http://jad.sagepub.com>
hosted at
<http://online.sagepub.com>

17 children with ADHD were guided on three 20-minute walks through:

- city park
- downtown area
- residential area

A 20-minute walk in the park:

- improved DSB performance to levels in children w/o ADHD
- rivalled the peak effects of Ritalin

Mean Postwalk Scores on Digit Span Backwards for Park, Neighborhood, and Downtown Conditions



People report significantly better health and wellbeing after spending ___ in nature per week:

- ① 1 hour
- ② 2 hours
- ③ 3 hours
- ④ 4 hours
- ⑤ 5 hours

SCIENTIFIC REPORTS

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

Received: 8 May 2018
Accepted: 8 May 2019
Published online: 13 June 2019

Mathew P. White¹, Ian Alcock¹, James Grellier¹, Benedict W. Wheeler¹, Terry Hartig², Sara L. Warber^{1,3}, Angie Bone¹, Michael H. Depledge¹ & Lora E. Fleming¹

PaRx

- Study of 19,806 adults in England
- Likelihood of reporting good health or high well-being significantly greater at nature contact ≥ 120 min/week
- Positive associations peaked between 200-300 min/week

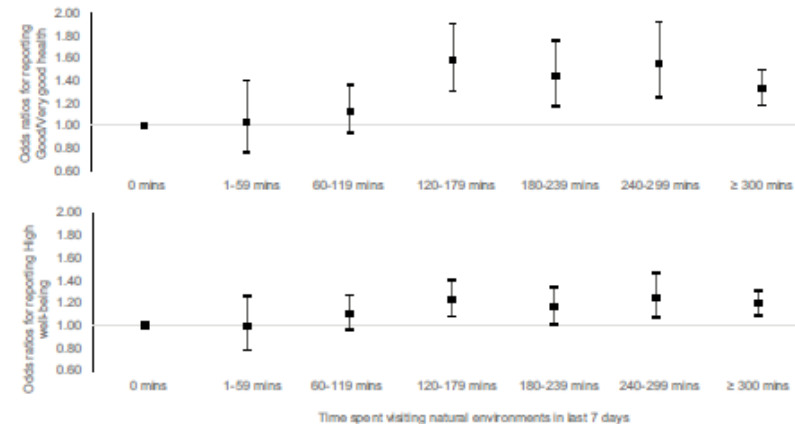


Figure 1. The odds ratios (OR) and 95% confidence intervals of reporting good health and high well-being as a function of nature visit duration in the last 7 days (0 mins = reference category). Note: Adjusted for urbanicity, neighbourhood greenspace, area deprivation, background PM10, sex, age, SES, restricted functioning, physical activity, employment status, relationship status, ethnicity, children in household, dog ownership and year.

The most efficient drop in cortisol levels happens between ___ in nature:

- ① 5 to 10 minutes
- ② 10 to 20 minutes
- ③ 20 to 30 minutes
- ④ 30 to 60 minutes
- ⑤ 1 to 2 hours

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

MaryCarol R. Hunter^{1*}, Brenda W. Gillespie² and Sophie Yu-Pu Chen³

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



PaRx

Over 8 weeks, 36 urban dwellers were asked to have a nature experience (NE):

- In an outdoor place that brings a sense of contact with nature
- At least 3 times/week
- For 10 minutes or more

Cortisol/stress levels ↓ 21.3% more after NE.
Efficiency of 'nature pill' greatest between 20-30 minutes

