

INSTITUTE FOR CLINICAL  
RESEARCH EDUCATION



# Writing Your Dean's Summer Research Program Abstract

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July 18, 2017

# Learning objectives:

1. Define “abstract” and recognize different types of abstracts
2. Identify the components and features of a strong abstract for the Dean’s Summer Research Program
3. Distinguish between effective and ineffective abstracts



# The word “abstract” is an old word!

- First introduced in the 14<sup>th</sup> century
- From the Latin roots *ab*=out, *trahere*=pull
- The result is the Latin verb *abstrahere*.
- Literally, “to pull out”



# An abstract...

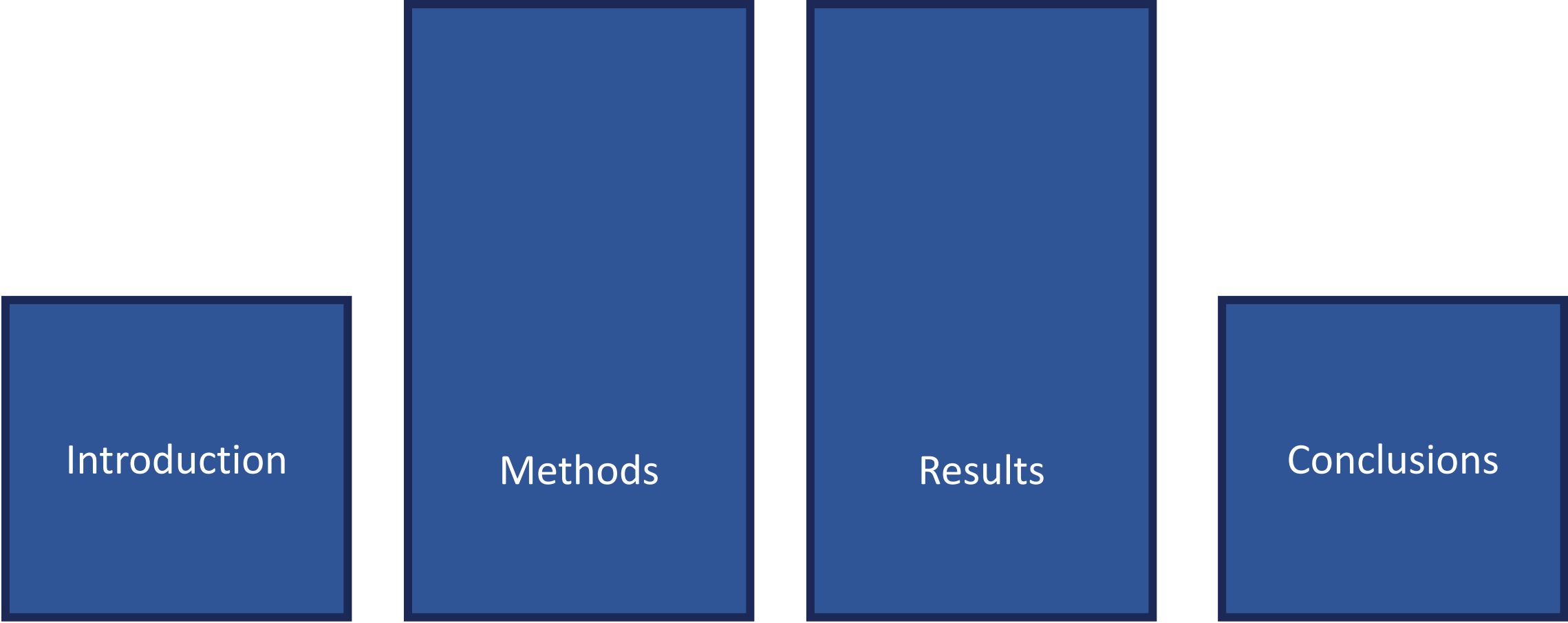
Appears as a summary at the beginning of an article...

Typically, ~250 words  
May be structured, with specific headings  
May be unstructured, with no headings

...or serves as a summary of your research, submitted to meetings:

Typically, ~400 words  
Sometimes includes a table or figure

# Abstracts follow a 1:2:2:1 ratio



# Structured journal abstract

## ABSTRACT

Go to:

**Background:** The use of a structured abstract has been recommended in reporting medical literature to quickly convey necessary information to editors and readers. The use of structured abstracts increased during the mid-1990s; however, recent practice has yet to be analyzed.

