

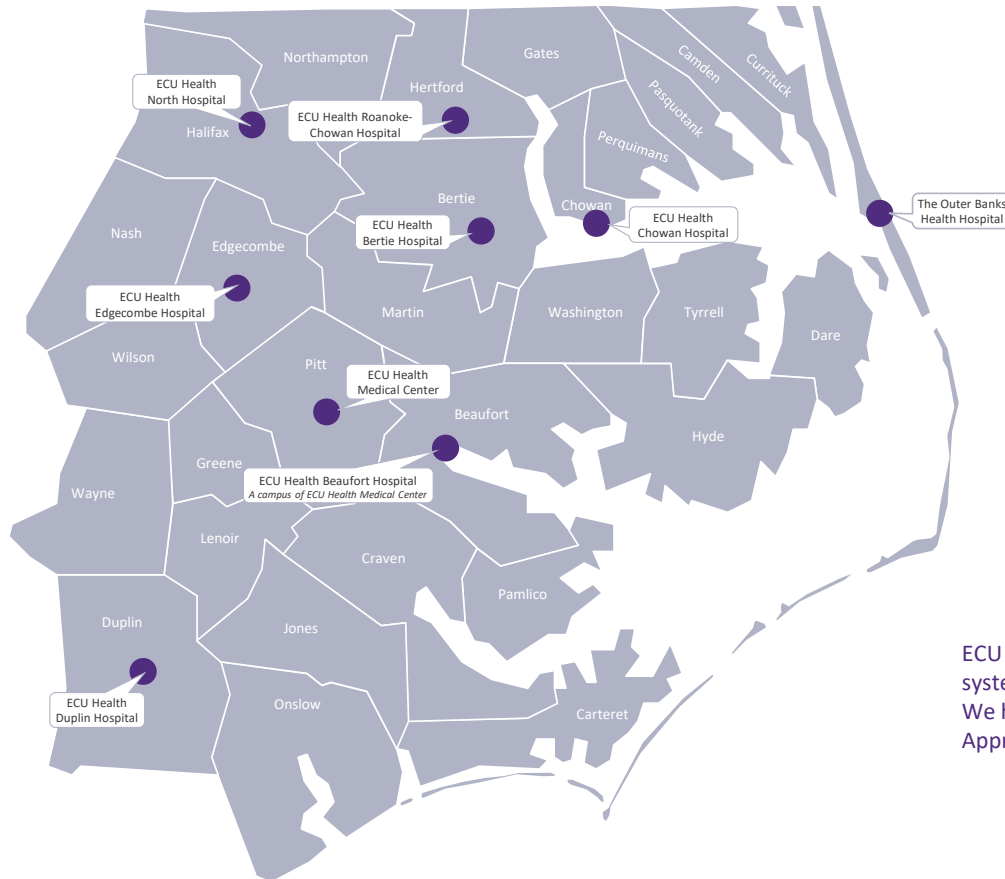


2026 NCCRA CEP Discipline Specific Meeting

Kim Smith, MA, ACSM-RCEP

Clinical Exercise Physiologist IV

ECU Health – Who are we?



● ECU Health hospital locations

ECU Health is a rural not-for-profit 1,447 bed hospital system that serves over 1.4 million people in 29 counties. We have 9 hospitals total, all earning the Gold Seal of Approval from JCAHO and more than 12,000 employees.