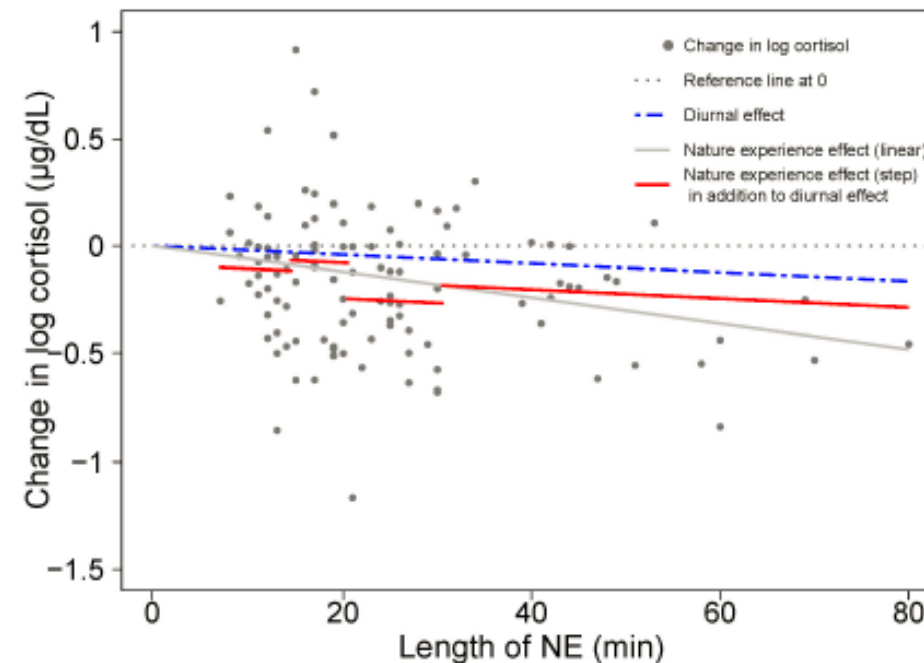


FIGURE 4 | A visual comparison of cortisol response to NE duration with linear (gray solid line) and step function regressions (solid red line segments) based on the results shown in **Tables 1** and **2**. As in **Figure 2**, the blue dashed line represents the diurnal effect of change in log cortisol. The difference between the blue dashed line and the red solid line segments represents the nature experience effect in addition to the diurnal effect.



Health as an Effective Message

Lessons from climate change research:

- Surveys conducted with >7,500 participants in 5 countries (China, Germany, India, UK, USA)
- Participants asked to read 5 pairs of statements, and asked which would make them more likely to support policies tackling climate change

Findings:

- Health* and Environmental framing increased support
- Economic framing had no effect
- Opportunity* framing increased support > Threat
- Present impacts more motivating than Future impacts

Focusing on current health impacts and opportunities in public policy messaging = more motivating to change behaviour

[Dasandi, N et al. How Do Different Frames Affect Public Support for Climate Change Policy: Evidence from a Multi-Country Conjoint Study January 2021.](#)

PaRx

Connecting to Nature is Good for the Planet



- Health care is a major contributor to global CO2 emissions.¹
- Urban nature makes cities healthier.²
- Children who have more nature experiences are more likely to become adult environmentalists—and adults who are more connected to nature are more likely to protect it.³

“Nature is ‘one of the most effective ways’ of combatting climate change and should be part of every country’s climate strategy”⁴

Inger Andersen, Executive Director, UN Environment Programme

¹ <https://noharm-global.org/documents/health-care-climate-footprint-report> ² <https://www.epa.gov/green-infrastructure/reduce-urban-heat-island-effect>

