



Olive Lennon

Lifestyle modifications and strategies for long-term secondary stroke prevention





Head versus Heart

Context

- 200 million stroke survivors globally by 2050



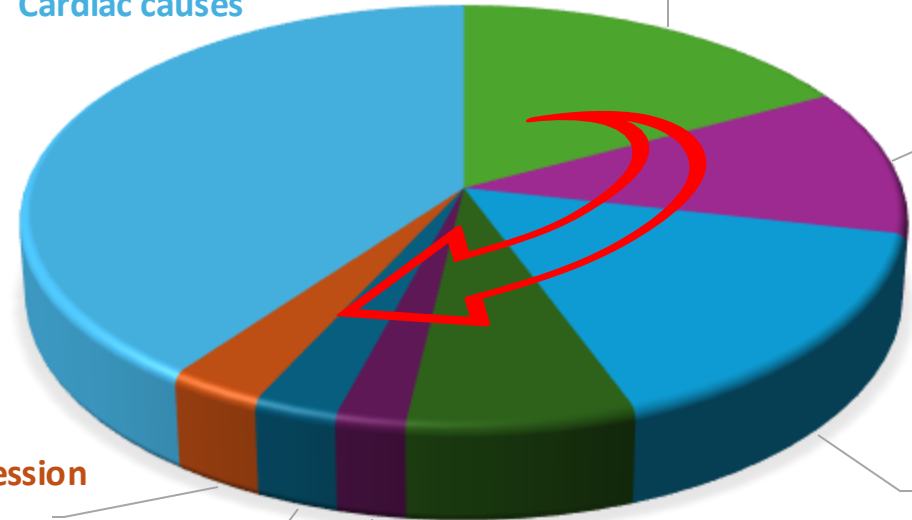
Known risk factors for stroke that can be changed

account for up to 90% of stroke

High blood pressure,
Cholesterol problems
Diabetes
Cardiac causes

No being active enough

Unhealthy eating**



Carrying weight around the middle**

Depression

Stress / Anxiety

Unsafe alcohol use

Smoking



* >30 drinks per month or binge drinking; ** waist-to-hip ratio (highest vs lowest tertile); ** diet risk score

O'Donnell MJ, Xavier D, Liu L, Zhang H, Chin SL, Rao-Melacini P, Rangarajan S, Islam S, Pais P, McQueen MJ, Mondo C. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. The Lancet. 2010 Jul 16;376(9735):112-23