Pulmonary Case Study

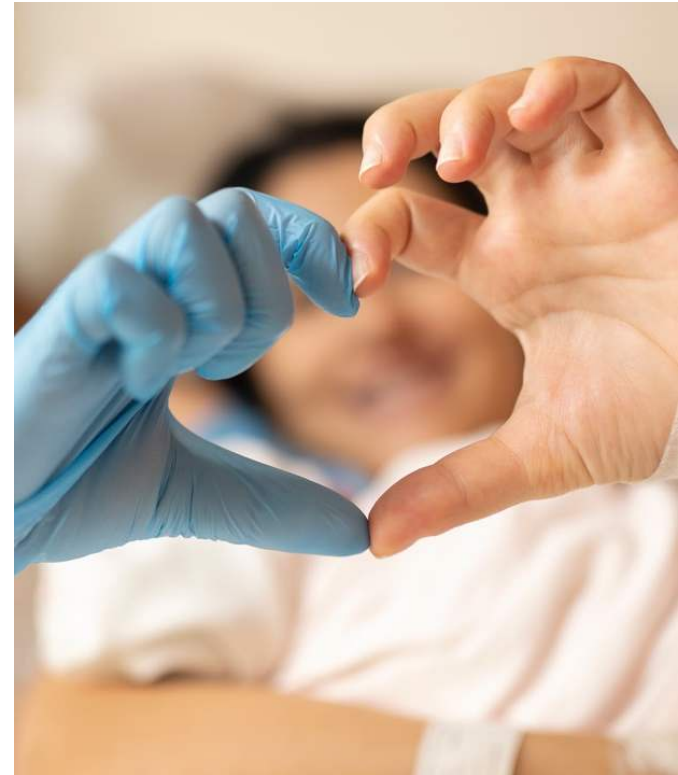
53yo Male participating in Respiratory Therapy Services

- Referred to Pulmonary Rehab for Emphysema
 - FEV1 (%): 69 %
- Pertinent medical history: Chronic respiratory failure, T2DM, HTN, HLD, OSA (has CPAP - does not use), Carcinoma of larynx, hx of Opioid use (on methadone), Current tobacco use, hx of Alcohol abuse
- Initial ExRx included:
 - Frequency (days/week): 3-5 days/week
 - Duration (minutes): 30-60 minutes/day
 - Rating of Perceived Exertion: 2-5/10
 - Conditioning MET's: Based on 6MWT results, signs/symptoms and as tolerated
 - Max HR Range: 114-149 bpm (40-80% HRR) using age predicted Karvonen &/Or RPE
 - Ischemic, HR, BP or Symptomatic Limitations: BP for HTN, pulse ox for desaturations, S&S of hypo/hyperglycemia, exercise intolerance
 - Supplemental O2: 3 Lpm supplemental oxygen
 - Titrate O2 to maintain SpO2 at: >88%

Initial Assessment

○ SUBJECTIVE Goals:

- Patient stated goal 1: Be more active & manage fatigue
- Patient stated goal 2: Learn tips & exercises to breathe better & decrease stress
- Patient stated goal 3: Meet w/Dietitian (RDN) to eat healthier/manage weight
- Patient stated goal 4: Receive support for nicotine dependence to reduce/quit tobacco use
- Former hobbies/interests in which unable to participate:
 - hunting, fishing



Initial Exercise Evaluation

○ INITIAL 6MWT

- Six Minute Walk Distance: **1282 ft**
 - # of rests: 0
 - SPO2: 91 %
 - Flow Rate (l/min): 3 L intermittent
 - O2 Mode: Nasal cannula
 - RPE Scale: 3
 - Dyspnea rating: 3
 - MET level achieved: 2.86

RESULT SUMMARY:

- 2097 feet Expected 6 Minute Walk Distance for healthy pt*
- 61 % Percentage of expected distance for healthy patient
 - Moderate Impairment
- 1595 feet Lower limit of normal

6 Minute Walk Distance from MDCalc.com

**INPUTS:*

Sex → 0 = Male

Height → 72 in

Age → 53 years

Weight → 213 lbs

Distance walked → 1282 ft

Initial Exercise Plan



○ OBJECTIVE Goals (based on initial 6MWT):

- **Cardio** - On 3Lpm intermittent oxygen. Track walking 8-12 laps, resting as needed and NS 50-70W at workload 2-3 for 10-15 minutes
- **Strength (UE/LE)** - Patient may begin with 3# hand weights or green resistance band and progress as tolerated
- Reinforce **warm up** and **cool down** (active cool down as well as stretches/flexibility) for safety and comfort

Tobacco Treatment

○ Background

- Prior to participation pt smoked 2 ppd
- Has tried NRT in the past without success
- Unclear how many quit attempts
- Personal goal to receive support for reduction/quitting smoking

○ Interventions

- Discouraged smoking 2 hrs before and after rehab sessions (any exercise)
- Motivational interviewing techniques utilized
- Provider prescribed Wellbutrin and Nicotine patches
- Patient motivated to qualify for Bronchoscopic Lung Volume Reduction procedure
- My Smoke Free Future (Mayo Clinic) information provided to help pt develop a plan

