

# SIMPLY... Oxygen Therapy

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# Plan

- Indications
- Delivery methods
- CPAP vs BiPAP
- Common cases



**Thorax**  
AN INTERNATIONAL JOURNAL OF RESPIRATORY MEDICINE

**Guideline for emergency  
oxygen use in adult patients**

**British Thoracic Society  
Emergency Oxygen Guideline Group**



# Oxygen Devices

Classified by

- ***Performance*** (variable or fixed)
- Duration (short term or long term)
- ***Flow*** (low or high)
- Non-invasive or invasive

## Low Flow Devices

All deliver VARIABLE O<sub>2</sub>

- Nasal cannulae
- Simple Face Mask
- Reservoir Mask

## High Flow Devices

Deliver FIXED O<sub>2</sub>

- Venturi Mask



# Oxygen masks

- Variable O<sub>2</sub> of 35-60%.
- Flow 5-10 L/min
- Comfortable
- Low cost
- Interfere with eating
- Easy displacement
- Increased aspiration by concealment of vomitus



# Nasal cannula

- Variable O<sub>2</sub> of 24-50%
- Flow 2-6L/min
- Convenient
- Patient preference
- Easily tolerated
- Nasal breathing
- Drying of mucosa and epistaxis



# Non-Rebreath Reservoir

- Variable O<sub>2</sub> of 60-80%
- Flow 15L/min
- Effective for short term treatment
- Uncomfortable
- High Flow



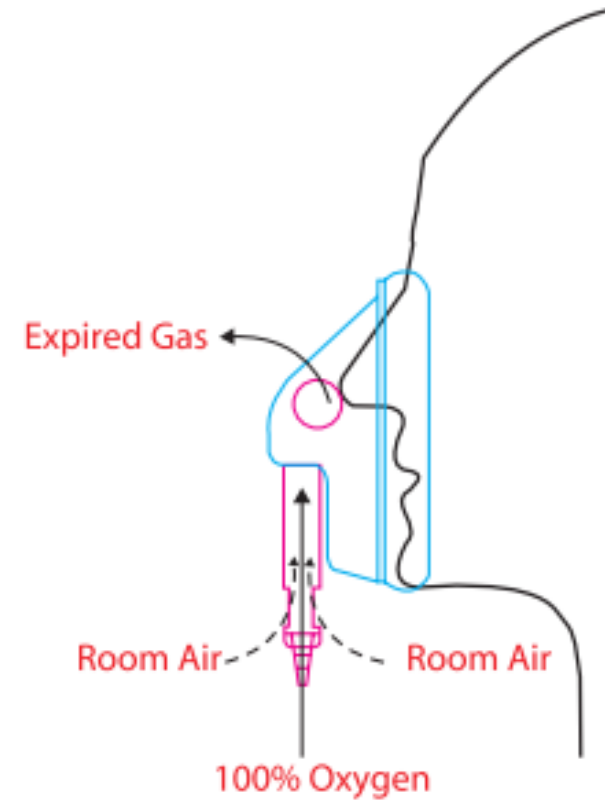
# Tracheostomy masks



# Venturi Masks

Deliver constant/Fixed  $O_2$  of 24-40%  
Increasing flow does not increase oxygen  
Concentration

Fixed delivery of Oxygen

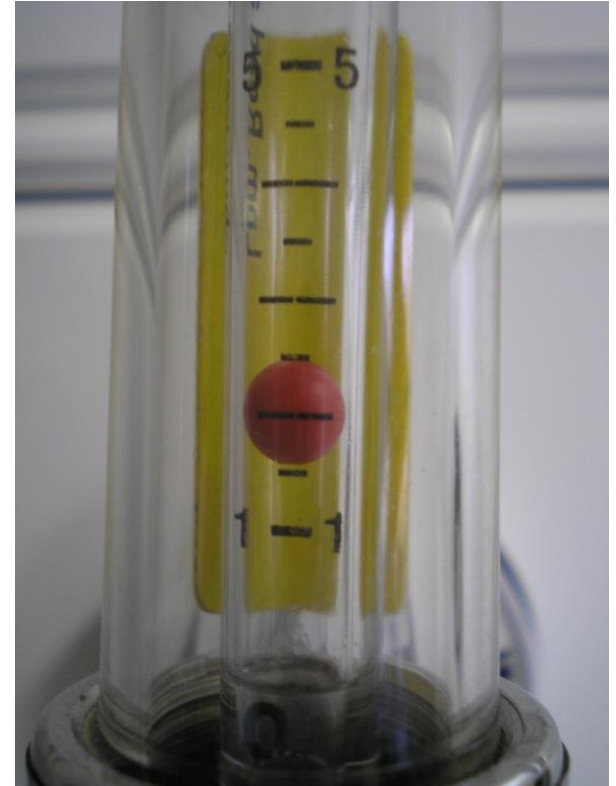
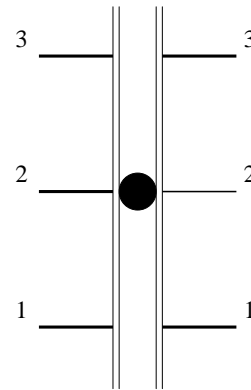