Medications

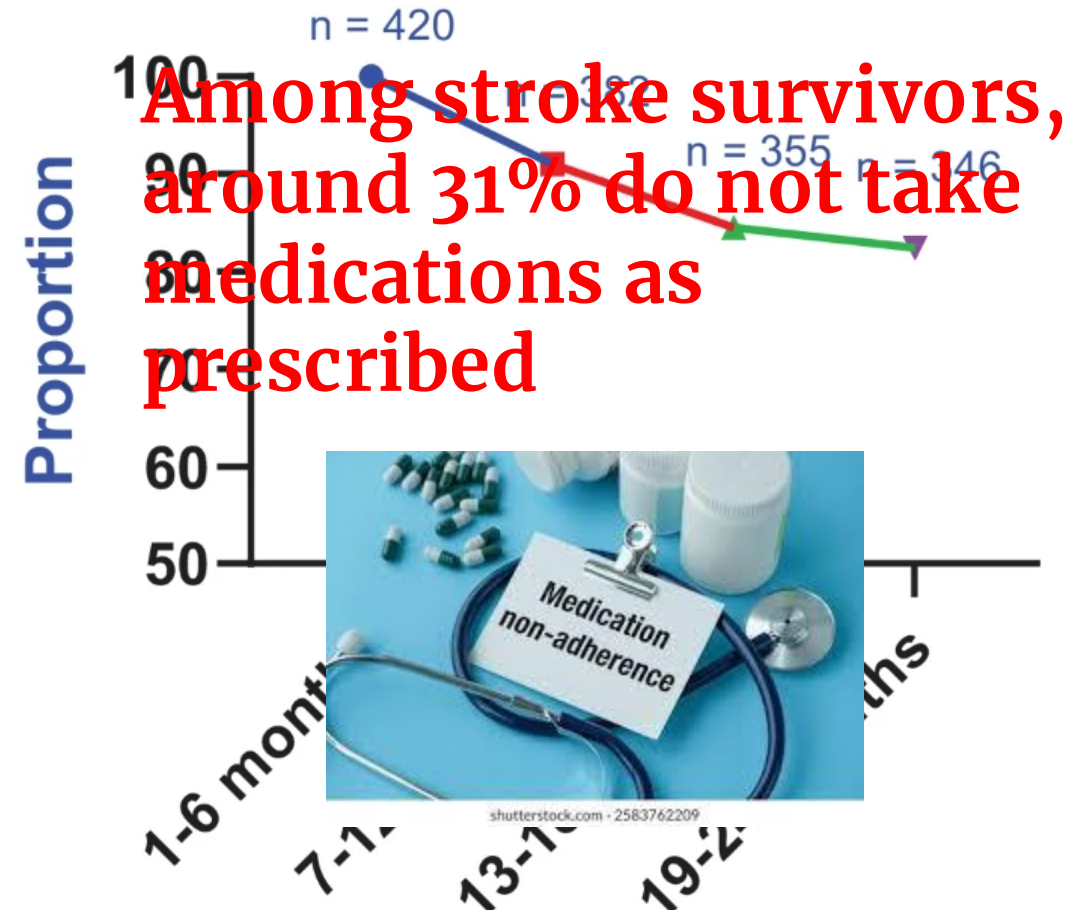
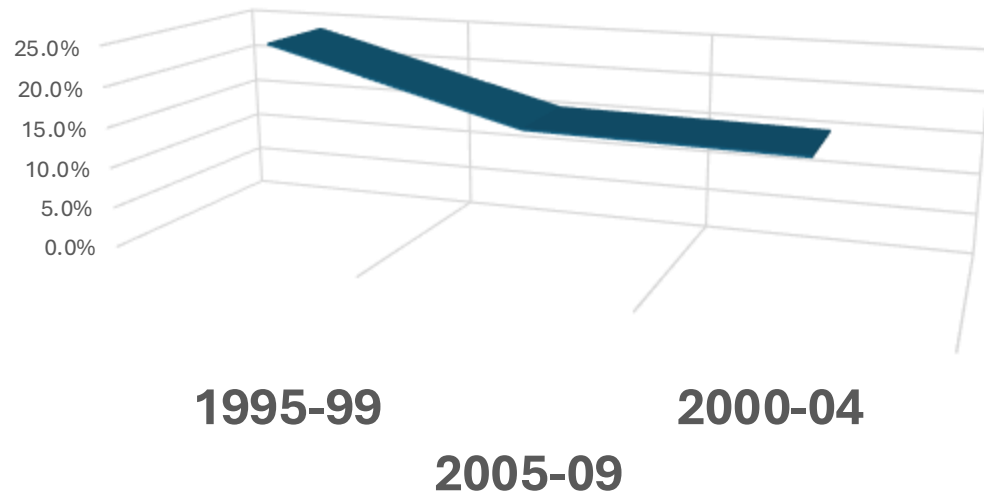


High blood pressure,
Cholesterol problems
Diabetes...



Taking medication as prescribed is a lifestyle behaviour for life

10 Year Stroke Recurrence Rates



1. Flach, C.; Muret, W.; Wolfe, C.D.; Bhalla, A.; Douiri, A. Risk and secondary prevention of stroke recurrence: A Population-Base Cohort Study. *Stroke* 2020, *51*, 2435–2444.

