



## The Impact of Training and Education on Outcomes in Cardiac and Pulmonary Rehabilitation

Kimberly L. Haney MNSc, RN, BC, CCRP and Chris Miller, EMT, BS Exercise Science



### BACKGROUND

Both cardiac and pulmonary rehabilitation (CR/PR) are medically supervised programs designed to guide those with cardiopulmonary disease as they return to a productive life by addressing the physical, psychological and educational components of heart and chronic lung disease. Intended to help patients achieve optimum health through a multidisciplinary approach of education, monitored and supervised exercise, and psychosocial support, CR is beneficial in reducing cardiovascular risk and disability, fostering compliance with healthy behaviors, and promoting an active lifestyle for patients with cardiovascular disease. While PR does not reverse chronic lung disease, it allows the individual to make the most of limited lung function through a physical activity plan tailored to the patient's needs.

The Cardiac and Pulmonary Rehabilitation programs at Sentara Northern Virginia Medical Center (SNVMC) are certified by the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR). Certification by AACVPR recognizes programs that are rigorously reviewed by a national board and found to meet essential requirements for standards of care.

### PROBLEM

This project explores correlations of program components with evidence-based standards of care regulated by AACVPR and designed to guide the structure and content of SNMVC's program.

### METHODS

- Data was collected from January through December 2014.
- 94 CR patients enrolled, 68 patient completed
- 20 PR patients enrolled, 12 patients completed
- Data points compared between admission and discharge
- Analysis of data to identify possible relationships between:
  - Length of total program vs. Outcomes,
  - Exercise increase vs. weight/BMI/Body fat changes
  - General Health changes vs. Outcomes
  - General Health scores vs. Weight & BMI changes
  - Pre and Post 6MWT Distance Achieved
  - Pre and Post Dyspnea Assessment