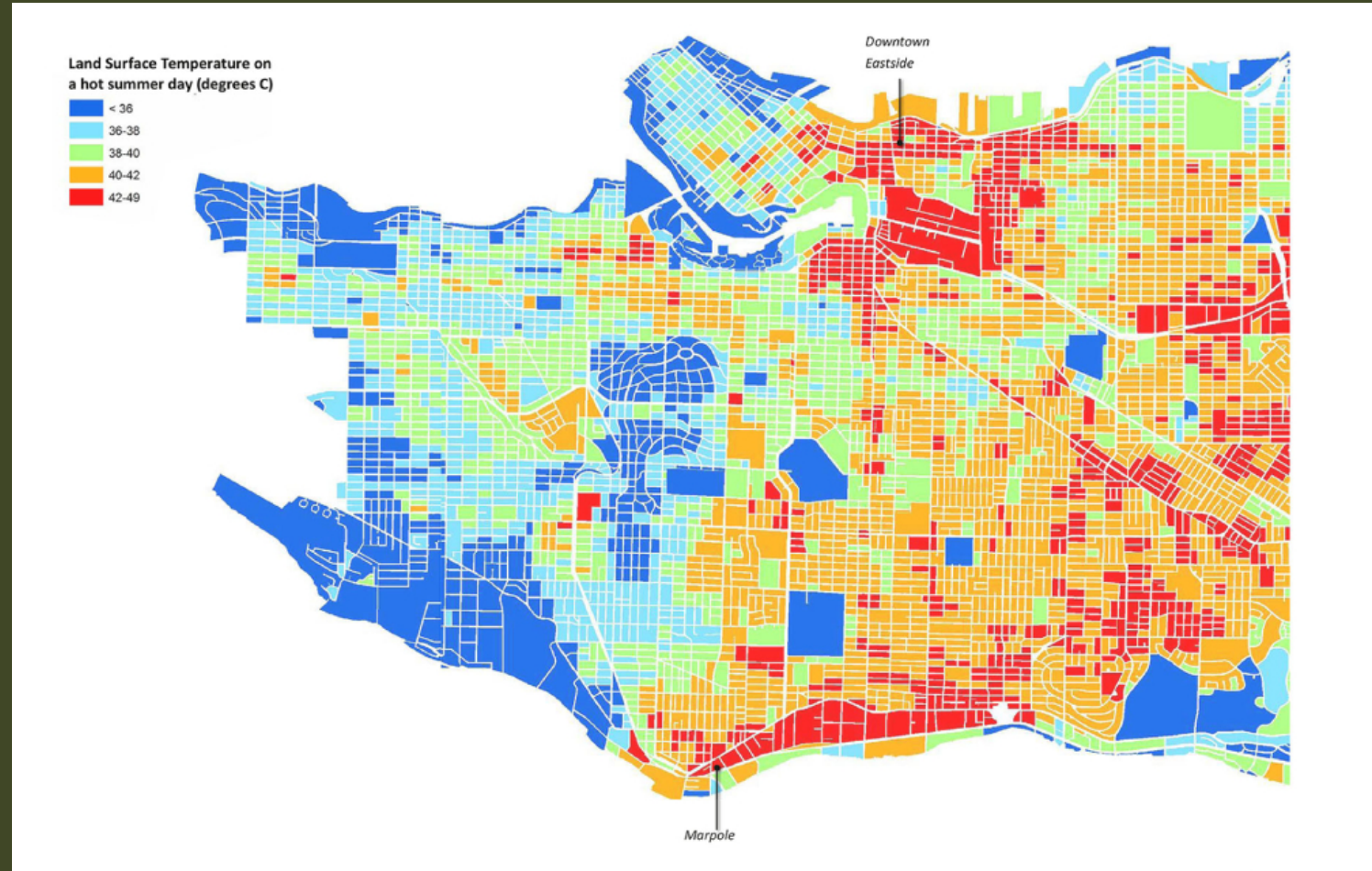
³ Wells NM, Lekies KS. Children Youth Environ. 2006;16(1):1-24. ⁴ <https://news.un.org/en/story/2019/09/1046752>

More Trees + Vegetation = Healthier Cities

Urban Greening Benefits:

- Shade ↓ need for air conditioning
- Lower energy demand ↓ air pollution and GHG emissions
- Removal of air pollutants
- Sequestration of CO₂
- Reduced stormwater runoff + improved water quality by absorbing and filtering rainwater
- Every \$1 invested in a tree returns up to \$3 in benefits⁵

Shaded surfaces are 11-25°C cooler than peak temperatures of unshaded ones⁶



⁵ <https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands>

⁶ Akbari, H., D. Kurn, et al. 1997. Peak power and cooling energy savings of shade trees. *Energy and Buildings* 25:139-148.



Promoting health and
wellbeing through urban
forests – Introducing the 3-
30-300 rule



Green Space and Built Environment

Urban green space, tree canopy and prevention of cardiometabolic diseases: a multilevel longitudinal study of 46 786 Australians