Norberg, H., Sjölander, M., Glader, E.L. *et al.* Self-reported medication adherence and pharmacy refill adherence among persons with ischemic stroke: a cross-sectional study. *Eur J Clin Pharmacol* 78, 869–877 (2022). <https://doi.org/10.1007/s00228-022-03284-4>

Al AlShaikh et al 2016 *European Stroke Journal*.

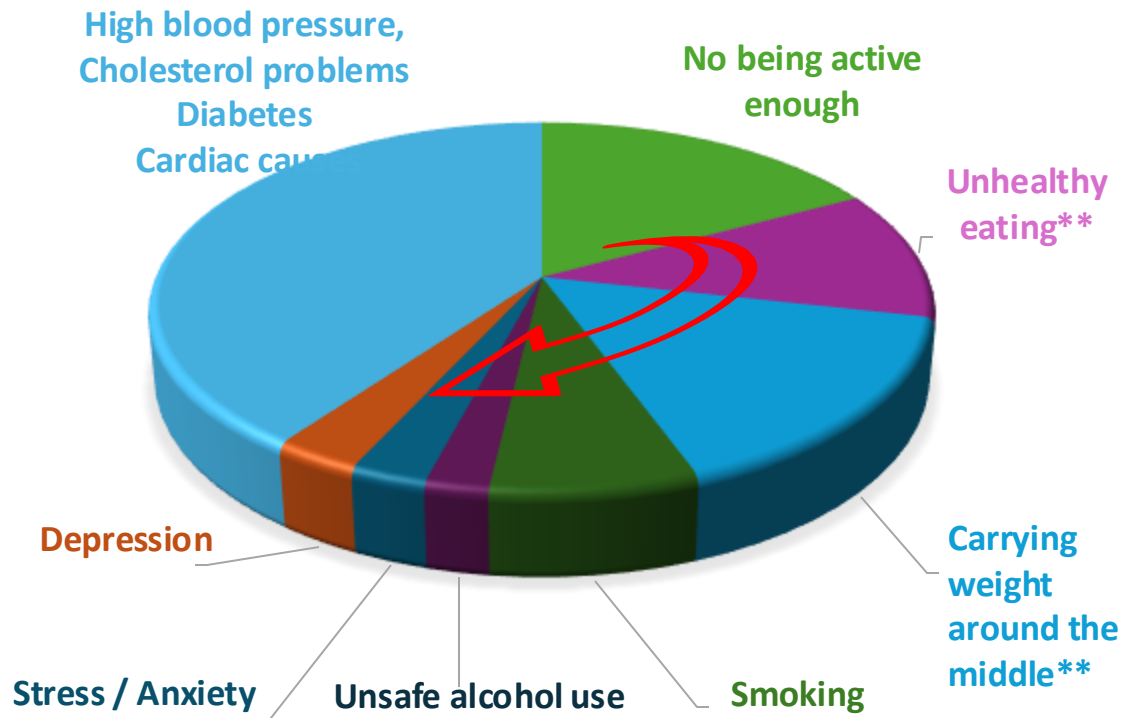
The importance of having a healthy lifestyle

Interventions for improving modifiable risk factor control in the secondary prevention of stroke (Review)

Bridgwood B, Lager KE, Mistri AK, Khunti K, Wilson AD, Modi P

Telling people doesn't work

Patient education alone, did not lead to improvements in modifiable risk factor control or the prevention of recurrent cardiovascular events.



Consensus work



Online and face-to-face meetings

- Glasgow, UK
- Stockholm, Sweden




Interventions to **self-manage** modifiable lifestyle risk factors are **contextualised and individualised** to the capacities, needs, and personally meaningful priorities of **individuals with stroke and their families**.

What interventions?



