GREENSPACE and MENTAL HEALTH

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- Climate Psychiatry Alliance
- New Hampshire Healthy Climate
- Medical Society Consortium for Climate and Health
- No Coal No Gas

Ways of measuring green space

- Nearness to greenspace
- Type of greenspace (grass or tree canopy)
- Size of greenspace
- Density of tree canopy
- Utilization of greenspace
- Normalized Difference Vegetation Index (NDVI)
- Enchanced Vegetation Index (EVI)
- Vegetation Continuous Field (VCF)
- NatureScore (NatureQuant)

Green Space Quality and Health: A Systematic Review

Nguyen, et al. International Journal of Environmental Research and Public Health, 2021

- 68 studies from 1970 to 2021 deemed higher quality and looking at different types of greenspaces
- Most showed health benefits with increased greenspace
- Primary benefits were in asthma, high blood pressure, heart attacks, and feelings of well-being
- Related to tree canopy but not grassland

Credibility of the evidence on green space and human health: an overview of meta-analyses using evidence grading approaches

Zie, et al. eBioMedicine 2024

- Review of all meta-analyses done before 2024
- 154 meta-analyses reviewed, each of which reviewed about 100 studies
- Tremendous variation in design, definitions, and outcome measures
- Moderate to high association between greenspace and all-cause mortality, cardiovascular mortality, diabetes mellitus, pre-term birth, small for gestational age, and feeling of well-being
    - About 10-15% difference between high and low greenspace in most studies
- Low to weak associations for cancer, high blood pressure, pulmonary disorders, and dementia

Ways of measuring mental health

- Self-rating of mental health
- Investigator rating of mental health
- Diagnoses and rating of mental health in medical records
- Number of mental-health related health provider visits
- Parents’ and teachers’ rating of mental health

The Relationship Between Greenspace Exposure and Psychopathology Symptoms: A Systematic Review

Tran, et. al. Biological Psychiatry, 2022

- Analyzed 40 studies published between 1980 and 2020
- Great variation in measuring greenspace and mental health
- The majority of studies found a significant relationship between greater exposure to greenspace and both lower incidence and less severe symptoms of mental disorders
- This was especially true for ADHD in children and depression in adults
- These effects were independent of urban environment

Green spaces exposure and the risk of common psychiatric disorders: a meta-analysis

Zhang, et al. SSM Population Health 2024

- Reviewed 59 high-quality studies from 2013-2023
- All used objective measures of greenspace (usually NDVI)
- All used clinician diagnosis of mental disorders
- High greenspace exposure associated with 5-15% lower incidence of depression, anxiety, dementia, schizophrenia, and ADHD

Greenspace exposure has been shown to improve mental health for

- All people living in urban, suburban, and rural areas
- People 65 years and older
- Young children
- Adolescents
- People living alone
- People during the Covid pandemic

Residential greenspace in childhood is associated with lower risk of psychiatric disorders from adolescence into adulthood

Engemann, et al. , PNAS, 2019

- Followed all persons born in Denmark between 1985 and 2003 for whom longitudinal mental health outcomes were available
- 943,000 individuals
- Measured NDVI for everyone from birth to 10 years old
- Followed subjects to ages 16-34
- Likelihood of developing a mental illness later in life was linearly related to greenspace exposure in childhood
- Those who had the lowest exposure to greenspace in childhood had 55% higher incidence of mental illness compared to those with the highest greenspace exposure
- Results independent of urbanization, economics, parental history

Long-term exposure to residential greenness and decreased risk of depression and anxiety

Wang, et. al. Nature Mental Health (2024)

- 410,000 adults in the UK
- Followed for 12 years
- Measured Normalized Difference Vegetation Index (NDVI)
- Looked at new diagnoses of depression or anxiety
- Those in highest quartile of NDVI, compared to lowest quartile, had 84% rate of depression and 86% rate of anxiety
- Largely mediated by reduced rate of PM2.5 (compared to NO2, SO2, and O3).

Ambient greenness, access to local green spaces, and subsequent mental health

Geary, et. al., The Lancet Planetary Health, 2023

- 2,300,000 adults in Wales
- Followed for 10 years
- Measured Enhanced Vegetation Index (EVI)
- Looked at combined likelihood of developing anxiety or depression requiring treatment
- Those with greatest access to greenspace (shortest distance) had 80% the likelihood of developing anxiety or depression compared to those with the least access (longest distance) to green space
- Every additional 360meters to the nearest green space increased the likelihood of developing anxiety or depression by 5%

Nature and mental health in urban Texas: A nature-score based study

Makram, et al. Int. Journal of Environmental Research and Public Health 2024

- Texas Hospital Outpatient Public Use Data Files
- Looked at 61,000,000 outpatient encounters across 1170 zip codes
- Measured NatureScore indexes of neighborhoods in zip codes
- 370,000 mental health encounters identified
- Neighborhoods with higher NatureScore indexes had half the mental health utilization of low NatureScore neighborhoods
- Association held across diagnoses of depression, bipolar disorder, and anxiety
- Not associated with race or economic factors

Long-term exposure to greenspace and and anxiety from preschool and primary school children

de la Osa, et al. Journal of Environmental Psychology 2024

- 539 Barcelona school children
- Followed yearly from ages 3 to 11
- Closeness to greenspace at home and school measured by NDVI and VCF
- Anxiety scales administered by researches
- Closeness to greenspace surrounding school was associated with lower anxiety scores
- Closeness to greenspace surrounding home was not associated with lower anxiety scores


WHAT MADE YOU GET OUT IN NATURE?
DOCTOR'S ORDERS!