Enhancing the Quality of the Pulmonary Patient by Creating a High Dependency Respiratory Care Unit

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Temple University Hospital

Temple is a 636-bed teaching hospital providing an array of inpatient and outpatient services to its surrounding community and highly specialized tertiary services to the entire Philadelphia region and beyond. Temple is well known for its expertise in cardiology, pulmonary, sports medicine and gastroenterology and is the chief clinical training site for the Temple University School of Medicine.

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Temple Lung Center

- Named by U.S. News & World Report as one of " America's Best Hospitals" for Respiratory Disorders.
- Joint Commission on the Accreditation of Healthcare Organizations granted national certification to Temple as a Center for Lung Volume Reduction Surgery (LVRS), a treatment for emphysema. Temple is the first hospital in Philadelphia, and among the first academic hospitals in the nation, to receive the Joint Commission's Gold Seal of Approval for LVRS.

COPD Facts

- World Health Organization estimates that COPD is the 4th leading cause of death, and projected to be the third leading cause by 2020.
- The WHO estimates that in 2000, 2.74 million people died of COPD worldwide.
- Approximately 12.1 million people in the US are currently diagnosed with COPD in 2001
- About 24 million adults have evidence of impaired lung function indicating COPD is under diagnosed
- About 1.5 million ED visits by adults >25 years were made for COPD in 2000.

2001 World Health Organization statistics

COPD Facts Continued

- The estimated cost of COPD in 2002 was 32.1 billion dollars in direct and indirect costs.
  - $18 million direct costs
  - $14.1 million indirect costs
- More than 726,000 inpatient hospitalizations for COPD occurred in 2000.
  - More females than males were hospitalized for COPD (404,000 vs. 322,000).

Identified Issues

1. Physicians identified a quality of care concern related to the complex respiratory care pt.
2. Clinical data showed;
   - 50% of patients receiving Bi-pap were admitted to non-pulmonary Nursing units.
   - All 12 in-patient medical surgical units had at least 2 bi-pap patients admitted in past year.
   - 60% of admitted patients with acute asthma requiring 2 or more urgent inhaled respiratory treatments within first 12 hours were placed on non-pulmonary units.
   - 40% of admitted patients with primary COPD had no Pulmonary consult.

Identified Issues

3. Operational issues;
   - Limited respiratory FTE's limited interventions on floors outside of the pulmonary floor.
   - Primary pulmonary service admissions had increased 18% over the past year
   - RICU utilization averaged 86% occupancy for the prior year.
   - New patients to Pulmonary practice increased by 38% over the past year.

     (Average for every 5 new patients=1 IP admission)

Interventions

- Assemble a Pulmonary team
- Develop a High Dependency Respiratory Care Unit, to care for complex pulmonary patients
- Develop Evidenced based clinical practice guideline
- Educate staff on HDRCU criteria
- Develop policies and procedures

Temple Lung Center
Goals of COPD Management

- Prevent chronic and troublesome symptoms
- Maintain (near) normal lung functions
- Maintain normal activity levels
- Prevent recurrent exacerbations and minimize ED visits or hospitalizations
- Provide optimal pharmacotherapy with minimal or no adverse effects
- Meet and/or exceed patients' and families' expectations and satisfaction with care

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High Dependency Respiratory Care Unit (HDRCU)

- 36 bed high dependency respiratory care unit located on a general medical floor of a tertiary care university urban teaching hospital.
- Complex and diverse problems of respiratory failure patients are treated by a team comprised of diverse specialists (pulmonologists, nurses, nutritionists, psychologist, respiratory, physical and speech therapists, social workers and case managers).

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High Dependency Respiratory Care Unit:

- Medical staff are Board Certified
- Weekly Discharge planning meetings by medical director
- All patients have been ventilated for ≥ 21 days for at least 6 hrs/day, require noninvasive ventilation for stabilization of acute on chronic respiratory failure, or require intense respiratory interventions (≥ 1 rx/2hrs)
- Emphasis is placed on rehabilitation and restoration of functional status.

HDRCU Admission Criteria

- Three types of patient populations served on this specialty unit.
  - Complicated COPD patients
  - Ventilator rehabilitation patients
  - Non-invasive positive pressure ventilation patients

Admission Criteria

- Bi-Pap patients
  - All patients who require bi-pap therapy, regardless of diagnosis.
  - Stable patients who require bi-pap to stabilize an acute respiratory event
- Ventilated patients
  - Patients being actively weaned from ventilator
  - Must have tracheotomy
  - Patient is able to actively participate in PT
  - Patient and family willing to partake in care
  - Patient must be able to actively signal for assistance

Criteria for Transfer of Ventilator-Dependent Patients From ICU to VRU

Respiratory Stability

- ***Airway:*** **Tracheostomy**
- ***Secretions:*** **Suctioning < every 2 hours**
- ***Oxygen:*** **Adequate oxygenation with F_iO_2 < 60%, PEEP ≤ 10cmH_2O (S_pO_2 ≥92%)**
- ***Ventilator Settings:*** **Stable settings**
- ***Patient Assessment:*** **Comfortable, no increased WOB or dyspnea**
- ***Weaning Technique:*** **Trach collar or Bi-Pap**
- ***NPPV:*** **Tolerates breaks off, stable settings**

Non Respiratory Medically stable

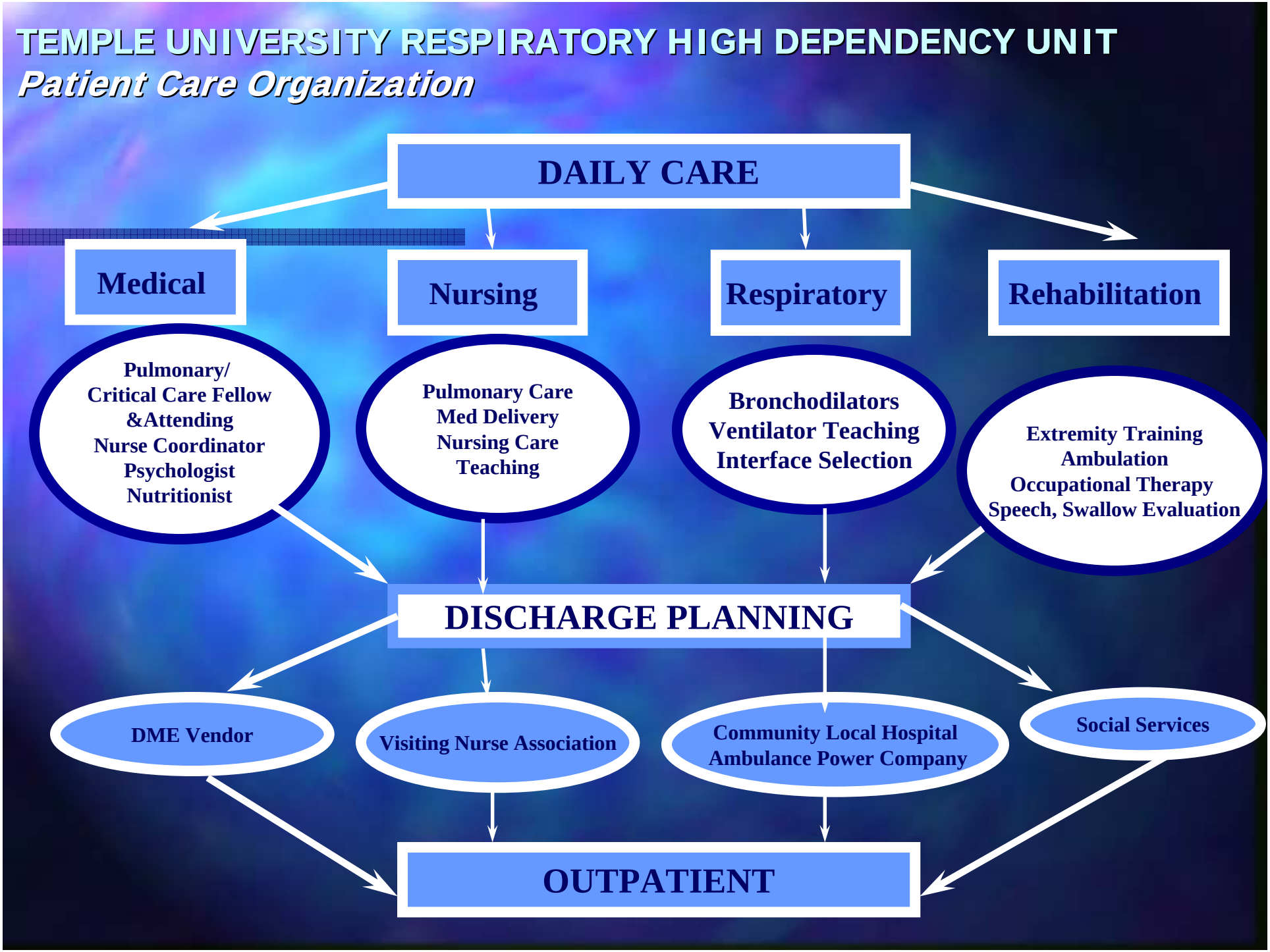
- Sepsis controlled
- No un-controlled hemor-rhage
- No arrhythmias, CHF, unstable angina
- No coma
- Secure IV access (PICC)
- Secure alimentation route

Admission Criteria Continued

- Complicated COPD patients
  - Patients who require Q 1- 2 hour bronchodilator treatments.
  - Patients who require frequent pulmonary monitoring (continuous pulse oximetry, pulmonary toilet)
  - Patients who require intense teaching in order to become independent.
  - Patients who require high oxygen demands, and frequent medical/nursing interventions.

TEMPLE UNIVERSITY RESPIRATORY HIGH DEPENDENCY UNIT

Patient Care Organization



What are the essentials of the Care Plan?