**Objectives:** This article explored actual reporting patterns of abstracts recently published in selected medical journals and examined what these journals required of abstracts (structured or otherwise and, structured, which format).

**Methods:** The top thirty journals according to impact factors noted in the “Medicine, General and Internal” category of the ISI Journal Citation Reports (2000) were sampled. Articles of original contributions published by each journal in January 2001 were examined. Cluster analysis was performed to classify the patterns of structured abstracts objectively. Journals' instructions to authors for writing an article abstract were also examined.

**Results:** Among 304 original articles that included abstracts, 188 (61.8%) had structured and 116 (38.2%) had unstructured abstracts. One hundred twenty-five (66.5%) of the abstracts used the introduction, methods, results, and discussion (IMRAD) format, and 63 (33.5%) used the 8-heading format proposed by Haynes et al. Twenty-one journals requested structured abstracts in their instructions to authors; 8 journals requested the 8-heading format; and 1 journal requested it only for intervention studies.

**Conclusions:** Even in recent years, not all abstracts of original articles are structured. The eight-heading format was neither commonly used in actual reporting patterns nor noted in journal instructions to authors.

[J Med Libr Assoc.](#)  
2005 Apr; 93(2):  
237–242.

# Unstructured journal abstract

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## Abstract

Since the emergence of the field in the 1970s, several trends have begun to challenge the original assumptions, claims, and practices of what became known as the medical humanities. In this article, the authors make the case for the *health humanities* as a more encompassing label because it captures recent theoretical and pedagogical developments in higher education such as the shift from rigid disciplinary boundaries to multi- and interdisciplinary inquiry, which has

transformed humanities curricula in health professions. Calling the area of study *health humanities* also underscores the crucial distinction between medicine and health. Following a brief history of the field and the rationales that brought humanities disciplines to medical education in the first place—the “why” of the medical humanities—the authors turn to the “why” of the health humanities, using disability studies to illuminate those methodologies and materials that represent the distinction

between the two. In addition, the authors make note of how humanities inquiry has now expanded across the landscape of other health professions curricula; how there is both awareness and evidence that medicine is only a minor determinant of health in human populations alongside social and cultural factors; and finally, how the current movement in health professions education is towards interdisciplinary and interprofessional learning experiences for students.

# Meeting Abstract

**BACKGROUND:** Herpes zoster (HZ) affects approximately 30 % of the general population over their lifetime. Both the incidence and severity of HZ increase with age. The zoster vaccine can prevent HZ and postherpetic neuralgia (PHN), and is licensed for use among people aged  $\geq 50$  years. However, the Advisory Committee on Immunization Practices recommends the vaccine for people aged  $\geq 60$  years only. To inform the decision making process, this study aimed to analyze the cost-effectiveness of HZ vaccine versus no vaccine for immunocompetent adults aged 50 years.

**METHODS:** We employed a previously published Markov decision model and updated the inputs relevant for people aged 50–59 years. The entire cohort entered the model in the 'Healthy' state at age 50; then moved between health states with transition probabilities for a life-long time horizon. The model considered cases of HZ, PHN, and other complications of HZ including ophthalmic and otic complications, hospitalization and death. Compared to the unvaccinated group, the vaccinated group had reduced disease incidence and complications proportional to vaccine efficacy. Model inputs were derived primarily from US-based studies to reflect the epidemiology, utilities, and quality-adjusted life years (QALYs) of a general US population. Vaccine efficacy was based on the Zostavax Efficacy and Safety Trial, and duration of efficacy on the Long-Term Persistence Substudy, which reported 11 years of follow up from the Shingles Prevention Study. Costs were drawn from the medical literature. They included both direct medical costs and indirect costs due to lost productivity, expressed in 2014 US dollars (\$) adjusted for inflation. Outcomes included costs and effectiveness (the number of HZ cases, PHN cases, and QALYs) for each strategy. Results were presented as incremental cost-effectiveness ratio (ICER) per QALY saved. The study was conducted from the societal perspective, with both costs and QALYs discounted at 3 % per year. In addition to deterministic sensitivity analysis, probabilistic sensitivity analysis was also conducted, in which all variables were varied simultaneously; 10,000 Monte Carlo iterations were performed.

