

**Controlled oxygen therapy for ED  
patients with chronic obstructive  
airways disease: a quality initiative**

**Sarah Cornish, Sharon Klim, Suzie  
Rusev and Karen Winter  
Western Health**



## Background

- Western Hospital Emergency Department sees approximately 35,000 patients per annum- mostly adults
- 530 COAD presentations in 2011
- Oxygen therapy administered to COAD patients – mostly a nurse led therapy
- Project opportunity- time to evaluate our current practice and recognise potential gaps between what ‘should’ happen and what ‘does’ happen



# Project Opportunity

- Emergency Care Improvement and Innovation Clinical Network (Department of Health, Victoria) offered member emergency departments the opportunity to participate in a quality improvement project addressing a selection of clinical issues, including oxygen therapy in patients with COAD
- Aim was to increase the proportion of patients receiving controlled oxygen therapy (nasal prongs or Venturi) after initial nursing assessment
- Utilised a Plan-Do-Study-Act structure
- Opportunity to implement evidence-based practice



# Evidence

## **Austin, M., Wills, K., Walters, E. & Wood-Baker, R. (2010)**

Compared standard high flow oxygen treatment with titrated oxygen (nasal prongs) treatment for patients with an acute exacerbation of COAD in the pre-hospital setting (n= 405)

The risk of death significantly lower in the titrated oxygen group for ALL patients (58%) and for confirmed COAD patients (78%)

Patients with COAD who received titrated oxygen according to the protocol were significantly less likely to have respiratory acidosis or hypercapnoea

## **Joosten et al (2007)**

Retrospective audit of 65 patients presenting to an ED of major metropolitan hospital in Melbourne with a diagnosis of COAD

Use of oxygen flow rates greater than 4L per minute in patients with high CO<sub>2</sub> levels was associated with a >LOS , increased use of NIV and a higher admission rate to HDU

Use of more than 4L/min associated with severe acidosis in patients with COAD with known CO<sub>2</sub> retention



# Evidence

## Guidelines for emergency oxygen use in adult patients. British Thoracic Society Oxygen Guideline Group 2008

In patients with risk factors for hypercapnoea, a 28% Venturi mask is the first line delivery system of choice (pre-hospital, and on arrival to ED before blood gases), in conjunction with a clinical aim of SpO<sub>2</sub> 88-92%

Venturi masks are recommended for patients requiring precise control of FiO<sub>2</sub>.

In those at risk of developing hypercapnoeic respiratory failure secondary oxygen therapy, the use of Venturi masks may reduce this risk.

Patients with Type II respiratory failure should receive oxygen via Venturi (p. 52),

If there were **NO** Venturi masks available, nasal prongs are the preferred method of oxygen delivery in patients with COAD

Nasal prongs are recommended in the general ward area for COAD patients



# Evidence

## **Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease (GOLD) 2013**

Controlled oxygen therapy should be titrated to a target saturation of 88-92%

Venturi masks offer more accurate and controlled delivery, but are less likely to be tolerated by the patient

The in-hospital mortality of patients admitted for a hypercapnoeic exacerbation with acidosis is approximately 10%



# Project Objectives

## **Overall project aim**

Reduce variation in practice and implement best evidence in the delivery of oxygen therapy for adult patients with COAD

## **Specific project objectives**

Increase the proportion of patients with COAD receiving oxygen via a Venturi system



# Data Collection-2011

## **Patient inclusion criteria:**

Clinical diagnosis of COAD

## **Patient exclusion criteria:**

NIV; ATS Category 1 and 2

## **Within first hour:**

### **Considered to have received controlled O2 therapy:**

documented FiO<sub>2</sub> ± flow rate, clear statement Venturi

### **Considered to have received uncontrolled O2 therapy:**

documented flow rate, nil percentage or Venturi



# Project methods

- Evidence-based in-service education sessions- incorporating pre-test data
- Medical education- registrar teaching
- Development of promotional material
- Use of clinical champions
- Clinical point of care audits by project team staff

Be an Ace Venturi O2  
Detective TODAY!



For further information please see:

Project Contacts:

Dr Karen, Sarah, Sharon K or Suzie

Clinical Champions:

Moina, Sonia, Allison G, Efron & Sylvia D

# Key improvements

**Inclusion criteria:** Clinical diagnosis of COAD

**Exclusion criteria:** NIV; ATS Category 1 and 2

**Inclusion documentation- within first hour:** FIO<sub>2</sub> percentage, Flow Rate, State 'Venturi'  
= controlled oxygen therapy

	Pre-data	Post-data
Sample size	50	50
Patients who had no oxygen therapy	2	2
Nasal Prongs	7	1
Hudson Mask	26	9
Venturi Mask	15	38
Proportion of patients documented $\leq 1$ hour as receiving controlled oxygen therapy after initial ED nurse assessment	30%	81%

