



Diabetes: Multifactorial, Multidisciplinary and Holistic Care

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Objectives

- Learn the benefits and challenges of multifactorial, multi-disciplinary and holistic approaches to managing diabetes.
- Learn how stress and metabolism inter-relate.
- Integrating a holistic approach into practice.

Case 1

- Mr C, 72 year old man with 8 years of Type 2 diabetes and HbA1c of 7.6% on:
 - Metformin 1g bd
 - Gliclazide MR 60mg
 - Byetta 10mcg bd
- He has had CABG and suffers from neuropathic pain involving both feet requiring 75mg bd pregabalin.
- No smoking or drinking.
- Weights 115kg.
- He has been lethargic on waking and has awoken from hypos every few days.

Case 1 (continue)

- Ceased his gliclazide.
- On review, he had a troubling hypo the night after cessation of gliclazide but hypos had subsequently ceased.
- He was waking in the morning and feeling more energy, describing himself as 'like a new man'.
- Still troubled with neuropathic pain.
- Increased pregabalin dose to 150mg nocte and 75mg mane which allowed him to do regular walking.
- He wants to lose weight but did not want to use Byetta.

Case 1 (continue)

- Commenced him on dapagliflozin 10mg daily
- He commenced regular exercise with help from our exercise physiologists.
- On review 1 month later, he had lost 5.5kg.
- Neuropathic pain had also improved.
- Urged him to see dietitian.
- Subsequent review 1 month later, he lost another 3kg.

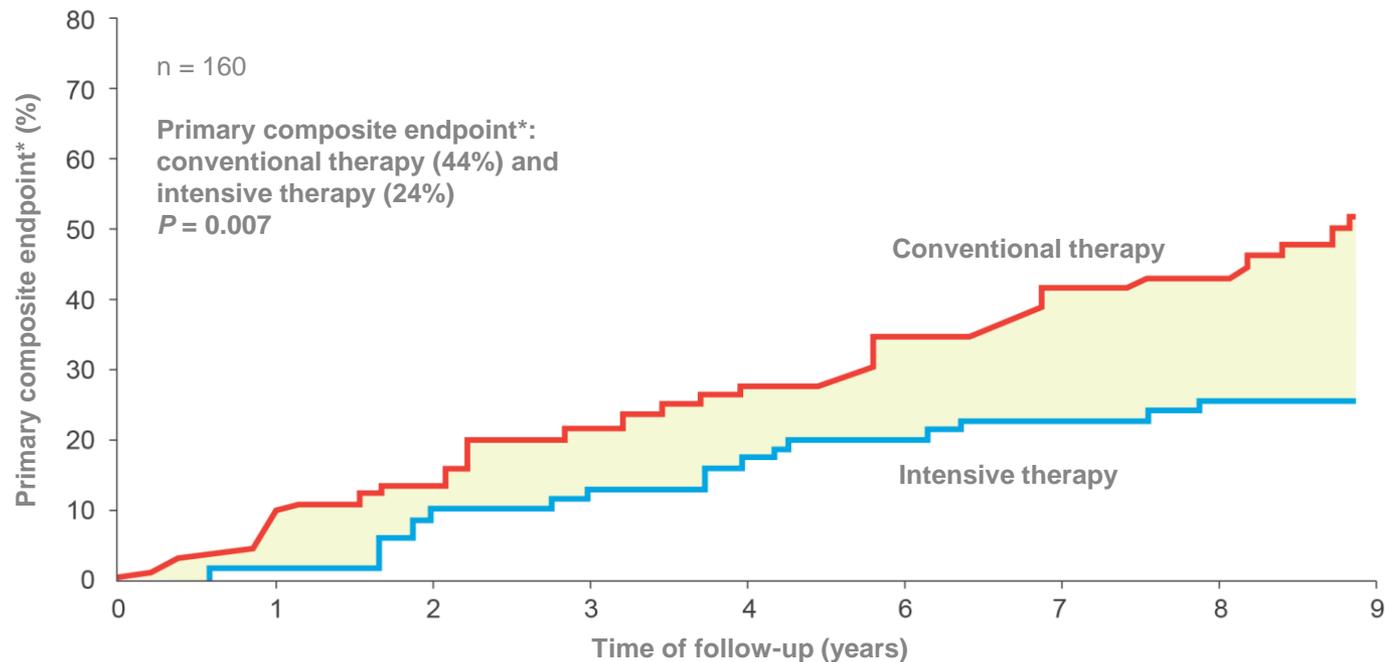
Case 1 (Continue)

- Checked his HbA1c and he had gone from 7.6% to 6.8%.
- Last review, he had lost more weight (115 to 98kg), losing a total of 16.9kg since initial consult 18 months ago.

Importance of a multifactorial approach¹

STENO-2 study

- Multifactorial management significantly reduced the risk of CV events¹



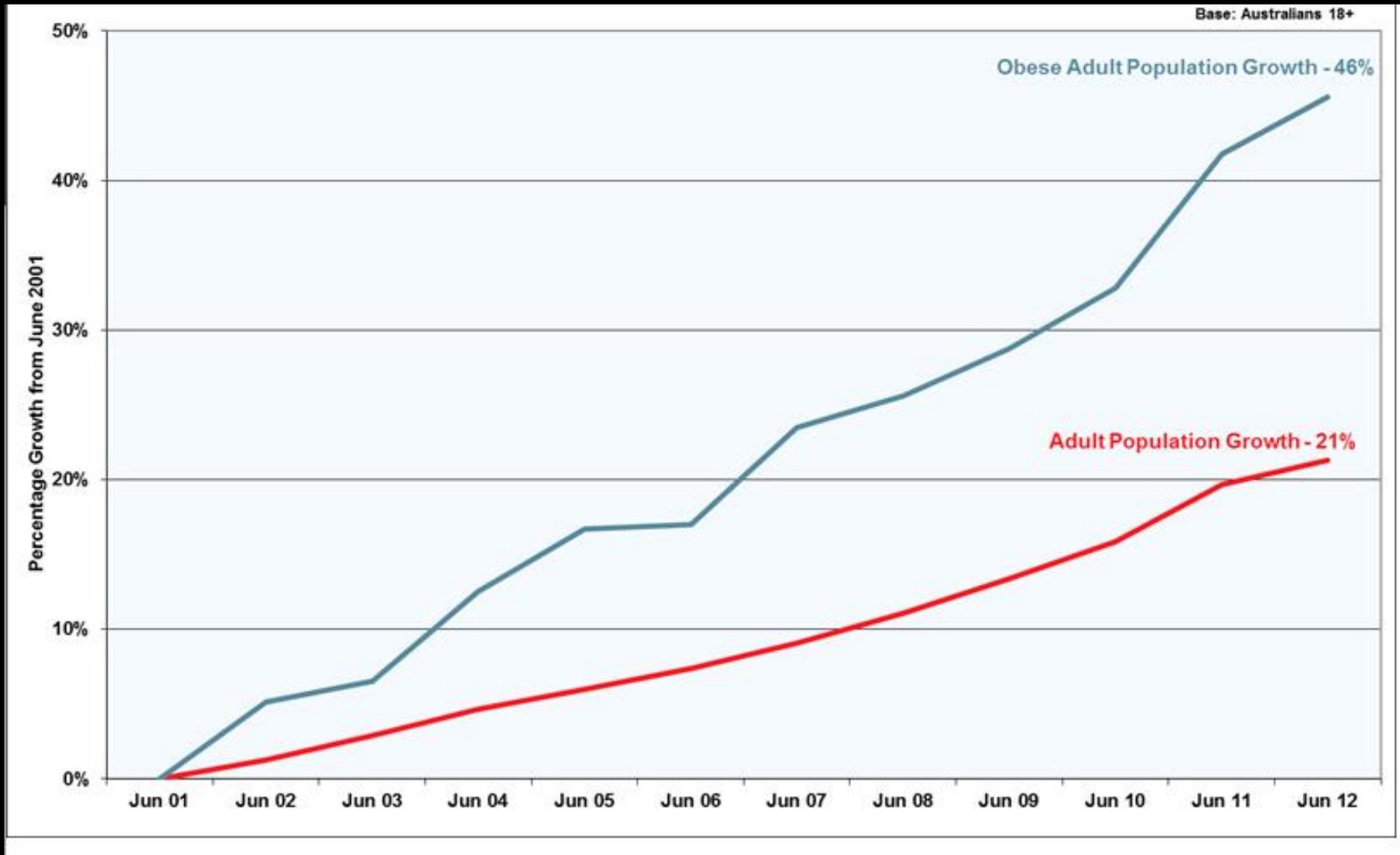
Adapted from Gaede *et al.* 2003.¹

*Primary endpoint was a composite of death from CV disease, non-fatal MI, non-fatal stroke, revascularisation, and amputation.