**RESULTS:** In the base case, for every 1000 persons vaccinated, 25 HZ cases and one PHN case would be prevented, equivalent to 0.4 QALYs saved at a cost of \$134,000 (\$318,071/QALY saved). Because HZ incidences were higher in women, the ICER was half as much for women as for men. In deterministic sensitivity analysis, only changes in vaccine cost resulted in an ICER of  $< \$100,000/\text{QALY}$  (at \$82/dose) (Figure 1). In probabilistic sensitivity analysis, the mean ICER was \$422,112/QALY (95 % CI \$17,814–\$1,438,991/QALY). At a willingness-to-pay threshold of \$100,000/QALY, the vaccine was cost-effective in 11 % of iterations.

**CONCLUSIONS:** Although HZ vaccine is efficacious in protecting people aged 50–59 years, it does not appear to represent good value for this group.

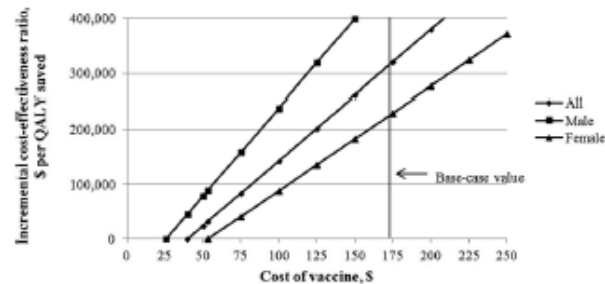
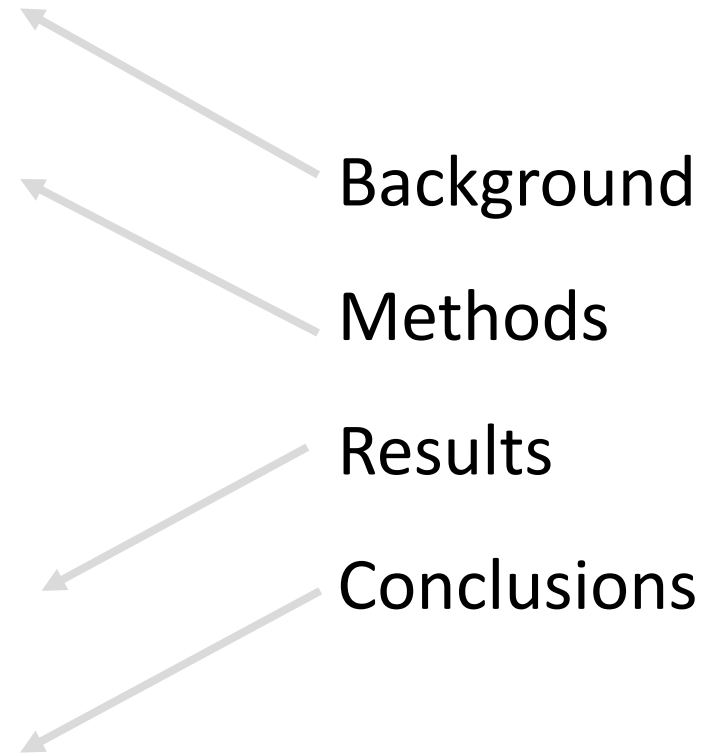


Figure 1: Incremental costs per quality-adjusted life year (QALY) saved of the herpes zoster vaccination program as a function of vaccine cost.