Thomas Astell-Burt^{1*} and Xiaoqi Feng²

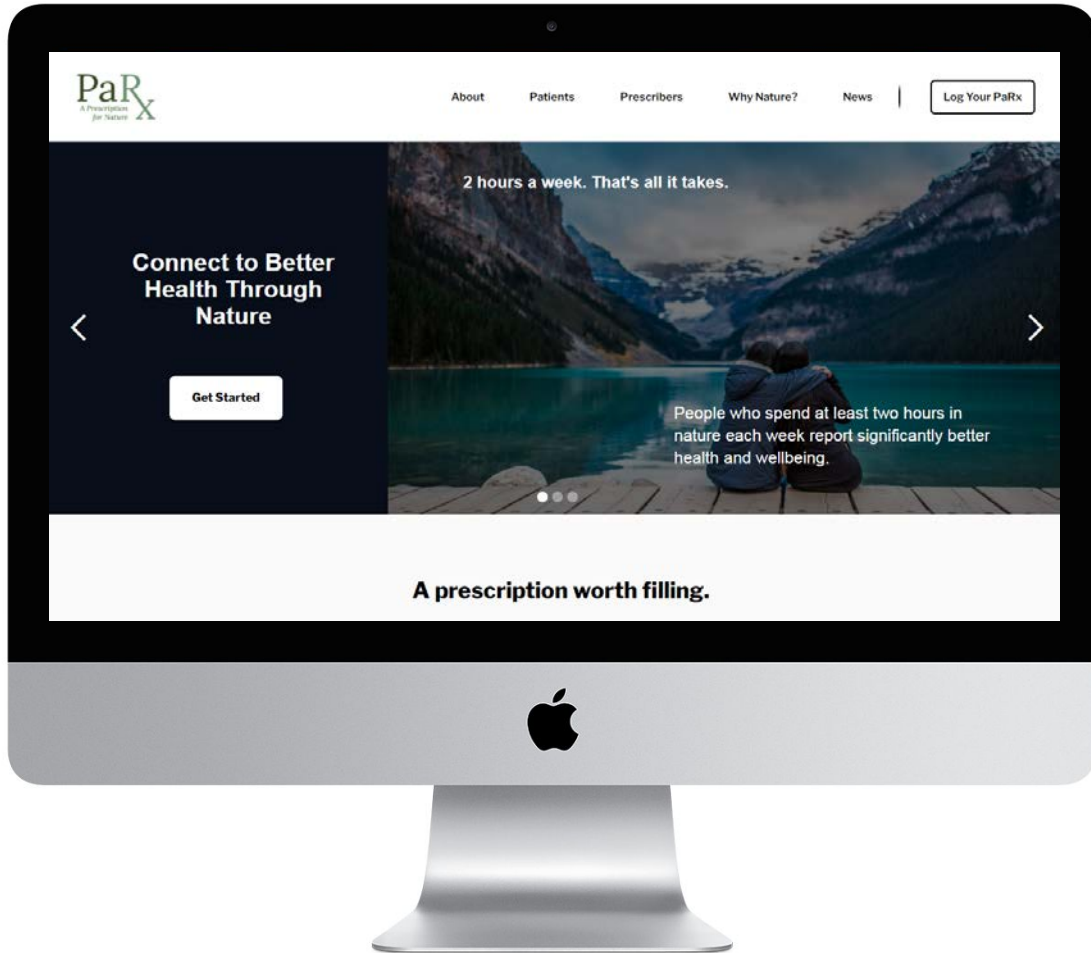
¹Population Wellbeing and Environment Research Lab (PowerLab), School of Health and Society, Faculty of Social Sciences, University of Wollongong, Wollongong, New South Wales, Australia, ²School of Public Health and Community Medicine, University of New South Wales, Sydney, New South Wales, Australia

Health Benefits of 30% Tree Cover

- ↓ Diabetes 31%¹
- ↓ Cardiovascular Disease 22%
- ↓ Hypertension 17%
- ↓ Psychological Distress 31%²
- ↓ Poor Sleep 13%³
- ↓ Loneliness 25%⁴

¹ Astell-Burt, T., & Feng, X. (2019). *International Journal of Epidemiology*, 49(6), 1226-1233. ² Astell-Burt, T., & Feng, X. (2019). *International Journal of Epidemiology*, 49(6), 1226-1233. ³ Astell-Burt, T., & Feng, X. (2019). *Social Science and Medicine*, 192, 104837. ⁴ Astell-Burt, T. et al. (2019). *International Journal of Epidemiology*, 49(6), 1226-1233.





parkprescriptions.ca
prescri-nature.ca

PaRx

Name _____

Date _____

My Outdoor Activity Plan (2 hours/week, 20+ minutes at a time):



Health Professional's Signature

Prescription #: BC-SA001 – _____ – _____
(YYMMDD) (Patient's Initials)

Register your PaRx for a chance to win prizes.
Head to PARKPRESCRIPTIONS.CA



2 hours/week, 20+ minutes at a time. That's all it takes.

