

The Burden of CV Disease in COPD Population and the Unmet Medical Needs

Stephen Rennard

University of Nebraska Medical Center

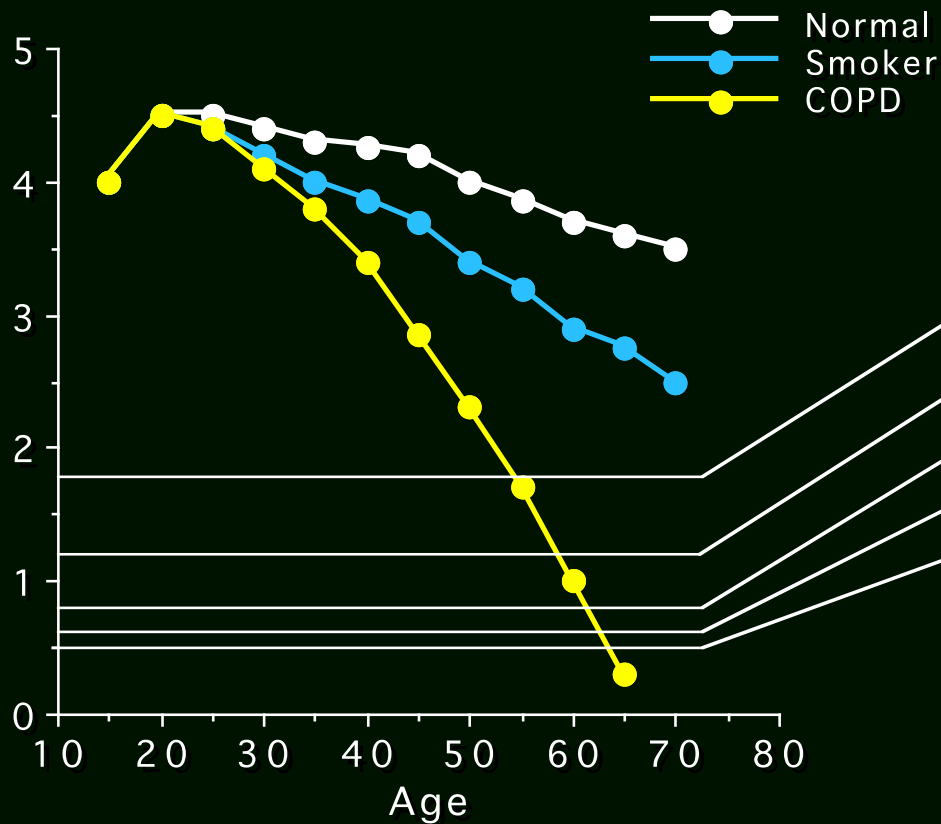
Silver Spring, MD

March 6, 2014

NATURAL HISTORY OF COPD

modified from Fletcher and Peto

FEV-1 (liters)



Dyspnea
Oxygen
Home bound
Bed bound
Death

COPD: Unmet needs

- **Alter natural history of disease**
 - **Slow progression**
 - **Restore lost function**
- **Treat co-morbidities**