**Overall improvement of 51%, is both statistically and clinically significant ( $p < 0.001$ )**



## Success factors

- Development of a project catchphrase was important to promote and raise awareness. Also, we used a staff members face on our poster which helped staff identify with the project
- Engaging clinical champions
- Success with the post data can be partly attributed to having such a comprehensive education program that captured 76% of nursing staff
- Important to engage medical staff
- A receptive workforce made the educational sessions enjoyable
- Theoretical improvement in patient care- however no scope to measure as a part of this project

## Sustaining the change

- Update Clinical Practice Guidelines- Orientation manual
- Incorporate current evidence into Transition to Speciality Practice program content
- Update Emergency Observation Unit Clinical Pathway for COAD patients
- Bi-annual in-service for clinical staff
- Recent change in hospital policy (2013) that specifically recommends the use of Venturi masks in patients with COAD

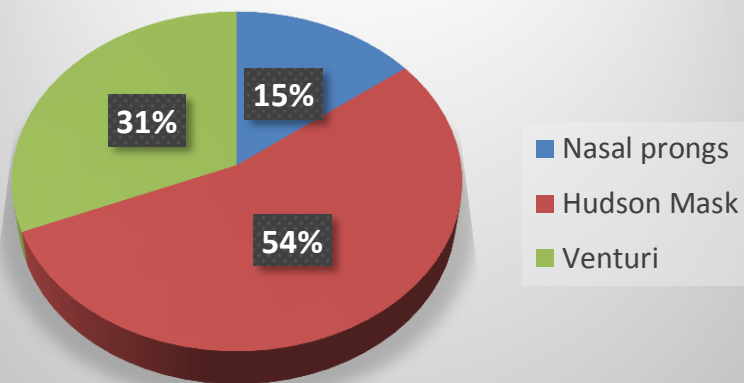
# Sustainability Audit

Retrospective audit of presentations of COAD between January-July 2013

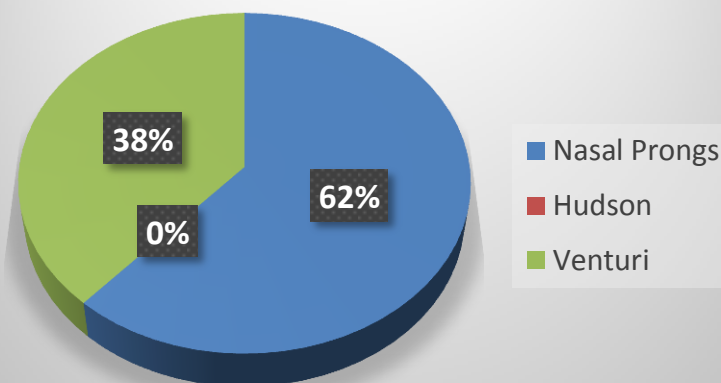
	Post-data- 2011	Sustainability data- 2013
Sample size	50	39
Patients who had no oxygen therapy	2	NA
Nasal Prongs	1	24
Hudson Mask	9	0
Venturi Mask	38	15
Proportion of patients documented $\leq 1$ hour as receiving controlled oxygen therapy after initial ED nurse assessment	81%	38%

# Review of the data

## Pre Project Data 2010



## Post Project 2013





## What else did we learn?

- Project lead should attend a project management course in the beginning stages of the project to ensure they have the right skill set to achieve and lead such a project
- Sustaining the change is a challenge
- Project materials, formal project approach and funding by the ECIICN was particularly helpful, especially to a novice project team
- Nurses can positively change clinical practice





## Conclusion

- Locally led quality improvement activities can make clinically important practice change, even in the busy ED environment
- A targeted, multidisciplinary education program is an enabler for change
- Sustaining the change provides ongoing challenges, and should be process based, rather than person based



# Funding / Acknowledgments

This project was supported by a grant from the Emergency Care Improvement and Innovation Clinical Network, Commission for Hospital Improvement, Department of Health, Victoria

Special thanks to Professor Anne-Maree Kelly and Sharon Klim, Joseph Epstein Centre for Emergency Medical Research at Western Health



Western Health

**QUESTIONS?**



## References

- Austin, M., Wills, K., Walters, E. & Wood-Baker, R. (2010) Effect of high flow oxygen on mortality in chronic obstructive pulmonary disease in pre-hospital setting: randomised control trial. *British Medical Journal*, 341.
- Driscoll, B., Howard, . & Davison, A. (2008) Guideline for emergency oxygen use in adult patients. *Thorax*, 63 (supplement VI)
- Joosten, S. Koh, M., Xiaoning Bu, Smallwood, D. & Irving, L. (2007) The effects of oxygen therapy in patients presenting to an emergency department with exacerbation of chronic obstructive pulmonary disease. *Medical Journal of Australia*, 186(5), 235-238.
- Vestbo, J., Hurd, S., Agustí, A., Jones, P., Vogelmeier, C., Anzeuto, A., . . . Rodriguez-Roisin, R. (2013). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *American Respiratory Care Journal*, 187(4), 347-365.