- Multidisciplinary care plan involving the pulmonary/critical care physician, therapists, nurses, dieticians, pharmacists and others
- Does not recreate the ICU, clear admission and discharge criteria for less than critical care needs
- Easy access to transfer or readmit patients to the ICU
- Knowledgeable in weaning from invasive ventilation, initiating home ventilation and converting to noninvasive ventilation
- Ability to track patients longitudinally post discharge to home or extended care facility

How a HDRCU Integrates Medical and Surgical Care in Patients with Advanced Lung Disease

Medical Care

Pre/Post Lung Transplantation
Pre/Post LVRS
COPD Exacerbations
Ventilator-Dependent ICU Patients
Noninvasive Mechanical Ventilation
Sleep Disorders

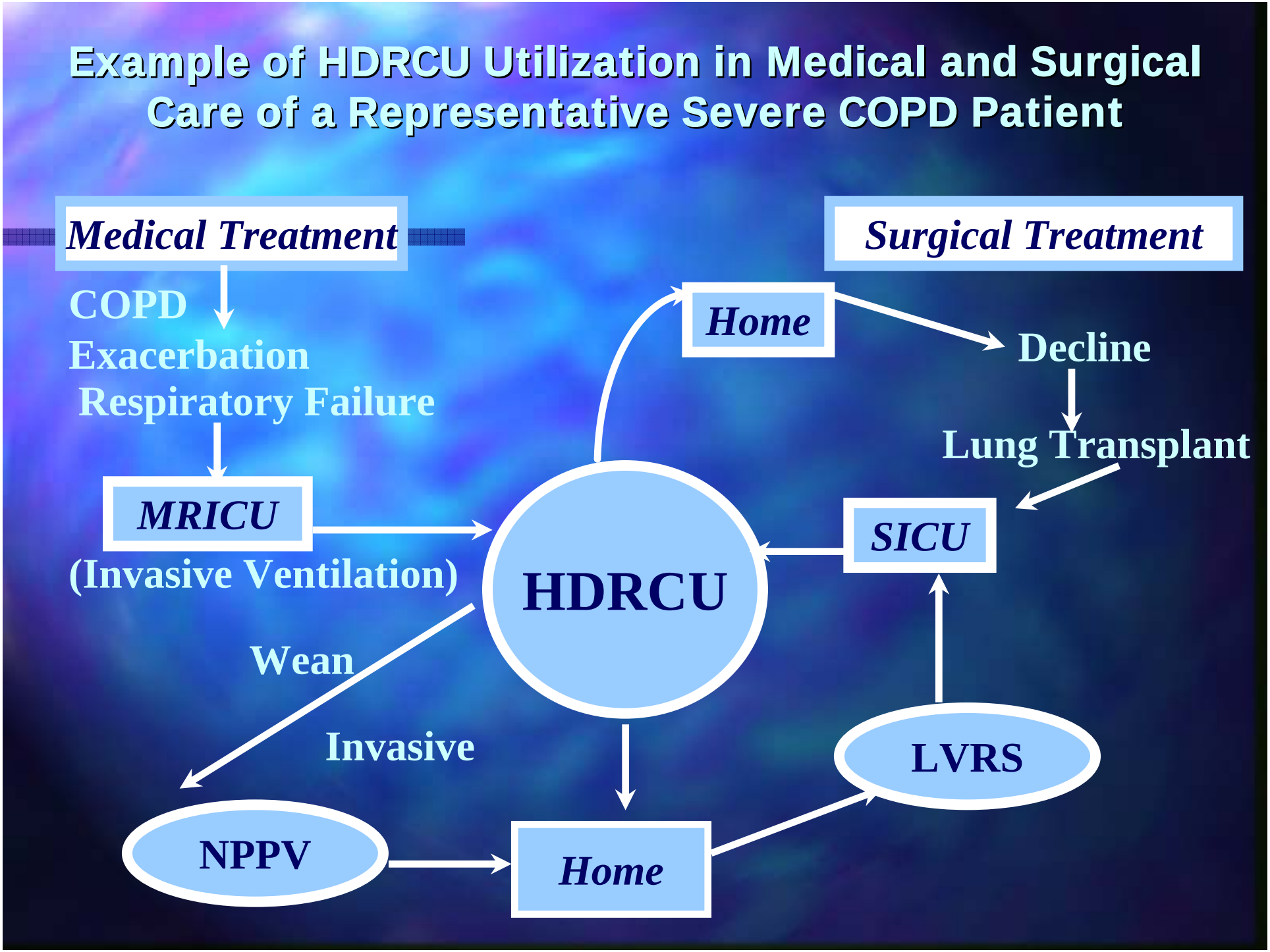
Surgical Care

Lung, Heart, Heart-Lung Transplant
LVRS
CABG in Severe Lung Disease
Lung Cancer Resection in Patients with Severe Lung Disease
Bariatric surgery

HDRCU

Noninvasive Ventilation
Wean Patients from Invasive Ventilation
Instruct home pulmonary and ventilator care
Multidisciplinary rehabilitation of ventilator-dependent patients
Intense family/patient teaching
Intense nursing and respiratory care interventions

Example of HDRCU Utilization in Medical and Surgical Care of a Representative Severe COPD Patient



Advantages of a HDRCU Over Standard ICU Care

- Less expensive
- Unclogs ICU beds for ICU level patients
- Transitions patients to home more efficiently.
- Emphasizes maximizing functional status
- Extends medical/surgical programs to treat patients with advanced lung disease.

What are the Special Needs of Patients Admitted to our HDRCU?

- Need some form of mechanical ventilation, or special respiratory treatment device
- Patients requiring invasive ventilation require special attention to:
  - swallowing dysfunction
  - impaired communication skills
  - psychologic dysfunction
- Re-nutrition
- Respiratory and whole body reconditioning
- Close attention to new or changing medical conditions

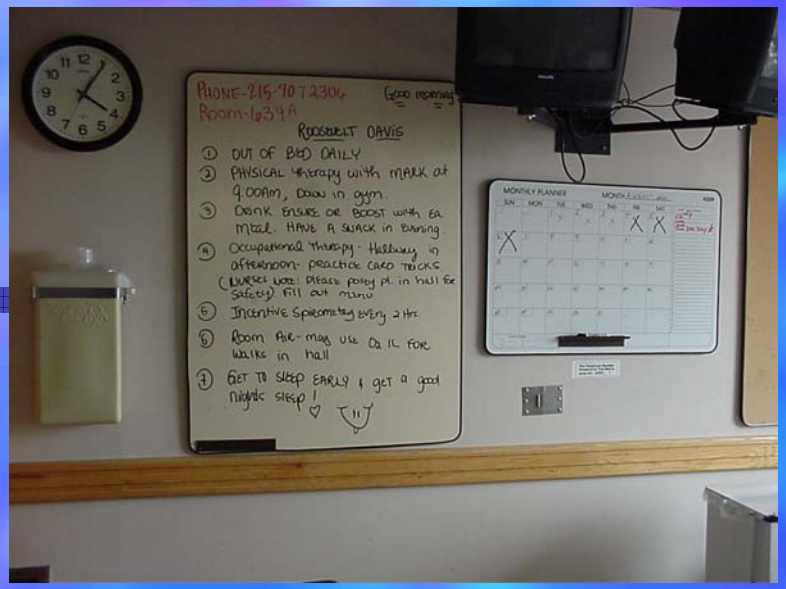
Psychological Dysfunction in High Acuity COPD Patients

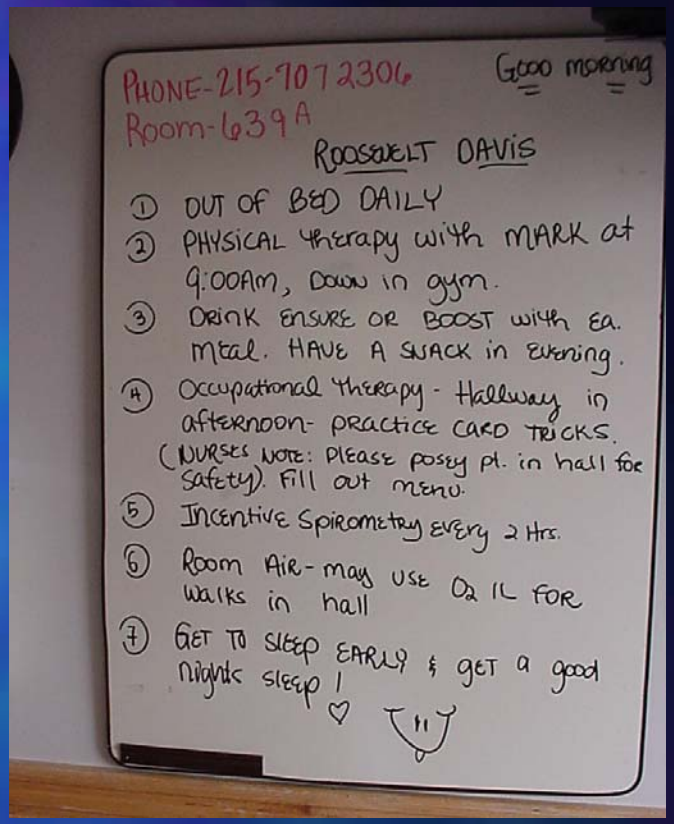
- *ICU Environmental Factors*
  - Sensory overload
  - Sensory deprivation
  - Sleep deprivation

  Factors Associated with Poor/inadequate Ventilation
  - Hypoxemia
  - Medication induced short-term memory loss
  - Inability to communicate is most important factor contributing to fear, or inability to rest or sleep
  - Lack of normal bodily function e.g., eating , social interaction, ambulation, etc.

Patient Involvement in Care

- Every patient upon admission and with every patient interaction is asked to identify 3 things that they feel comprises very good care.
- Patients then rate these items
- This identifies what is important to the patient and keeps the patient at the center of the care
- This has improved communication with patient and team





Orientation Techniques Used in Chronic HDRCU Patients

Evidenced Based Clinical Guidelines

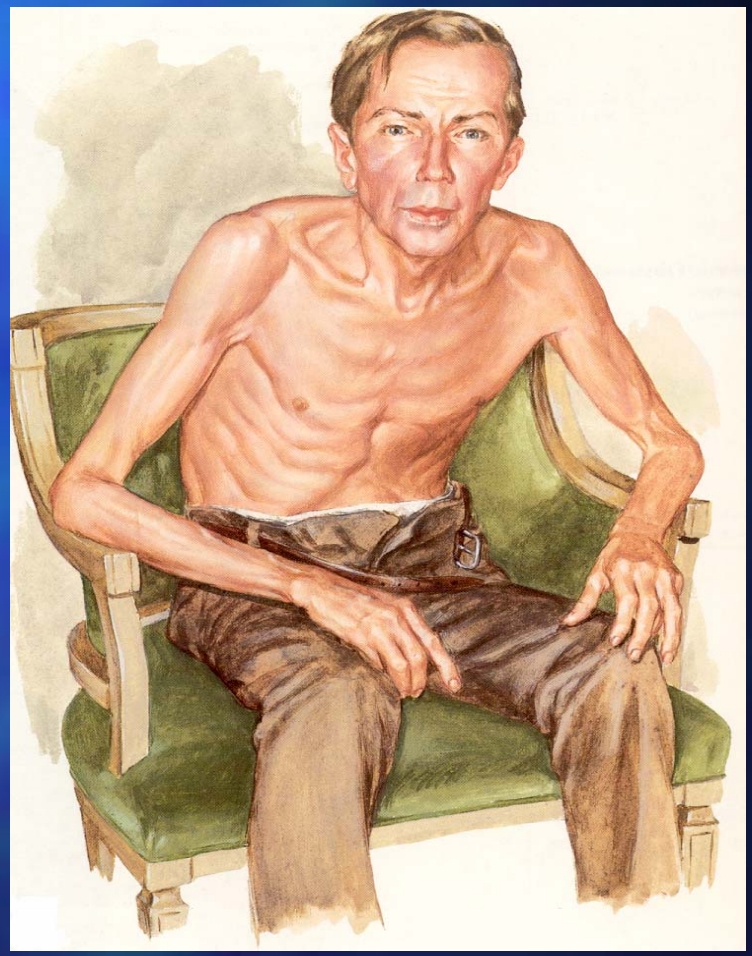
- Tools that guide the team in the coordination and management of care.
- Guidelines are based upon current evidenced based clinical care and/or research.
- Incorporates patient safety, and performance improvement into daily guides.
- Guideline is reviewed 2x daily on rounds with team.
- Guidelines are updated annually or as needed.