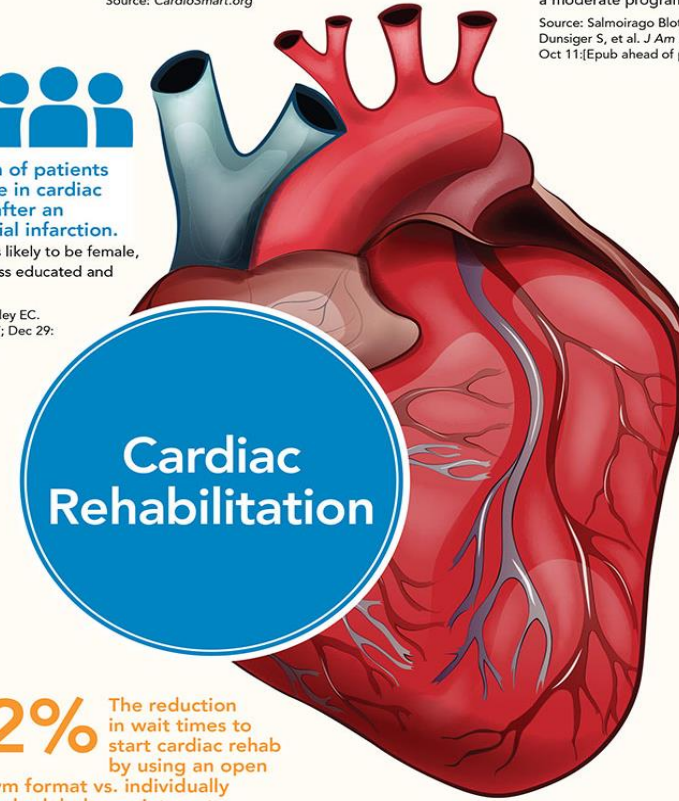
30%
 The reduced chance of a fatal heart event with cardiac rehab compared with standard therapy alone.
 Other benefits include less chest pain, prevention of future hospital stays, weight loss, better nutrition, knowledge to make heart healthy choices, reduced stress and greater emotional well-being.
 Source: CardioSmart.org

90%
 The retention rate at nine months of participants with coronary heart disease who joined a tai chi course after declining participation in a cardiac rehab program. In the randomized study, physical activity as measured by accelerometry, weight and quality of life improved. Tai chi was shown to be safe and feasible, with a more intensive program providing greater benefits over a moderate program.
 Source: Salmoirago Blotcher E, Wayne PM, Dunsiger S, et al. J Am Heart Assoc 2017; Oct 11[Epub ahead of print].




1/3 

The proportion of patients who participate in cardiac rehabilitation after an acute myocardial infarction. Participants are less likely to be female, black, uninsured, less educated and current smokers.
 Source: Peters AE, Keeley EC. J Am Heart Assoc 2017; Dec 29; [Epub ahead of print].



22%
 The reduction in wait times to start cardiac rehab by using an open gym format vs. individually scheduled appointments.
 Long wait times is associated with reduced participation. Instead of set appointment times, patients attended a group intake session and then could attend subsequent sessions any time during open gym hours when it was staffed by at least two exercise physiologists. Similar improvements were seen in both groups.
 Source: Bachmann JM, Klint ZW, Jagoda AM, et al. J Cardiopulm Rehabil Prev 2017;37:322-8.

20-30%
 The reduced chance of death during the five years following a heart attack or bypass surgery in patients who participate in cardiac rehabilitation.
 Source: Centers for Disease Control and Prevention.

36 
 The number of cardiac rehab sessions associated with a 47 percent lower risk of death at four years, vs. only one session, in Medicare patients (average age 74 years). A dose response was found between the number of sessions and the reduction in death and heart attacks.
 Source: Hammill BG, Curtis LH, Schulman KA, Whellan DJ. Circulation 2010;121:63-70.

A Comparison of Cardiac Rehabilitation for Non-Disabling Stroke and Cardiac Conditions: Outcomes and Healthcare Professionals' Perceptions

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What about stroke vs cardiac?