Ischaemic heart disease
Congestive heart failure
Hypertension
Arrhythmia



Hypercoagulability
Stroke
Pulmonary embolism
Deep vein thrombosis

Weight loss
Muscle weakness



Diabetes



Osteoporosis



Depression



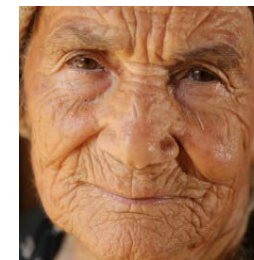
Metabolic
Syndrome



Anemia



Fluid
retention



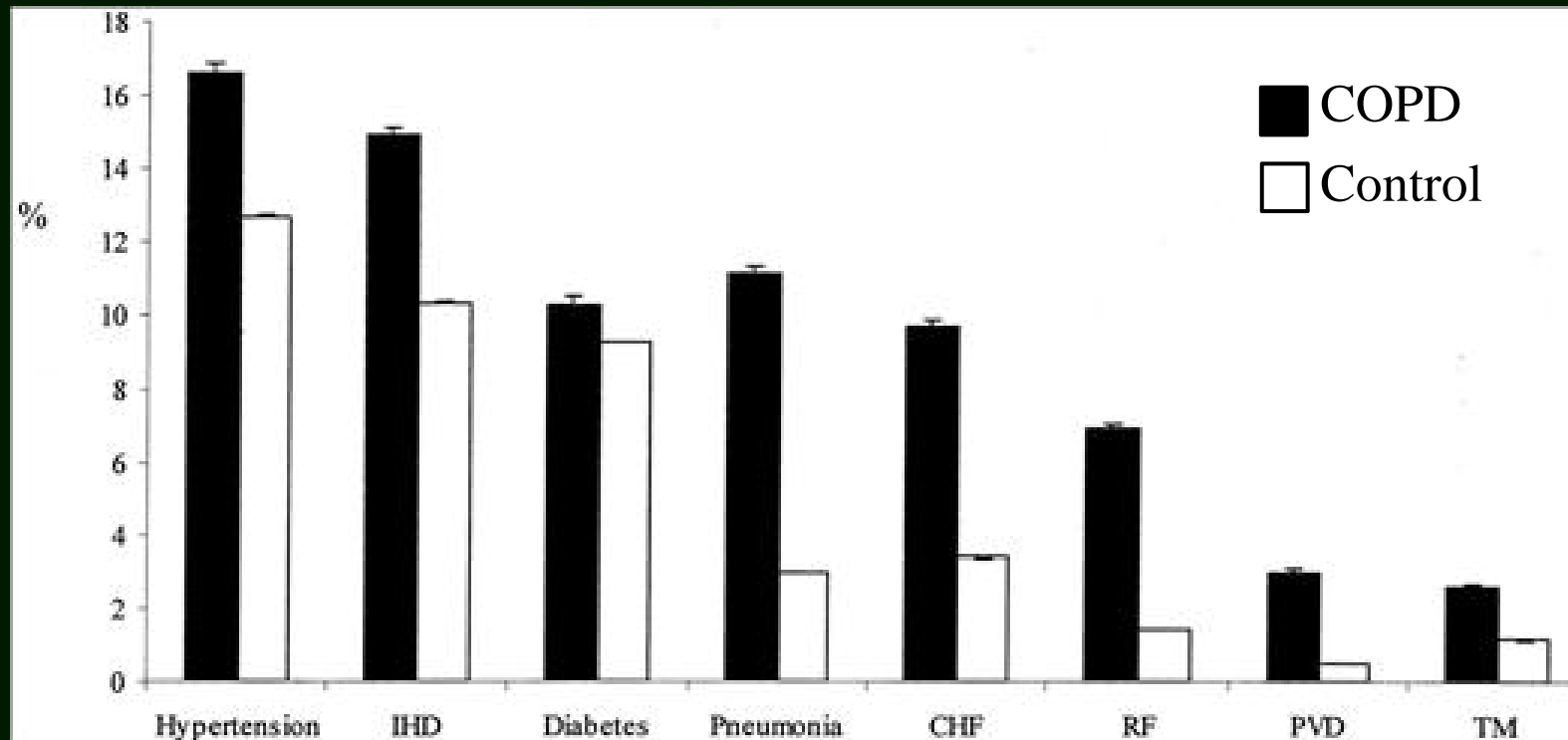
Skin
wrinkling



Prevalence of Co-morbidities in COPD Patients Discharged from Hospital

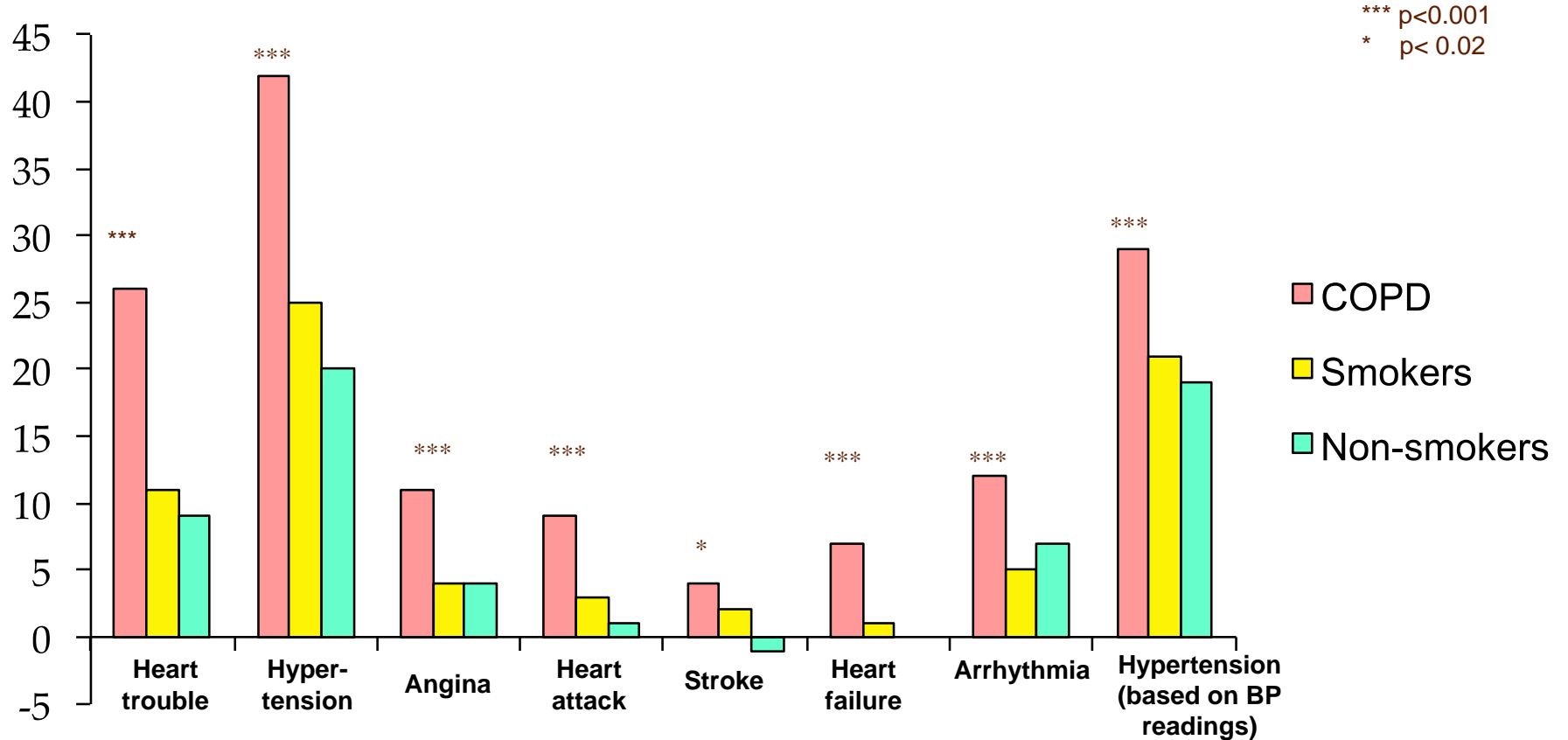
Holguin et al. Chest 128: 2005, 2005

Percentage of Patients

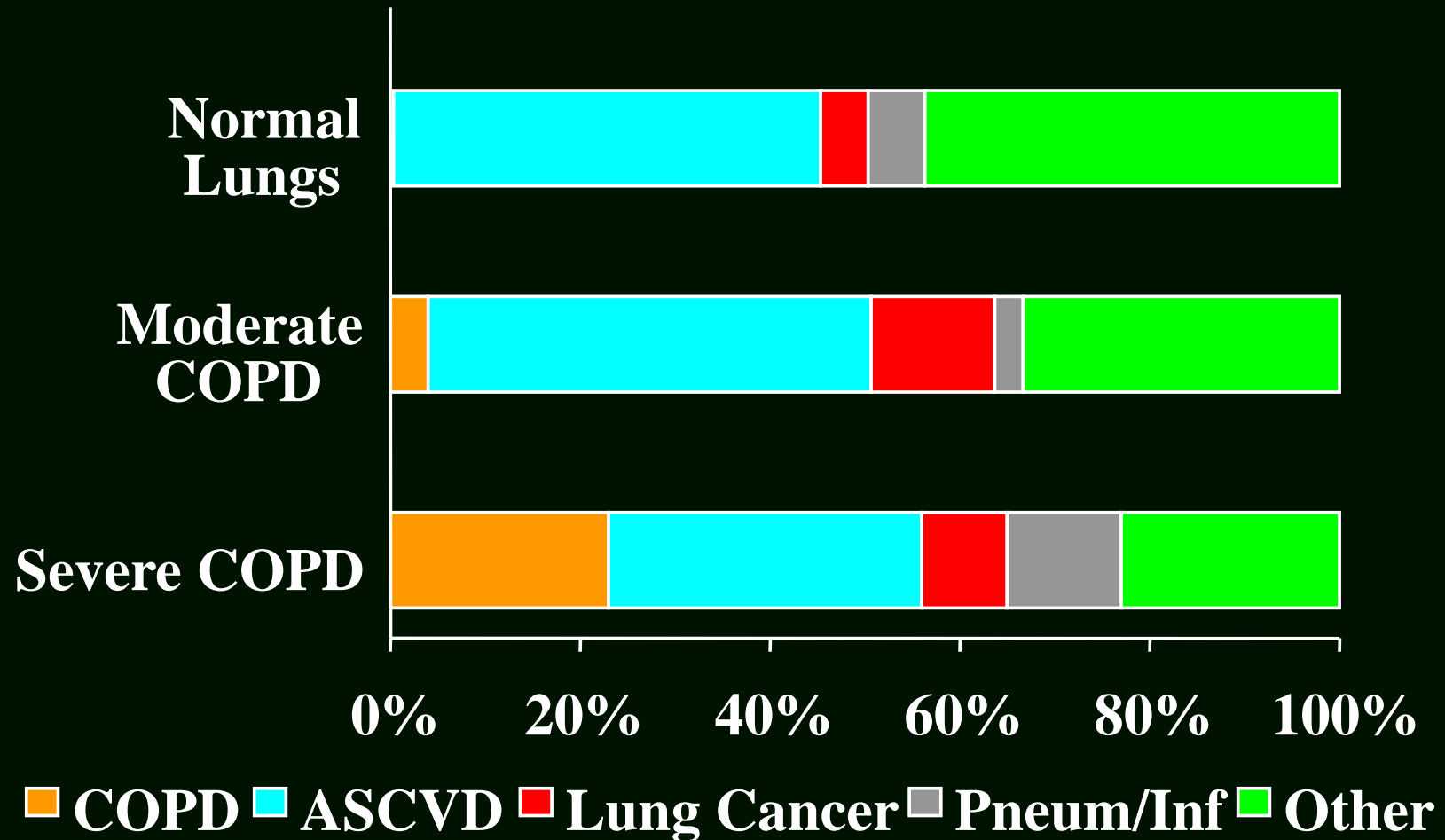


Prevalence of Cardiac Co-morbidities in ECLIPSE