# Colour Coded Venturi Masks

Colour of Mask attachment	Oxygen (%)	Rate of Oxygen L/Min
Blue	24	2-4
White	28	4-6
Yellow	35	8-10
Red	40	10-12
Green	60	12-15

# Oxygen Flow Meter



# A Case...

A 68yo man comes by ambulance to A&E. Wife called ambulance as concerned that husband very unwell and breathless.

*Has known COPD (states similar to previous exacerbation)*

What would be your management?

- ABCDE
- Hx: as above
- Ex: widespread polyphonic wheeze
- Obs: BP 125/85 HR 120 RR 29 Sats 78%



# Oxygen Therapy

68yo COPD. SOB. Wheeze. RR 29 HR 120 Sats 78% OA.

*Is the patient critically ill or  $O_2$  sats <85% ?*

**YES**


High Flow/NRM  
15L/min  $O_2$

Then do Arterial Blood Gas

**HYPOXIA KILLS**



# Prescribe

DRUG		OXYGEN	
(Refer To Trust Oxygen Policy)			
<i>Circle target oxygen saturation</i> 88-92% <b>94-98%</b> Other ____		STOP DATE	
Starting device/flow rate <u>15L/min, NRM</u> PRN <b>Continuous</b>			
		PHARM	
(Saturation is indicated in almost all cases except for palliative terminal care)			
SIGNATURE / PRINT NAME 		DATE 11/02/15	

# Another case...

68yo woman walks into A&E with mild breathlessness and productive cough. She has known COPD and has had previous ITU admissions with *“problems with the gases in my blood”*

What would be your management?

- ABCDE
- Hx- as above
- Ex- widespread polyphonic wheeze
  - BP 145/90 HR 105 RR 20 Sats 87%



# Oxygen Therapy

68yo COPD. Mild SOB/cough. Wheeze. RR20 HR105 Sats 87% OA

*Is the patient critically ill or  $O_2$  sats <85% ?*

NO


*Is patient at risk of hypercapnia?*

	Target Sats	Starting Device
NO →	94-98%	Nasal Cannula (2-6L/m) or Face Mask (5-10L/m)
YES →	88-92%	Venturi 24%

... and do an Arterial Blood Gas



# Prescribe

DRUG		OXYGEN	
(Refer To Trust Oxygen Policy)			
<i>Circle target oxygen saturation</i> <b>88-92%</b> <b>94-98%</b> Other ____		STOP DATE	
Starting device/flow rate <u>24% Venturi</u> PRN <b>Continuous</b> 2L/min			
		PHARM	
(Saturation is indicated in almost all cases except for palliative terminal care)			
SIGNATURE / PRINT NAME 		DATE 11/02/15	



## ... and do ABG

- *If CO<sub>2</sub> elevated (>6.0kPa) and pH normal*  
Continue with target sats 88-92%
- *If CO<sub>2</sub> normal and not acidotic*  
Change to target sats 94-98%  
(As now not considered in low risk hypercapnia group)
- *If CO<sub>2</sub> elevated (>6.0kPa) and acidotic*  
Then consider NIV ... i.e. Get help!

**DO NOT STOP THEIR OXYGEN** due to hypercapnia.  
**HYPOXIA KILLS! HYPOXIA KILLS! HYPOXIA KILLS!**

Repeat ABG in 30-60mins



# Back to the first case...

A 68yo man comes by ambulance to A&E. Wife called ambulance as concerned that husband very unwell and breathless.

*Has known COPD (states similar to previous exacerbation)*

Ex: widespread polyphonic wheeze

Obs: BP 125/85 HR 120 RR 29 Sats 78%

Management: NRM 15L/min O<sub>2</sub>

... then do Arterial Blood Gas



# The ABG of our first unwell case...

What is your management of the 68yo man with acute exacerbation of his known COPD, following this ABG.