- TIA/non-disabling stroke and cardiac patients made similar cardiovascular fitness improvements and reductions in blood pressure and cholesterol following cardiac rehabilitation.
- Poor uptake/adherence rates after stroke warrant investigation

Modelling from cardiac to stroke

Stroke

Volume 38, Issue 6, 1 June 2007; Pages 1881-1885
<https://doi.org/10.1161/STROKEAHA.106.475525>



ORIGINAL CONTRIBUTIONS

Combining Multiple Approaches for the Secondary Prevention of Vascular Events After Stroke

A Quantitative Modeling Study

Daniel G. Hackam, BSc, MD, PhD, FRCPC and J. David Spence, MD, FRCPC, FAHA



80% reduction in the risk of having a major cardiovascular event after stroke by 80%

Translates to a number needed to treat of 5.



RESEARCH PAPER

Impact of a healthy lifestyle on all-cause and cardiovascular mortality after stroke in the USA

Amytis Towfighi,^{1,2} Daniela Markovic,³ Bruce Ovbiagele⁴

► Additional tables are published online only. To view these files please visit the journal online (<http://jnnp.bmj.com/content/83/2.toc>).

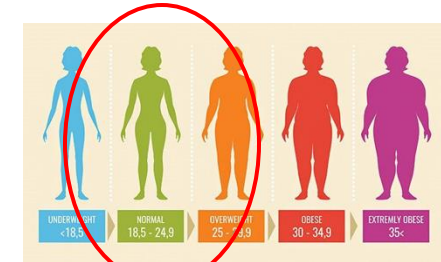
ABSTRACT

Background Little is known about the effects of a healthy lifestyle on mortality after stroke. This study assessed whether five healthy lifestyle factors had

numbers of healthy lifestyle behaviours were associated with a greater survival benefit.

METHODS

Examined Five factors:



Outcome of cardiovascular mortality:

a dose dependent response is seen

4-5 healthy factors vs none: Risk is 92% lower

1-3 healthy factors vs none: Risk is 85% lower

4-5 healthy factors vs 1-3 factors: Risk is 47% lower

What does the scientific evidence tell us?

European Journal of



analyses
Results



Citation: Lawrence M, Pringle J, Kerr S, Buu...

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Interventions for Behaviour Change and Self-Management of Risk in Stroke Secondary Prevention: An Overview of Reviews