Agusti et al. Resp. Res. 11: 122, 2010



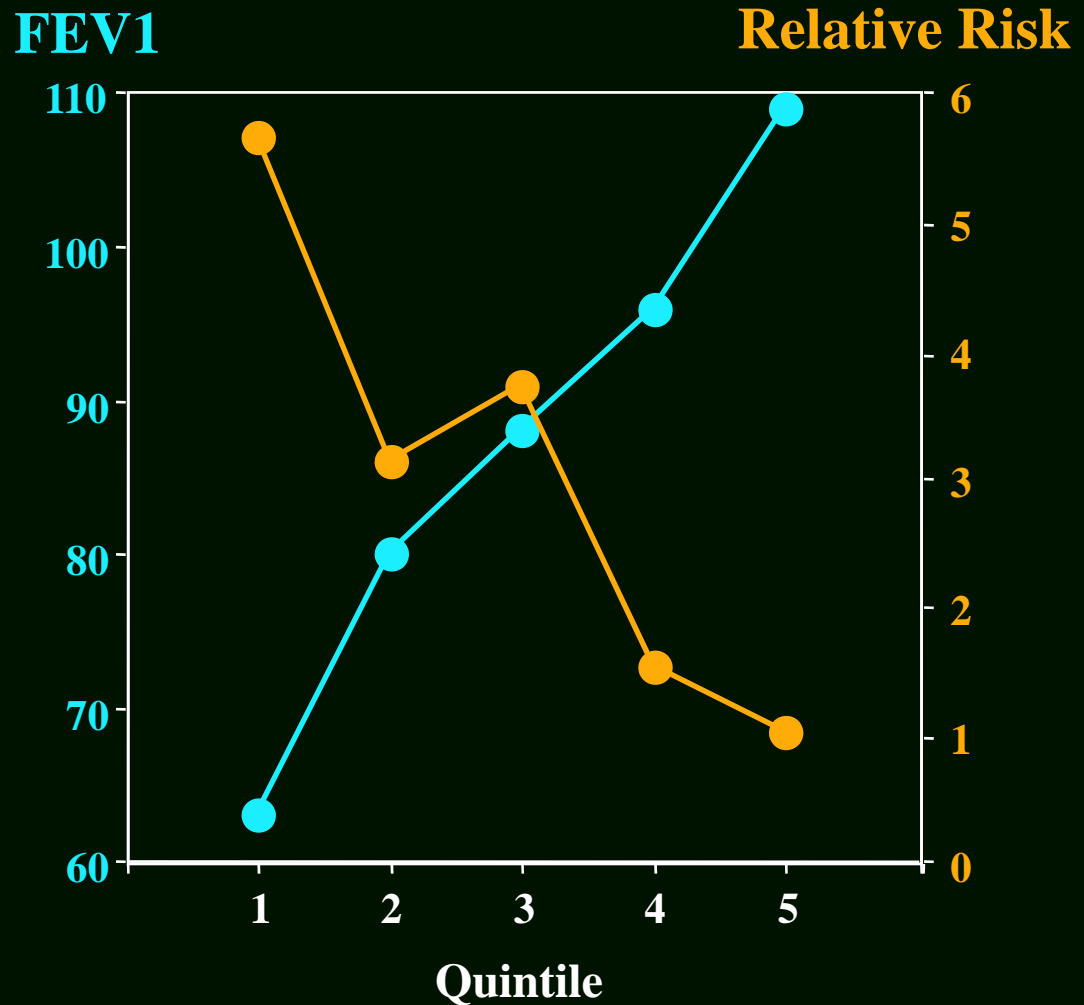
What Do COPD Subjects Die From?



Relationship of FEV1 to Cardiac Risk: *hospitalization or death*

Sin et al. Chest 127: 1952, 2005

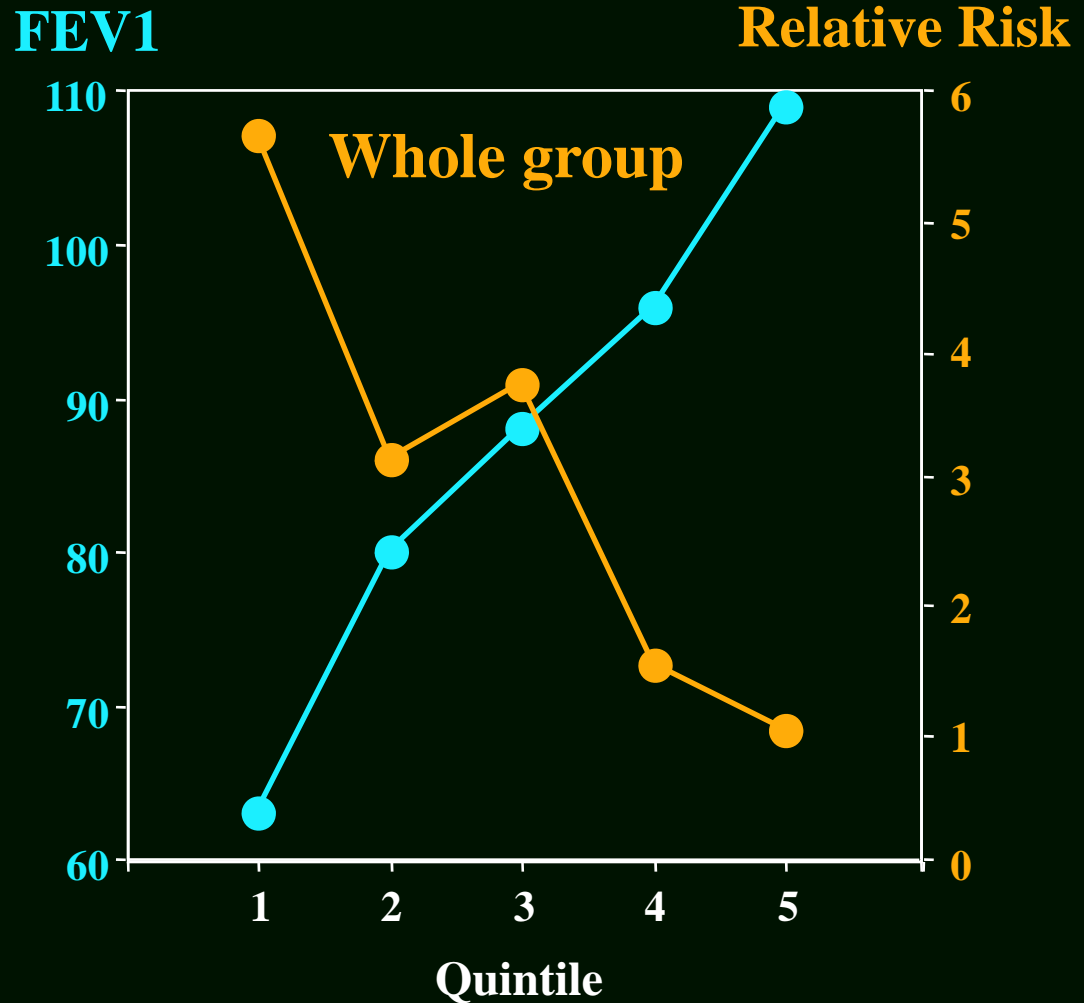
- NHANES follow up dataset
- Age 40-60
- 1861 subjects
- Assess cardiac events
- FEV1