### CARDIAC REHABILITATION

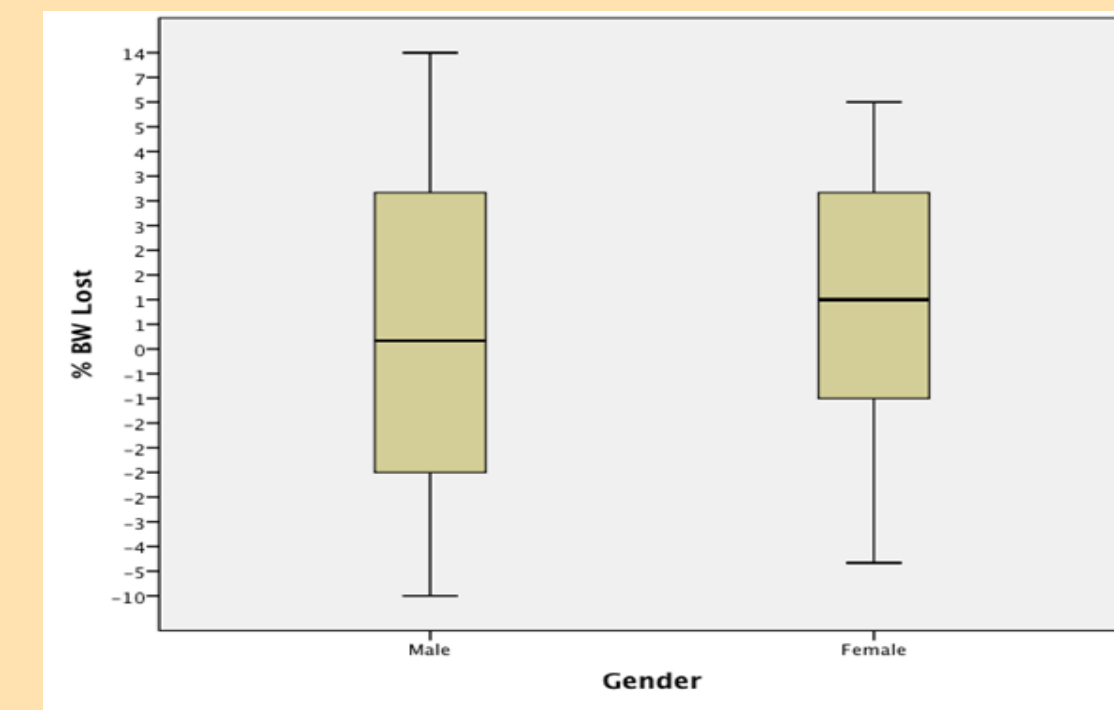
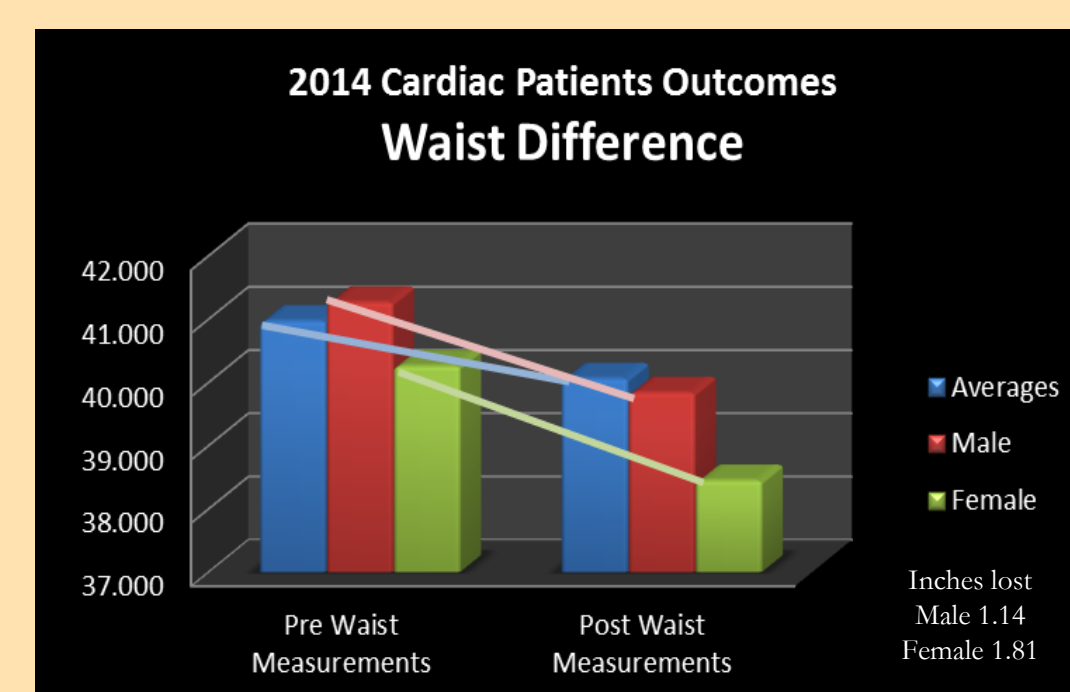
