Introduction
Coronary Artery Disease is the leading cause of death in the US. Coronary Artery Bypass Graft (CABG) Surgery is an invasive method to treat this condition. During a CABG, a harvested healthy artery or vein redirects blood flow around a blockage in a coronary artery. A CABG procedure requires general anesthesia and thus intubation to protect the airway. This study focuses on early extubation in the post op CABG population.

Methods
A PICO question was developed regarding post operative extubation times in CABG patients. Articles were retrieved from Penn State George T. Harrell library databases CINAHL, and PUBMed. Results from various Evidence Based Practice studies were obtained using the keywords: Coronary Artery Bypass Graft Surgery, cardiac surgery, benefits, extubation time, early extubation, outcomes, and costs. Also, Penn State Heart and Vascular Institute (PShVI) extubation times for the past two years were evaluated. The HVICU Vent Pre-Weaning Assessment Policy was reviewed. Finally, a survey was sent out for PShVI nursing staff to complete regarding their perceptions of post-CABG extubation time on the unit.

Limitations
Limitations to these studies include acuity of patient population, inadequate sample sizes, and varying institutional protocols and management of post-op CABG patients. Examples of higher acuity patients include increased number of diseased arteries, ejection fraction of less than 50%, and pre-operative co-morbidities (renal disease, pulmonary disease, and vascular disease).

Pros & Cons
Pros to early extubation include lower costs for patients and hospitals, early mobilization, earlier return of respiratory function, and decreased ventilator associated complications. When extubated within six hours after CABG surgery, unit costs decreased by 53%, total CABG costs decreased by 25%, and patient costs decreased by 13%, with the majority of savings directly related to nursing care (Cheng, et al., 1996). Early extubation also facilitates earlier patient mobilization, which decreases risks for complications such as deep vein thrombosis, pulmonary embolism, and pneumonia. Less time on the ventilator also yields lower incidence of complications such as Ventilator Acquired Pneumonia (VAP), atelectasis, decreased lung volumes and pneumothorax (Imanipour, Bassampoor, Nasrabbadi, 2008). Cons to early extubation include hemodynamic instability, respiratory distress requiring reintubation and increased incidence of myocardial infarction (MI). If a patient is extubated too early, hemodynamic complications related to heart rate, blood pressure, and cardiac functioning may occur. If extubation is performed before patients are awake enough to maintain airway, reintubation may be necessary (Sato, Suenaga, Koga, Matsuyama, Kawasaki, & Maki, 2009). One study shows that out of fifty patients extubated in the OR, three individuals suffered an MI; versus 50 patients extubated in an ICU setting with only one patient suffering an MI (Montes, et al., 2000).

RN Survey
A survey was created using survey monkey and was e-mailed to all of the nurses of the HVICCU. Nurses were asked when CABG patients should be extubated, only 55.9% of nurses answered correctly choosing “within 6 hours of arrival to the unit”. 97% of the nurses surveyed felt that they understood the benefits of early extubation in the CABG patient population. The perceived reasons of the RN staff relating to why extubation was not possible within the first 6 hours is depicted here.

HVI Weaning Parameters/ Policy
A policy exist specifically for weaning a patient in the HVICCU (Policy Number 7-101). Parameters to be met prior to extubation include:

- Hemodynamic Stability which is defined as SBP > 100mmHG, Cardiac Index > 2.0/min/cm³, Chest Tube Output < 150ml/hr, Hematocrit > 26% and heart rate < 120bpm.
- Patient ability to follow commands.
- Head of bed elevated to at least 30 degrees.
- Temperature > 35.9 Degrees Celsius with the absence of shivering.
- Adequate Oxygenation, FiO2 of at least .50 with SpO2 of at least 95% and PEEP less than or equal to 5cm H2O.
- Acceptable Pulmonary Mechanics as defined by resting minute ventilation < 12 L/min, Tidal Volume < 5-7ml/kg, Vital Capacity=10-15mL/kg, RR<30, I/E Ratio<105, and NIF<20cm H2O in 20 seconds.
- Acceptable ABG on vent. settings of CPAP 5/PS 5.

Unit Results
CABG Extubation Times are documented and reported in percentages by month in the HVICCU.

The results from 2011 and 2012 can be seen here.

Recommendations for Nursing Practice
Based on our research and nurses’ perceptions regarding early extubation, we have found several interventions that can be implemented to facilitate the best outcome for patients. One such recommendation is frequent monitoring of respiratory status and lab results prior to extubation. Secondly, nurses should advocate for their patients when they meet the required standards of HVI’s weaning parameters. Finally, nursing staff should implement an interdisciplinary approach with physicians and respiratory therapists to extubate patients safely and appropriately.

Conclusions
Our research has shown that extubation within the first six hours after surgery is beneficial to the patient, the hospital, and nursing staff. However, individual patient needs may differ, requiring personalized plans of care to ensure optimal outcomes. According to PShVI, extubation times are being managed appropriately based on HVICCU weaning parameters and individualized needs to promote hemodynamic stability and maintenance of airway.

References