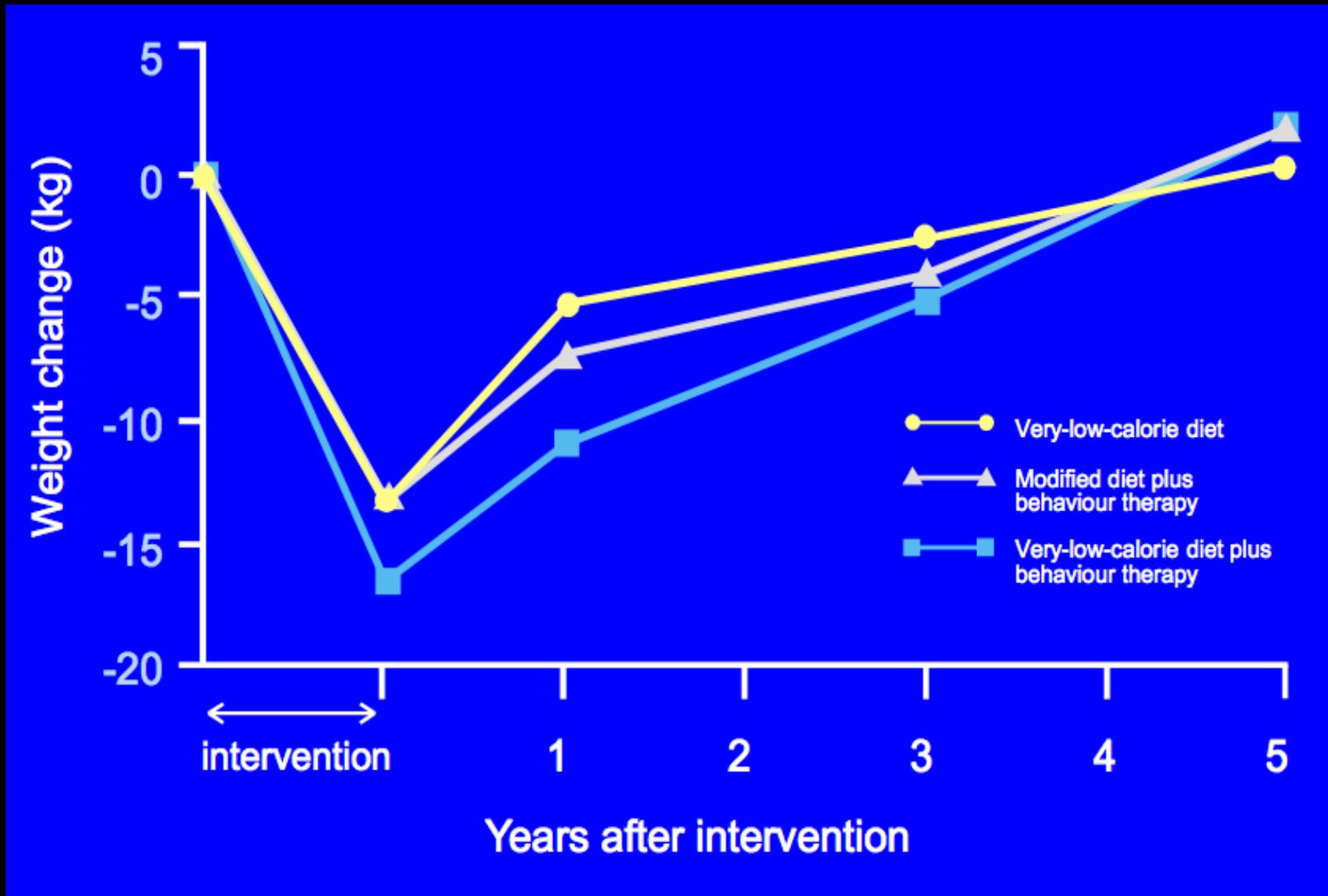
Intensive therapy involved **behaviour modification** and pharmacological therapy targeting **hyperglycaemia, hypertension, dyslipidaemia, and microalbuminuria**, with secondary prevention of CV disease with aspirin.

CV: cardiovascular; MI: myocardial infarction.

Obesity Rates are Increasing



Weight Loss is Difficult to Maintain



Questions

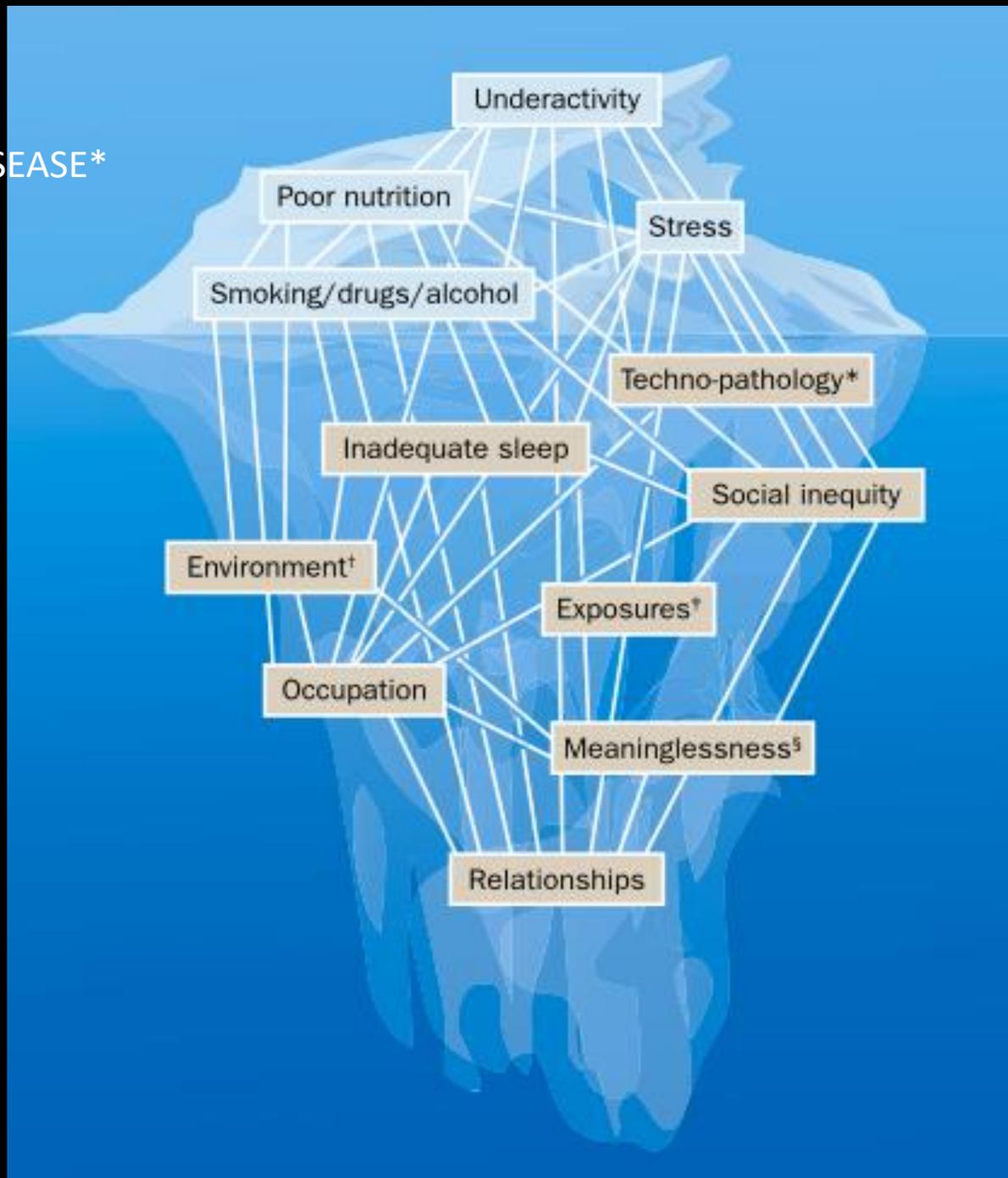
- Why does weight regain in the vast majority of patients motivated to lose weight?
- Is asking people to diet actually effective or even safe?
- Are the causes of weight gain not actually being taken into account leading to weight regain?