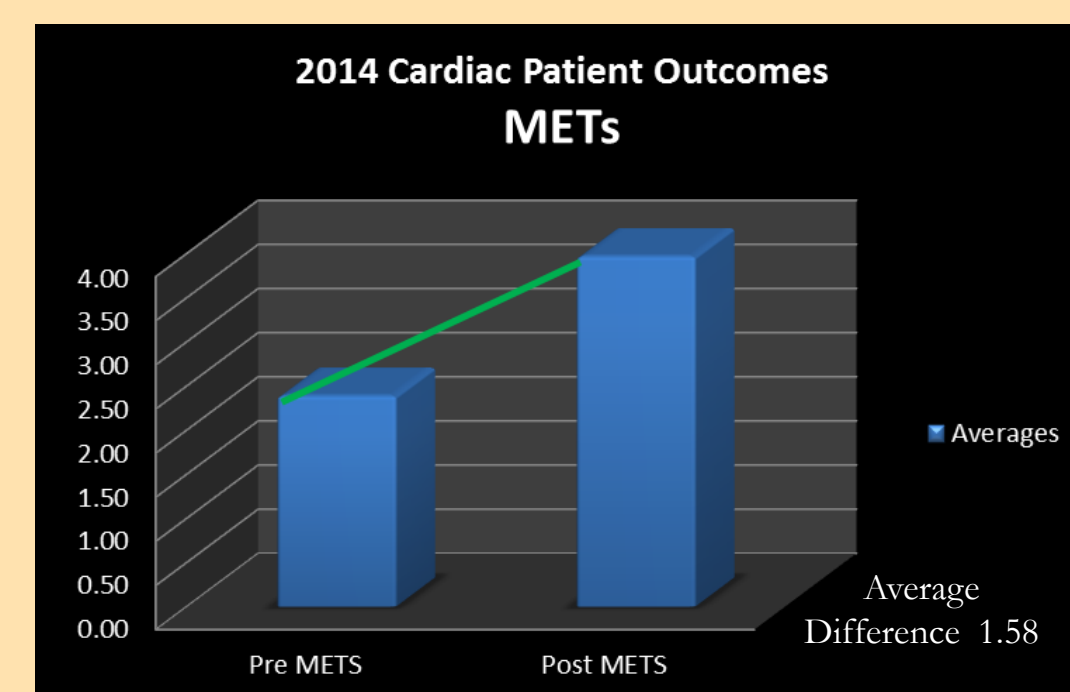
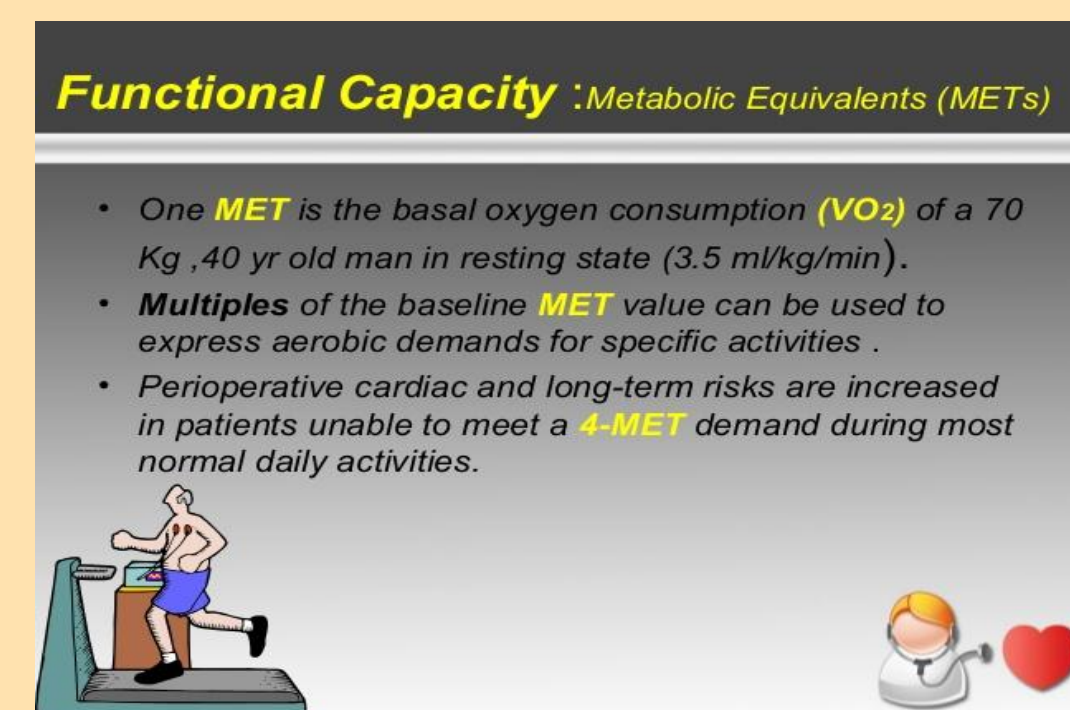