# Dean's Summer Research Program Abstract

- 450 word limit + fit within the boxes on one page
- Structured, with these sections:
  - Background
  - Hypothesis
  - Methods
  - Results (can include one figure or table if space permits)
  - Conclusions
  - References (maximum of 5 – can use additional page)
  - IRB / IACUC / CORID/ QA approval number

**Dean's Summer Research Program -- Abstract Form**

*Note: Abstract will be printed and must fit on a single page – inside the boxes. Include the*

*(Title of Project)*

*(Authors AND Affiliations)*

*(~450 word limit in this section)*

**Background:**

**Hypothesis:**

**Methods:**

**Results:**

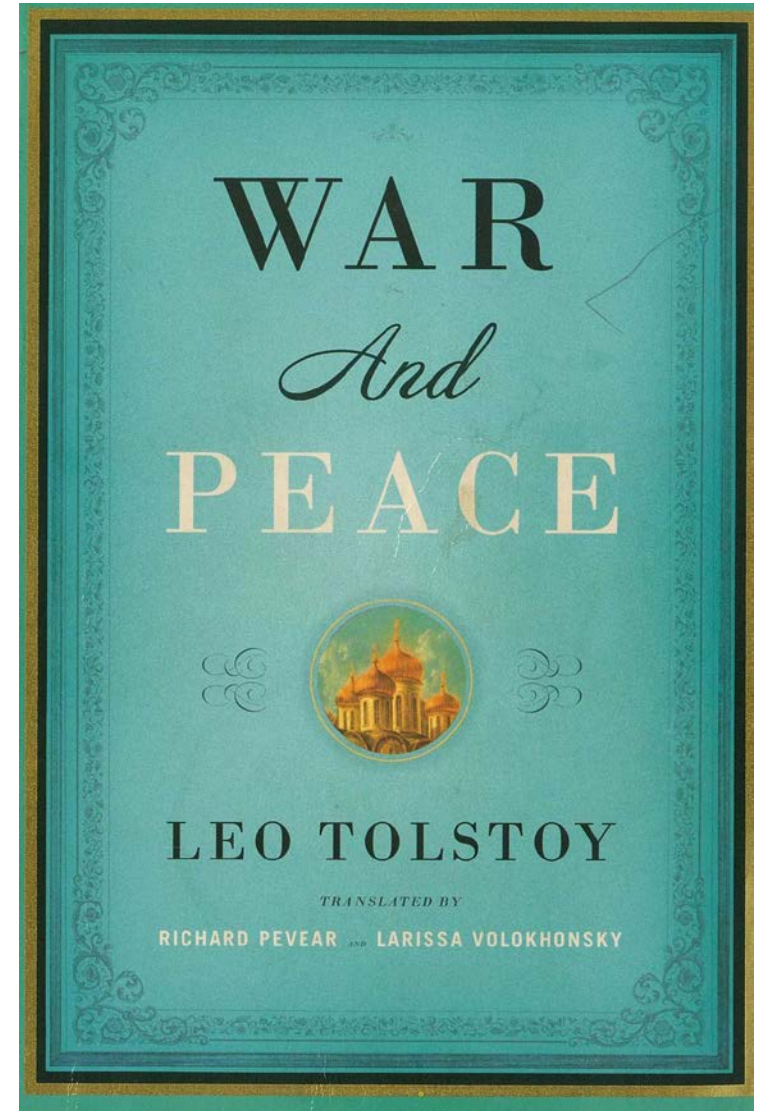
**Conclusions:**

**References:**

**IRB / IACUC / CORID / QA approval number or exemption *(if appropriate)*:**

# Title

- Be Informative! Be Concise!
- Blah: Use of a blood pressure tracking tool in an electronic health record
- Better : Blood pressure tracking tool is an underused patient care resource in electronic health record
- Titles with cute phrases and questions?



# Remember the ratio?

Introduction

Methods

Results

Conclusions

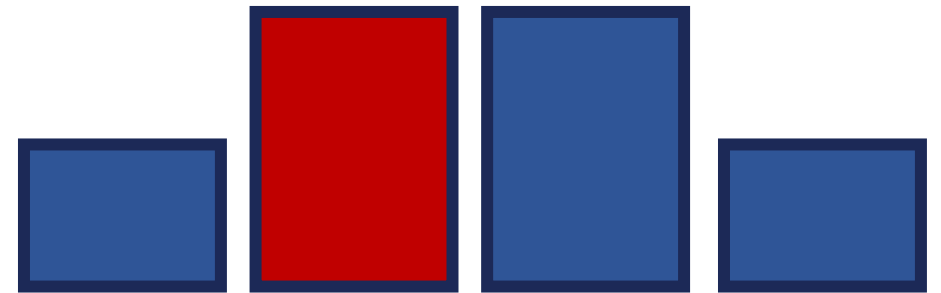
# Introduction

- 2-3 sentences
- Background
  - 1 sentence that conveys a gap, problem, or contradiction in what is known
- Purpose
  - 1 sentence stating the purpose or aims/goals
  - Include the *a priori* hypothesis, if one exists and if appropriate to research type



