Evidence Summary Title:
The effectiveness of interventions based on a stages-of-change approach to promote individual behaviour change: Evidence and implications for public health

Review Quality Rating: 8 (strong)

Review on which this evidence summary is based:

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This is an evidence summary written to condense the work of the authors of this systematic review, referenced above. The intent of this summary is to provide an overview of the findings and implications of the full review. For more information on individual studies included in the review, please see the review itself.

Review content summary
This systematic review of 37 randomized controlled trials (RCTs) aimed to determine the effectiveness of interventions based on a stage-of-change approach (compared with controls or non-stage-based interventions) to promote individual behaviour change in the following areas: a) smoking cessation; b) physical activity; c) dietary change; d) multiple lifestyle changes; e) mammography screening; f) treatment adherence; and g) the prevention of smoking and alcohol use. Participants studied were: individuals whose behaviour could be modified primarily in order to prevent the onset or progression of disease. To be included, studies were: RCTs that evaluated stages-of-change approaches to behaviour modification, in any setting. Interventions described in this review included: any intervention that could be classified as a stage-of-change approach. These approaches distinguish between three types of individuals who are the targets of the intervention: those who have not yet decided to change their behaviour, those who have decided to change and those who have already changed. Outcomes measured include: health behaviour changes such as smoking cessation, dietary modification, and reduction in alcohol consumption. Authors report that describe overall study findings (was the intervention found to be effective under what conditions).

Comments on this review's methodology
This is a methodologically strong systematic review. A focused clinical question was clearly identified. Appropriate inclusion criteria were used to guide the search. A comprehensive search was employed using health, social, psychological, and educational databases; reviewing reference lists of primary studies; and contacting key informants. The search was not limited by language. Primary studies were assessed for methodological quality using the following quality criteria: research design, study sample, data collection (measurement of independent/dependent variables), follow-up/attrition rates, and data analysis. The methods were described in sufficient detail so as to allow replication and it is unclear if two reviewers were involved in quality appraisal. Any discrepancies in appraisal results were not indicated in the review. The results of this review were not transparent. Results were clearly presented in narrative form so as to allow for comparisons across studies. Heterogeneity was not assessed. Appropriate analytical methods (fixed effects, random effects) were not employed to enable the synthesis of study results.

Why this issue is of interest to public health
Public health is interested in reducing the burden of chronic diseases given that many unhealthy habits produce morbidity and mortality in Canadians of all ages. In Canada, more than 75% of deaths every year result from six groups of non-communicable diseases: cardiovascular, cancer, diabetes, asthma, chronic obstructive pulmonary disease, and mental illness1. These chronic diseases share common preventable behavioural risk factors especially among some vulnerable groups. According to the World Health Organization, over 90% of type 2 diabetes and 80% of coronary heart disease could be avoided or postponed with behavioural changes related to smoking cessation, physical activity, diet, and stress management1. The estimated total cost in Canada of illness, disability and death attributable to chronic diseases amounts to over $80 billion annually1. This represents the major and growing component of health care costs. To address these issues, in 2002, the Federal, Provincial, and Territorial Ministers of Health and the Public Health Agency of Canada committed to the Integrated Pan-Canadian Healthy Living Strategy, which advocates sustained action based on Healthy Living1.

Evidence and implications
Evidence points are in order of the strength of evidence
### What's the evidence?