Clinical Practice Guideline

High Dependancy Respiratory Care Unit Practice Guideline	Patient Plate			
Date:	HDRCU CLINICAL PRACTICE GUIDELINE	RN INITIALS		
		7a-7p	7p-7a	N/A
Assessment	O2 to maintain SaO2 > 92%			
	Continuous pulse oximetry (notify MD if less than 92%)			
	Room air pulse Ox daily			
	VS every 4 hours or as indicated by patient condition continuous monitoring via OX net system with trend printed			
	Remove Foley unless clinically indicated			
	Skin assessment every 8 hours/ reposition every 2 hours while in bed			
	Weigh and record every Mon-Wed- Fri.			
	Oral care every 4 hours			
	Bipap/Vent/ O2 settings as ordered			
	All alarms audible			
	Peak flow/spirometry daily recording by resp. therap.			
	Intake and Output every 8 hours			
	If restrained, is physician order written?			
	OOB to chair 2 X daily especially for meals			
	Reinforce health education/ medication teaching			
	Reinfoorce Discharge planning needs with family/patient			
	Reassure/ explore any anxieties of patient or family.			
	Patient tolerating appropriate treatment (BiPap, Nebs)			
	Explain/teach condition to Family/patient			
Goals:	Hemodynamically stable, adequate respiratory parameters, & no skin breakdown.			
Tests	Sputum specimen with any sputum change			
	Collect sputum specimen before commencing Antibiotics.			
	Urine analysis/MSU			
Goals:	Labs, EKG, Respiratory status within expected limits.			
Medications	Nebulizer/MDI treatments as ordered			
	IV meds changed to PO when clinically indicated			
	Can nebs be changed to inhaler? If not ensure that RX for home nebs are written			
Goals:	Maintain level of activity, and/or increase level of activity			
Therapy	Can patient walk without desaturating <88%, if NO then PT evaluation required			
	Can patient ambulate steadily using noraml assistive devices? If No PT eval is required			
	Can patient feed, bathe, groom and dress themselves independantly? If NO OT eval is required.			
	Family/ patient education is in progress regarding therapy n			
RN Signatures				
RN Signatures				
RN Signatures				
RN Signatures				
RN Signatures				
RN Signatures				
Initials denote completion of intervention, Circled initials indicates intervention not completed.				
Form to be completed by RN during am and pm rounds.				

Under Nutrition in COPD

- Common problem: 20% outpatients, 50% inpatients
- Respiratory muscle weakness
- Gas exchange abnormalities
- Decreased exercise tolerance
- Decreased survival



Principal Goals of Pulmonary Rehabilitation

Goals

- Reduce symptoms
- Decrease disability
- Increase participation in physical and social activities
- Improve the overall quality of life

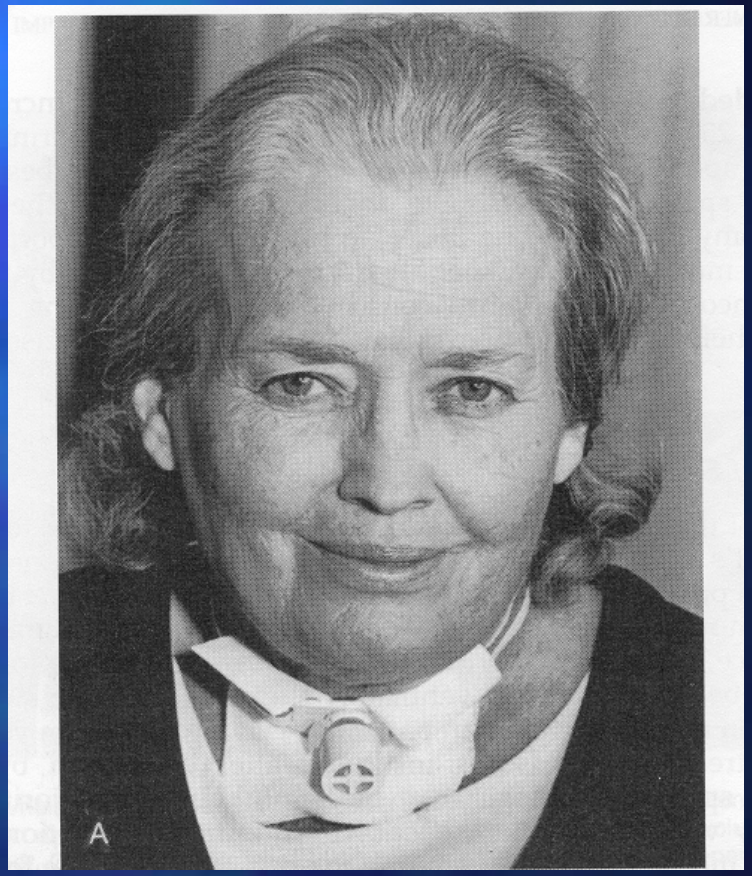
Methods

- Exercise training
- Patient and family education
- Psychosocial and behavioral intervention

Lower Extremity Exercise

Speaking in Tracheotomy Patients

Electrolarynx



Passy-Muir Valve

Discharge Planning

- Weekly multidisciplinary discharge rounds are lead by Pulmonary Chief.
- Rounds include DME providers & community agencies
- Issues include power back up for home, equipment needs, education needs, financial needs
- Every HDRCU patients' care is discussed and reviewed for timely discharge
- Case managers and attending review each case daily for progression of care and DC.

What are the Outcomes?

- Limited quality data collected under prospective, randomized and controlled conditions
- Health Care Financing Demonstration Chronic Ventilator Dependent Project ,however, provides prospective and controlled (but not randomized) data on the effectiveness (cost and outcomes) of multidisciplinary rehabilitation provided in a non-ICU location in the chronic ventilator dependent patient
- The following charts represents TUH findings

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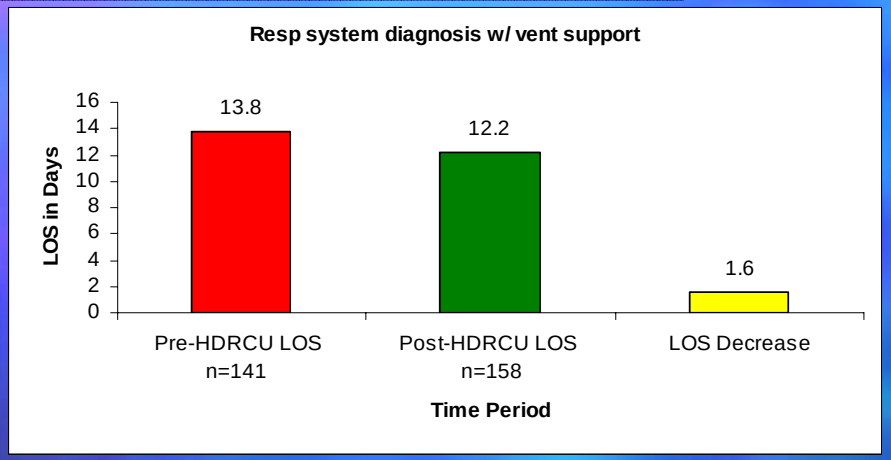
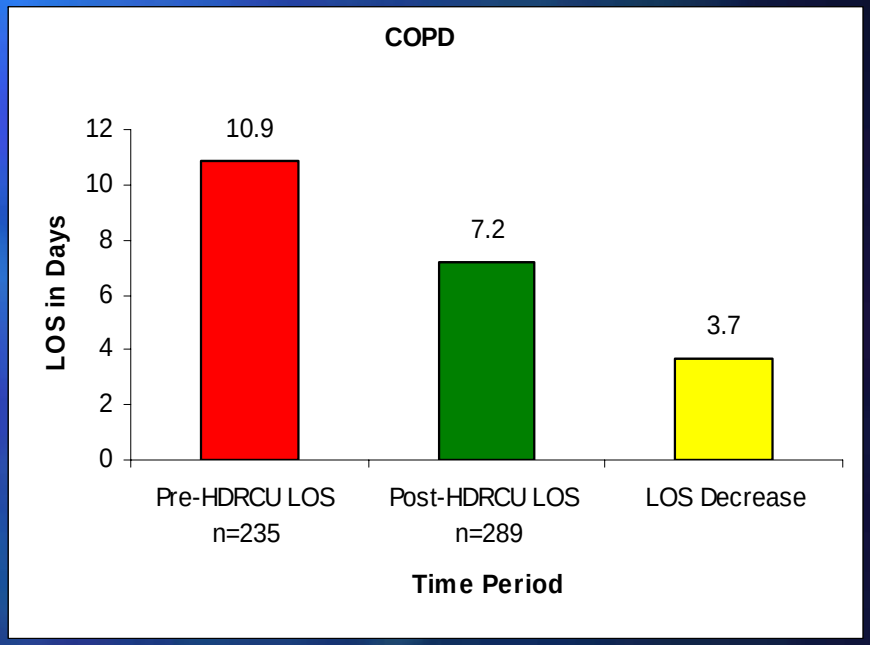
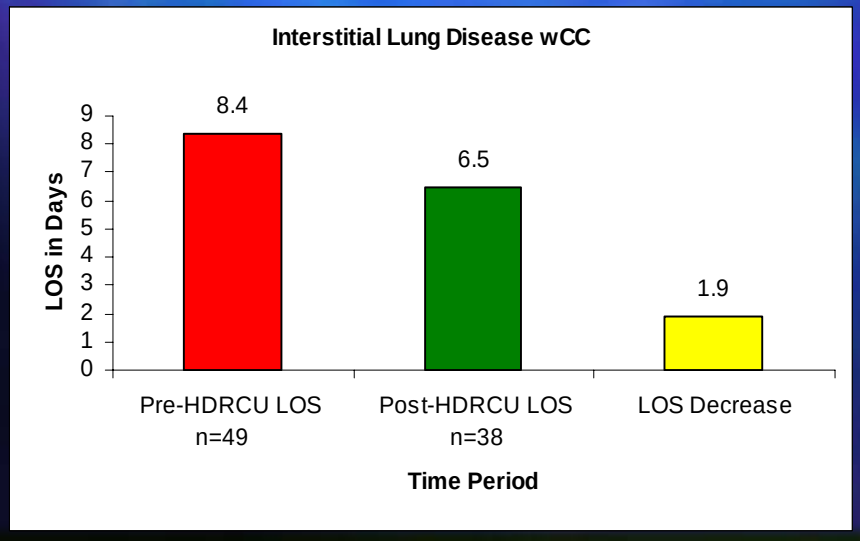
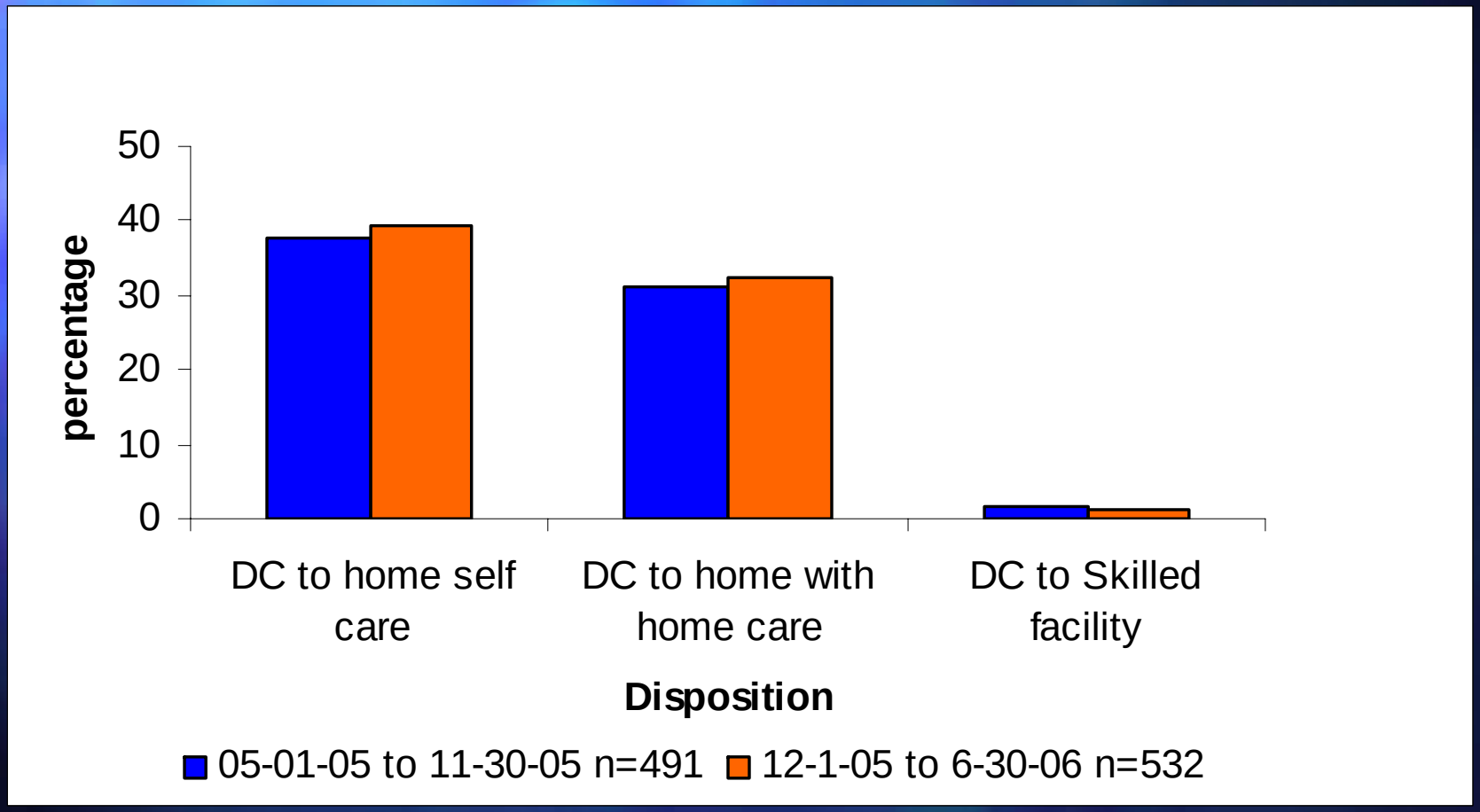
HDRCU Effect on LOS