What does this ABG show?

pH	7.20
PaCO <sub>2</sub>	10.9 KPa
PaO <sub>2</sub>	7.6KPa
HCO <sub>3</sub>	30mmol/l
BE	3.0

(on 15L/min)

(7.35 – 7.45)

(4.7 – 6.0kPa)

(>10 kPa)

(22-26)

(+/- 2)



5 step approach

- Step 1 HOW IS THE PATIENT?
- Step 2 Assess Oxygenation
- Step 3 pH- acidosis vs alkalosis
- Step 4 Respiratory component
- Step 5 Metabolic component

*Type 2 respiratory failure*  
*Acidosis- Respiratory*  
*Compensating- Metabolic*

# Alert Card

**OXYGEN ALERT CARD**

Name: \_\_\_\_\_

I am at risk of type II respiratory failure with a raised CO<sub>2</sub> level.

Please use my \_\_\_\_% Venturi mask to achieve an oxygen saturation of \_\_\_\_% to \_\_\_\_% during exacerbations.

Use compressed air to drive nebulizers (with nasal oxygen at 2 L/min).

If compressed air not available, limit oxygen-driven nebulizers to 6 minutes.

# Non-Invasive Ventilation



Avoids intubation.  
Can easily apply/remove.

## Indications

- Acute Type 1 or Type 2 RF
- Chronic T2 RF/ Sleep Apnoea
- Uncontrolled acidosis or hypercapnia

## Contraindications

- Patient declines- is v.uncomfortable
- Patient very confused
- High Aspiration Risk
- Facial Trauma

Should show ABG or clinical improvement within 2 hours



# Non-Invasive Positive Pressure Ventilation



## **CPAP**

Continuous Positive Airway  
pressure ventilation

## **BiPAP**

Bilevel Positive Airway  
Pressure ventilation device

*Both deliver oxygen above  
estimated Peak End  
Expiratory Pressure (PEEP)*

# CPAP or BiPAP?

You are FY1 on August 5<sup>th</sup> 2015

Nurse calls...

“68yo COPD patient becoming unwell and now very short of breath. What would you like to do doctor, CPAP or BiPAP?”

What would you do??



# Management

- ABCDE
- Give high flow O2
- See the notes / involve the patient
- Hx / Ex / Ix
- Basic investigations – ? CXR, ABGs, ECG, Bloods
- Institute initial management
- Get Help!





# NIV

## CPAP

Oxygenation

Type 1 RF

e.g. LVF/CCF

Chest wall trauma

Continuous pressures

“Breathing into wind tunnel”

## BiPAP

Ventilation

Type 2 RF

e.g. COPD with Acidosis

Decompensated OSA

IPAP/EPAP pressures

“Senses inspiration”

Pushes O<sub>2</sub> in and CO<sub>2</sub> out



# Cases

1. A 23yo Asthmatic with an acute asthma attack who has O<sub>2</sub> sats of 93% on room air. *What is your management?*

2. A previously fit and well 61yo man who is immediately post hemi-colectomy, no specific complaints.

Sats 98%, HR 90, BP 120/80, RR 14

*Would you continue oxygen?*

*Other considerations?*

3. 17yo asthmatic Type 2 respiratory failure

*What is your management?*



1. A 23yo Asthmatic with an acute asthma attack who has O<sub>2</sub> sats of 93% on room air. ***What is your management?***

O<sub>2</sub> via simple face mask or nasal cannulae

Nebulised salbutamol

Oral steroids

Monitor clinical response and PEFR

Treat any underlying exacerbating factors

2. A previously fit and well 61yo man who is immediately post hemi-colectomy, no specific complaints.

Sats 98%, HR 90, BP 120/80, RR 14

***Would you continue oxygen?*** ?Nasal Specs, 2-4L/min

***Other considerations?***

Fluid balance, NBM/IV Fluids; regular obs. Analgesia/Anti-emetics.

3. 17yo asthmatic Type 2 respiratory failure.

***What is your management?***

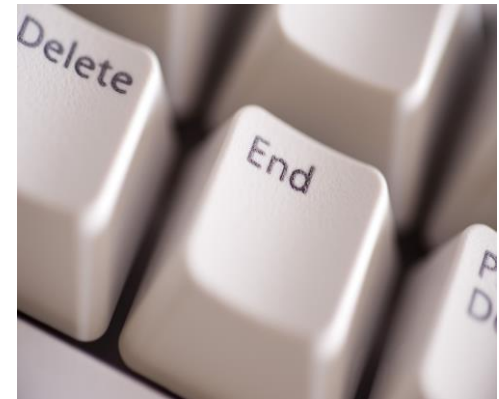
SENIOR HELP/ITU. High flow oxygen. Back to Back nebulisers.

Monitor all vital signs. Examine patient for possible reversible causes



# Take home messages

- Hypoxia Kills
- Work to target saturations
- If unwell → high flow oxygen / involve senior early
- Non invasive ventilation – know the differences



*Questions??*