Research shows that people who spend at least 2 hours in nature each week report significantly better health and wellbeing.ⁱ Science suggests that the most efficient drop in cortisol (stress hormone) levels happens between 20 to 30 minutesⁱⁱ — hence our 20-minute rule.

Spending time in nature:

Reduces your risk of chronic disease.

Spending more time in green space drops your risk of asthma, diabetes, heart disease, high blood pressure and stroke.ⁱⁱⁱ

Makes you feel richer. Living in a neighbourhood with 10 more trees per block improves your health perception similar to an increase in your personal income of \$10,000 per year.^{iv}

Busts stress. Sitting in a forest for just 15 minutes significantly reduces your cortisol levels and heart rate variability—while sitting on a urban street does nothing.^v

Boosts your immune system. Adults who take short day trips to the woods boost their levels of immunoproteins and natural killer cells for at least 7 days.^{vi}

Makes you smarter. Your memory, creativity and task performance increase much more after a walk in a park than on a city street.^{vii}

Make the most of your nature prescription with these simple tips:

1. Make easy green tweaks to your routine.

Avoid adding extra time and effort by substituting outdoor activities for indoor ones.

2. Write nature into your schedule.

Prioritize your date with nature by entering it into your day planner.

3. Phone a friend or family member.

Involving others increases your chances of meeting your goals.

4. Respect nature—and yourself.

Dress for the weather, stay on the trail and pack out what you pack in.

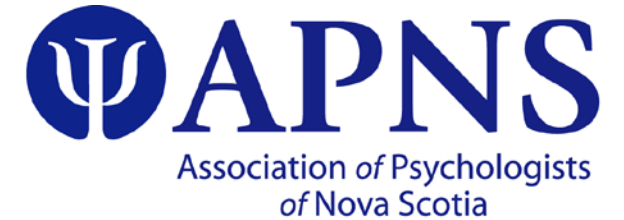
5. Do what feels right for you. The health benefits of nature start to add up when you feel like you've had a meaningful nature experience.

ⁱWhite, M.P. et al. *Sci Rep* 9, 7730 (2019). ⁱⁱHunter, M.R. et al. *Front Psycho* 10, 722 (2019). ⁱⁱⁱTwohig-Bennett, C., Jones, A. *Environ Res* 166, 628 (2018). ^{iv}Kardan, O. et al. *Sci Rep* 5, 11610 (2015). ^vHiromitsu K. et al. *Altern Med* 2015, 671094 (2015). ^{vi}Li, Q. et al. *J Biol Regul Homeostat Agents* 24, 157 (2010). ^{vii}Koselka E.P.D. et al. *Int J Environ Res Public Health* 16, 4338 (2019).

Ready to Fill Your Prescription?
Head to PARKPRESCRIPTIONS.CA



PaRx endorsements



A CHAPTER OF THE COLLEGE OF FAMILY PHYSICIANS OF CANADA
UNE SECTION DU COLLÈGE DES MÉDECINS DE FAMILLE DU CANADA

and 85 other partners and endorsers

Protect and restore nature as the foundation of our health.

Protect and restore nature as the foundation for healthy lives and livelihoods.



Healthy human societies are dependent upon biodiversity and healthy ecosystems - as the source of clean air, water, healthy soils, shelter, medicines, food, pollination and for the regulation of pests, disease, climate and extreme weather events. Human pressures, from land and sea use change such as deforestation, over-exploitation of resources, pollution, intensive and unsustainable agricultural practices, to unsafe management, trade and consumption of livestock and wildlife, and invasive alien species all undermine these services (110).

Nature-based solutions have the potential to provide over one third of the CO₂ emissions reductions needed by 2050 to meet the goal of keeping climate warming to 1.5°C, while they can maximize gains for health and well-being, particularly for the most vulnerable and disadvantaged populations (111). Communities that have traditionally been custodians of lands and waters, such as Indigenous communities, are well-placed to help protect and restore ecosystems as the foundations for healthy lives and livelihoods.