# Methods

- Priorities for content depends on the study design
  - survey; decision analysis; cohort study; RCT, etc.
- Key materials to include:
  - study design
  - eligibility criteria for participants
  - setting and time frame of study
  - baseline data collection
  - primary and secondary outcomes
  - interventions or exposures (if relevant)
  - methods of analysis



# Results

- Study enrollment numbers
- Baseline characteristics of patient sample
- Unadjusted outcomes followed by adjusted outcomes
  - For meeting abstracts, consider using tables to save space
- Provide p-values for positive findings and power statements for negative findings



# Conclusions

- First sentence ties directly to the purpose stated in the introduction
  - Must be supported by the data
- Explain meaning and/or discuss clinical or policy implications
  - Make sure these are supported by the data
  - Okay to state the limitations
- Do not end with a call for more research





# Good Example #1

## NSE and S-100b as Prognostic Biomarkers of Neurological Injury and Survival Following Resuscitation from Cardiac Arrest

Calderon L., Rittenberger J., Guyette F., Callaway C.; Department of Emergency Medicine, University of Pittsburgh School of Medicine

**Background:** Neuron Specific Enolase (NSE) and astroglial protein S-100b are associated with outcome following resuscitation from cardiac arrest [1].

**Hypothesis:** We hypothesize that NSE and S-100b levels are associated with depth of coma on hospital arrival and are associated with survival to hospital discharge.

**Methods:** Prospective cohort of subjects successfully resuscitated from cardiac arrest. Levels of NSE and S-100b were obtained at arrival and 24 hours after cardiac arrest. The change in these levels was determined. Data included demographic information, category of post-cardiac arrest illness severity ((I) awake, (II) coma (not following commands but intact brainstem responses) + mild cardiopulmonary dysfunction (SOFA [Sequential Organ Failure Assessment] cardiac + respiratory score <4), (III) coma + moderate-severe cardiopulmonary dysfunction (SOFA cardiac + respiratory score ≥4), and (IV) coma without brainstem reflexes) and survival to hospital discharge. Non-normal data were log-transformed. Levels of NSE and S-100b at each time interval were compared by category of post-cardiac arrest illness severity using ANOVA. Single variable logistic regression was used to determine predictors of survival using a cut-off of  $p < 0.1$ . Multivariable logistic regression was used to create a final parsimonious model. Hosmer-Lemeshow value was used to determine goodness of fit.

**Results:** Of 86 subjects, 9 were awake and excluded. Mean age was 59 (SD 16) years and most were male (N=44, 57%). Out of hospital cardiac arrest made up 69% (N=53), with VF/VT and PEA the majority of rhythm at arrest (47% and 25%). Most (N=71, 93%) received TH. Grouped by arrest categories: category II comprised 30 (39%); category III, 15 (19%), and category IV, 32 (42%). Survival was 39% (N=30). Category IV illness severity was associated with higher levels of NSE at 24 hours (1.22, SD=0.51; 1.03, SD=0.53; 1.63, SD=0.35;  $p=0.001$ ). Category IV illness severity was associated with higher levels of S100b at arrival (-0.83, SD=0.75) and 24 hours (-0.92, SD=0.78). In the multivariate analysis, only change in NSE between arrival and 24 hours was associated with survival (OR=0.96, CI: 0.92 - 0.99). Category II illness severity (OR=1.64, CI: 0.30 - 9.05) Category IV illness severity (OR=0.30, CI: 0.05 - 1.86) and VF (OR=2.46, CI: 0.62-9.81) were not associated with survival.

**Conclusions:** More severe neurologic injury on initial examination is associated with higher levels of NSE and S-100b 24 hours following resuscitation. The change in NSE between arrival and 24 hours after resuscitation is associated with survival.

### References:

1. Oddo M. and A.O. Rossetti, *Predicting neurological outcome after cardiac arrest*. Current Opinion in Critical Care. 17(3): p. 254-9.