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Sin et al. Chest 127: 1952, 2005

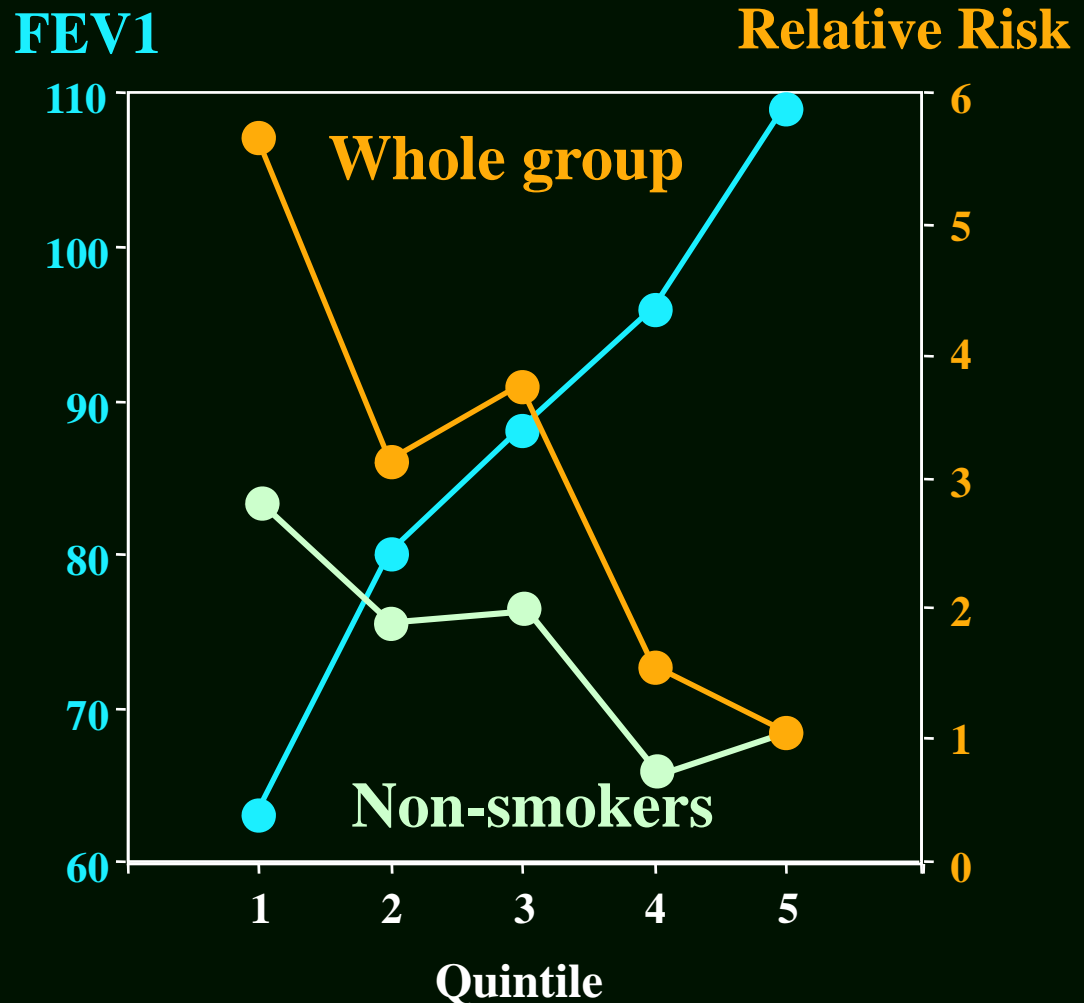
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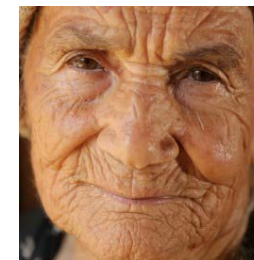
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Mechanism for Lung-driven Cardiac Disease

- **Inflammation**
- **Right ventricle**
 - **Pulmonary hypertension**
 - **Loss of pulmonary vascular bed**
 - **Hypoxic vasoconstriction**
- **Intra-thoracic pressure**

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- **Medications**
 - **β -agonist**
 - **Anti-cholinergic**
 - **Other: azithromycin**

