

# **CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

## **Treatment Opportunities in a Heartsink Disease**


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A photograph of a middle-aged man wearing a tan cap, glasses, a light-colored striped shirt, and a brown jacket. He is holding a white inhaler to his mouth and appears to be using it. The background is dark and textured, possibly a wooden wall. The overall tone is serious and informative.

# THE OTHER LUNG DISEASE

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Health  
Sciences



**340,000**

**Americans with lung cancer**

**13 million**

**Americans with COPD**

Source: American Lung Association, 2000 figures

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# COPD – Treatment Opportunities

## Target of treatment

- To improve quality of life
- To improve lung function
- To prevent deterioration
- To prevent exacerbations
- To reduce shortness of breath
- To decrease mortality

# COPD – Treatment Opportunities

## Causative elements

- Oxidative stress associated with neutrophil infiltration
- Elastin breakdown
- Narrowing of small airways – inflammation and scarring
- Increase in goblet cell size and number.

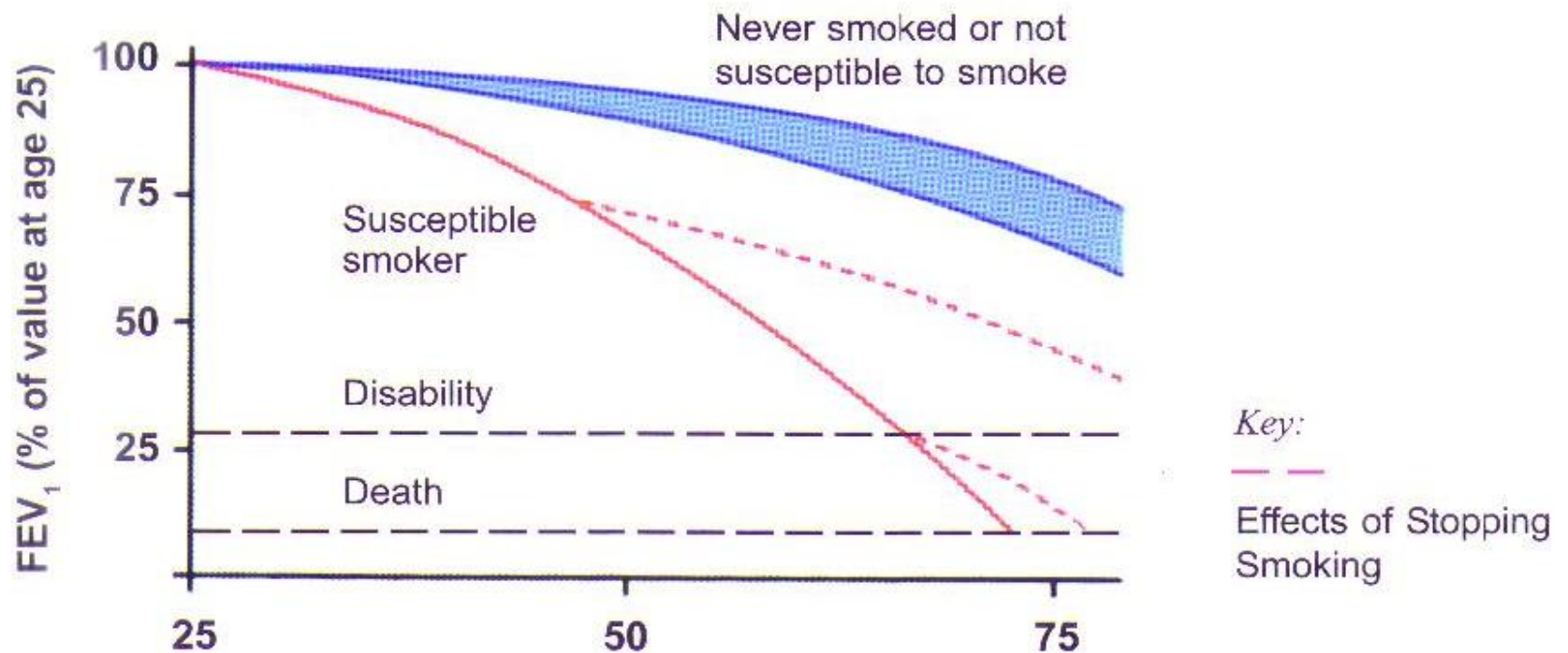
# COPD – Treatment Opportunities

The common denominator is cigarette smoke.