“What you abuse or don't use, you lose” is applicable to your body's welfare - particularly your heart. Cardiac Rehabilitation is beneficial to patients who recently have heart transplant, heart attack, coronary bypass surgery, P.T.C.A. (balloon procedure), stents, angina, valve surgery, and cardiovascular disease. Studies show exercise based CR programs are associated with a 47% lower risk of re-infarction, a 36% reduction in cardiac mortality, and a 26% reduction in all-cause mortality as well as improved quality of life.

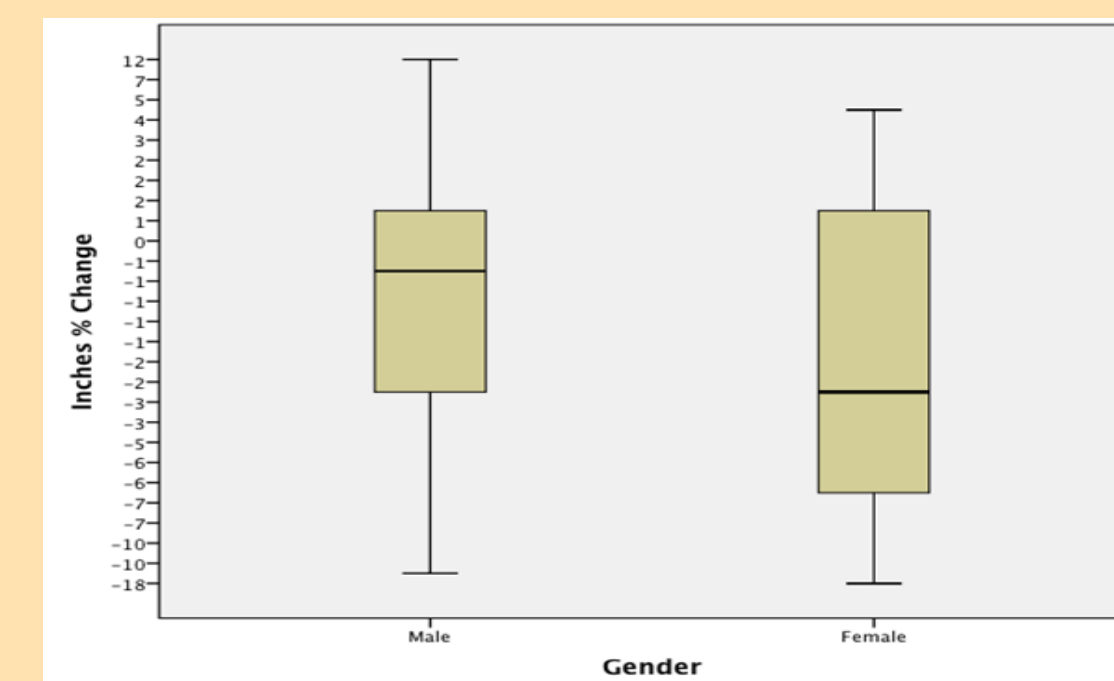
At SNVMC, highly qualified and experienced cardiac rehabilitation staff members offers dietary counseling, exercise counseling, stress reduction counseling, blood pressure monitoring, medication education and diabetic counseling.

### RESULTS / PATIENT OUTCOMES

- Cardiac Rehab patients with the highest percent improvement in Metabolic Equivalents (METs) levels had the greater change in body weight. This warrants further investigation into how motivation, age, gender and comorbidities affect these results and factor into individual success in risk factor modification.
- Decreases in Body Mass Index (BMI) correlates with a loss in waist circumference which may indicate fat loss. This has implications for the program in that an improvement in body composition may indicate a reduction in cardiac risk factors.