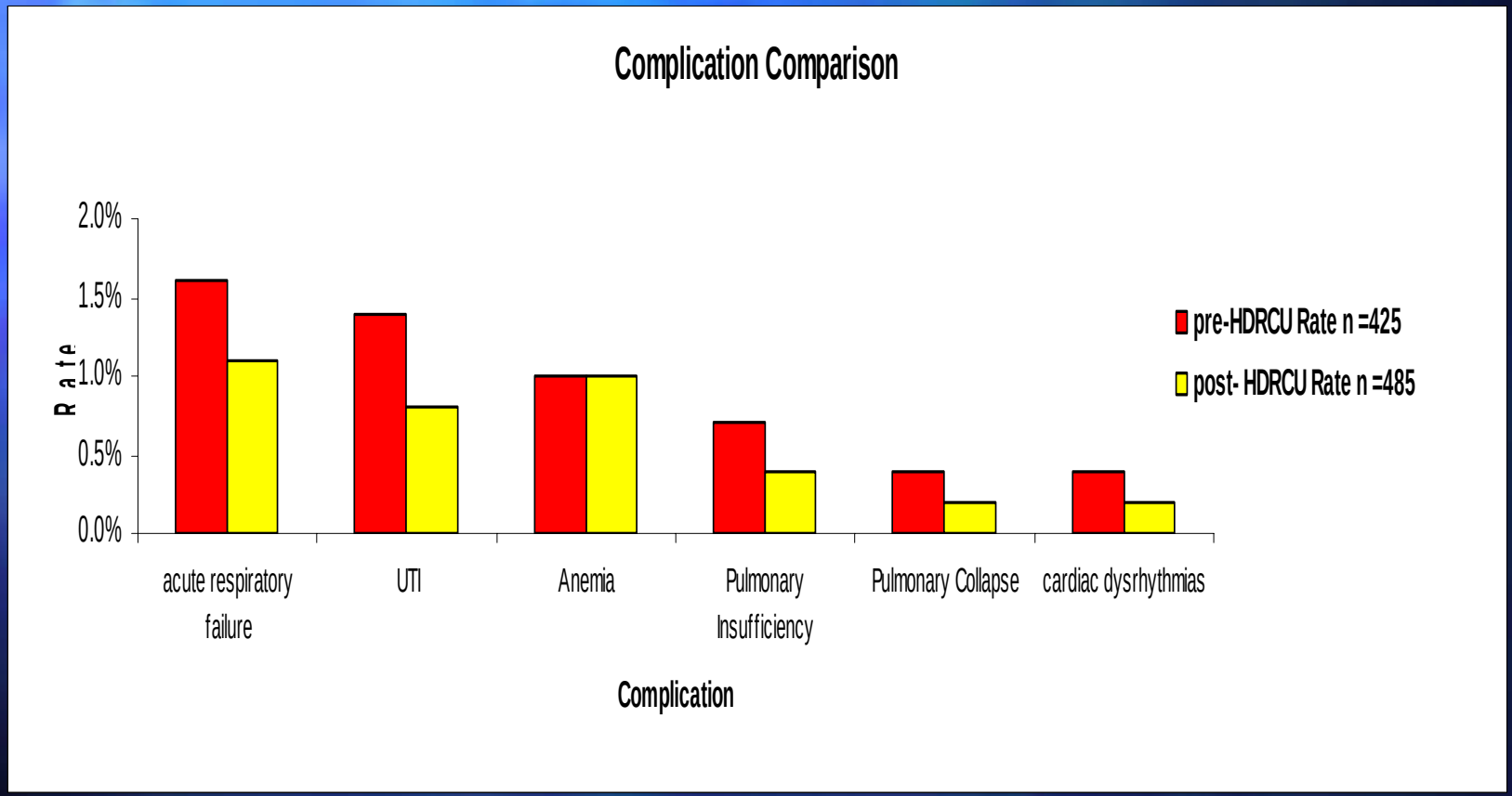




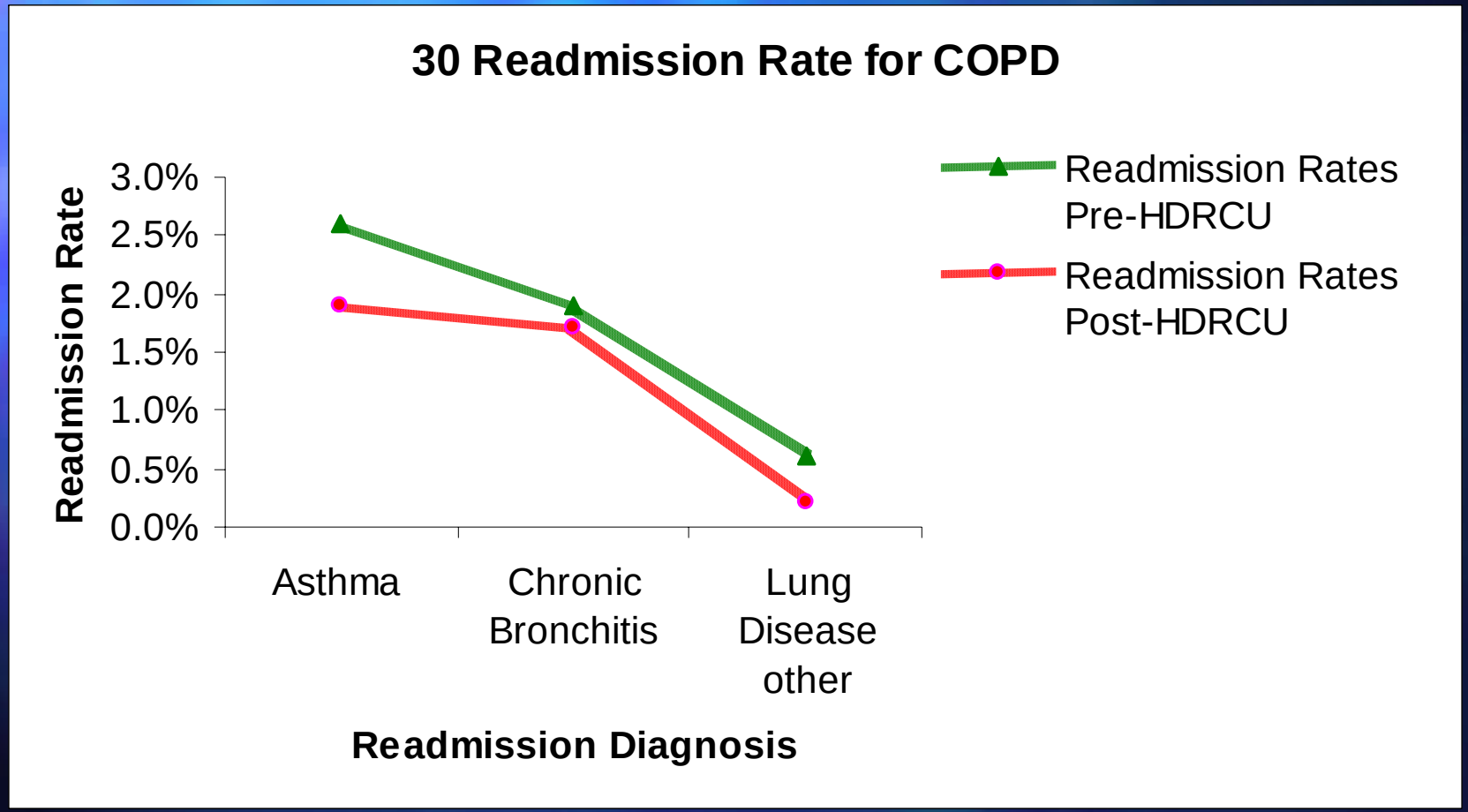
Pulmonary Service Discharge Disposition



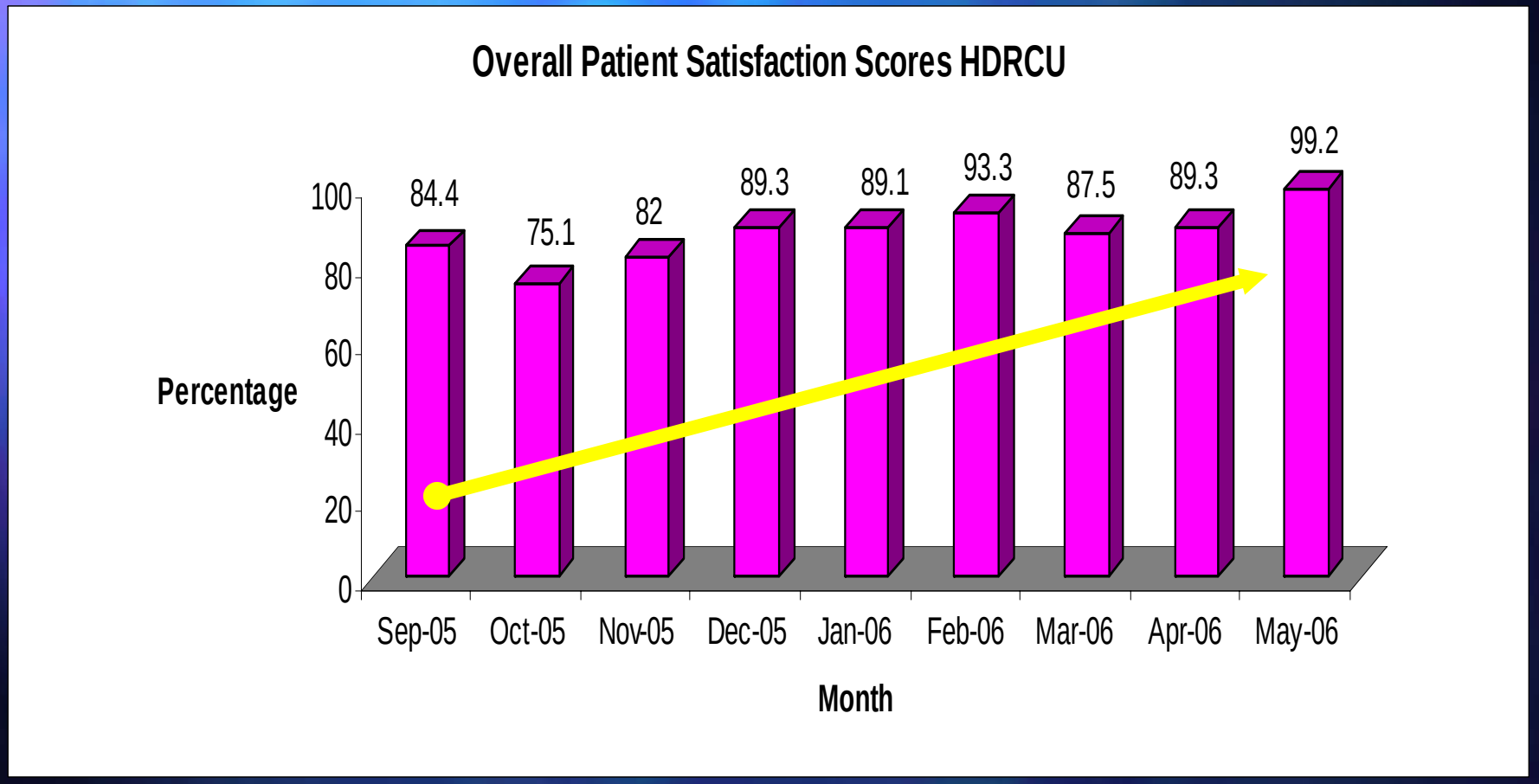
Temple University Hospital Complication Comparison



