

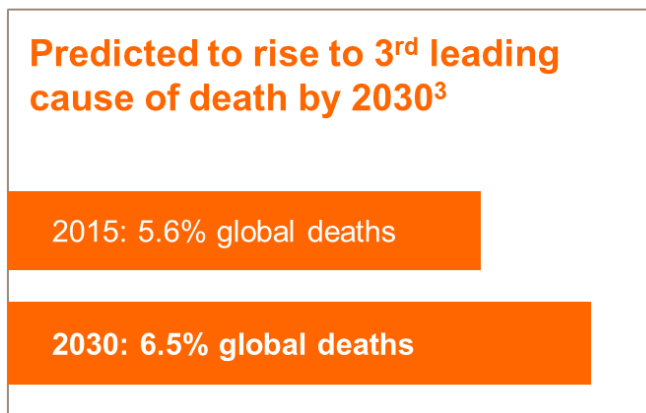
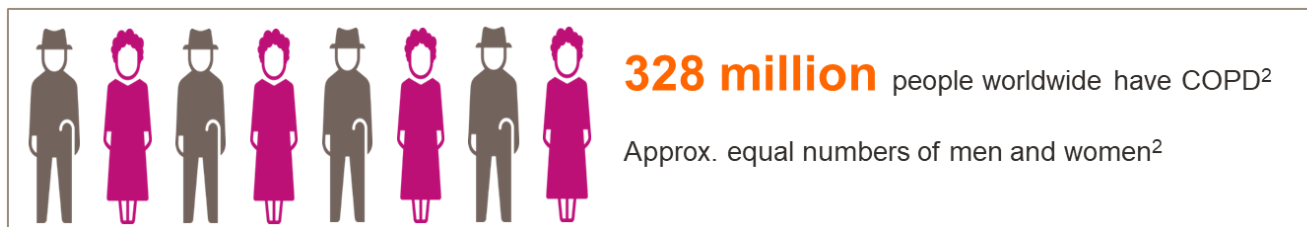


# **Predicting COPD exacerbations using omics data**

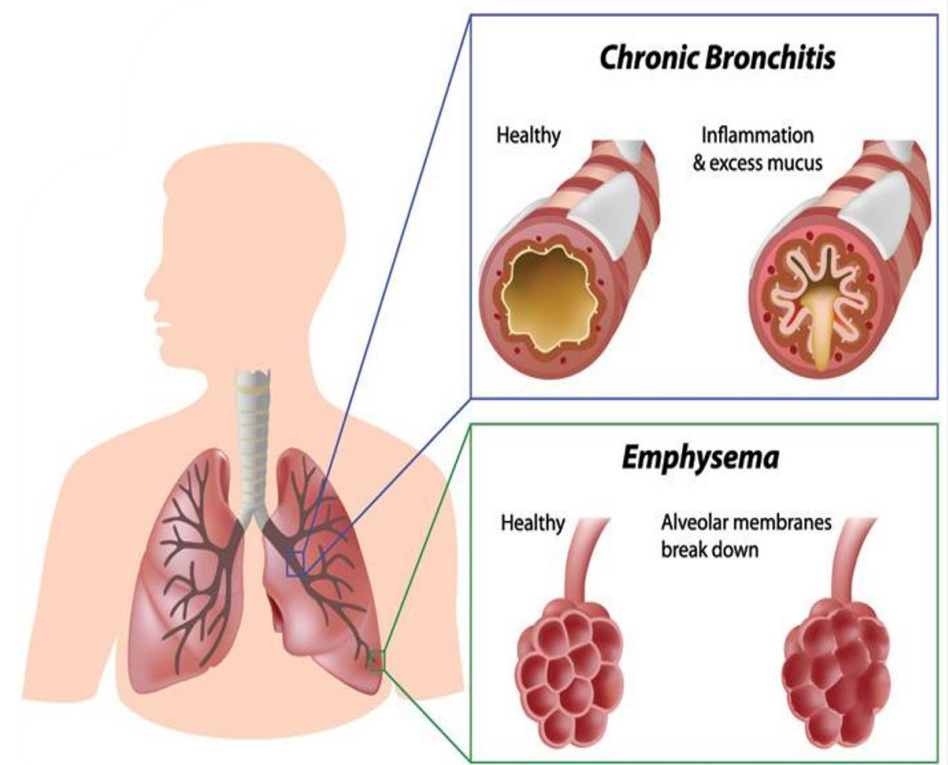
Mohammad Mehrian, Dan Lin, Steven Sijmons and Nathalie Devos

# COPD: Chronic Obstructive Pulmonary Disease

- COPD, a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways.