IRB: 0608172

# Good Example #2

## **Simplifying Prognostic Testing in Cystic Fibrosis: How does heart rate recovery after sub-maximal aerobic exercise correlate with maximal exercise testing results?**

Sarah Cohen, medical student, University of Pittsburgh School of Medicine

David Orenstein, MD, Department of Pediatric Pulmonology, Children's Hospital of Pittsburgh

**Background:** Cystic fibrosis (CF) is the most common profoundly life-shortening genetic disease among Caucasians. Poor exercise capacity, as represented by low maximal oxygen consumption ( $VO_2\text{max}$ ), has been shown to be a powerful independent predictor of mortality in pediatric and adult CF patients (1). However, the testing required to measure  $VO_2\text{max}$  is uncomfortable and resource-intensive. Submaximal exercise tests that can be performed outside an exercise physiology lab have been developed to address these concerns. A 3-minute step test at a cadence of 30 steps per minute has been verified as a feasible submaximal field exercise test for use in children and adults with CF (2,3). Heart rate recovery after sub-maximal exercise correlates closely to all-cause mortality in adult non-CF populations (4).

**Hypothesis:** In children 8 and older with CF, a shorter time to return to resting heart rate (HR) and a greater percent change from maximum HR one minute following a submaximal exercise test will positively correlate with greater percent predicted  $VO_2\text{max}$  as measured by a maximal exercise test.

**Methods:** Eleven children 8 years of age and older (range 8-17, 64% male) with CF were recruited from the CF center at Children's Hospital of Pittsburgh. Each subject performed a three-minute stepping exercise on a 15cm step at a cadence of 30 complete steps per minute (STEP). HR and  $SpO_2$  were measured at rest, during, and after STEP. Subjects then performed a clinically indicated maximal oxygen consumption test. Data from routine pulmonary function tests were also collected. Percent of maximal HR at one minute post-STEP and time in minutes to reach resting HR were compared with peak oxygen consumption by calculating Pearson's Correlation Coefficients.

**Results:** All subjects were able to complete STEP, with no adverse events. Average percent predicted  $FEV_1$  was 89% (range 68%-107%) and average percent predicted  $VO_2\text{max}$  was 114% (range 83%-137%). Maximum heart rate on STEP was on average significantly lower than maximum heart rate from the maximal test (134 vs. 188,  $p < 0.01$ ). Shorter time to resting heart rate after STEP positively correlated with % predicted  $VO_2\text{max}$  ( $R = 0.7$ ,  $p < 0.02$ ), though change in percent of maximal heart rate at one minute post-STEP did not ( $R = -0.2$ ,  $p = 0.47$ ).

**Conclusions:** All subjects completed STEP without any adverse events. STEP is a useful submaximal test in children with CF. Shorter time to resting heart rate after STEP 30 positively correlated with percent predicted  $VO_2\text{max}$ , but percent of maximal heart rate at one minute-post STEP did not.

**References:** 1. Nixon A, et al. (1992). New England Journal of Medicine 327: 1785-1788. 2. Balfour-Lynn IM, et al. (1998). Pediatric Pulmonology. 25:278 -284. 3. Holland A, et al. (2011). Respiratory Care 56:8. 4. Cole C, et al. (2000). Annals of Internal Medicine 132: 552-555.

**IRB approval number:** PRO12010547

# No Data Example

**Title: ACTIVATE CF: Examining the effect of exercise on FEV<sub>1</sub> in patients with Cystic Fibrosis**

**Hypothesis:** In patients with cystic fibrosis (CF), exercise therapy will significantly increase their FEV<sub>1</sub> and mucociliary clearance after acute exercise and 6 months of chronic exercise compared to patients who do not regularly engage in aerobic exercise.

**Background:** Cystic fibrosis, an autosomal recessive disease with a 4% carrier rate, affects nearly 70,000 people in the world, with about 1,000 new cases being diagnosed each year.<sup>2,5</sup> The hallmark of CF is a mutation in the CFTR gene, leading to dysfunction of the CFTR protein it encodes.

