

**ORIGINAL RESEARCH**

# Development of a Chronic Disease Management Program for Stroke Survivors Using Intervention Mapping: The Stroke Coach



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## Abstract

**Objective:** To describe the systematic development of the Stroke Coach, a theory- and evidence-based intervention to improve control of lifestyle behavior risk factors in patients with stroke.

**Design:** Intervention development.

**Setting:** Community.

**Participants:** Individuals who have had a stroke.

**Interventions:** We used intervention mapping to guide the development of the Stroke Coach. *Intervention mapping* is a systematic process used for intervention development and composed of steps that progress from the integration of theory and evidence to the organization of realistic strategies to facilitate the development of a practical intervention supported by empirical evidence. Social cognitive theory was the underlying premise for behavior change, whereas control theory methods were directed toward sustaining the changes to ensure long-term health benefits. Practical evidence-based strategies were linked to behavioral determinants to improve stroke risk factor control.

**Main Outcome Measures:** Not applicable.

**Results:** The Stroke Coach is a patient-centered, community-based, telehealth intervention to promote healthy lifestyles after stroke. Over 6 months, participants receive seven 30- to 60-minute telephone sessions with a lifestyle coach who provides education, facilitates motivation for lifestyle modification, and empowers participants to self-management their stroke risk factors. Participants also receive a self-management manual and a self-monitoring kit.

**Conclusions:** Through the use of intervention mapping, we developed a theoretically sound and evidence-grounded intervention to improve risk factor control in patients with stroke. If empirical evaluation of the Stroke Coach produces positive results, the next step will be to develop an implementation intervention to ensure successful uptake and delivery of the program in community and outpatient settings.

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After 55 years of age, 1 in 5 women and 1 in 6 men will have a stroke.<sup>1</sup> Because of population aging, the total number of people with first ever stroke is increasing.<sup>2</sup> After a stroke, there is a 13% risk of a subsequent stroke within 1 year and a 25% to 33% risk

after 5 years.<sup>3-5</sup> These high rates of recurrence, largely because of poor risk factor control,<sup>6,7</sup> place increasing emphasis on the importance of developing, evaluating, and implementing preventive strategies.

Stroke prevention guidelines<sup>8-10</sup> and epidemiological studies<sup>11</sup> consistently report both behavioral and physiological processes as stroke risk factors. The efficacy of behavior modification at improving physiological factors is well established,<sup>12-14</sup> and therefore, the existing paradigm for secondary stroke prevention is to emphasize improvements to lifestyle behaviors, which, in turn, will lead to improved control of physiological risk factors, and eventually improved secondary prevention.

There is increasing recognition that interventions to change behavior should have strong theoretical foundations because such programs will more likely target causal determinants of behavior change, contribute to the testing and further development of theory, and lead to an increase in the understanding of strategies that facilitate change.<sup>15</sup> Most secondary stroke prevention programs, however, do not appear to be based on behavior change theory.<sup>16</sup> Thus, it is not surprising that meta-analyses of results from existing behavior modification programs after stroke show minimal effects on behavioral stroke risk factors,<sup>17</sup> and no effect on mortality, cardiovascular event rates, or cardiometabolic risk factor profiles.<sup>18</sup>

The complex nature of behavior change complicates the process of intervention development, evaluation, and implementation.<sup>19</sup> Several theoretical frameworks have been proposed to help researchers navigate through the complexities by providing guidance during the planning phases (eg, intervention mapping<sup>20</sup> and behavior change wheel<sup>21</sup>). These frameworks are comprehensive in that they provide guidance on the development of theoretically sound and evidence-guided interventions and also emphasize the importance of considering implementation and evaluation strategies. Given the high rates of secondary stroke and inadequacies of existing prevention programs, the use of theoretical frameworks to aid in the development of new preventive interventions seems prudent.

In this article, we report on the development of a theory- and evidence-based intervention, the Stroke Coach, using an intervention mapping approach.<sup>22</sup> The purpose of the Stroke Coach is to empower individuals to improve lifestyle behaviors and maintain the improvements after the conclusion of the intervention.

## Methods

Intervention mapping is composed of 6 steps that serves as a blueprint for designing, implementing, and evaluating practical interventions supported by theory, empirical evidence, and clinical experiences.<sup>22</sup>

### Step 1: Needs assessment

We used several methods to assess needs, including (1) establishing and working with a planning group to provide input throughout intervention development and (2) conducting a detailed literature search to assess the issues associated with secondary prevention efforts and conceptualize a framework for an intervention to address the needs derived from theory, empirical evidence, and practical knowledge.

### Step 2: Proximal intervention objectives

To determine proximal objectives, we followed 2 steps: (1) identify performance objectives that specify lifestyle behaviors to change to improve stroke risk factor control and (2) identify theoretical determinants of those behaviors as the proximal objectives.<sup>22</sup>

### Step 3: Evidence-based intervention methods and practical strategies

We identified evidence-based intervention methods to target the proximal objectives and then translated the methods into practical strategies for intervention delivery. Whereas methods are general evidence-based techniques (eg, self-monitoring) used to influence behavioral determinants, strategies are more specific and practical techniques used to operationalize and deliver the method (eg, using an activity monitor to track daily steps and instruction on how to use the monitor to provide motivation for continued physical activity).<sup>22</sup>

### Step 4: Organizing the strategies into an intervention

We integrated the practical strategies into an organized intervention that addresses the proximal objectives. In doing so, we conceptualized the (1) dose; (2) delivery; and (3) organization of the intervention. We also obtained (4) feedback from stakeholders, including end users as well as from decision makers from organizations that could potentially implement the intervention, and refined the program structure and materials on the basis of the feedback.<sup>22</sup>

### Step 5: Implementation plan

We initiated plans for initial implementation, including training materials for the coaches, as well as methods to assess program fidelity.

### Step 6: Evaluation plan

We developed an evaluation plan to test whether the intervention is successful at addressing the proximal objectives.<sup>22</sup>

## Results

Below we present the considerations and decisions made during each of the 6 intervention mapping steps<sup>22</sup> in developing the Stroke Coach.

### Step 1: Needs assessment

#### Establish and work with a planning group

Our planning group (n=8) was composed of health care professionals, including a neurologist, psychologist, physiatrist, dietitian, and physical therapist, and researchers with expertise in neurosciences, stroke and cardiac prevention, human nutrition, behavior change theories, self-management, and research and evaluation methodologies. Three members of

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