Special Considerations

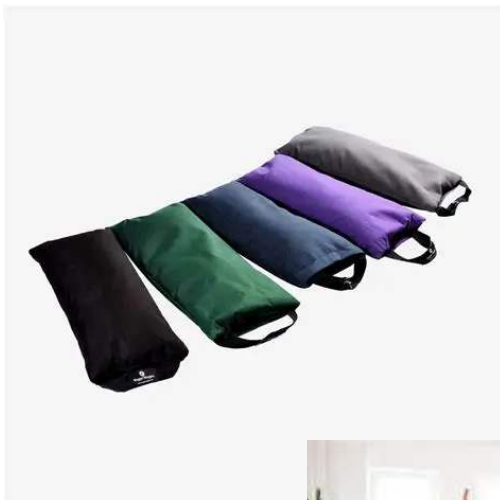
While waiting for education to begin, pt reported throat & chest tightness/pressure with exertion while taking the trash out at home. Reported it always resolves with rest. After this conversation, was on the bike had an episode in the rehab gym. Again, it resolved quickly with rest.

- CEP consulted with Cardiac Rehab RN

- Physician consulted
- Ordered:
 - Nuclear Stress Test
 - Cardiac cath



Exercise Progression & Education



○ Pulmonary Specific Education

• Breathing Retraining Exercises

- Pursed Lip Breathing
- Diaphragmatic Breathing
- Sandbag Breathing
- Chair Yoga
 - Side Waist Breathing/Pilates Breath

○ Exercise Progression

• Weight bearing

- Progressed from level Track Walking to TM (w/grade)

• Non-weight bearing

- Progressed from NS to RB to Seated Elliptical

• Hand Weight

- Unable to progress due to Rt shoulder

Outcomes

○ Vital Signs

- BP – 142/81 pre to 135/66 post
- SpO2% (Low/High) – 91/95 pre to 92/95 post
 - On 3 L/Min intermittent

○ Depression

- PHQ-9 score went from 9 pre (mild) to 3 post (normal)

○ Tobacco Use

- Coping/distraction strategies identified
- Decreased from 2 ppd to 0.5 ppd
- Feels confident in his ability to quit when ready

Exercise Outcomes

○ Total Exercise (Home & Rehab)

- Initial - 15-20 minutes 2X/wk
- Final – 45 minutes 5X/wk



○ 6MWT distance 15% improved (195 ft*)

- Pre = 1282 ft (61% predicted)
- Post = 1475 ft (72% predicted)



- *More than the 98.4 ft minimum to represent a clinically significant difference per ACSM

○ CVPR HIGHEST METS 34% improved

- Highest conditioning METs achieved
- Pre = 2.9 increased to Post = 3.9



Outcomes Regarding Special Considerations

○ Ultimately

- Positive Nuclear Stress Test
 - Large size moderate intensity fixed defect involving inferior and inferoseptal walls suggestive of RCA infarct
- Cardiac cath 3/30
 - No significant atherosclerosis
 - Diagnosed with Pulmonary Hypertension

○ As a result

- Moderate-severe post capillary pulmonary hypertension
 - Started Lasix 40mg daily
 - Already placed on Imdur prior to cardiac cath
 - Was already on aspirin 81 mg Oral Tablet



Recommendations

- Modify the ExRx if new information becomes available, ie:
 - Moderate-severe post capillary pulmonary hypertension
 1. Negatively affects pulmonary perfusion, cardiac output, endothelial regulation, and sympathetic tone
 - Observable fatigue, dyspnea, and exertional intolerance
 - Could also see chest tightness, dizziness, syncope, and/or S&S of Cor pulmonale (Rt HF)
 2. Exercise prescription update to >90% SpO₂ with activity
 3. EKG might be a valuable tool to implement to monitor for high grade ventricular ectopy or bradyarrhythmias
 4. Might need to modify modalities with simultaneous UE/LE use if CP/light headedness occurs
 - Pulmonary Artery pressures increase in a more robust way during these motions
- Remember
 - We are caring for the ENTIRE patient
 - Listen to the patient
 - Observe non-verbal cues
 - Think critically
 - *We can make a difference*

**“If you change the way you look at things,
the things you look at change.”**

Dr. Wayne Dyer