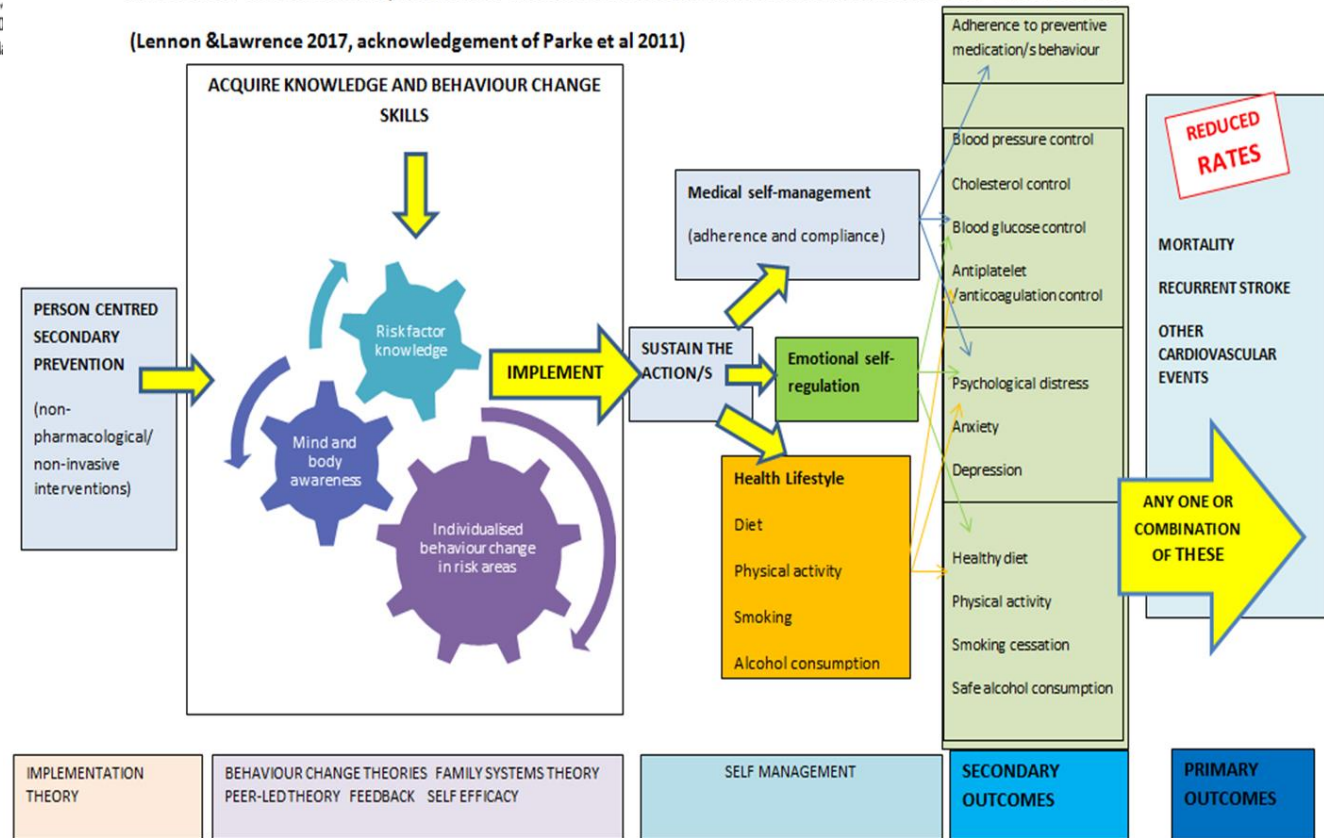
Patricia Hall^{a,b} Maggie Lawrence^c Catherine Blake^b Olive Lennon^b

^aPASTAR CDA Programme, Division of Population Health Sciences, RCSI, Dublin, Ireland; ^bSchool of Public Health, Physiotherapy and Sports Science, UCD, Dublin, Ireland; ^cDepartment of Nursing and Community Health, GCU, G4 OBA Glasgow, Glasgow, UK

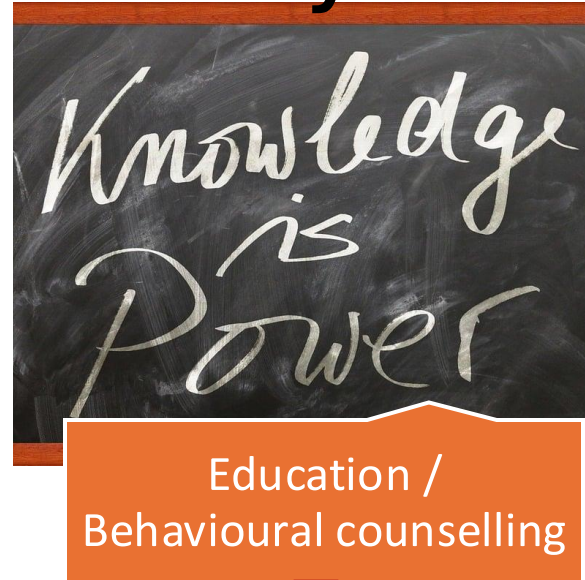
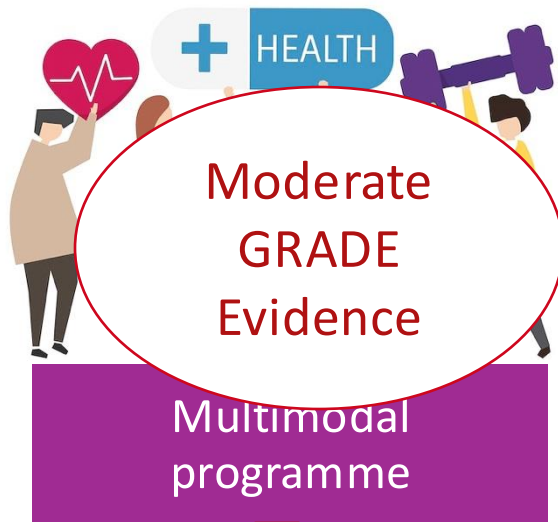
- 15 systematic reviews identified with 72 meta-analyses (246 screened)
- 21 outcomes of interest
 - Mortality and cardiovascular morbidity
 - Adherence to secondary prevention