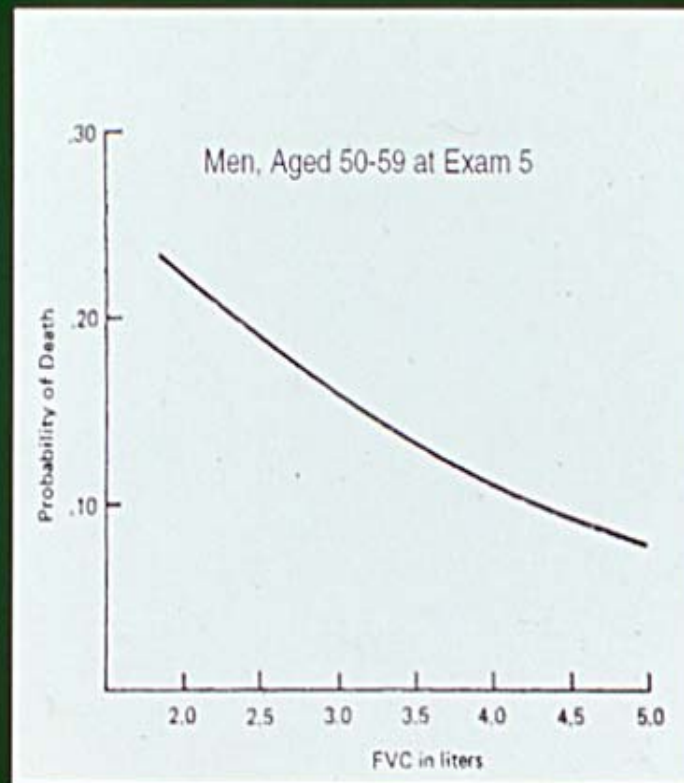
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Population and the Unmet Medical Needs**



RELATIONSHIP BETWEEN LUNG FUNCTION AND MORTALITY

Ashley et al. Ann. Int. Med. 82: 739, 1975

- Framingham study
 - 5209 adults
 - Spirometry
- Mortality recorded over 18 years follow-up



• Significant relationship between lung function and mortality remains when corrected for smoking status