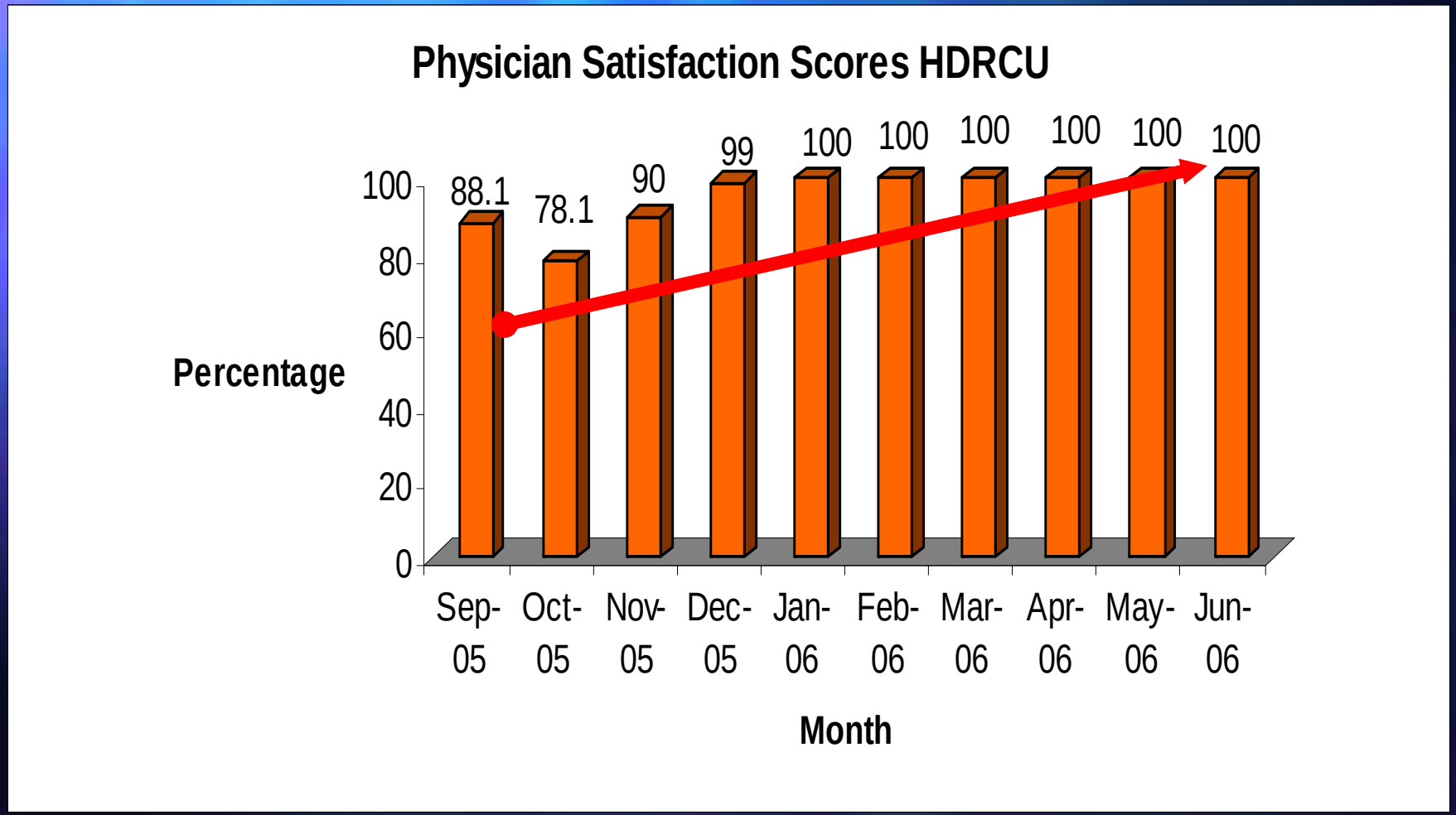
Temple University Hospital
30 Day Readmission Rate



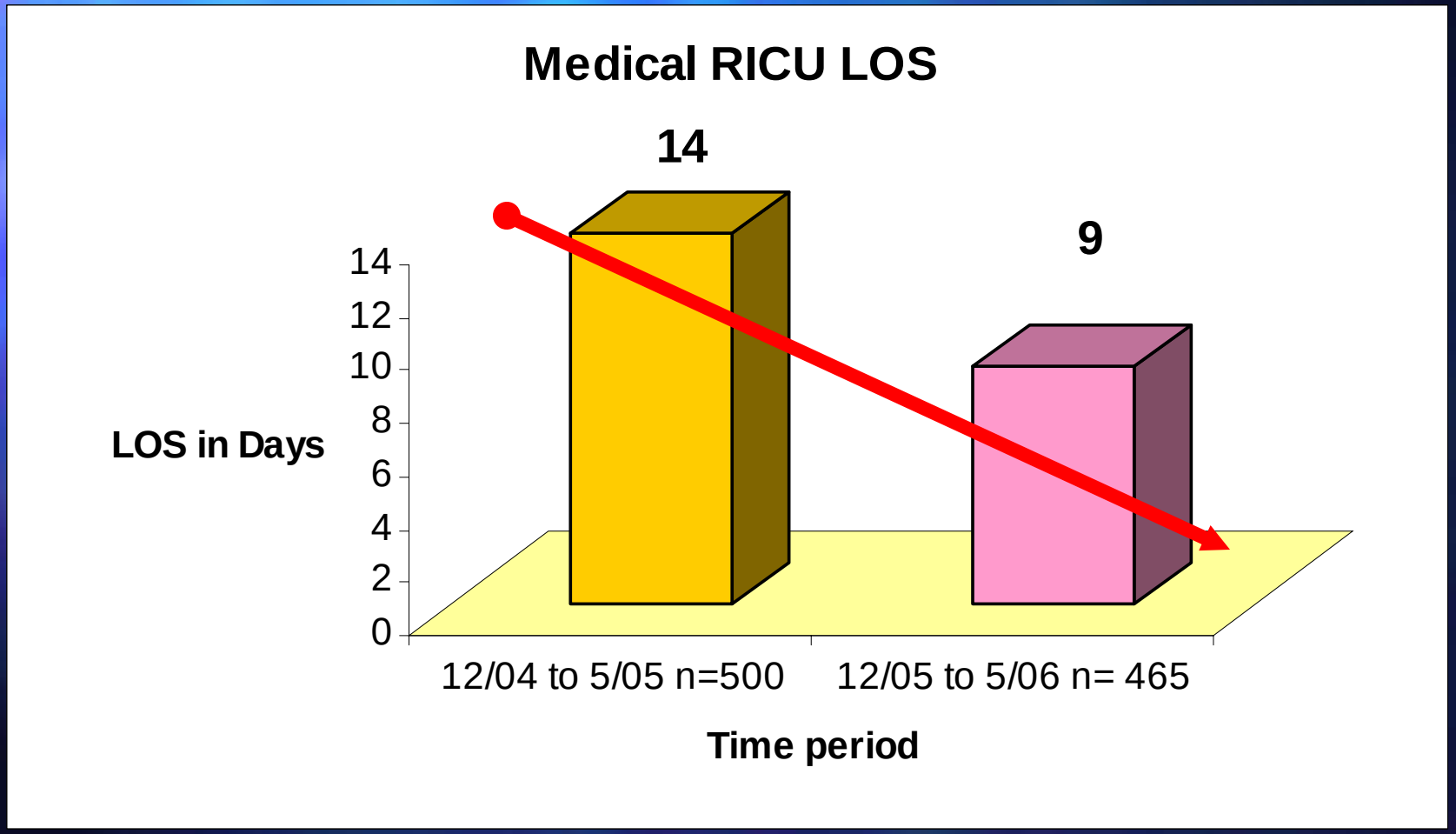
Temple University Hospital Patient Satisfaction Scores