# COPD

## Natural History<sup>2</sup>

Illustration of effects of smoking on rate of decline in FEV<sub>1</sub>



# COPD – Treatment Opportunities

## Other Causes

- Burning of biomass fuels
- Industrial pollution
- Mining – coal, silica etc
- Car exhaust pollution.

# AIR POLLUTION



Air pollution resulting from the burning of wood and other biomass fuels is estimated to kill two million women and children each year.

# COPD – Treatment Opportunities

## Opportunity # 1

- Smoking cessation
- Adequate ventilation if exposed to biomass burning – Cooking.
- Avoidance of exposure to industrial pollution etc
- Adequate breathing protection.

# COPD – Treatment Opportunities

## Opportunity # 1

- Influenza Vaccination
- Pneumococcal Vaccination.

# COPD – Treatment Opportunities

COPD - a chronic inflammatory disease – large numbers of

- neutrophils,
- macrophages,
- CD8 T lymphocytes

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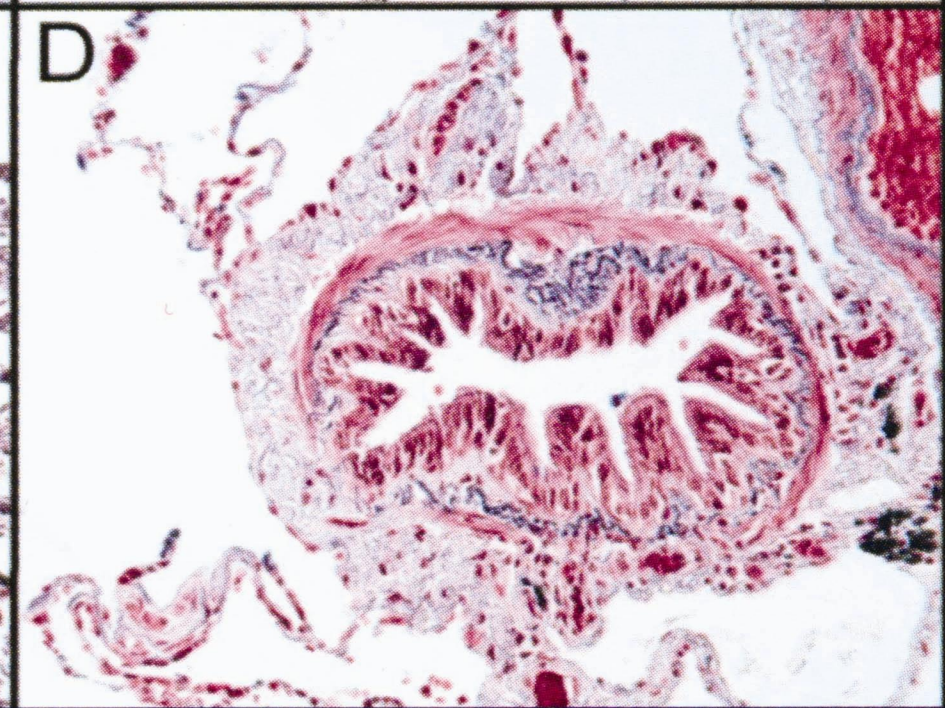
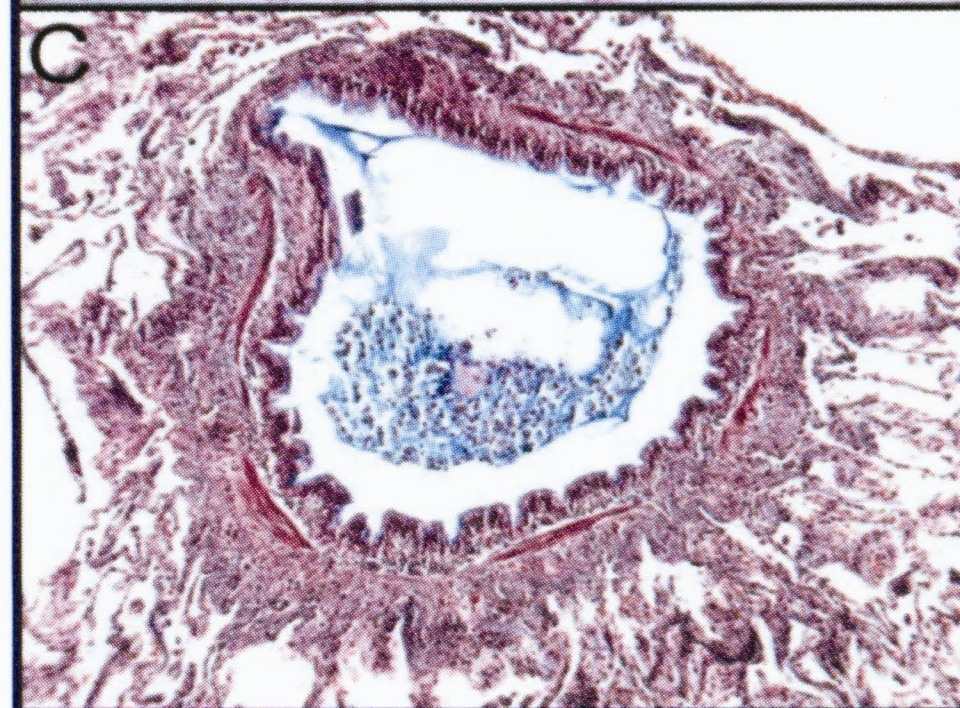
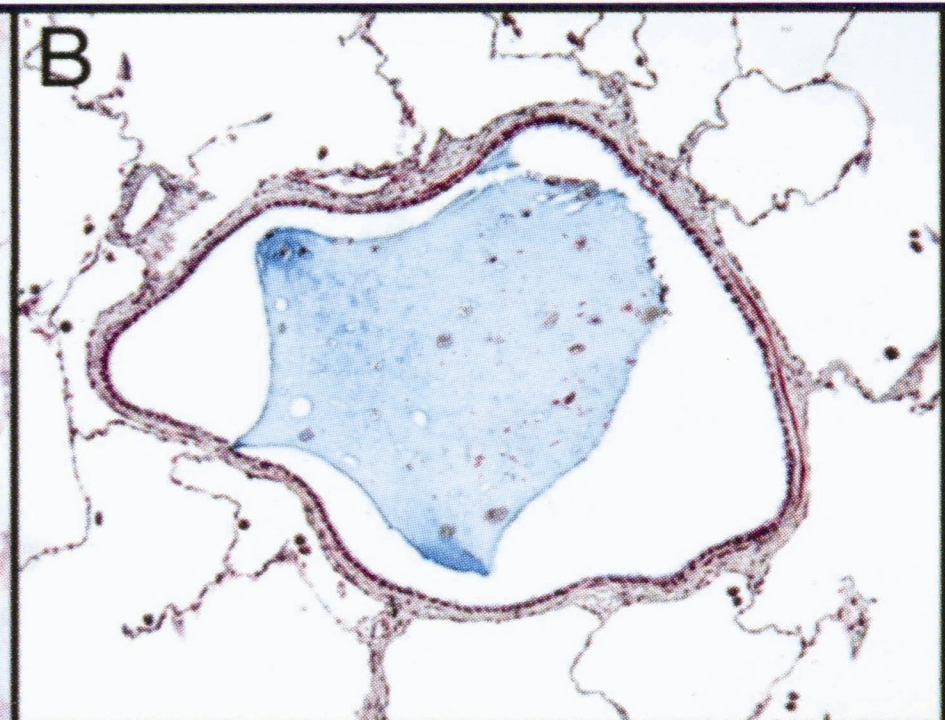
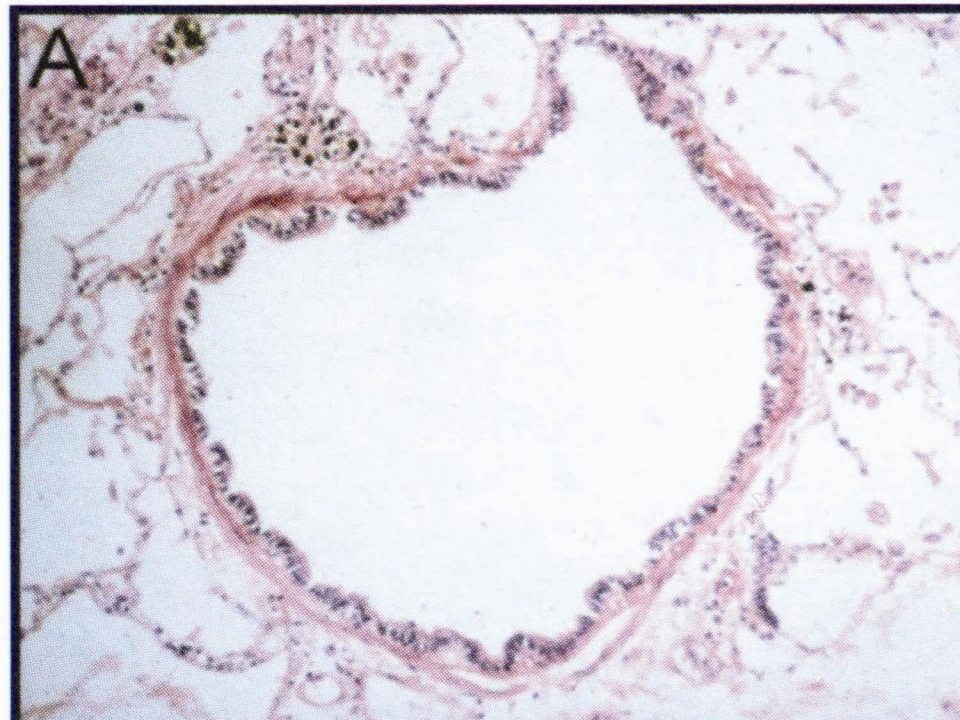