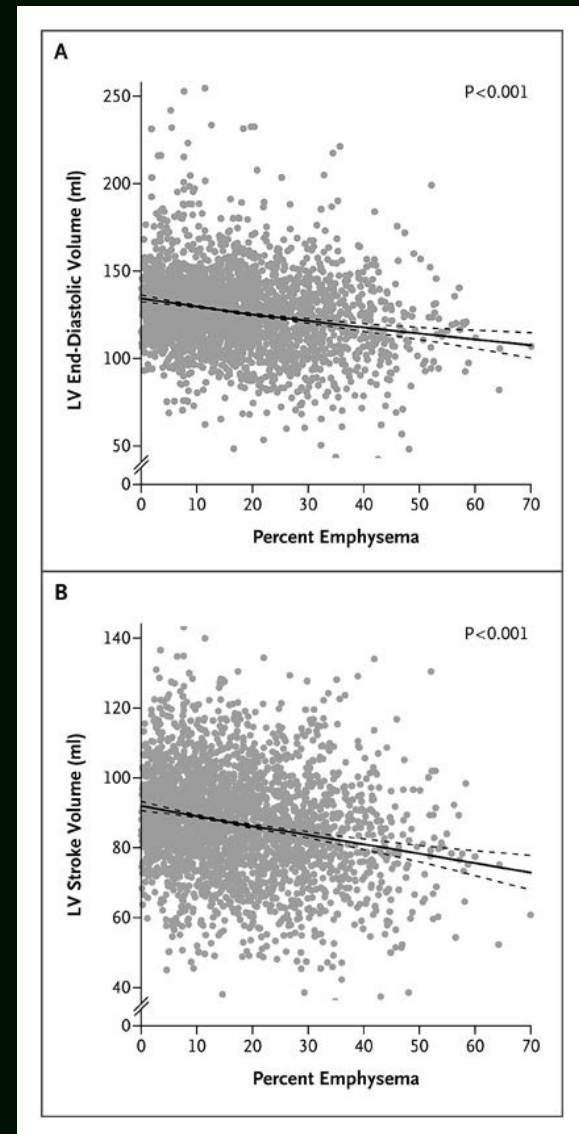
Left Ventricle Volumes and Emphysema

Barr et al. New Engl. J. Med. 362: 217, 2010

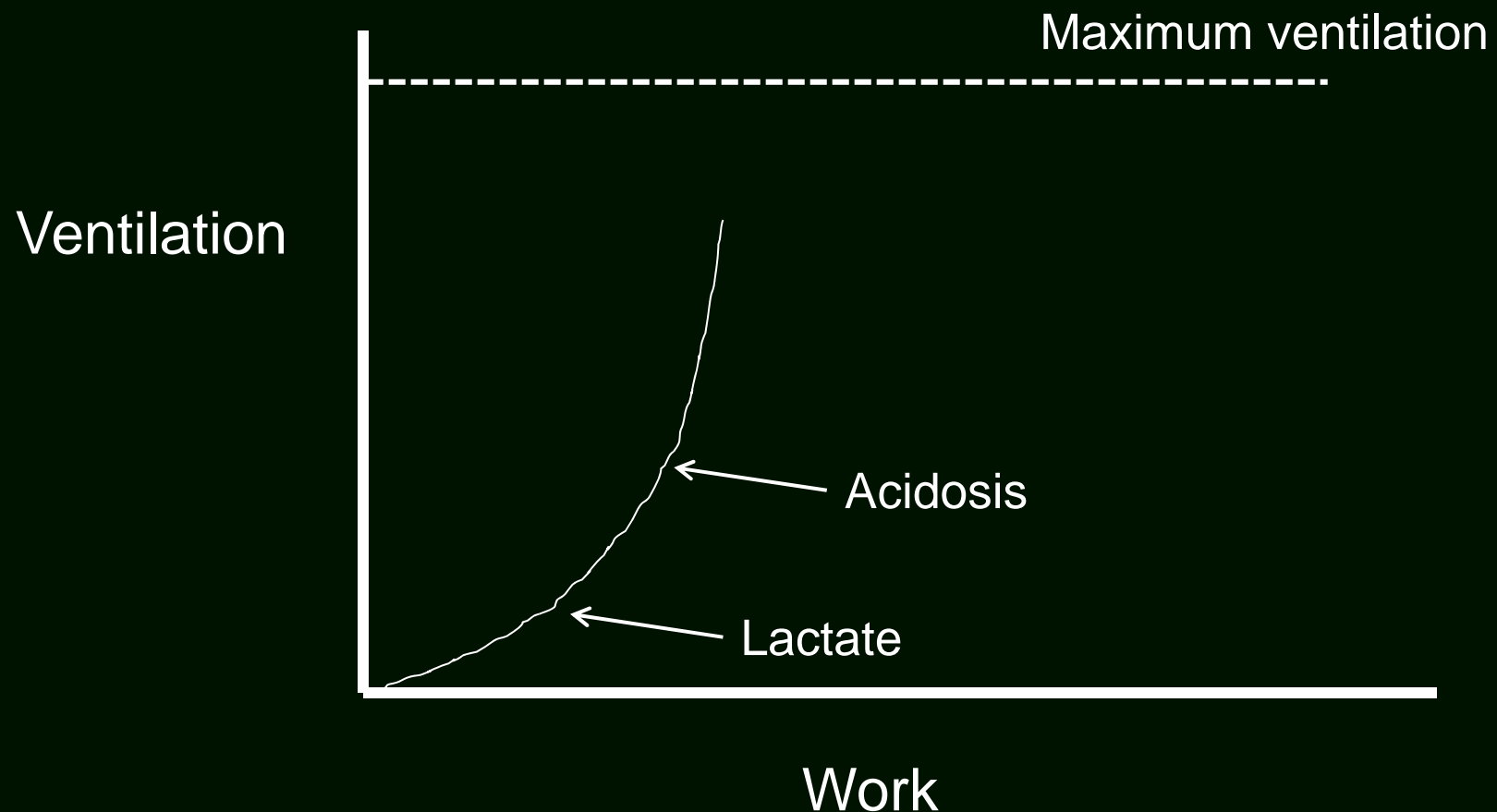
- **MESA study**
 - 2816 subjects
 - 45-84 years old
- **CT scan**
- **Spirometry**
- **MRI for heart volumes**