DETERMINANTS OF CHRONIC DISEASE*

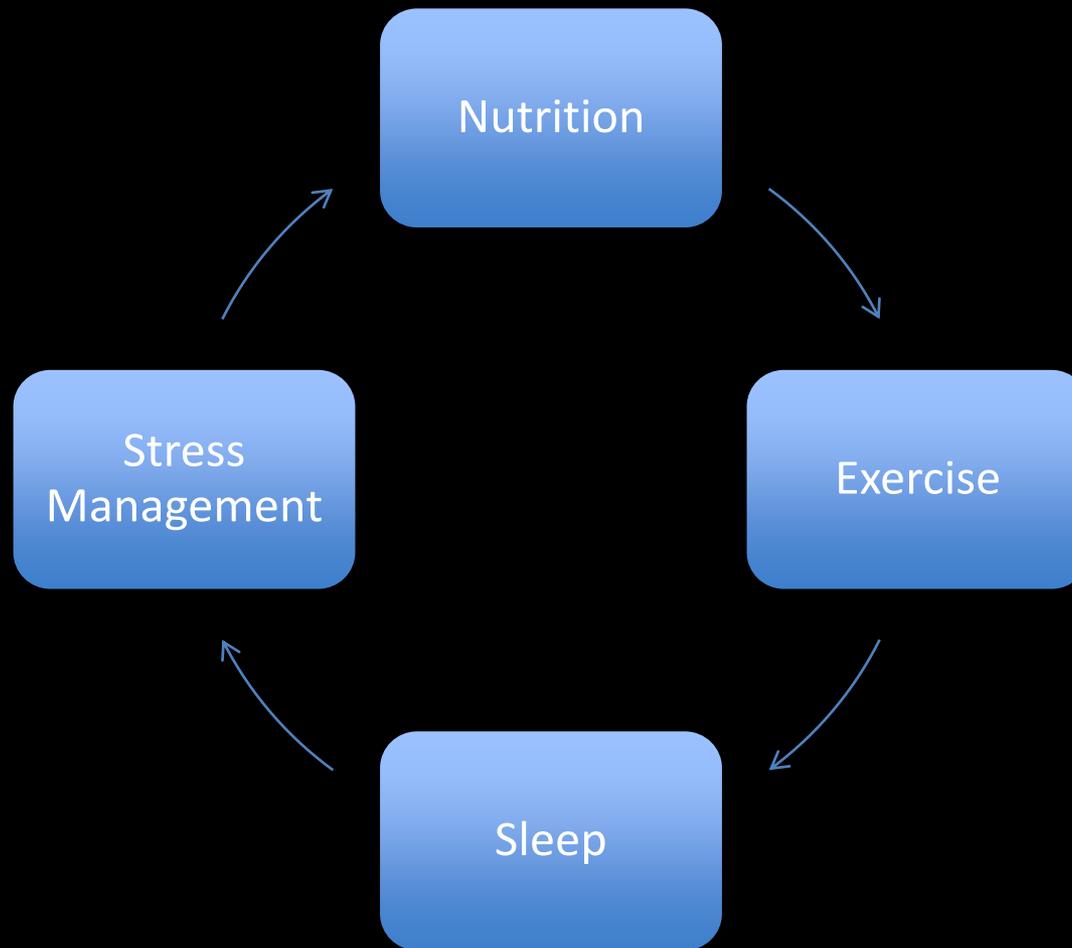
Large scale studies show that 90% of cardiovascular disease and type 2 diabetes is preventable through healthy lifestyle practices.

- Chen et al., Framingham Study, JAMA 2016
- Birkhead et al., Nurses Health Initiative, AmJPubHealth, 2017
- Yusuf et al., Lancet 2004
- Ornish et al., Lancet 1990

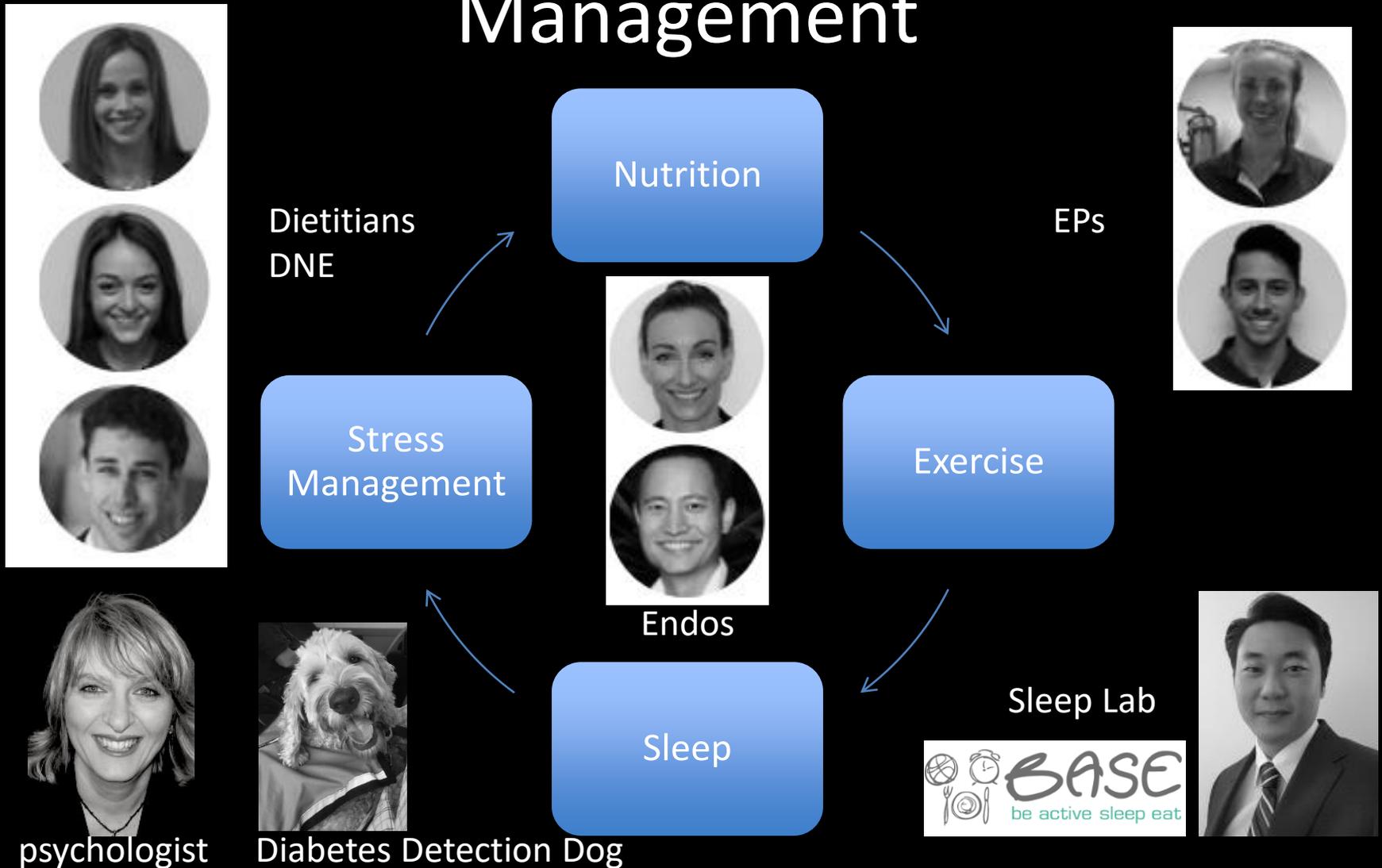
*Egger et al., Medicine Today, 2017



An Iterative Approach to Weight Loss



Multidisciplinary Approach to Weight Management



Case 2

- JJ is a 50 y.o. female who struggles with weight, weighing 98.9kg in November 2013 from Bendigo (BMI 41).
- PMHx:
 - Irritable bowel syndrome
 - Bipolar affective disorder
 - Epilim 200mg nocte
 - Seroquel XR 100mg nocte
 - Efexor XR 450mg/d
 - Epilepsy
 - Lamictal 100mg nocte

Progress 1

- Investigate for complications of weight gain.
- Found to have impaired glucose tolerance.
- Comfort food eats when feeling bored or stressed.
- Commenced Metformin 500mg daily
- Introduced mindfulness based movement.
- Review by dietitian.

Progress 2

- 3 months later, she returned with weight loss of 5kg.
- Husband who rides down from Bendigo with her reports less comfort food eating.
- Listed stressors for discussion.
- Encouraged to re-engage with psychologist, CBT and mindfulness based therapy.
- Consistency in walking after work improved.
- Increased metformin to 500mg bd without gastrointestinal side effects.

Progress 3

- Returns in 6 months with further weight loss of 5.5kg.
- In consultation with her GP, she reduces her efexor dose to 150mg and Seroquel to 25mg.
- She is now adopting a mindfulness way of living with improvements communicating with her daughter.
- 12 months later, weight is further reduced by 7kg.
- Total weight loss thus far is 17.5kg (starting weight 98.9kg).
- Commenced low dose saxenda (1.2mg daily) for weight maintenance.
- Recently husband suffered a CVA & she became his support.