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# COPD – Treatment Opportunities

Inflammation leads to

- Fibrosis
- Small airway narrowing
- Decrease in FEV1.



# COPD – Treatment Opportunities

## Difficulties

- Diagnosis
- Progression - outcome



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# COPD – Treatment Opportunities

## Diagnosis

- Symptoms
- Spirometry

Progression of symptoms with increase in airway wall thickness, decrease in surface area, resulting in decrease in FEV1.

# COPD Diagnosis

<u>HISTORY</u>	<u>COPD</u>	<u>ASTHMA</u>
Smoker or ex smoker	Nearly always	Variable
"Chesty Childhood"	Infrequent	Often
Chronic Cough and Sputum	Common	Infrequent
Breathlessness	Gradual and Progressive	Intermittent

# COPD Diagnosis

<u>INVESTIGATION</u>	<u>COPD</u>	<u>ASTHMA</u>
FEV1	Always Reduced	Variable
Daily Variations in PEFr	Minimal	"Morning dip + day to day
Objective Response to SABA	Nil / Partial	Partial / Complete
Objective Response to Corticosteroid Trial	Partial Response in 10 - 20%	Good Response in Majority

# COPD – Treatment Opportunities

## Outcome

- Impossible to predict progression or outcome of disease in patient with Gold stage 0.