COPD underdiagnosis is universally high<sup>4</sup>  
Surveys suggests as many as **50%** cases of COPD cases are **undiagnosed**



2015 Global Initiative for Chronic Obstructive Lung Disease



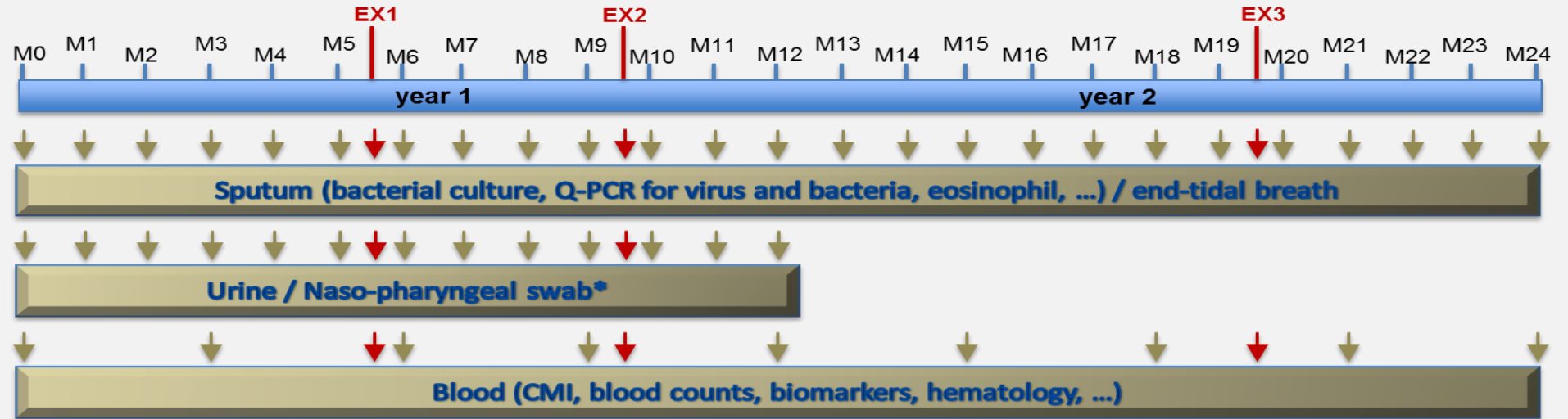
1. GOLD Global Strategy for the Diagnosis, Management and Prevention of COPD 2016. Available from: <http://goldcopd.org/> (Accessed October 2016) López- 2. Campos JL et al. Respirology 2016;21:14–23 3. WHO Projections of mortality and causes of death, 2015 and 2013. Available from: [http://www.who.int/healthinfo/global\\_burden\\_disease/projections/en/](http://www.who.int/healthinfo/global_burden_disease/projections/en/) (accessed October 2016) 4. Lamprecht B et al. Chest 2015;148:971–85

# The AERIS study

## Acute Exacerbation and Respiratory InfectionS

□ A 2-year longitudinal non-interventional study to assess the contribution of bacterial, fungal and viral pathogens to Acute Exacerbations of COPD in adults aged 40 to 85 years of age in Southampton, UK.

□ Design:

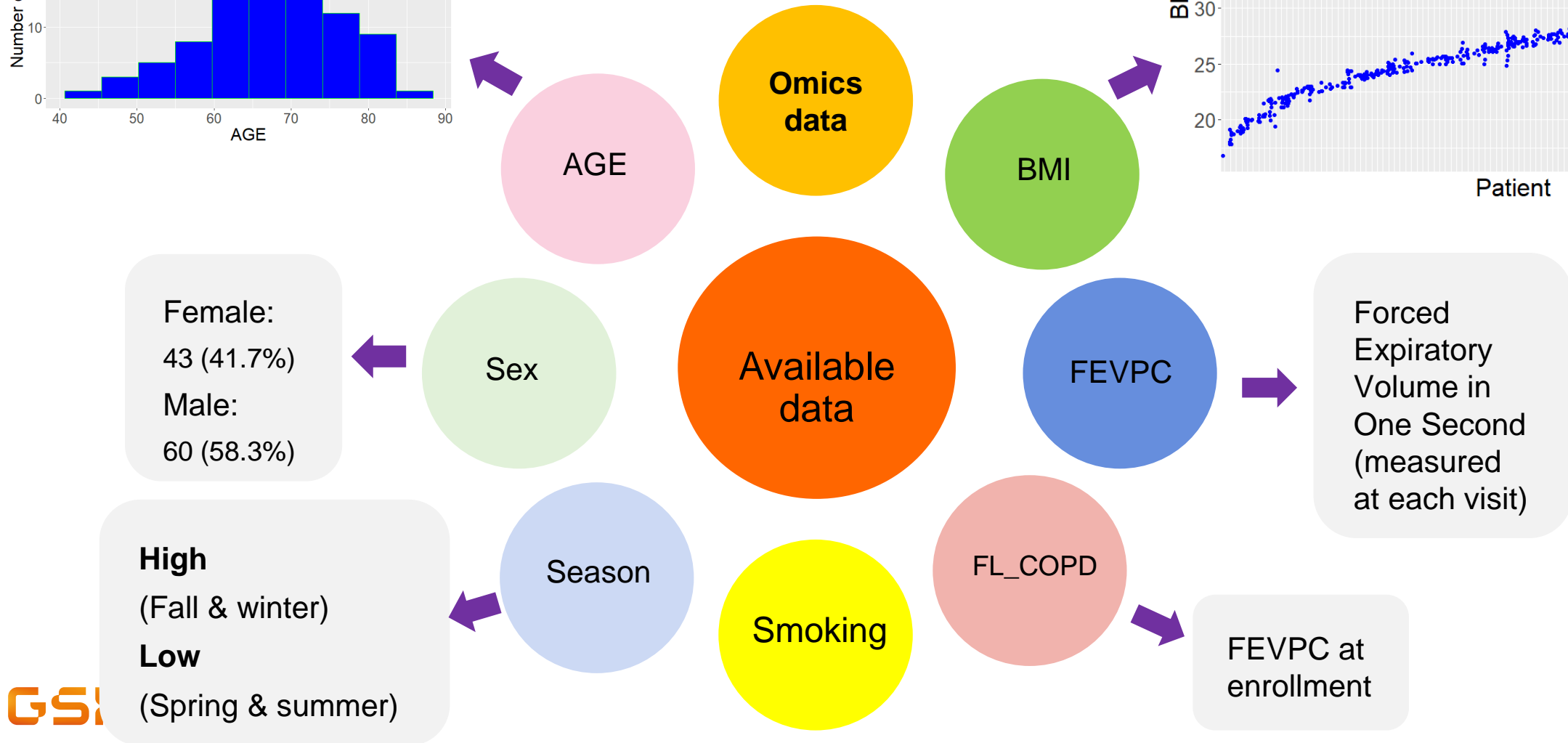
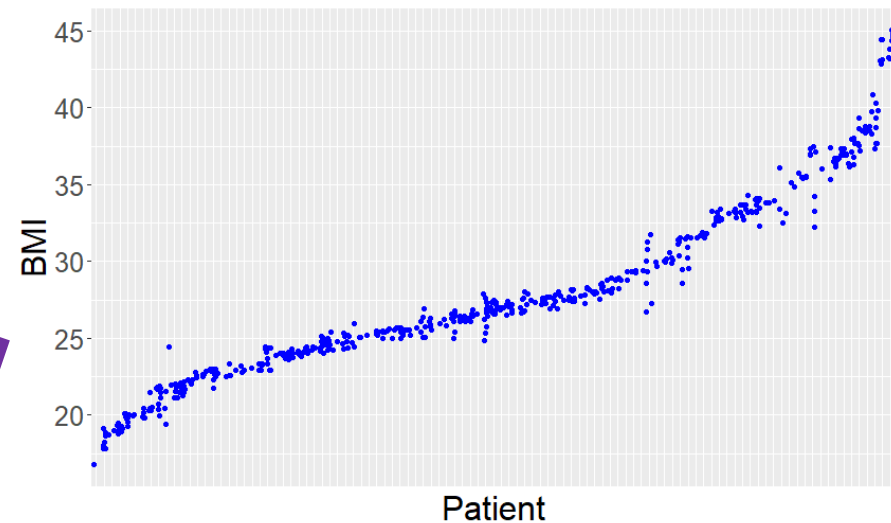
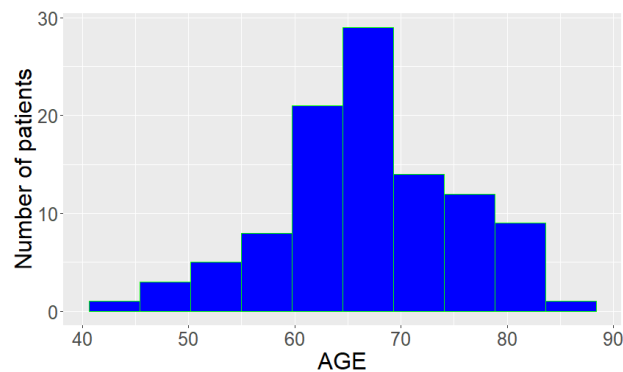


□ Cohort:

- 127 patients.
- Mean age: 67.8 years, most retired.
- Previous history of acute exacerbation(s)

COPD status	Number of samples (%)
Exacerbation	159 (30%)
Stable	370 (70%)

# Patient's demographics + Clinical data + Omics data



# Gradient Boosting Machines (GBMs) results

## □ Goal:

- Predict exacerbation events (Yes/No) using patient's demographics data + omics data

Data	Prediction outcome	Predicted as stable	Predicted as exacerbation
Cross-validation data	Stable	232	49
	Exacerbation	52	105
Test data	Stable	40	10
	Exacerbation	15	26

Data	TPR	TNR	ACC
Cross-validation data	67%	82.5%	77%
Test data	63%	80%	72.5%