Stress & Weight

- How does stress affect weight?
- What actually is stress?
- How does the body perceive psychological stress?
- What can stress management do to improve physical health?
- How can stress management be implemented in the medical clinic?

How does stress affect your weight?

- a. Increase
- b. Decrease
- c. No change

Weight & Stress

- Studies have mixed results regarding the impact of psychosocial stress and weight gain.
- Large prospective study showed that psychosocial stress is correlated with weight gain (Block et al., 2009)
 - Men & women share (job demands, difficulty paying bills) but also differ (strains in relations) in type of stress that affects weight gain.
- Recent meta-analysis (n = 32 studies) showed that 70%, 25% and 5% of studies showed null effect, increase and decrease in weight with psychosocial stress respectively (Wardle et al., 2011).

Stress & Weight

- Whitehall (II) Study shows that *job strain and job control but not job demand correlates with change in weight (Kivimäki et al., 2006)¹.
- This weight change was bidirectional.
 - Men that have low BMI (<22) lose further weight with job strain while men with high BMI (>27) gain weight with job strain.
- *Job strain = Job demand – Job control score

1. Kivimäki, M., Head, J., Ferrie, J.E., Shipley, M.J., Brunner, E., Vahtera, J., Marmot, M.G., International Journal of Obesity, 2006: 30: 982-987

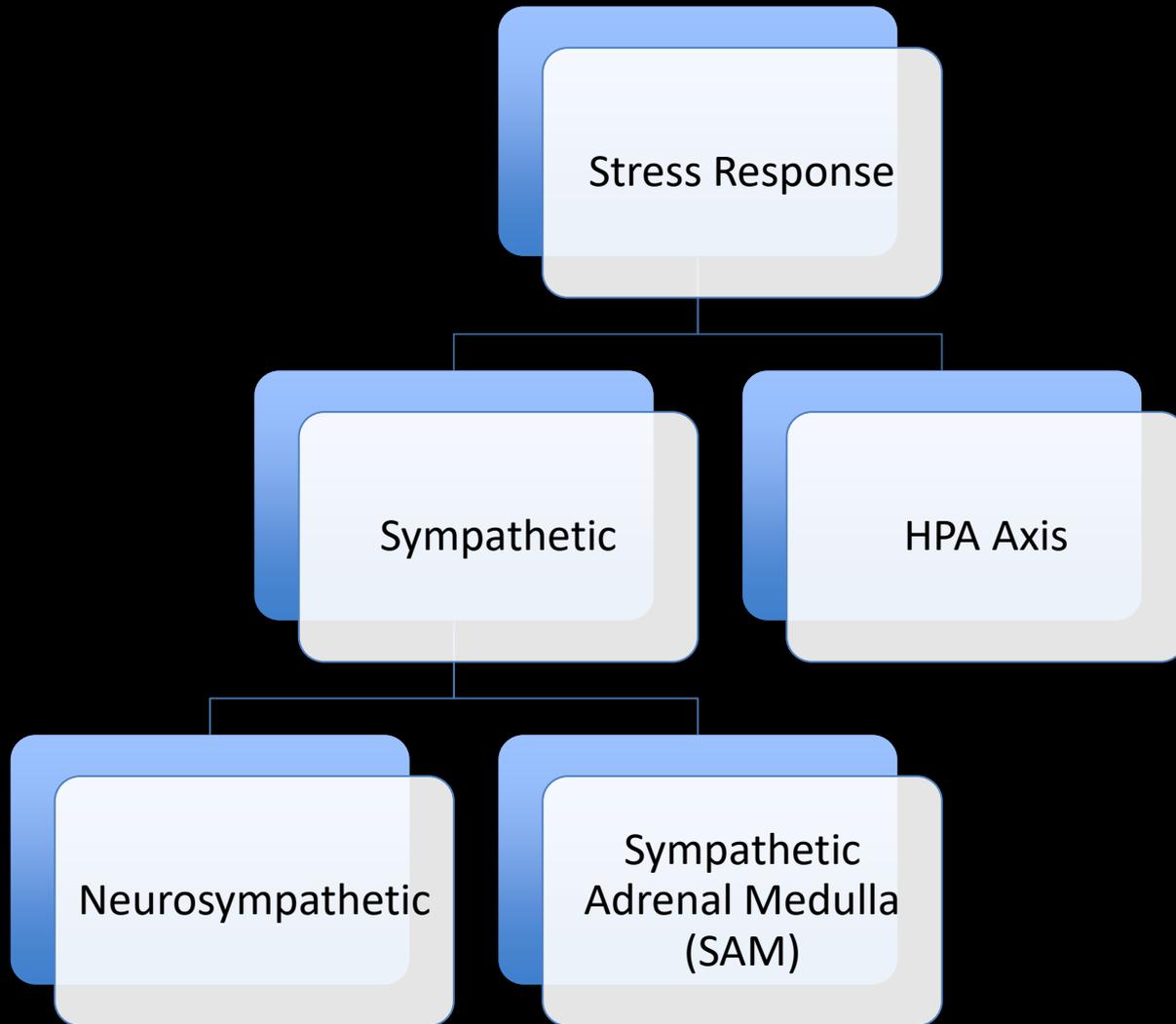
What is stress?



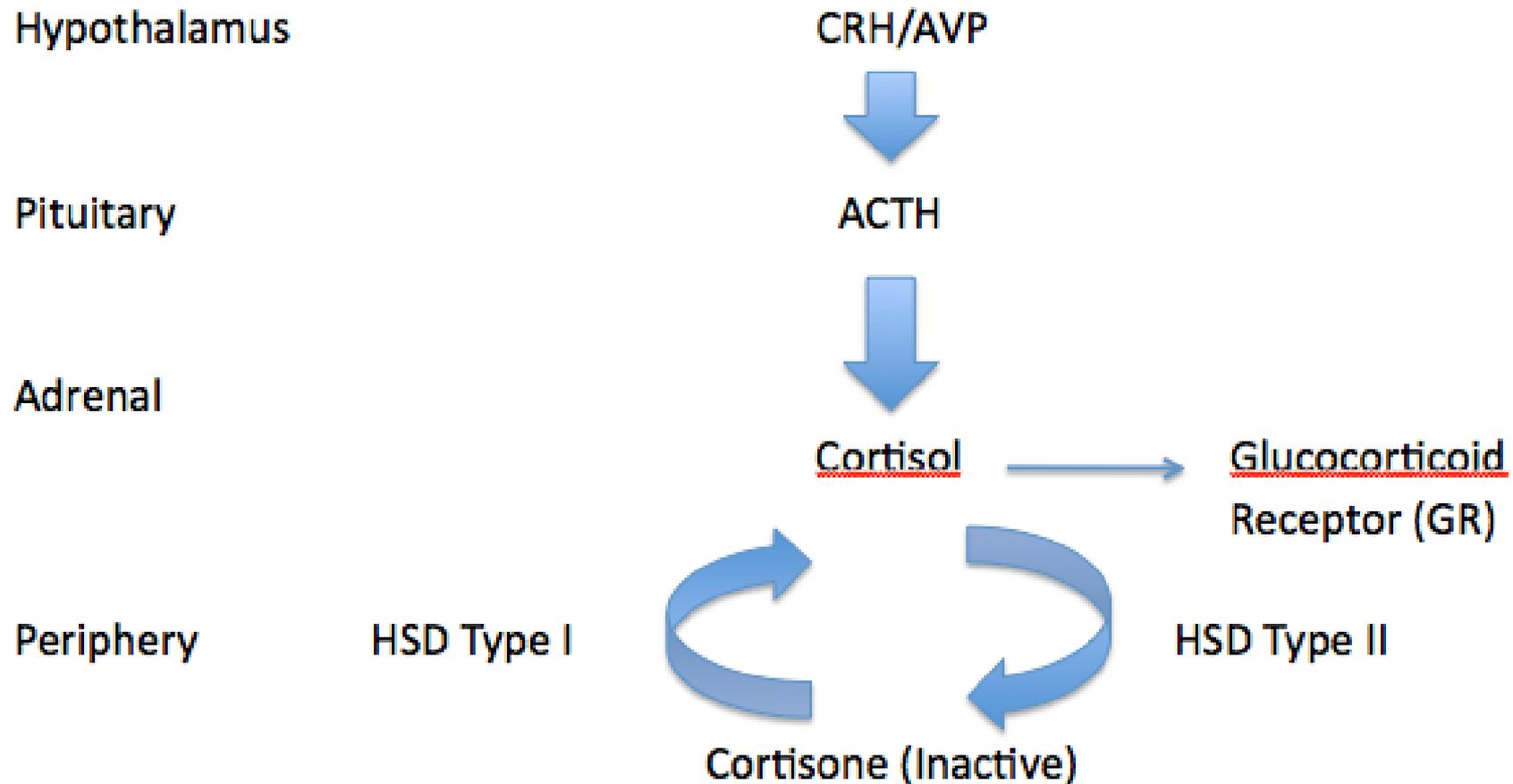
Stress is Ubiquitous

- A term that covers the spectrum from daily worries to clinically significant anxiety and depression.
- 2/3 of Australians lost sleep in past year due to stress (Lifeline 2013 Stress Poll).
- Work stress (71%) and financial stress (78%) were the top contributors.
- 70% loss sleep occasionally while **20% loss sleep regularly.**

