

Cost-effectiveness Analysis of a Worksite Wellness Program for Reducing Cardiovascular Disease Risk Among Long-Term Care Workers

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Introduction

- From 2017-2018, CVD cost the United States \$229 billion dollars. CVD is currently the leading cause of death (mortality) and most common disease (morbidity) in both men and women
- There is not a lot of research into long term care workers (LTCW) and CVD
- Individuals who followed life's essential 8 significantly reduced their likelihood of developing CVD
- The total direct cost of CVD per person with care is about \$5507 per year, 2020 est. MEPS-HC



Background

Intervention

- A worksite-based program that incorporates 10 minutes of exercise and 5 minutes of education about healthy living during work time each day
- Areas covered in the intervention are:
 - Physical activity, Sleep, Stress, Relapse, Health Promotion, Nutrition, Goals, Tobacco Exposure and Weight Management
 - 1:1, Group support and 3x weekly motivational and education texts
 - Various fitness levels accommodation (e.g. Zumba, yoga, walking) and diet exploration (low sodium, high protein and fiber, healthy snacking and meal planning)
 - Stakeholder team meetings to inform project and reduce job stress, which is a risk factor for CVD and prevents engagement in wellness activities
 - Engagement competitions to motivate participants

Measures

- Baseline measures: Blood Glucose, Cholesterol, Height, Weight, BIA, Tobacco Exposure, Diet
- DASS scoring Anxiety, Depression, and Stress
 - Recommend PCP follow up if outside of normal range
- Motion watch worn for 5 days monitoring sleep cycles and activity
- All measures are repeated at baseline, 6 month and 12 month follow up
- Function Focused Care (FFC) to measure how they encourage residents to engage in physical activity

Target Population

- Employees at long-term care facilities, n=240

Effective Dose

- Participants can join wellness activities for 30 minutes 5 days a week.

Study Goal Statement

Test the hypothesis that from the Health care sector perspective, the WHHIP is a cost-effective solution to reducing CVD risk among LTCW in comparison to the current standard of no intervention.

Methods

A Reference case analysis from the Health care Sector perspective includes all medical costs paid by third-party payers and out-of-pocket costs paid by patients

- Health care costs: Cost of physicians and providers, hospital services, prescribed medications, home health care, and other medical durables and lost productivity resulting from mortality and indirect costs
 - includes coronary heart disease, heart failure, cardiac dysrhythmias, rheumatic heart disease, cardiomyopathy, pulmonary heart disease, and other or ill-defined heart diseases.
- Program costs: Cost of study staff, measurement, and intervention materials

Markov model

Also called the state-transition model. Each transition has a probability (transition probability) and each health state can have a cost and benefit associated with it. The **practical approach** is to group states by the number of risk factors co-occurring, yielding 9 states in total.

For example, State 4 would represent any combination of 4 Simple 8 risk factors. Such as 1. Smoking 2. High Cholesterol 2. Overweight and 4. High Blood Pressure in one individual.

State 1: Healthy (No Simple 8 risk factors)

State 2: Any of 2 Risk factors (ie. High Blood Pressure and Smoking exposure, 2 of the Simple 8's)

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State 8: All 8 of the Risk factors

State 9: CVD

Further, we propose to categorize the number of risk factors to better comprehend the transition threshold and increase statistical power.

Table 1. Table shell for 6-month transition probability matrix from Healthy to At-Risk Categories to CVD

Transition States	Healthy	1 Risk factor	Combinations of Risk factors	CVD
Healthy	P (H-> H)	P (H-> 1rf)	P (H -> Crf)	P (H -> CVD)
1 Risk factor*	P (1rf-> H)	P (1rf -> 1rf)	P (1rf -> Crf)	P (1rf -> CVD)
Combinations of Risk factors**	P (Crf-> H)	P (Crf -> 1rf)	P (Crf -> Crf)	P (Crf -> CVD)
2-3				
4-5				
6-8				
CVD	P (CVD-> H)	P (CVD -> 1rf)	P (CVD -> Crf)	P (CVD -> CVD)

*rf
**Crf

Limitations

- Varied severity of the risk factors included
- Data availability to estimate the transition probabilities
- Overlap of risk factors and comorbidities
- Varied definitions of CVD and measures used in the literature

Next Steps

- Determine healthy cohort transition probabilities
- Assess 6-month WHHIP data to estimate sick state transitions
- Explore the use of MEPS/ NHANES data to assess individual risk factors costs and transitions
- Investigate microsimulation models in a sensitivity analysis
- Compare CEA results to similar contexts

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