MODEL FOR PERSON CENTRED, SECONDARY STROKE PREVENTION BEHAVIOURAL CHANGE AND SELF-MANAGEMENT

(Lennon & Lawrence 2017, acknowledgement of Parke et al 2011)



Best evidence synthesis



Knowledge
Skills
Goals
Social influences

Knowledge
Beliefs about
consequences
Goals

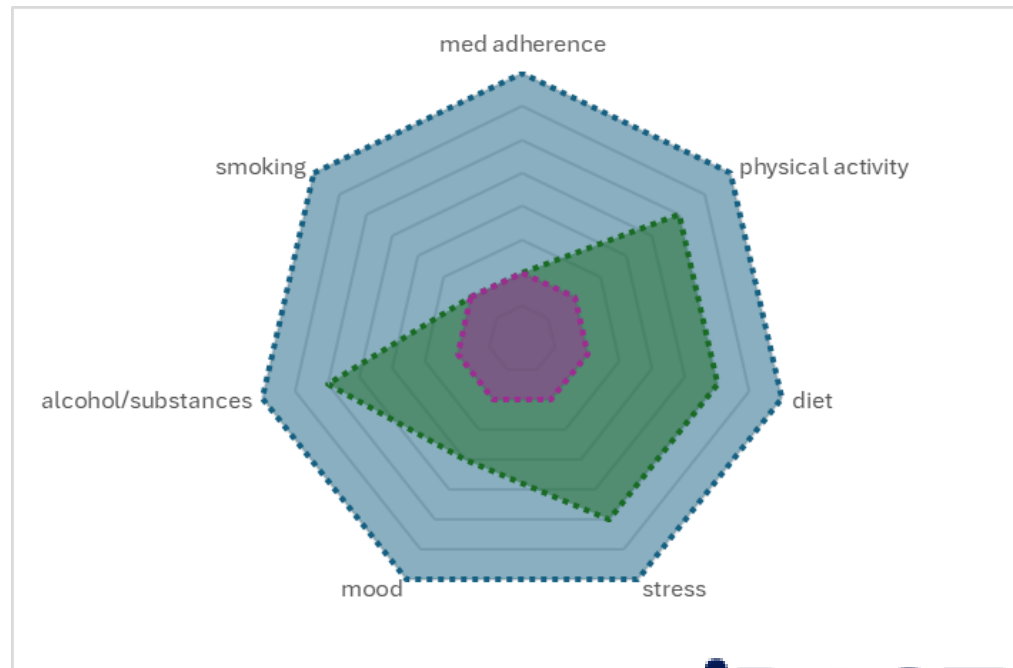
Beliefs about
capabilities
Skills
Goals
Intentions

Skills
Emotions



- Best evidence synthesis
- ⊕⊕⊕○ **Moderate GRADE certainty**
 - Multimodal interventions to reduce future cardiac events & improve physical activity participation
 - Psychological therapies to reduce depression post-stroke
- ⊕⊕○○ **Low GRADE certainty**
 - Self-management interventions to improve medication adherence
 - Multimodal interventions to reduce blood pressure & reduce anxiety
 - Education/behavioural counselling to improve healthy eating

Recognising personal risks after stroke and building an evidence-informed intervention



iPASTAR

Improving Pathways for Acute Stroke and Rehabilitation





Thank you