Neuroendocrine Stress Response



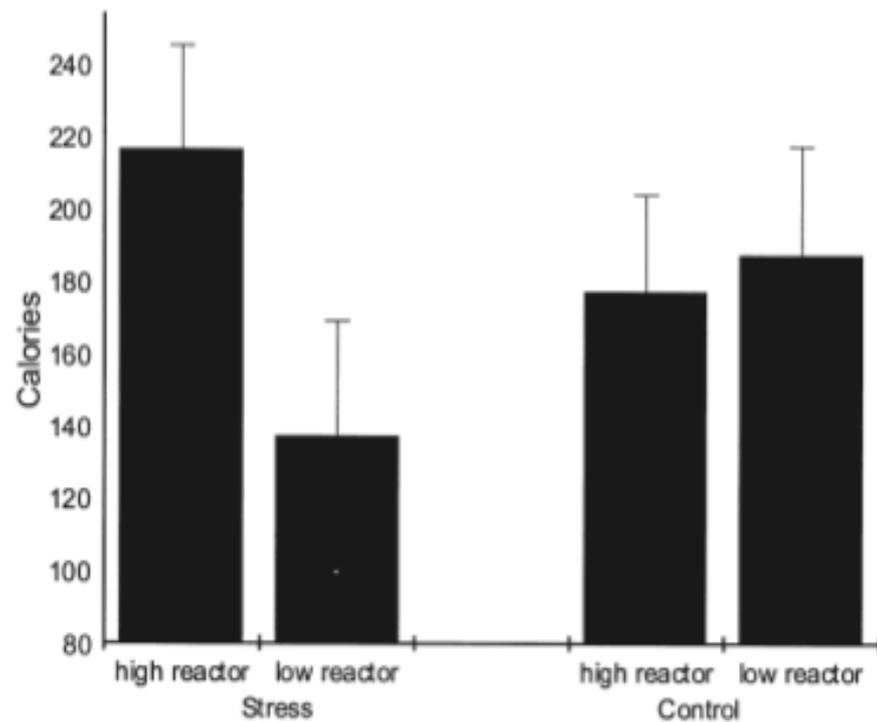
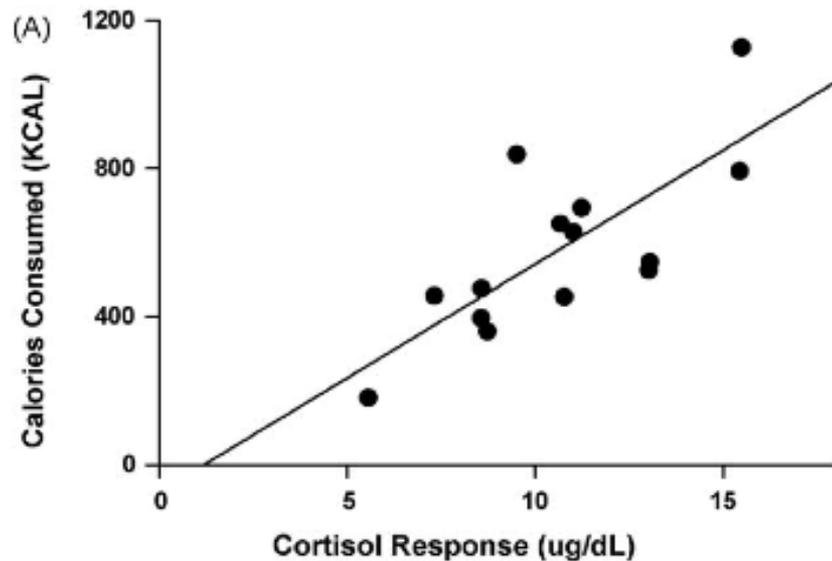
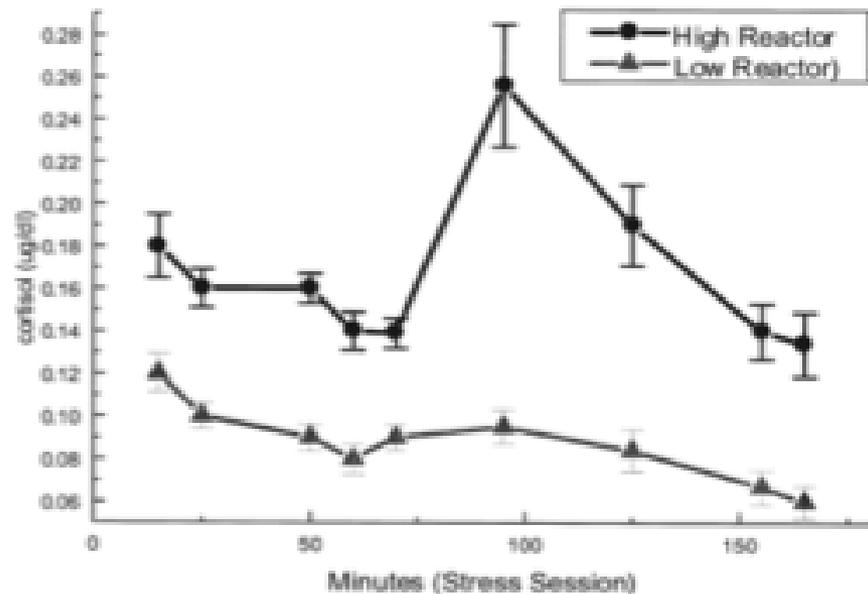
Hypothalamic-Pituitary Adrenal Axis



HSD – 11-beta-hydroxysteroid Dehydrogenase

Stress Response Correlates with Food Intake.

(Epel et al. 2001, George et al. 2010)



Stress and Energy Balance

- Stress leads to different food choices, especially those that are high cortisol responders.
- High cortisol responders also have reduced adaptive thermogenic response to food. (Lee et al., FACEB, 2012)
- High cortisol responders also have innate differences in coping styles to stress (Lee et al., PNE, 2014).
 - High cortisol responders are more reactive while low cortisol responders are more pro-active.
- Stress also leads to altered epigenetic alterations and predisposition to weight gain in offspring.

How do you tackle stress and stress responsiveness?