# COPD – Treatment Opportunities

## Comorbidities

- Co - morbities increase with progression of the disease – decreased lung function, reduced exercise tolerance, muscle catabolism

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# COPD – Treatment Opportunities

## Opportunity # 2

### Bronchodilatation

The cornerstone of treatment



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# COPD – Treatment Opportunities

## Bronchodilator choice

- Short acting beta agonist
- Long Acting beta agonist
- Anticholinergic – long or short acting
- Combination
- Theophylline

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# COPD – Treatment Opportunities

## Bronchodilator Choice Consider

- Price
- Effectiveness including side effects
- Individual Properties.

# COPD – Treatment Opportunities

## Treatment of Inflammation

- Inflammatory basis of asthma known since the time of Osler (1900)
- Emphasis of treatment for 70 years was bronchodilatation
- Inflammation not targeted till mid 1960's.

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# COPD – Treatment Opportunities

## Inhaled Corticosteroids in COPD

- Ineffective in neutrophil induced inflammation

However

- IHCs in significant COPD have been shown to reduce exacerbation rate.

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# COPD – Treatment Opportunities

## Importance of Exacerbations

- While lung function steadily declines with age, it declines more rapidly in sufferers of COPD.
- With each exacerbation, lung function never quite returns to the previous state

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# COPD – Treatment Opportunities

## Exacerbations

- If exacerbations can be reduced, deterioration in lung function may be reduced.
- This seems to only be relevant in GOLD stage 3 and 4.
- IHC use associated with increased survival

Van Schayck & Reid 2006

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# COPD – Treatment Opportunities

## INHALED CORTICOSTEROIDS – 2008

- There is increasing evidence that IHCs may influence disease outcome in **severe** COPD
- Used in higher doses than in asthma (500µg bd fluticasone or 800µg budesonide)
- Reduce number of exacerbations which can cause progressive deterioration of lung function, but increase incidence of pneumonia.
- Increasing evidence that combination IHC and LABA have symbiotic action and are more effective together than when used separately.

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# COPD – Treatment Opportunities

## Opportunity # 3

- Inhaled corticosteroids in selected patients.

# COPD – Treatment Opportunities

## Opportunity # 4 - Theophylline

- Some patients may benefit
- Now 3<sup>rd</sup> line treatment
- Narrow therapeutic window and potential for toxicity.
- Start low – go slow
- Blood levels after 1 week on increased dose till plateau reached
- Levels should be maintained 40 – 60 microl / L.

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# COPD – Treatment Opportunities

## Opportunity # 5 REHABILITATION

- Exercise training - Walking
- Nutrition
- Education

### GOALS

- Reduce symptoms
- Improve quality of life

# COPD – Treatment Opportunities

## Opportunity # 6

- Oxygen
- Long term oxygen increases survival.  
Goal to  $> PO_2$  to 60mmHg.  
Suitable only for stage 4 disease if  $PaO_2$  is  $<55$ mm Hg.
- Lung reduction Surgery
- Lung transplant.

# COPD – Treatment Opportunities

## Opportunity # 7

### EXACERBATIONS

- Antibiotics for infective episodes
- Regular bronchodilatation
- Glucocorticoids

# COPD – Palliative Care

- A new concept with application to COPD
- The disease is incurable and has a terminal phase
- Concept needs careful planning, a team approach, with team consensus.
- Needs frank, pragmatic, sensitive approach.

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# COPD – Treatment Opportunities

## The Future

- Inhibition of inflammation
  - Phosphodiesterase inhibition. Theophylline is a non targeted PDE inhibitor
  - Leukotriene B4 Inhibitors
  - Chemokine Inhibitors
  - Tumour Necrosis Factor Inhibitors.
  - Interleukin -10 – (A cytokine with anti-inflammatory actions)

# NZPCRG

- A special interest group of primary care physicians and allied health professionals.
- Has international affiliation (over 40 countries belong).
- Medline listed journal available free on line (International Primary Care Respiratory Journal).

If interested, please leave your name and email at the University of Otago Stand. (No prize draw!)