LV
End diastolic
volume

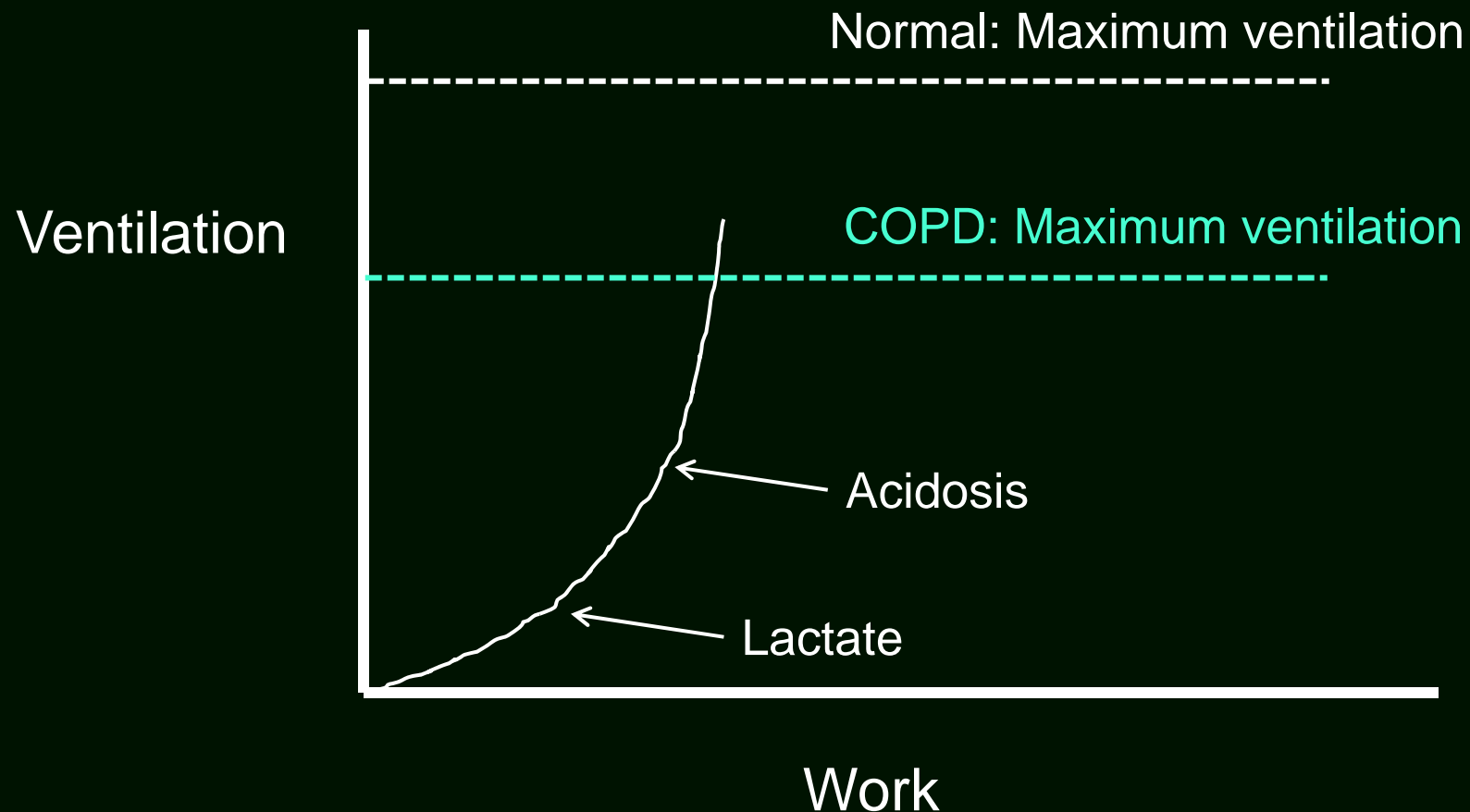
LV
Stroke
volume



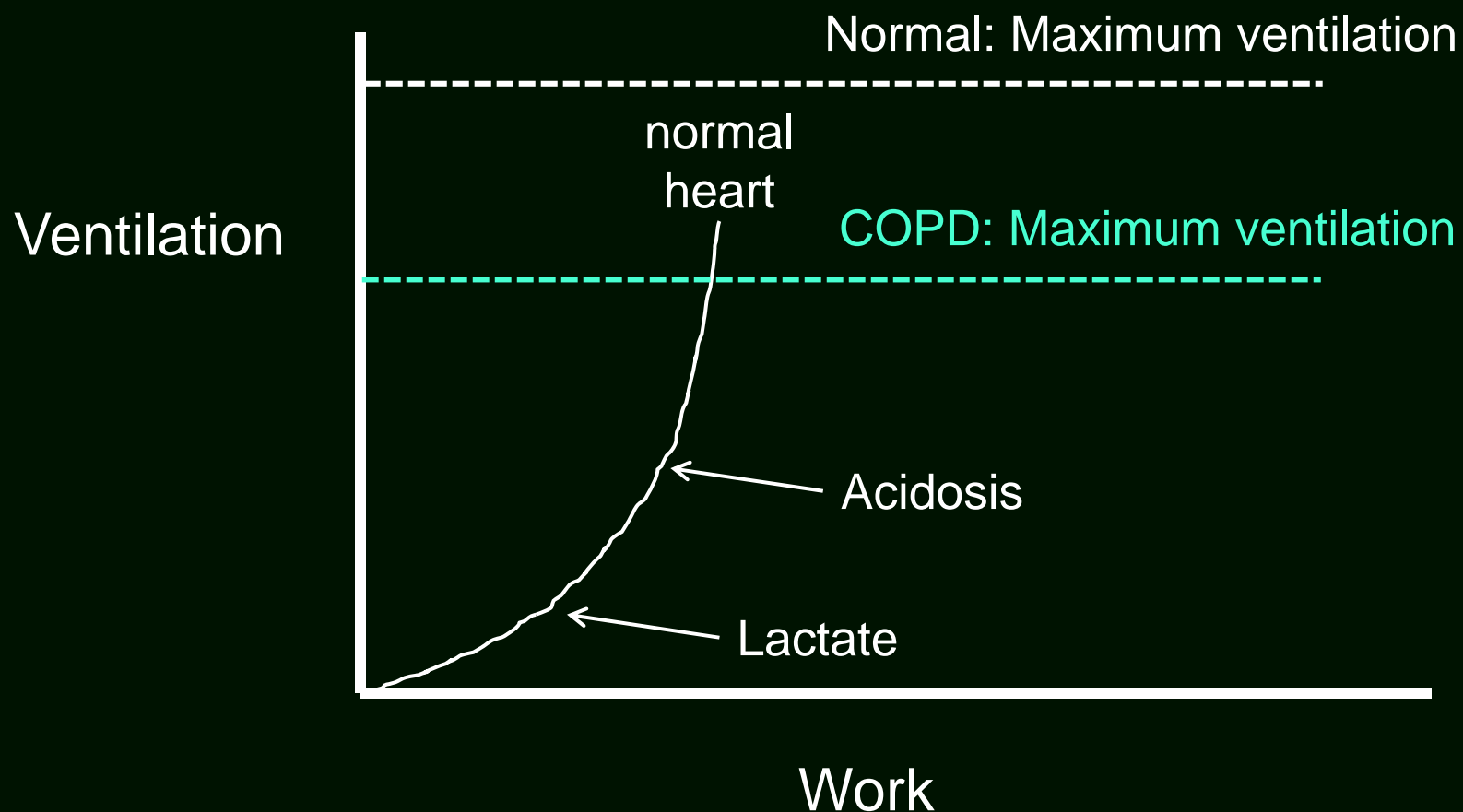
Synergistic Effect of CHF and COPD on Ventilatory Limitation



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