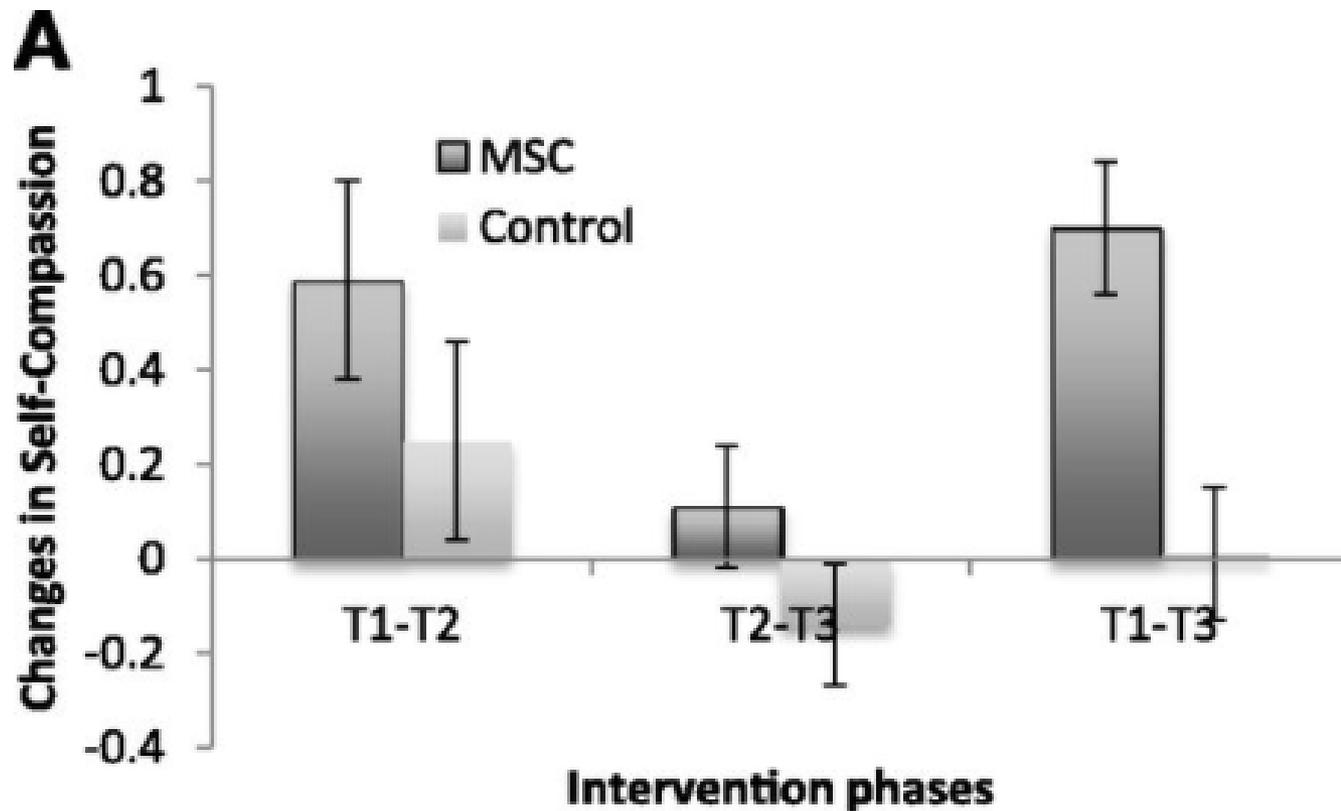
Mindfulness Intervention in Diabetes

Friis et al., a.friis@auckland.ac.nz

Published Diabetes Care 2016: Nov 29(11):1963-1971

- Randomized control trial
- Intervention: 8 week Mindfulness Self Compassion (MSC) program
- N = 32, wait list control, n = 31
- Mean age 43, range 18-70
- Patients with Type 1 and Type 2
- Measured self-compassion, depressive symptoms, diabetes specific distress and HbA1c
- Follow Up Duration: Baseline (T1), week 8 (T2) and 3 months (T3).

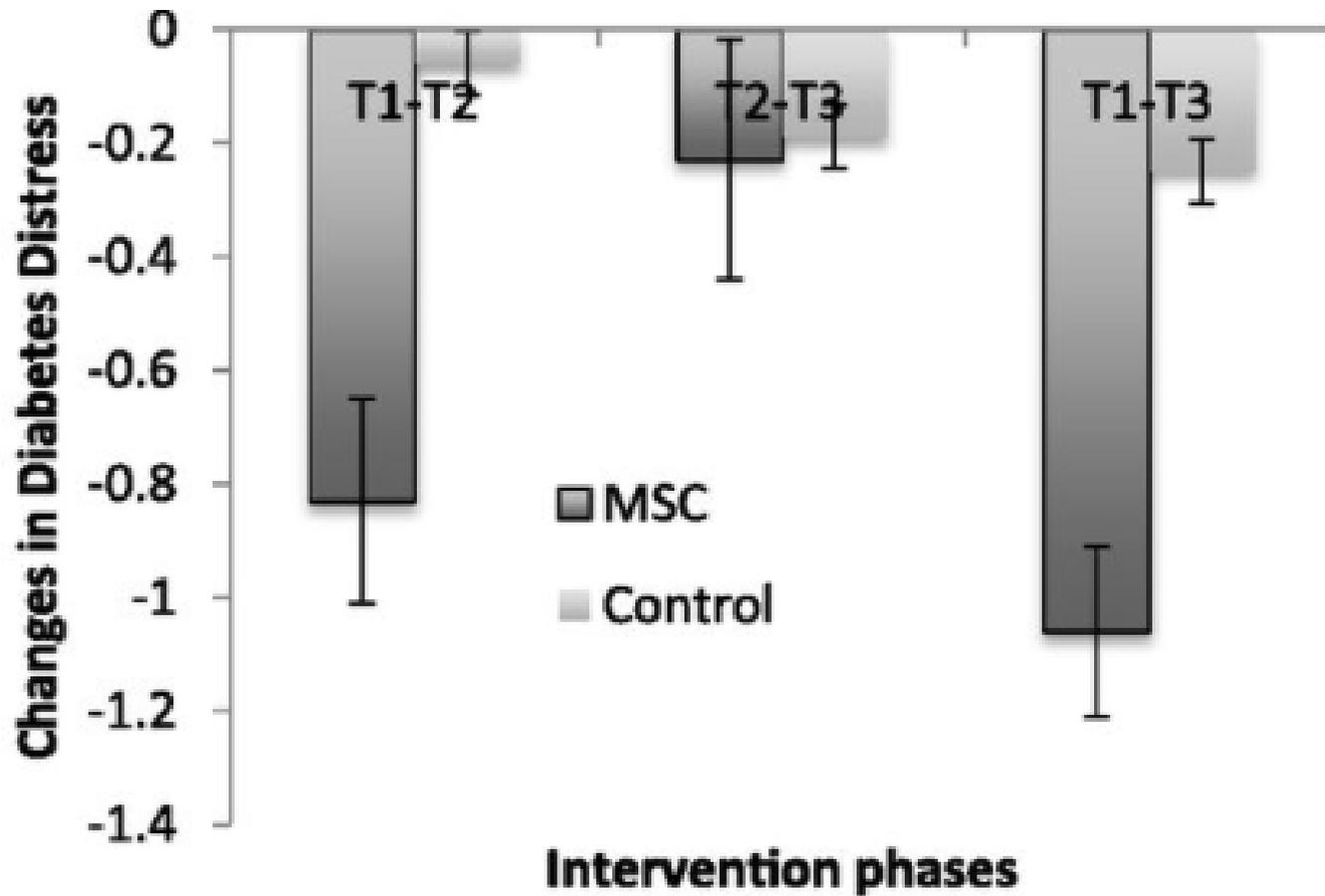
MSC increased self compassion (26 item SC Scale)



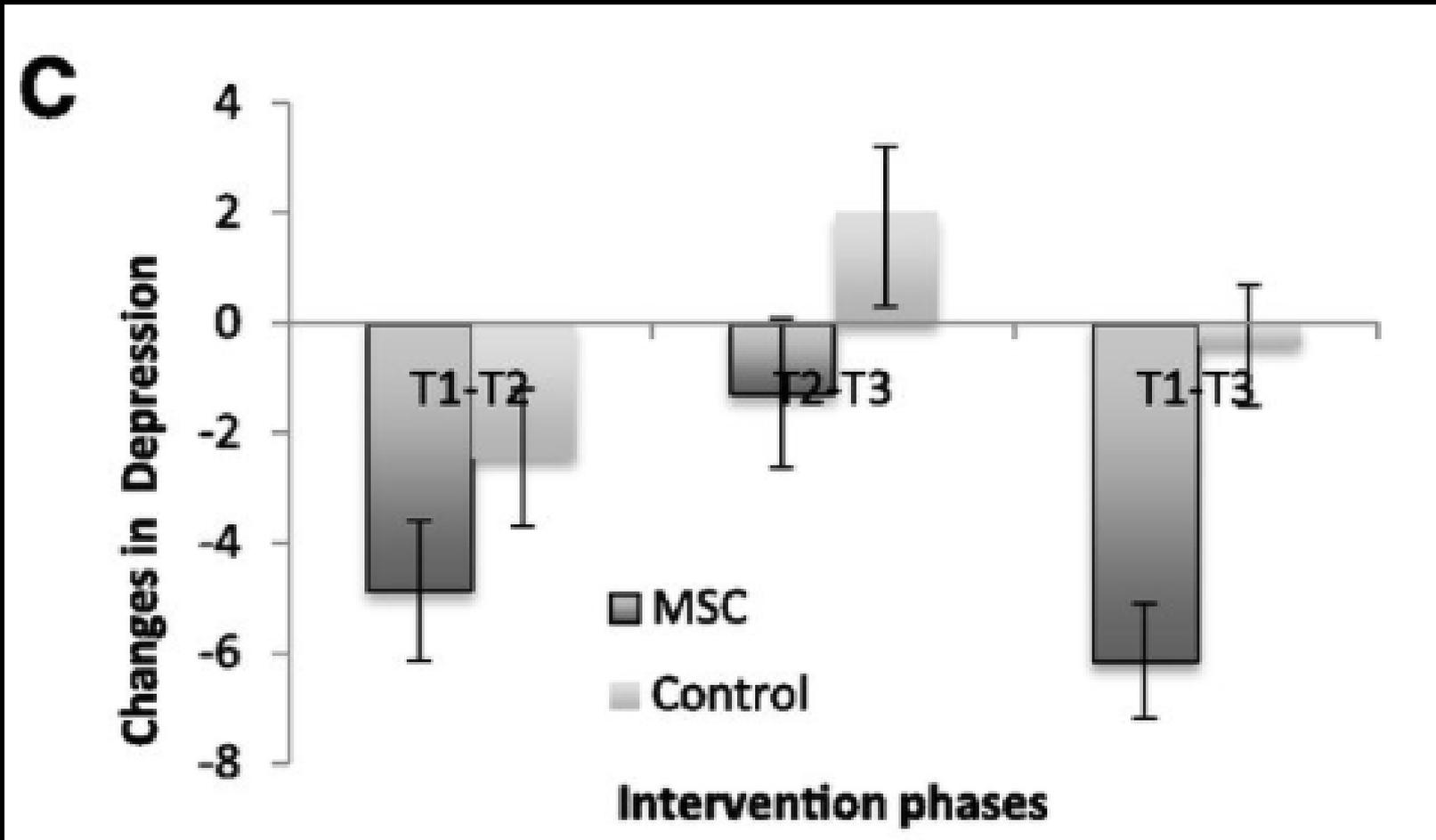
ANOVA $P_{(time)} = 0.000$, $P_{(group)} = 0.902$, $P_{(interaction)} = 0.001$