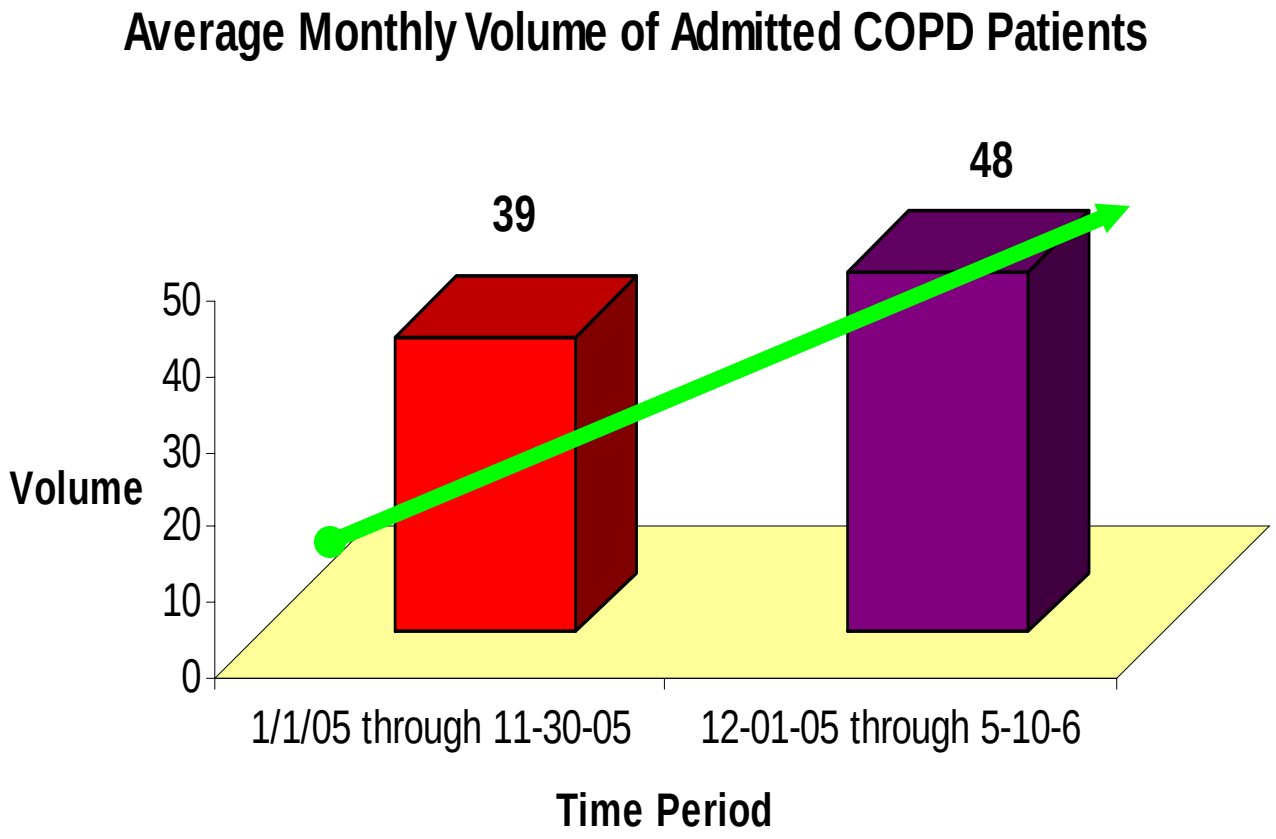
Temple University Hospital Physician Satisfaction Scores



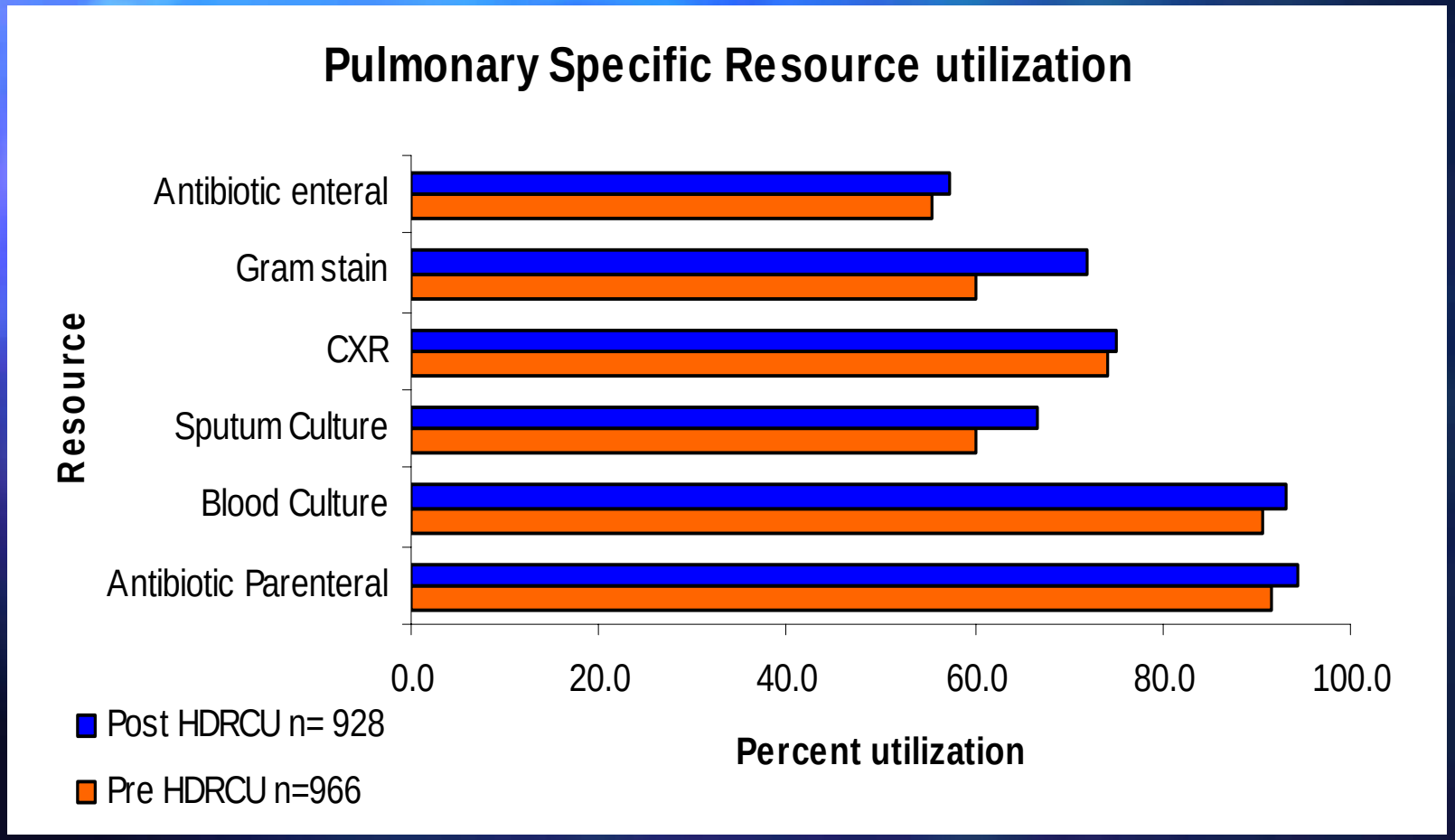
HDRCU Effect on LOS in the Medical RICU



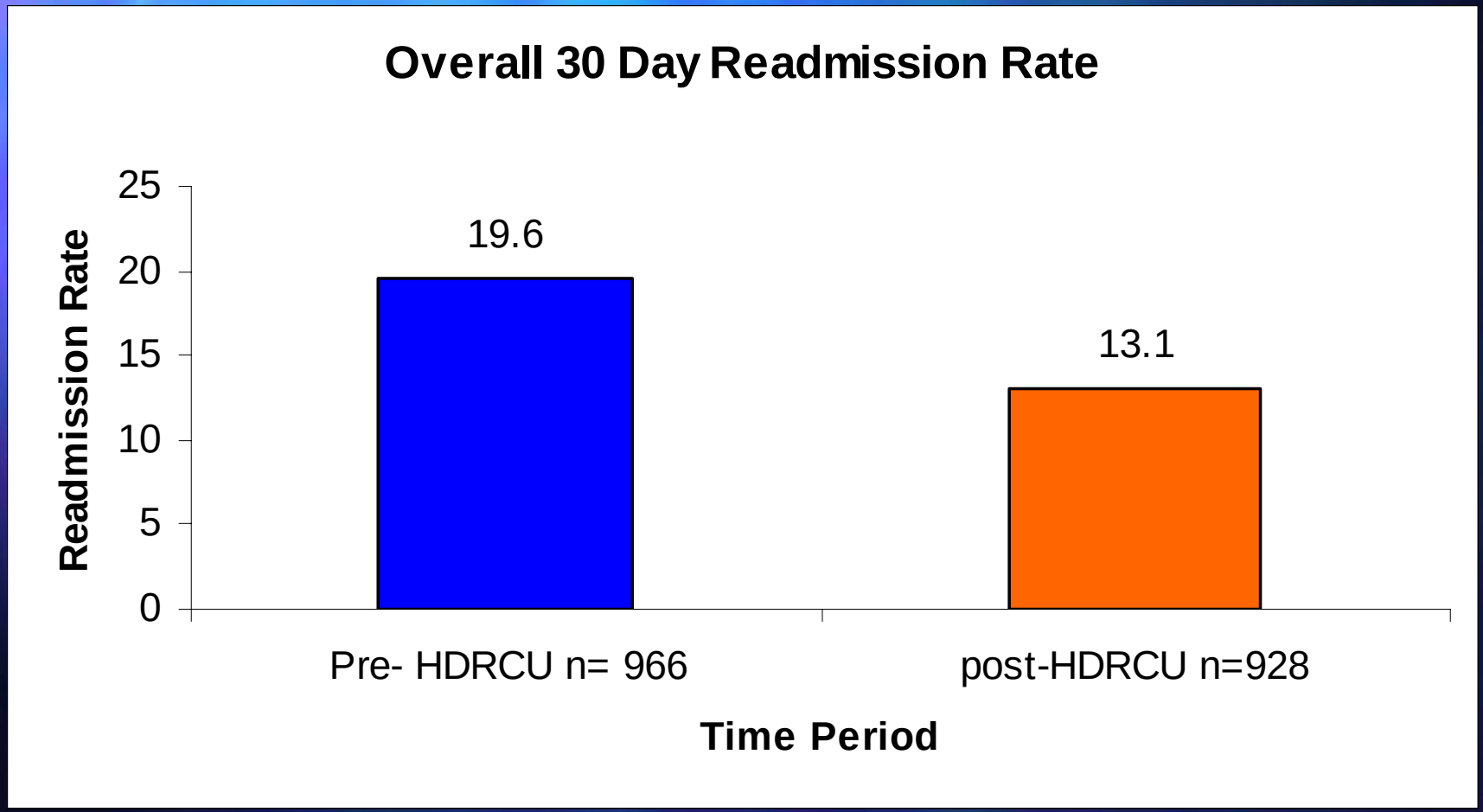
Volume Increase in Complex COPD Patient Population