<table>
<thead>
<tr>
<th><strong>1. Physical Activity (7 studies)</strong></th>
<th><strong>Implications for practice and policy:</strong></th>
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<tbody>
<tr>
<td>1.1. Generally, stage-based interventions are no more effective in promoting physical activity than information-only or non-stage-based interventions controls.</td>
<td>1. <strong>Physical activity</strong></td>
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<td>1.2. Three studies found that the stage-based interventions had a significantly greater effect on activity behaviour change than control conditions (involving either usual care or activity promotion information). However, positive effects were not maintained beyond 12 weeks.</td>
<td>1.1. Caution should be taken when developing and implementing programs to promote physical activity based on a stage-based approach as currently evidence does not support this as an effective approach.</td>
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<td>1.3. Interventions associated with positive stage-based physical activity changes involved: targeted stage-based and/or motivational written information, brief and long-term motivational interview with or without financial incentive; skill development strategies (goal-setting, relapse prevention); promotion of small behaviour changes.</td>
<td>1.2. Programs that aim to promote physical activity based on a stage-of-change approach should involve targeted stage-based and motivational information provision; financial incentives; skill development strategies (goal-setting, relapse prevention); and the promotion of small behaviour changes.</td>
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<tr>
<th><strong>2. Smoking cessation (13 studies)</strong></th>
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<tr>
<td>2.1. Generally, stage-based interventions are no more effective in promoting smoking cessation than control conditions or non-stage-based interventions.</td>
<td>2.1. Caution should be taken when developing and implementing programs to promote smoking cessation with a stage-based approach as currently evidence does not support this as an effective approach.</td>
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<tr>
<td>2.2. Generally, stage-based interventions to promote smoking cessation are not effective in moving participants along the stages of change.</td>
<td>2.2. Programs that aim to promote smoking cessation based on a stage-of-change approach should involve booster sessions and targeted stage-based and individualized written provision.</td>
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<tr>
<td>2.3. When positive effects were reported interventions included: 2.3.1. Booster sessions. 2.3.2. Targeted staged-based and individualized written information provision. 2.4. stage-based interventions vs. control (6 studies) 2.4.1. Staged-based intervention groups were significantly more effective than control groups in quit rates (2 studies). In one of these studies the intervention was also effective in changing daily cigarette consumption. 2.4.2. No significant difference between groups was found at last follow-up (3 studies). One study reported a significant result (P&lt;.05) for 7-day quit rates.</td>
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<td>2.5. stage-based vs. non stage-based (8 studies) 2.5.1. Significant changes in quit rates were found between staged-based intervention groups and those receiving non-stage-based interventions (1 study) at 6, 12 and 18 months follow-up. The intervention in this study involved written material and telephone counselling targeted to their stage of change. 2.5.2. Significant changes were not found between intervention groups at final follow-up (5 studies). In one study, a subgroup involving booster sessions had significantly higher point prevalence quit rates and quit attempts. In another, while quit rates were not impacted, daily cigarette consumption was significantly lower in the stage-based intervention.</td>
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<th><strong>3. Dietary changes (5 studies)</strong></th>
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<tr>
<td>3.1. Generally, stage-based dietary interventions to promote dietary changes are no more effective than non-stage-based interventions or a control group.</td>
<td>3.1. Caution should be taken when developing and implementing programs to promote dietary changes with a stage-based approach as currently evidence does not support this as an effective approach.</td>
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<tr>
<td>3.2. Two studies reported significant effects of the stage-based intervention as compared with non-stage-based intervention (1 study) or control groups (1 study).</td>
<td>3.2. If programs to promote dietary changes based on a stage-of-change approach are implemented they should include nutrition education sessions aimed at skill development, peer educators, social support, and information provision via several means.</td>
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<td>3.3. One trial showed non-significant intervention effects in behaviour change outcomes.</td>
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<td>3.4. Interventions associated with positive stage-based dietary change included: nutrition sessions (brief and workshop series) conducted by peer educators, skills development, social support; printed materials and visual reminders; and direct mail.</td>
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<td>3.5. All studies involved mail delivered intervention. Additional nutrition sessions were given at the worksite or at the WIC program site (2 studies).</td>
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<th><strong>4. Multiple lifestyle changes (6 studies)</strong></th>
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<td>4.1. Lifestyle changes (6 studies)</td>
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4.1. Generally, stage-of-change interventions to promote multiple lifestyle changes are no more effective than non-stage based interventions or controls.

4.1.1. Three of the studies aimed at multiple lifestyle changes (smoking cessation – 5 studies; dietary changes – 5; physical activity – 2; substance use – 2; medical compliance – 1) showed no difference between groups for any of the behaviours observed.

4.1.2. One study found significant intervention effects for low intensity (single face-to-face appointment and 5 telephone counselling appointments - lasting 15 minutes) but not high intensity interventions (6 appointments in the general practice -lasting 45 minutes).

4.1.3. Another study showed significant effects of stage-based interventions for certain outcomes only (i.e., percentage of energy from fat and servings of fruit and vegetables, but not for smoking cessation).

4.1.4. Another showed positive stage-based effects for all outcomes included (the number of cigarettes smoked per day and increases in quit rates among participants receiving stage-based interventions at 4- and 12-months follow-up; greater reductions in dietary fat; and an increase in the number of exercise sessions).

4.1. Caution should be taken when developing and implementing programs to promote multiple lifestyle changes with a stage-based approach as currently evidence does not support this as an effective approach.

4.2. Programs that aim to promote multiple lifestyle changes based on a stage-of-change approach should not involve higher intensity interventions as these are more costly and less likely to have the desired impact.