MSC reduced Diabetes Distress (17 item DDS)

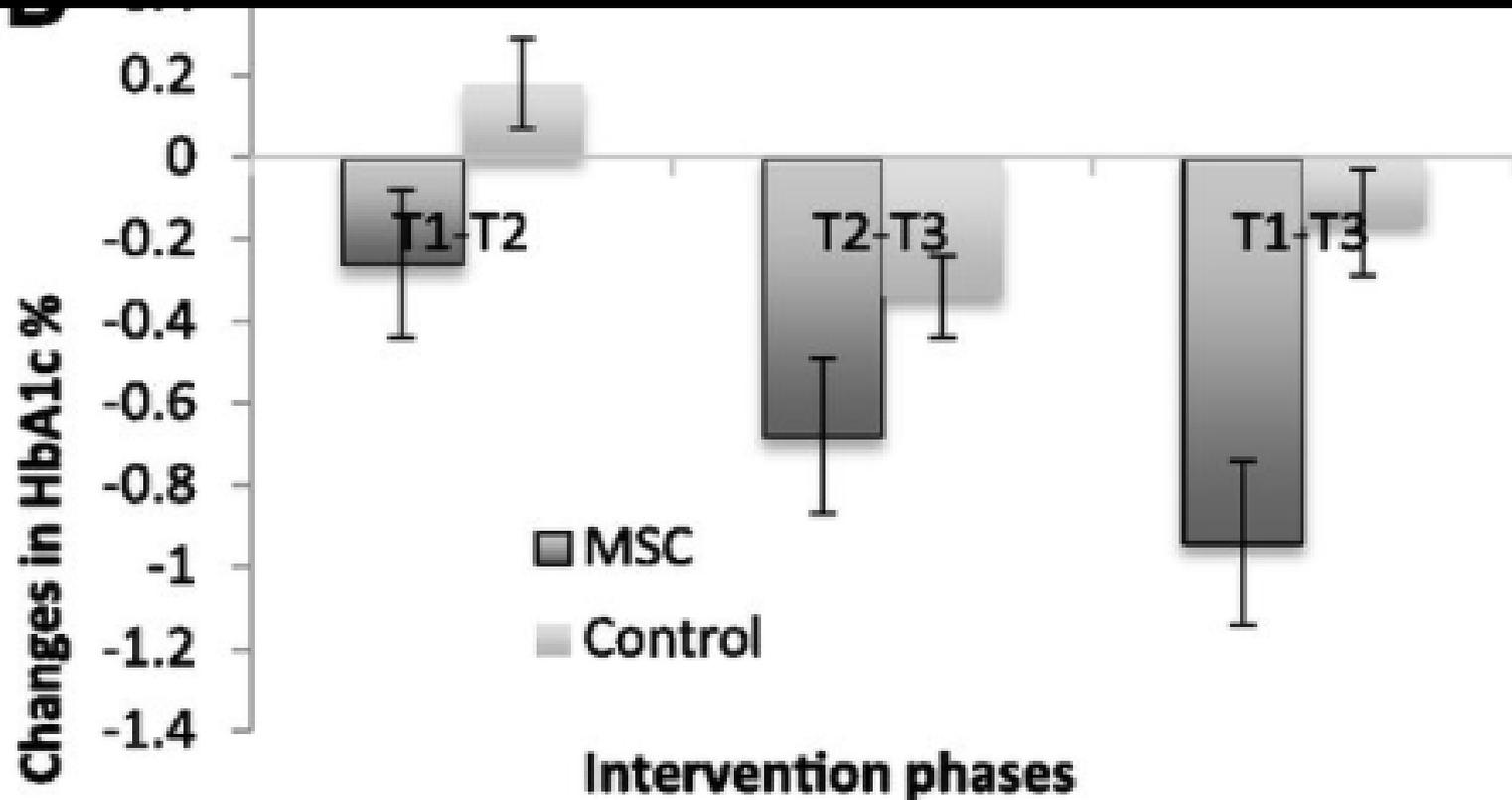
B



MSC Reduced Depression (PHQ-9)



MSC reduced HbA1c by ~ 1%
(Baseline ~8.9%)



Every 1% reduction in HbA_{1c} counts for your patients¹



A 1% reduction in HbA_{1c} leads to reductions in:

Peripheral vascular disease[†]

Microvascular disease

Deaths related to type 2 diabetes

Cataract extraction

All cause mortality

43%*
(95% CI, 31–53%)

37%*
(95% CI, 33–41%)

21%*
(95% CI, 15–27%)

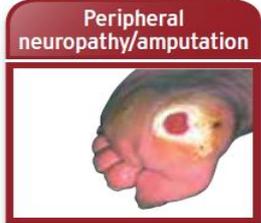
19%*
(95% CI, 11–26%)

14%*
(95% CI, 9–19%)

*p<0.0001.

[†]Amputation or death from peripheral vascular disease.

Newly diagnosed T2DM at baseline; follow-up median=10 years.



MSC – Mindfulness Self Compassion

- 8 weekly session, 2.5h per session.
- Clinical supervision weekly through skype.
- Standardized email 2 days after each session that summarized the teachings and encouraged practice.
- 8-12 people per session.
- Session included formal and informal mindfulness practices.

Limitations

- Findings are generalized only to those who volunteer for RCT (low drop out of 6% c/w 30% in most diabetes trials).
- Greater proportion of clinical significant depression (30%) compared to population (10%)
 - Lloyd et al., 2012.
- Failure of complete randomization of all baseline characteristics.
- Absence of active control group.

8 Sessions for MSC

- Introduction and review of self-compassion
- Foundational knowledge and practice of mindfulness
- Discussion of application of practices in various aspects of life
- Recognize the inner critic
- Recognize importance with living with core values.
- Skills to deal with difficult emotions
- Skills for dealing with interpersonal relationships
- Skills to relate to positive aspects of self and one's life with appreciation.

Stress Management Strategies

- Psychological Based Tools
 - Reflective Practice
 - Cognitive Tools, CBT, Psychoanalysis, ACT
 - Mind to Body Approaches eg NLP
- Somatic Based Tools
 - Nutrition, Exercise, Supplements, Medications
 - Body to Mind Approaches eg Kinesiology, Sleep.
- Transcendental Tools
 - Mindfulness, Body Scans etc.

What is mindfulness?

- Mindfulness is an inherent aspect of consciousness that can be enhanced through mental or physical training.
- Paying attention in a particular way, on purpose, in the present moment, non-judgementally (Kabat-Zinn, 1990).
- A manner of observing with an element of curiosity, kindness, compassion and patience.

Benefits of Mindfulness

- Enhanced ability to disrupt ruminative thought processes that lead to prolonged stress reactivity and mental illness (Teasdale et al., 1995).
- Improve detection of potential stressor and that effective coping will be implemented in a timely manner (Epel et al., 2009).
- Improve interoceptive processes, awareness of visceral signals and subtle emotional feelings important in emotion regulation (Nielson et al., 2006).