Action Points Protect and restore nature as the foundation of our health.

- 1 End our destruction of nature.** Halt the destruction and degradation of biodiversity and carbon-rich ecosystems as soon as possible.
- 2 Protect and restore the ecosystems we all depend on.** Commit to protecting at least 30% of the land and sea by 2030, prioritising areas of high importance for biodiversity and the delivery of ecosystem services.
- 3 Recognise the interconnections between human, animal and ecosystem health.** Integrate a One Health approach to ensure prevention and early detection of health risks.

4 Promote nature-based solutions and a nature-based recovery. Avoid additional harm to nature and build forward better from the pandemic through nature-based solutions that jointly support biodiversity, health, and climate action.

5 Protect people and planet by implementing new global biodiversity framework. Commit to reversing biodiversity loss by 2030 and develop ambitious plans and programmes to support an ambitious post-2020 global biodiversity framework.

1) End our destruction of nature.

Increasing energy consumption, overexploitation of natural resources and unprecedented transformation of land uses, freshwater and seascapes have led to changes in climate and the accelerating decline of biological diversity worldwide (112). The increasing destruction and degradation of biodiversity and carbon-rich and ecosystems is negatively impacting lives and livelihoods.

To end our destruction of nature, governments should avoid any further biodiversity and ecosystem loss or degradation. Important first steps to achieve this goal are: to reduce deforestation and any further degradation of forests, non-forest terrestrial ecosystems, and coastal ecosystems; to support Indigenous peoples and local communities to maintain or regain stewardship of their traditional lands and waters; and to implement ambitious National Biodiversity Strategies and Action Plans (NBSAPs) as part of commitments under the Convention on Biological Diversity (CBD). Incentives that are harmful to biodiversity, such as perverse subsidies, should be eliminated or reformed (7).

Advanced proof

COP26 Special Report / The health argument for climate action / 41



COP26 SPECIAL REPORT ON CLIMATE CHANGE AND HEALTH

THE HEALTH ARGUMENT FOR CLIMATE ACTION



→ **Eight cities rewilding their urban spaces.** Cities across the world - including Singapore, Dublin, Sydney and Barcelona - are working to create open spaces and “rewild” their communities, to combat the global loss of nature while bringing health benefits to communities. [Learn more here.](#)

→ **A Planetary Health approach to rainforest conservation in Madagascar.** The Manombo Special Reserve in Madagascar protects the vital habitat for many critically endangered plant and animal species, while also providing medicine and food security to local communities. [Learn more here.](#)

→ **Prescribing nature in Canada.** PaRx is Canada’s first national, evidence-based nature prescription program, driven by healthcare professionals who want to improve their patients’ health by connecting them to nature. A growing body of research suggests that spending time in nature has a wide range of positive effects on human health, from reduced chronic disease to improved mental health, immune function, and birth outcomes. [Learn more here.](#)


→ **A nature-positive green recovery in Pakistan.** The government of Pakistan is implementing a “Green Stimulus” plan to recover from COVID-19 while creating jobs and restoring the country’s natural ecosystems. [Learn more here.](#)

Find more case studies on the [WHO website.](#)



guardian  • [Follow](#)



guardian  Just what the doctor ordered?

Research has found that spending just two hours in nature per week significantly boosts health and wellbeing ... And so in Canada this is being made part of treatment plans for both physical and mental health.

Parks Canada, the agency that manages the country's 38 national parks and ten national park reserves, is collaborating with Canada's national nature prescription programme PaRx to allow registered healthcare professionals to provide a free annual passes to patients.

The pass would usually cost \$72 CAD (\$57 USD) per adult for a year of unlimited access to national parks, but this initiative would allow some doctors to prescribe them for free.

"So this is all about breaking down those barriers to access to nature," PaRx director Dr. Melissa Lem told Global News.

"There's this huge body of research showing that nature time can improve all kinds of different physical and mental health conditions, from diabetes and heart disease to ADHD and depression," she explained.

The PaRx program is aiming to be nationwide by the end of 2022 and has already signed up over 1,000 prescribers.