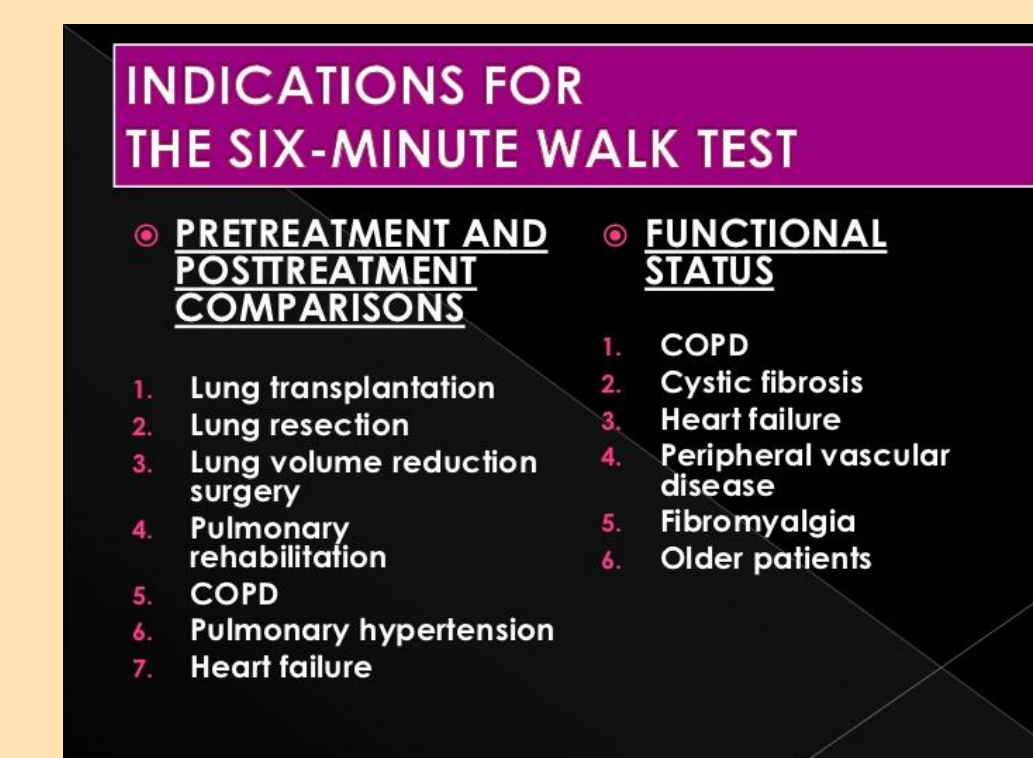
MET Increase vs. Body Weight Change  
There is a negative relationship between MET Total Increases and Body Weight Changes, which is statistically significant at the 10% level. This indicates at some level that MET Increases equates to weight loss in this program.



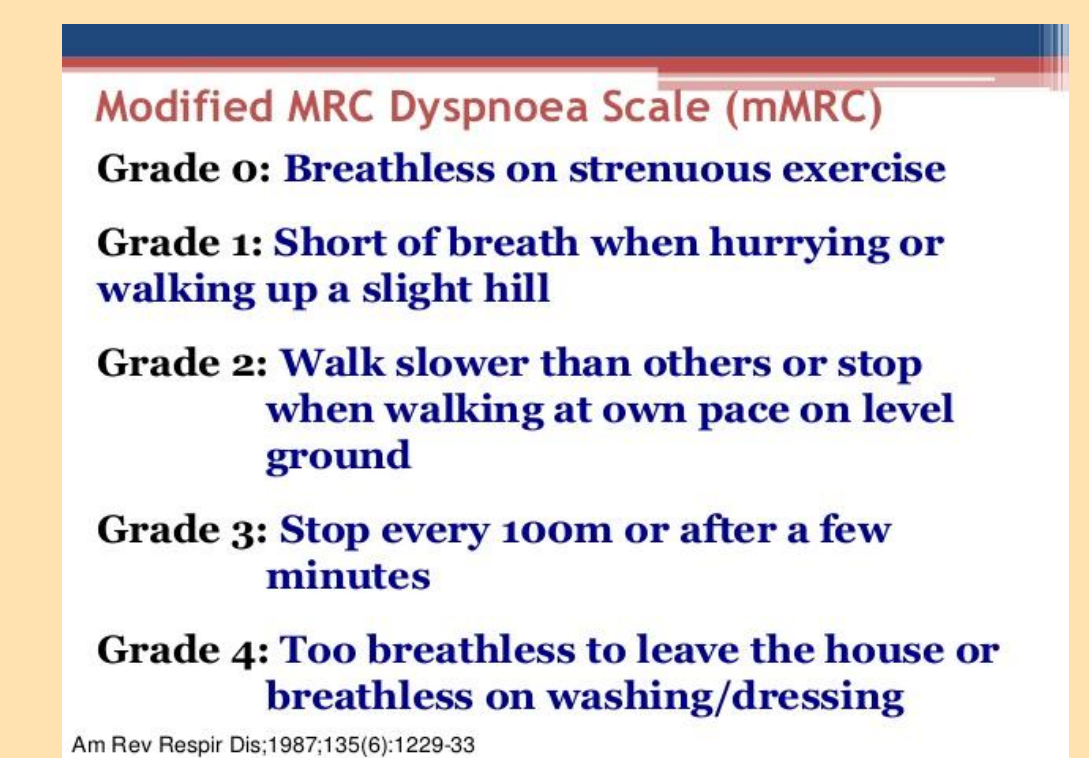
Body Mass Index Change vs. Inches Lost  
There is a positive correlation between BMI Change and Inches Lost off of ones waist line. This is statistically significant at the 0.01 level which means that this program is providing for fat loss.