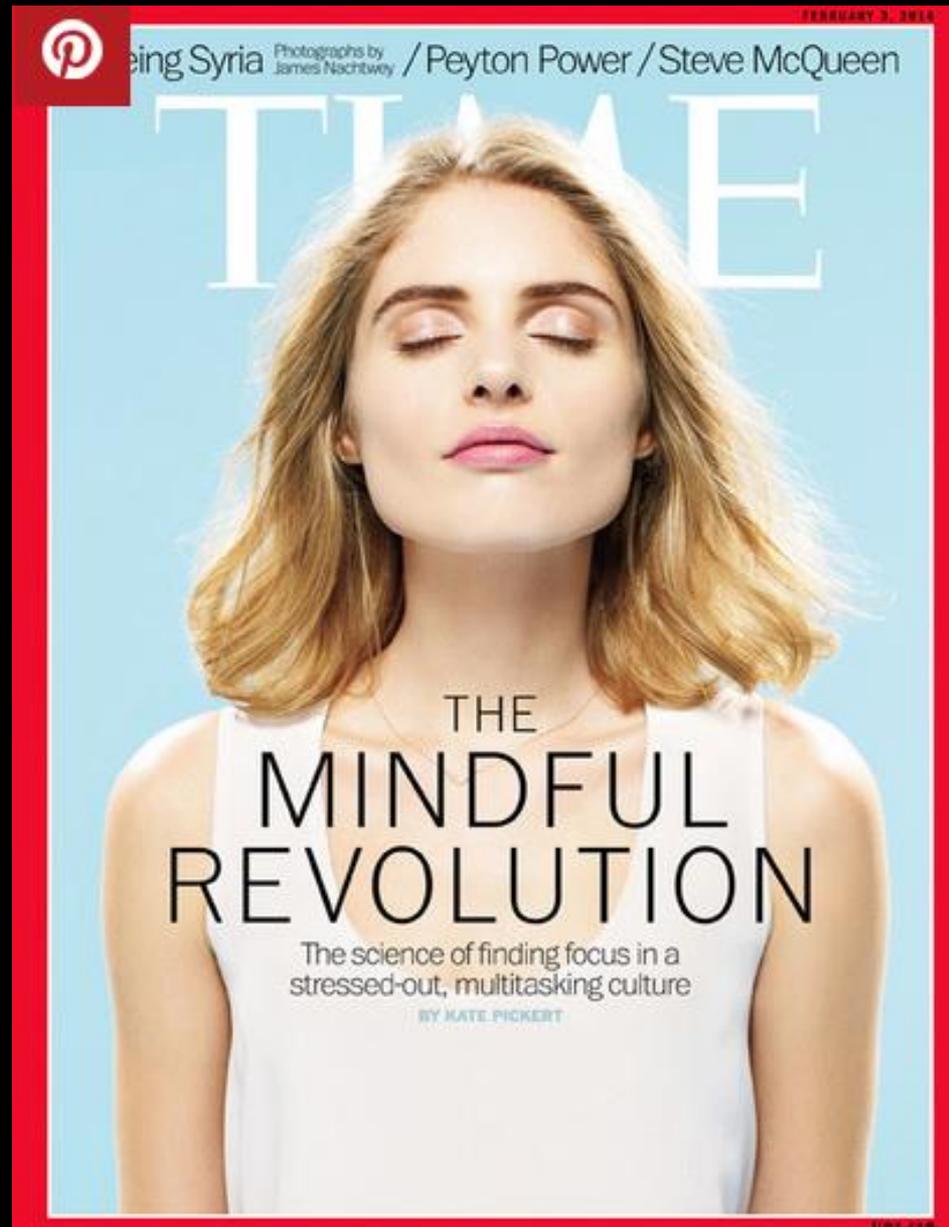
Physical Benefits of Mindfulness

- Mindfulness has been shown affect the immune system:
 - Reduction in inflammation (hsCRP). (Dalen et al, 2010)
 - Increase in salivary IgA levels (Tang et al., 2007)
 - Reduce the cortisol rise associated with stress.
- Mindfulness also facilitates weight loss with lower Neuropeptide Y levels. (Johnston et al., 2014).
- Mindfulness also reverses cellular aging
 - Improved telomerase activity (Jacob et al., 2011).

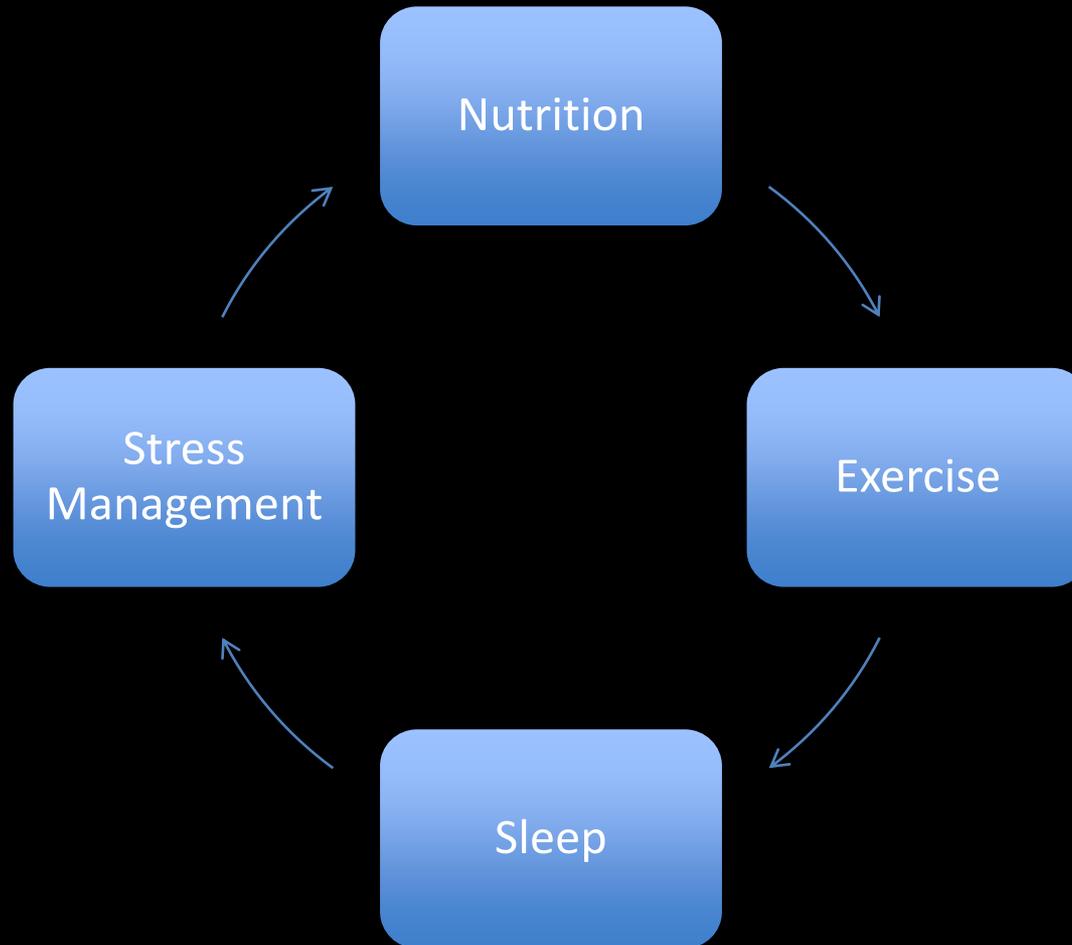
Mindfulness & Medicine

- Immune
 - Psoriasis (Kabat-Zinn et al., 1998, 2007)
 - Fibromyalgia (Curtis et al., 2011, Cash et al., 2015)
 - Ulcerative Colitis (Jedel et al., 2014)
- Metabolic Syndrome
 - Obesity (Daubenmier et al., 2012)
 - Polycystic Ovarian Syndrome (Stefanaki et al., 2015)
 - Heart Disease (Younge et al., 2015)
- Cancer
 - Breast cancer (Dodds et al., 2015)
 - Prostate Cancer (Ornish et al., 2013)
- Psychological
 - Alcohol Dependence (Zgierska et al., 2008)
 - Post traumatic Stress Disorder (Bergen-Cico et al., 2014)

Medicine and Mindfulness



Iterative Approach to Diabetes Management



Hierarchy in Diabetes Management



Integrating Mindfulness in Treating Diabetes

- Demonstrate mindfulness in action in your consultation.
 - Blood Pressure Measured Pre and Post-3 mindful breaths.
- Inform your patient on how mindfulness can reduce stress related glycaemic excursions, weight, blood pressure through:
 - Improvement in sleep depth
 - Reduced cortisol levels
 - Reduced comfort food eating and metabolism.
- Show them how to integrate mindfulness in daily life:
 - Mindfulness breathing or body awareness whilst waiting or sitting.
 - Learn to identify stressors and use psychological and mindfulness tools to deal manage them.
- Engage with mindfulness yourself to help those around you.