5. Screening mammography (2 studies) and treatment adherence (1 study)

5.1. Generally, stage-based interventions to promote screening mammography and treatment adherence are no more effective than non-stage-based interventions or controls.

5.1.1. The studies involving screening mammography revealed mixed results (1 effective; 1 not).

5.1.2. The study related to treatment adherence revealed no significant impact.

5.2. Given the mixed results, rigorous program evaluations and high quality research should be conducted.

6. Participant characteristics

6.1. In studies involving participants with low incomes, stage-based interventions generally did not result in a behaviour change.

6.2. Well designed research studies are needed in order to determine participant characteristics that impact the effectiveness of stage-based interventions aimed at behaviour change.

7. Methodological Issues with the Primary Studies in the Review

7.1. Issues with the methodological quality of primary studies involved:

7.1.1. Method of randomization.

7.1.2. Method of allocation concealment.

7.1.3. Lack of blinding (participants, data collectors, care providers).

7.1.4. Failure to use an intent-to-treat analysis.

7.1.5. Lack of clarity on validity of data collection tools.

7.1.6. Failure to provide comparisons to non-stage based interventions.

7.1.7. Failure to report any behaviour change data

7.1.8. Failure to report any health outcomes or adverse outcomes.

7.2. Quality research studies (including program evaluations) should be funded and conducted that:

7.2.1. Have sufficient power (e.g., sufficient sample size) and are of sufficient dose (frequency, duration and intensity) to determine significant effects

7.2.2. Evaluate the relative effectiveness of stage-based and non-stage-based approaches to behaviour change.

7.2.3. Evaluate the relative effectiveness of stage-based and non-stage-based approaches to multiple behaviour change.

7.2.4. Develop and/or uses valid measures of physical activity; smoking cessation (abstinence, intention to quit, number of previous quit attempts, perceived co-worker encouragement to quit, number of cigarettes smoked daily); socio-economic status; stage-of-change

7.2.5. Involves long term follow-up at various intervals.

7.2.6. Determine factors (socioeconomic status) that impact the effectiveness of a behaviour change intervention based on the stages of change.

7.2.7. Determine short and long term impacts of interventions.

7.2.8. Identify core components of effective behaviour change interventions.

7.3. Given the mixed results, rigorous program evaluations and high quality research should be conducted.

7.4. Caution should be taken when developing and implementing programs to promote multiple lifestyle changes with a stage-based approach as currently evidence does not support this as an effective approach.
8. Cost Benefit or Cost-effectiveness Information

8.1. Physical Activity
   8.1.1. None of these studies included an economic evaluation

8.2. Dietary change
   8.2.1. None of these studies included an economic evaluation

8.3. Smoking cessation
   8.3.1. 2 studies included economic evaluation
   8.3.2. The marginal cost per quitter was estimated at £450.65 (which may fall to an extreme of £265.00 with increased use).
   8.3.3. The marginal cost per reduction in addiction was estimated at £279.63 (minimum: £164.44).
   8.3.4. The marginal cost per quit attempt was estimated at £311.99 (minimum: £183.47).

8.4. Multiple lifestyle changes
   8.4.1. Only 1 study included economic evaluation but the actual cost data, used to calculate cost-effectiveness, were not reported in the review.

8.5. Treatment adherence
   8.5.1. 1 study included economic evaluation

General Implications
- Generally stage-based interventions are no more effective in promoting behaviour change than control conditions or other behaviour change interventions when applied to any of the following areas:
  - Smoking cessation
  - Physical activity
  - Dietary change
  - Multiple lifestyle changes
  - Mammography screening
  - Treatment adherence
  - Prevention of smoking and alcohol use

- Additional research is needed as methodological concerns with primary studies may have affected these findings

Legend:  CI – Confidence Interval; OR – Odds Ratio; RR – Relative Risk
**For definitions see the healthevidence.org glossary [http://www.healthevidence.org/glossary.aspx]

References used to outline issue
1. The Secretariat for the Intersectoral Healthy Living Network in partnership with the F/P/T Healthy Living Task Group and the F/P/T Advisory Committee on Population Health and Health Security (ACPHHS), (2005). The Integrated Pan-Canadian Healthy Living Strategy.

Other quality reviews on this topic

Related links
- Canadian Coalition for Active Living [www.activeliving.ca]
- Chronic Disease Prevention Alliance of Canada [http://www.cdpac.ca]

Suggested citation

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