### PULMONARY REHABILITATION

Pulmonary Rehabilitation is a comprehensive evidenced-base intervention for patients with chronic lung diagnosis designed optimize function, increase ability to complete activities of daily living (ADLs) and decrease dyspnea as well as preventing readmissions to the hospital. This program is specifically intended to benefit patients with Asbestosis, Bronchiectasis, Chronic Asthma, Pulmonary Hypertension, Interstitial Lung Disease, Chronic Bronchitis, COPD, Cystic Fibrosis, Emphysema, Pulmonary Fibrosis, Reactive Airways Disease and Sarcoidosis. Specially trained staff upgrade patient's activity, teach purse lip, and diaphragmatic breathing techniques to reduce shortness of breath. In addition, educational materials promote healthy nutrition, energy conservation, and relaxation techniques and coping skills while setting goals essential to maintaining independence.

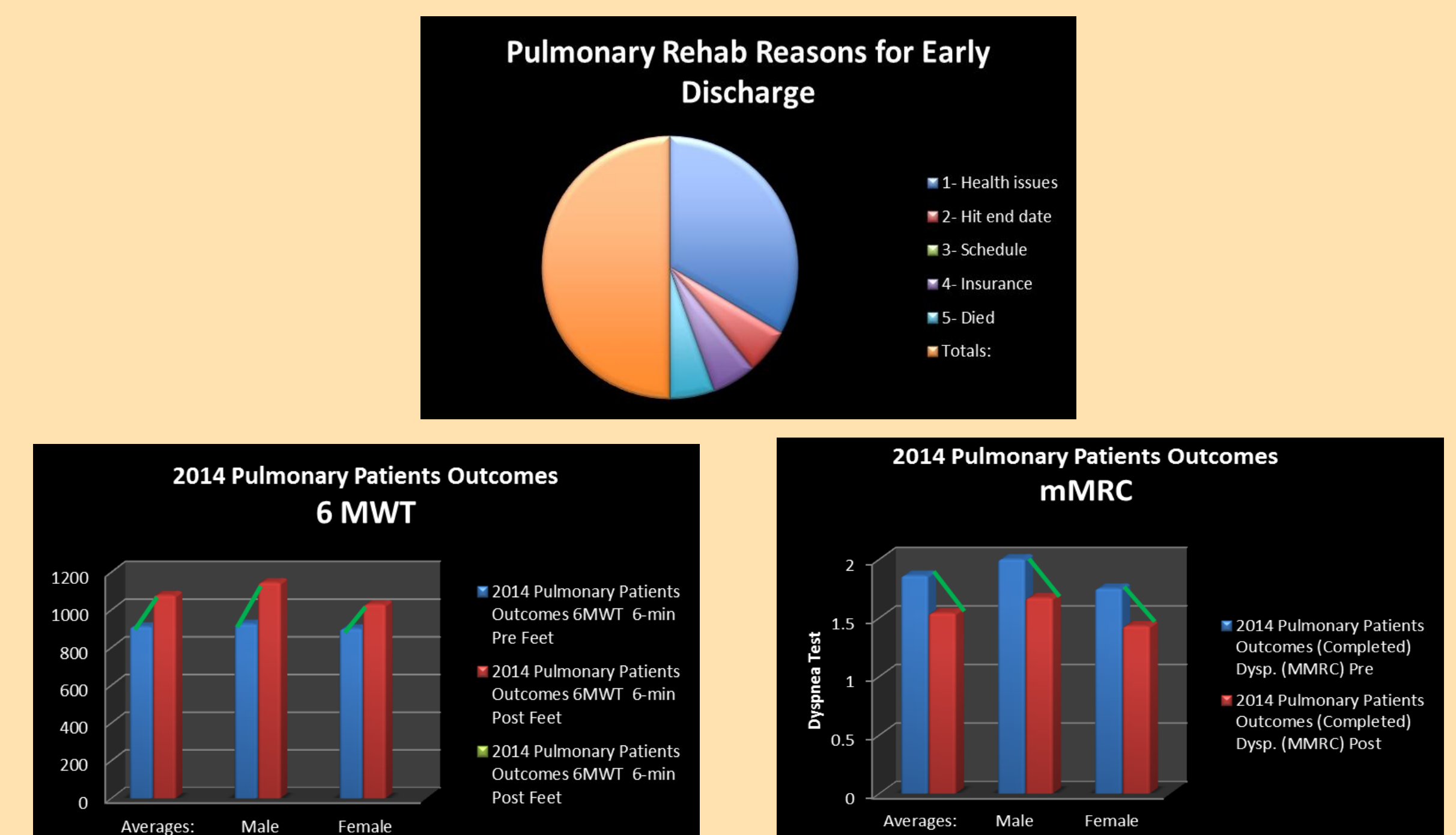


The six-minute walk test is a simple practical test that measures the maximum distance walked in 6 minutes. This is used to evaluate functional capacity and ability to perform ADLs. Studies have demonstrated that improving 6MWT distance through a supervised PR program of exercise training, breathing retraining, exercised and self management education.



Modified Medical Research Council Dyspnea Scale, or mMRC, uses a simple grading system to assess a patient's level of dyspnea -- shortness of breath. The patient selects a grade on 5-point scale (rating of 0-4) that describes everyday situations or activity levels provoking breathlessness and impairment. The scale requires recall. The mMRC is used to help calculate BODE Index, a tool for predicting life expectancy of someone with COPD.