Liked by [claudel.desr](#) and others

15 HOURS AGO

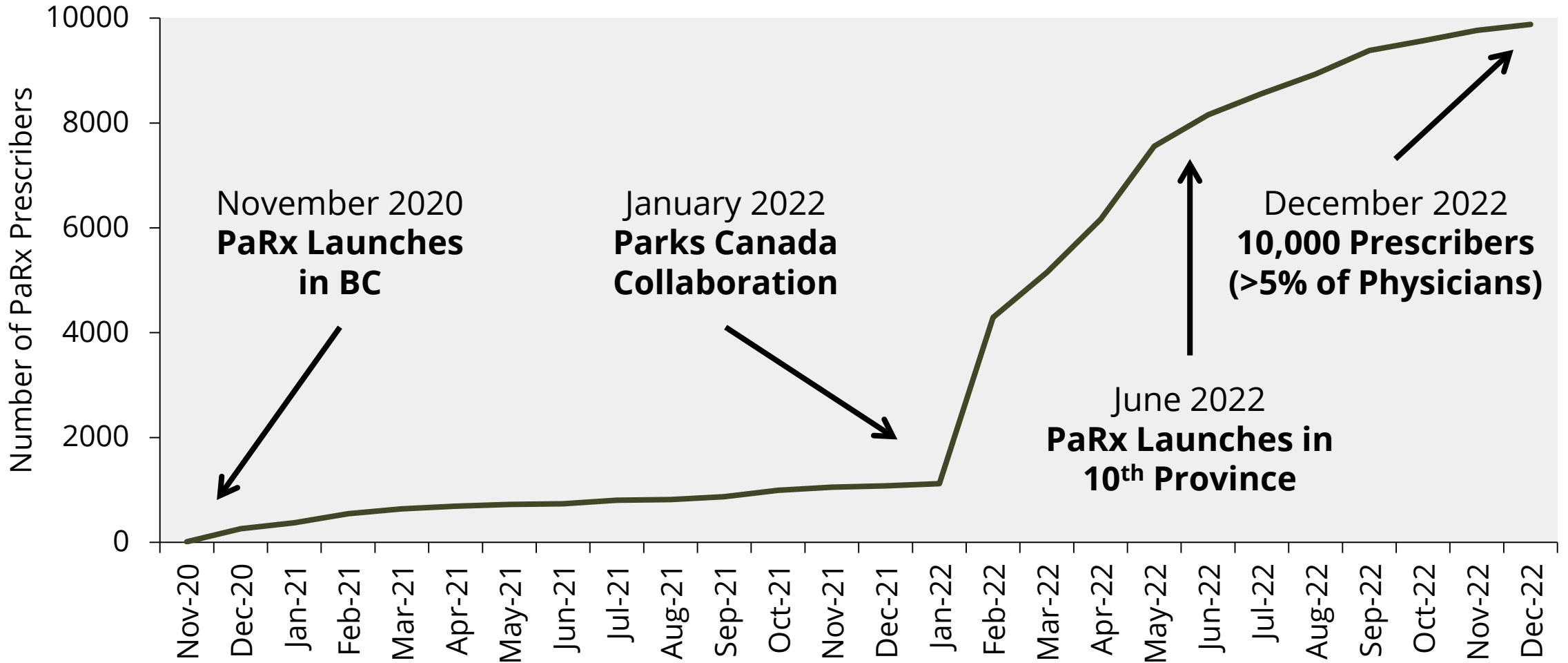
**Doctors in Canada can now
prescribe free national park visits**



Add a comment...

Post

Prescriber Growth





- Nature Prescribing formally recommended in CMA's Environmentally Sustainable Health Systems in Canada policy
- CMA officially announced endorsement of PaRx at COP15 in Montreal

Next steps

- Launch of PaRx in the Territories
- Collaborating with transportation, community and nature-based organizations to further reduce barriers to nature access
 - Know one? Connect us!
- Launch of PaRx app to track and incentivize nature time



Key Messages

- Prescribing and spending time in nature are **simple and effective interventions** for improving patient and planetary health
- **Urban green spaces and tree canopy** are essential for health (remember: 3-30-300 rule)
- There is an established and growing body of health professionals prescribing nature across Canada—join us!
parkprescriptions.ca
prescri-nature.ca