Our study is focusing on CF-related respiratory symptoms – thick, sticky mucous. These symptoms are largely caused by an increased efflux of sodium and water from the apical side of the epithelia due to inhibition of ENaC, and reduced efflux of chloride, and likely bicarbonate, because of the absence or poor function of CFTR in the apical membrane.<sup>4</sup>

Aerobic exercise has been shown to be beneficial in increasing pulmonary function in CF patients. In 2008, a Cochrane review by Bradley and Moran showed that different exercise protocols may lead to improvements in various areas such as aerobic capacity.<sup>1</sup> However, the effects of exercise on mucociliary clearance have not yet been examined, and the effects on forced expiratory volume in one second (FEV<sub>1</sub>) have varied in different studies.

**Methodology:** Our goal is to enroll 20 participants by March 2016 in the Pittsburgh center. The study will randomize 292 patients total, 12 years and older, with a confirmed CF diagnosis into control and intervention groups.

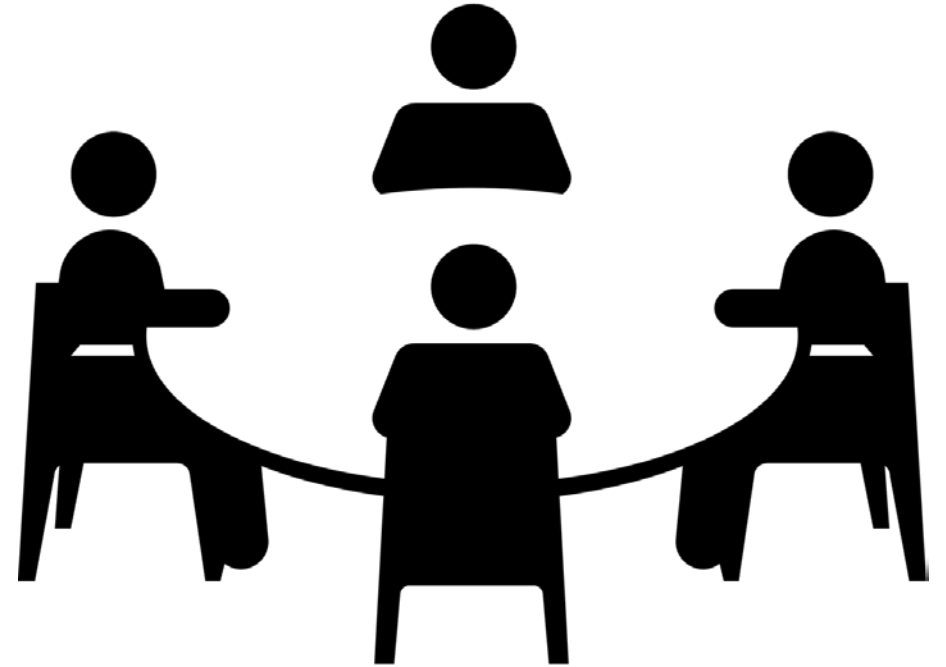
Participants in the randomly-assigned intervention group will add ≥3 hours of strenuous exercise per week to their baseline activity. The exercise will include at least 30 minutes of strength-building exercises and 2 hours of aerobic exercise, with allowances for preference for the remaining time.

Patient mucociliary clearance will be evaluated at the first baseline visit 1A, and during the second baseline visit 1B 21 days after visit 1A. During the second visit, participants will perform a STEP-30 test – a 3-minute step test of 30 steps per minute – prior to MCC evaluation to examine MCC response to acute exercise. Patients will also undergo MCC evaluation at 180 ± 14 days to examine MCC response to chronic exercise. FEV<sub>1</sub> will also be examined during these visits using a spirometer.

**Results & Conclusions:** As patients have not come in yet for visit 1B, no comparisons have been made as of this time.

# Practice!

- Each table is a small group.
- Evaluate the two abstracts we pass out and rate them using the rubric. No need to calculate a score.
- Choose one abstract to present to our larger group.
- Pick a reporter to describe the strengths and weaknesses your group identified.
- You have 15 minutes. Go!



# Thank you!

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Thanks to Molly Conroy, MD, MPH.  
Slides contain content from her 2016 presentation.

Thanks to Marie K. Norman, PhD, for her assistance with slide design.