### RESULTS / PATIENT OUTCOMES



6 Minute Walk Test (6MWT) distances average improved by 17% indicating an improved stamina and exercise tolerance. This important improvement in exercise tolerance correlates with an increased ability to complete ADL's. Modified Medical Research Council (MMRC) dyspnea scores improved by 17% indicating less perception of dyspnea with exercise tolerance. This scores reflect an increased patient sense of confidence in their ability to be independent and self manage their disease process.

### CONCLUSION

This study demonstrates participation in SNVMC's AACVPR-certified CR/PR program has improved patient outcomes through a demonstrated decrease in risk. The outcomes help guide the structure and content of the program to meet individual patient goals and reflect evidence based practice. Additionally, patients demonstrate enhanced confidence and ability to manage their disease. The program continuously evaluates and aligns with national goals for risk factor modification to maintain evidence-based program content. Constant assessment also creates appropriate modifications of individual prescriptive exercise and rehabilitation strategies to best meet patient needs. Limitations of this study include small sample size for PR, impact of comorbidities, individual motivational factors, and family and social support.

### CONTACT INFORMATION

Kimberly L. Haney MNSc, RN, BC, CCRP  
Clinician II Cardiovascular Therapy, Sentara Northern Virginia Medical Center  
[KLHANAY@sentara.com](mailto:KLHANAY@sentara.com)

Chris Miller, EMT, BS Exercise Science

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