Social Prescribing
The impact of Nature
Kings Fund
18 May 2017
We were designed to be connected to nature

Yet 54% of the world’s population live in cities

Is this disconnection the underlying cause of the epidemics of obesity and other chronic diseases?
Do we need healthy landscapes?
If we take an hour to equal 1,000 years, then four days is 100,000 years – the time from the origin of mankind to today.
Our factory setting is to be in a sociable group, supportive environment and have a purpose

People
Sociable

Place
Green

Purpose
Valued
How does nature benefit health?

(a) Less stressed,

(b) More exercise,

(c) More positive social interactions and

(d) Better quality environment for health promotion (i.e. has lower levels of air pollution)

The Effect of Trees on Cognitive Performance

Digit Span Backward Test

Exposure to Neighbourhood Green Space and Mental Health


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Association Between Trees, Vegetation, Depression and Stress

Normalized Difference Vegetation Index (NDVI)

- 25% more Tree Cover
- 25% Higher NDVI
- 25% more Greenspace


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Green Space reduces Health Inequalities

High Blood Pressure in pregnant women increased by 14% for every 300 meters away from green space.

Birth weight and baby’s head size were larger within the 500 metres of green space.

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People

Loneliness

Place

Hostile

Purpose

Rejection

Fear and Chronic Stress
Chronic Stress
Anxiety and depression

Physical Inactivity
Poor diet
Mitochondria as a key component of the stress response. Manoli et al. Trends in Endocrinology and Metabolism Vol 18 No 5 2007

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Inactivity causes inflammation

1. Increases visceral fat
2. Reduces anti-inflammatories
3. Damages healthy cells
Inactivity: trilogy of inflammation

1. Increases visceral fat

2. Reduces anti-inflammatories

3. Damages healthy cells
Reducing inflammation – fat

Variation in visceral fat content in men with the same waist circumference

Visceral fat = 0.5 L
Visceral fat = 1.1 L
Visceral fat = 1.2 L
Visceral fat = 1.3 L
Visceral fat = 1.7 L
Visceral fat = 1.8 L
Visceral fat = 4.2 L
Visceral fat = 4.3 L
Visceral fat reduction with exercise

Fat loss after 13 weeks of walking 60 mins a day and no weight loss

% Loss of Fat

Lean | Obese | Type 2 Diabetes

Subcutaneous Fat | Visceral Fat


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Inactivity: trilogy of inflammation

1. Increases visceral fat
2. Reduces anti-inflammatories
3. Damages healthy cells
Reducing inflammation – muscles

Contracting muscles release powerful anti-inflammatories called Myokines

These Myokines Circulate around the whole body calming every cell
Inactivity: trilogy of inflammation

1. Increases visceral fat
2. Reduces anti-inflammatories
3. Damages healthy cells
Inside a healthy cell

- Chromosomes keep dividing
- Immune system is switched off until needed
- Mitochondria, healthy and active. Providing lots of energy
‘The mitochondria is like a dynamo, it has to keep moving ... 

... and in the body they weigh as much as a car battery’

Prof Mike Murphy,  
MRC Mitochondrial Biology Unit Cambridge University
Sedentary, high fat diet and stress

Mitochondria

- Mitochondrial DNA
- Oxidative Phosphorylation
- Reactive Oxidative Species
- Anti-Oxidants
Physically active, low fat and not stressed

Mitochondria

Oxidative Phosphorylation

Reactive Oxidative Species

Anti-Oxidants

Mitochondrial DNA
Telomeres get shorter


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Neighbourhood Disorder and Telomere length

A study examined the relationship between neighbourhood environment and salivary telomere length of 99 children living in New Orleans (Theall et al., 2013). Both the level of poverty and the level of neighbourhood disorder were associated with shorter telomere length.
Neighbourhood Environment and Telomere Length

(Needham et al., 2014)

- aesthetic quality (litter, noise, and attractiveness),
- social cohesion (perception of neighbours’ trustworthiness, willingness to help, and value sharing),
- and safety (whether they felt safe walking in their neighbourhood and level of violence).

- The strongest indicator of telomere length was social environment. Those living in the neighbourhoods with the worst perceived social environments had telomeres that were shorter by the equivalent of eight years of natural telomeric shortening as compared to those living in the best social environments.
Green Exercise vs Indoor exercise and Telomere length

- A recent study (Olafsdottir 2016) of 60 adults, tested the difference between five months of
  - i) “Green Exercise”;
  - ii) indoor gym-based exercise;
  - or iii) no exercise programme.

Telomere length increased in both exercise groups, but not in the control group. However, telomerase activity decreased in the gym group, but not in the green exercise. Green exercise thus seemed to be associated with better cell-ageing profiles, as compared to indoor gym based or no exercise.
Oxford Textbook of Nature and Public Health

The role of nature in improving the health of a population

Matilda van den Bosch
William Bird
Senescence: the end of the cell


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This causes inflammation

Immune system is constantly switched on
Inflammation: ‘the cause of causes’

Chronic Inflammation starts in children as young as 6 years old.

- Diabetes
- Anxiety and Depression
- Obesity
- Dementia
- Cardiovascular disease
- Cancers
- Arthritis
- Cardiovascular disease
Fear and Chronic Stress
Chronic Stress

Stress Hormones

Physical Inactivity
And other poor health behaviours

leads to inflammation
Mitochondrial damage and telomere shortening

Depression
Cancers
Cardiovascular
Diabetes
Dementia

Mitochondria as a key component of the stress response. Manoli et al. Trends in Endocrinology and Metabolism Vol 18 No 5 2007

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So what can we do?

- SEE! THIS IS CALLED THE OUTDOORS
- OH, I'VE SEEN THIS LEVEL ON MY VIDEO GAMES
Single Sessions of Physical Activity can enhance Attention and Memory

After 20 minutes of sitting quietly  After 20 minutes of walking

Hillman et al. (2009). Neuroscience, 159, 1044-1054
To make a step change in activity levels we need to be bold

Let’s remove boundaries and turn a whole town into a playground!
Step change across a community

Anticipation 3 months
Participant entrance route
- Schools
- Local Businesses
- Community Organisations
- Local Authority
- GP / NHS
- Local Media

Experience 2 months
Enter into programme

Legacy 7 months
Participant exit route
- Sport and Leisure
- Health Programmes
- Nature and Outdoor Spaces
- Culture and Arts
- Active Travel
- Community

Mass Community Participation
Community ‘own’ the game
Community Champions bring their community together
Handsworth Library Community Sports Day
430 Beat Boxes across a population of 550,000
Exploring the local area (66%)
Getting fit (54%)
Having fun (54%)
Spending time with friends or family (53%)
and feeling more healthy (52%)
Winning Prizes (13%)
A day in the life of …Annan Beat the Street
Beat the Street Reading

Over two years in Reading there has been a 20% increase in the number of people reaching the Government recommended activity levels of 150 minutes a week.
The Story

We are designed to be Hunter Gatherers

- Disconnection from nature causes chronic stress
- We eat badly and exercise less
- More visceral fat, inflammation and telomere shortening.
- Result: an epidemic of chronic disease e.g. diabetes, heart disease
- Being healthy is about friends, family, nature and feeling good about ourselves.
- Nature reduces stress connects people, increases activity and is generally more healthy
Thank you

Building Active Communities
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