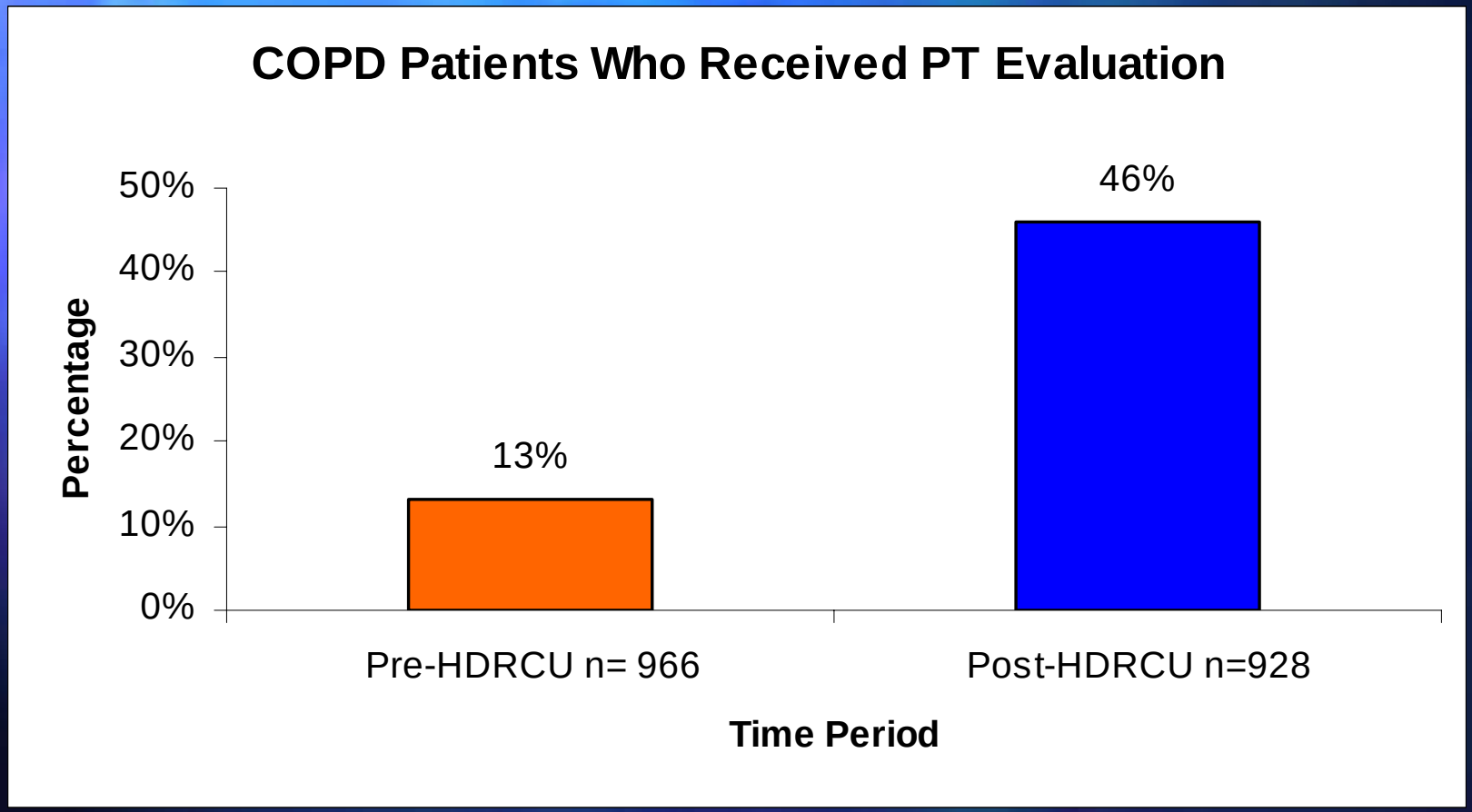
HDRCU Resource Utilization



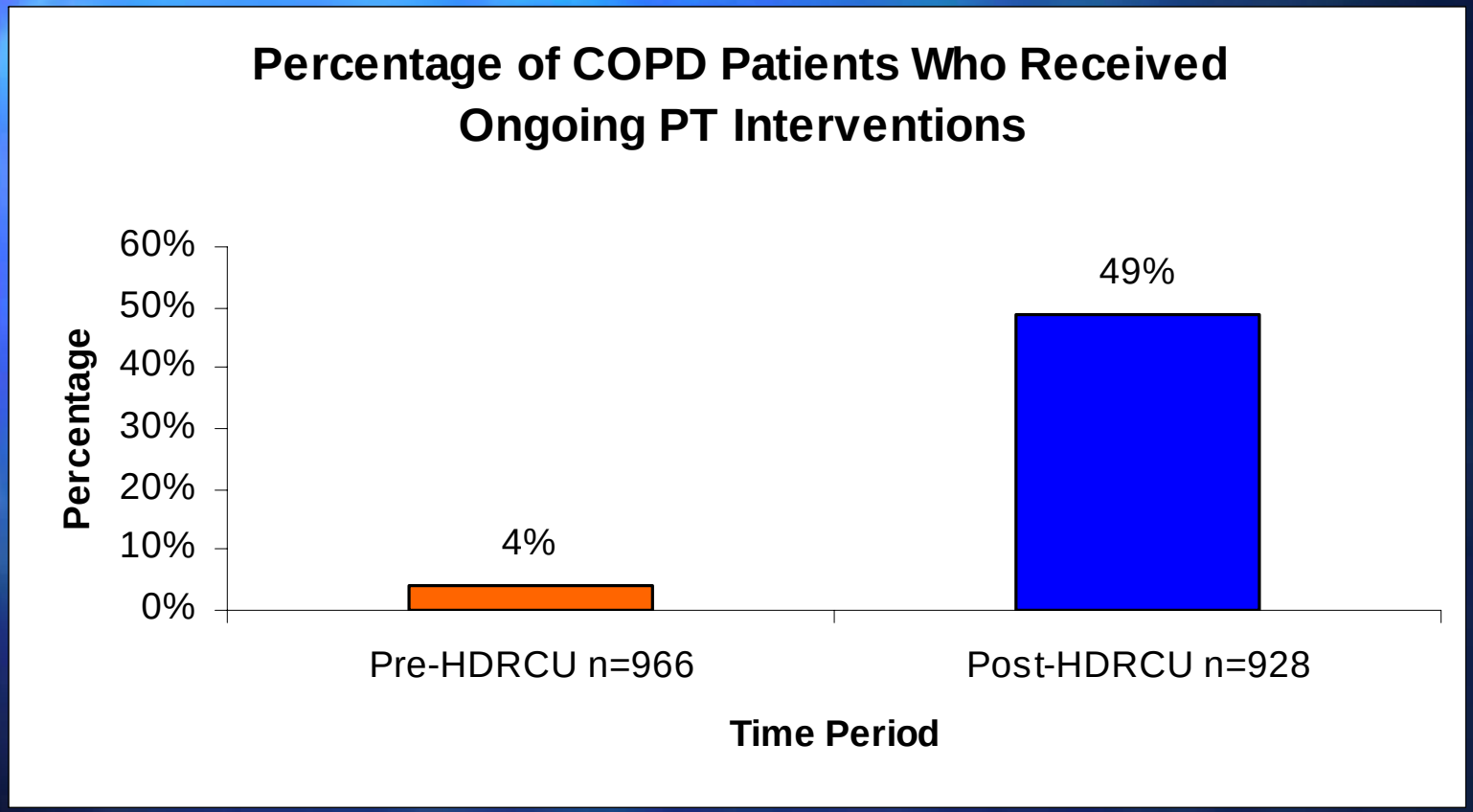
Overall 30 day Readmission Rate



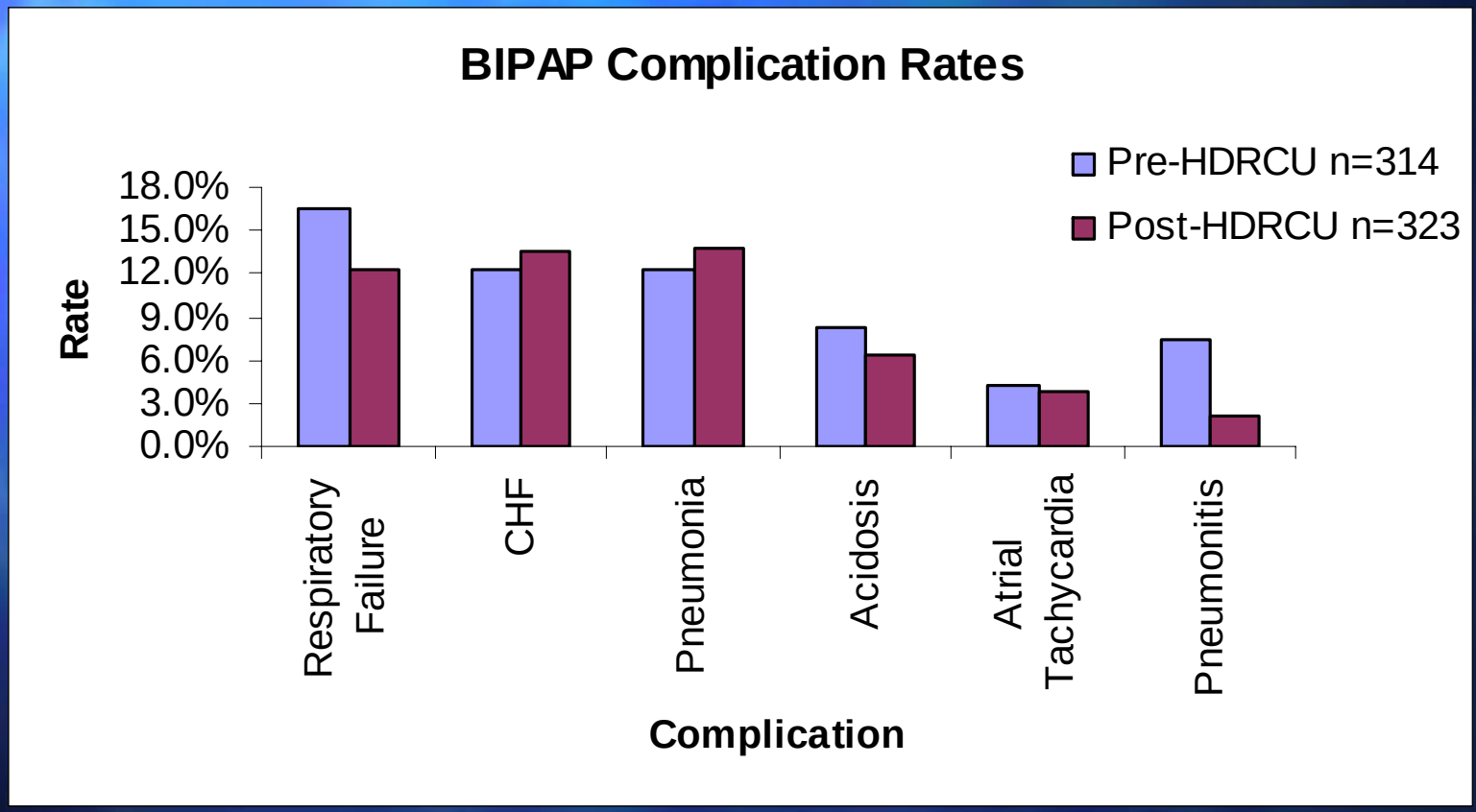
Physical Therapy Utilization



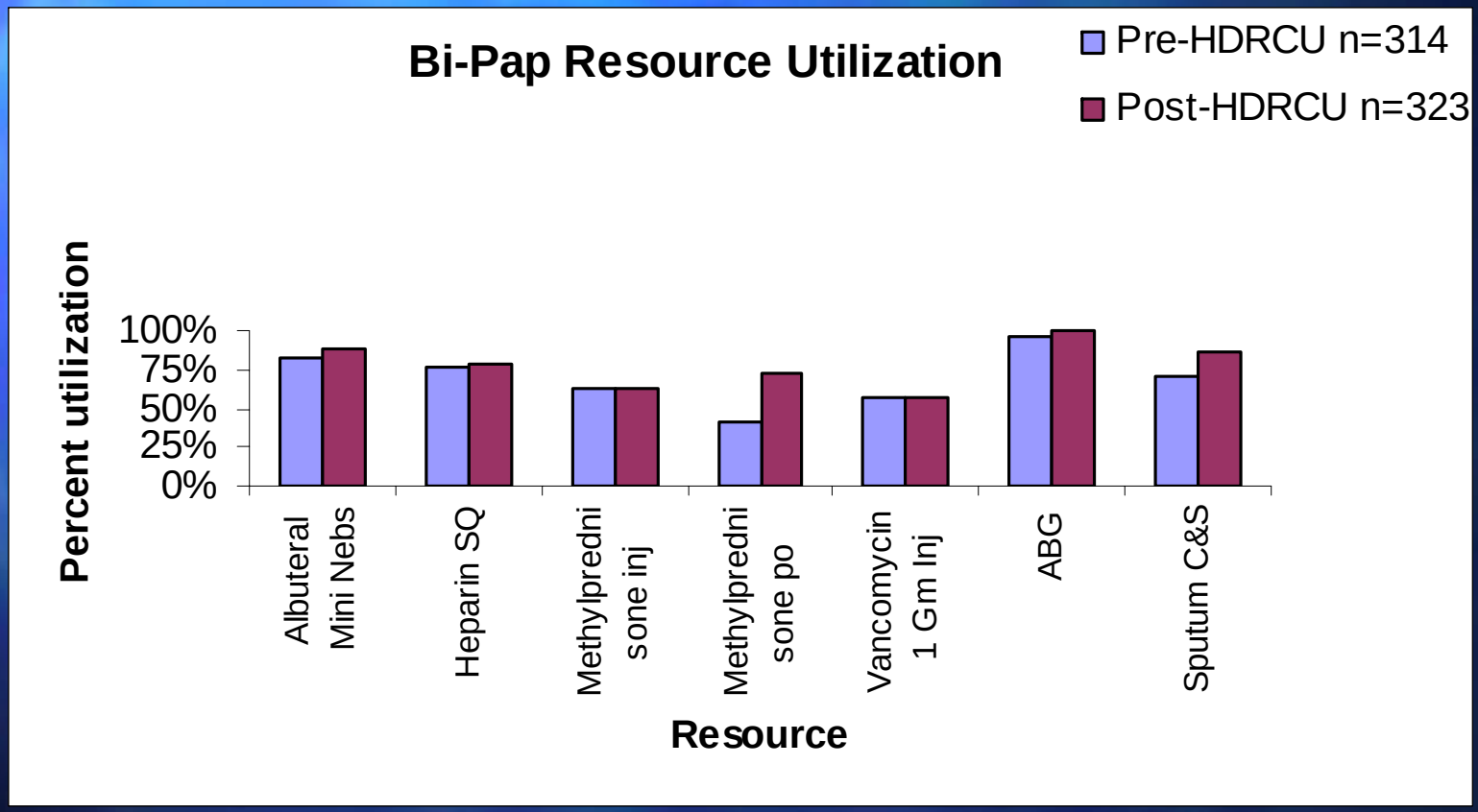
Physical Therapy utilization

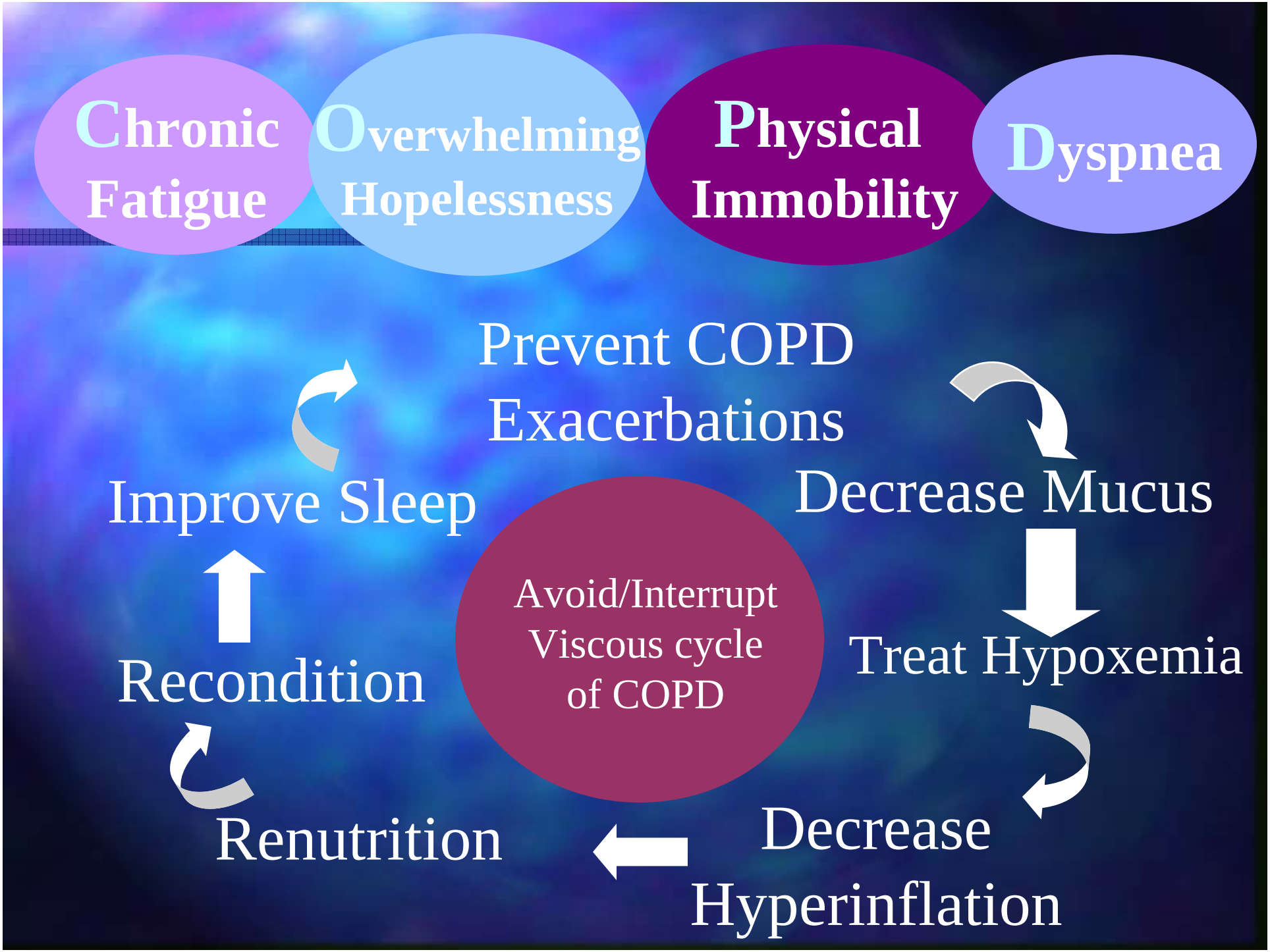


Bi-Pap Complication Comparison



Bi-Pap Resource Utilization Comparison




Chronic Fatigue
Overwhelming Hopelessness
Physical Immobility
Dyspnea
Prevent COPD Exacerbations
Decrease Mucus
Treat Hypoxemia
Decrease Hyperinflation
Renutrition
Recondition
Improve Sleep
Avoid/Interrupt Viscous cycle of COPD

Why Does It Work?

- Commitment from all levels of the organization. (CEO,Pulmonary Chief, staff RN, RT, PT, etc...)
- Open data sharing
- Ongoing change to the program
- Committed and expert nursing and ancillary leaders.
- Seamless relationship between the hospital and physician teams.
- Ongoing commitment to be experts in advanced pulmonary care

Summary

- Chronic Pulmonary patients require multidisciplinary care due to their complex and diverse medical conditions.
- Swallowing, ambulation and general conditioning may lag behind respiratory independence and requires early intervention to maximize recovery
- Optimum integration of multidisciplinary care results in a reasonably good long term QOL and enhances the medical and surgical programs for pulmonary disease.

Outcome Summary

- The HDRCU has resulted in the following
  - Decreased LOS
  - Decreased 30 day readmission rates
  - Increased patient satisfaction
  - Improved patient outcomes in mortality and complications.
  - Decreased ICU LOS
  - Improved resource utilization
  - Improved Nursing and ancillary recruitment and retention

Success is a Team Effort

QUESTIONS?