# Evaluation of lung function abnormalities prevalence in poultry workers

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## Introduction:

Poultry workers can be at an increased risk of occupational respiratory diseases, like asthma[1], chronic obstructive pulmonary disease[2] and extrinsic allergic alveolitis[3] . Spirometry screening is fundamental to early diagnosis trough the identification of related ventilatory defects.

## Purpose:

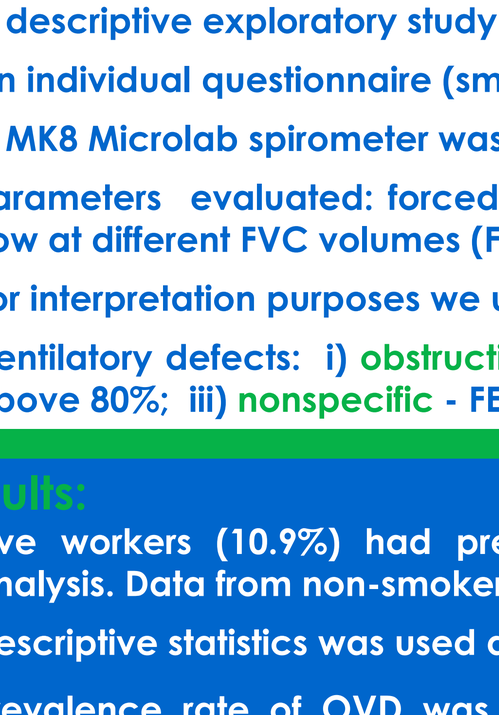
We aimed to assess the prevalence of lung function abnormalities in poultry workers.

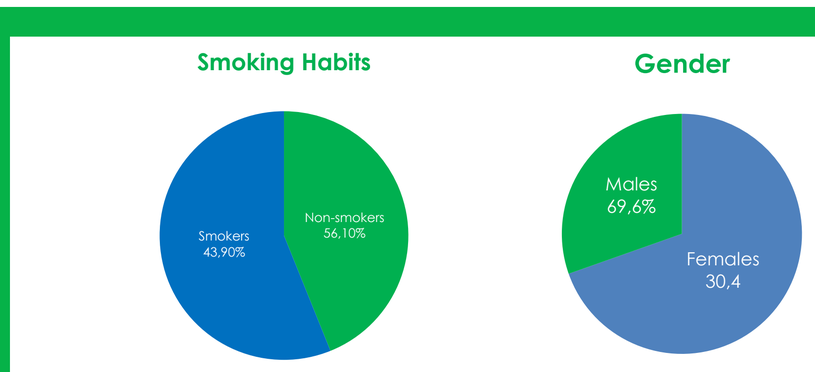
## Material and Methods:

- A descriptive exploratory study was done on seven poultry farms in a total of 46 workers.
- An individual questionnaire (smoking habits; history of lung disease; respiratory symptoms; exposure history) was applied.
- A MK8 Microlab spirometer was used. Spirometry was performed according to ATS/ERS 2005 guidelines[4].
- Parameters evaluated: forced vital capacity (FVC), forced expiratory volume in one second (FEV1), FEV1/FVC% and forced expiratory flow at different FVC volumes (FEF 25, FEF50; FEF75 and FEF25-75).
- For interpretation purposes we used the fixed cut-off of 80% of predicted.
- Ventilatory defects: i) obstructive (OVD) - FEV1/FVC% below 80%; ii) restrictive - FEV1 and FVC below 80% with a FEV1/FVC % equal or above 80%; iii) nonspecific - FEV1, FVC and FEV1/FVC% below 80% or FEF's below 60%.

## Results:

- Five workers (10.9%) had previous lung disease so they were excluded from analysis. Data from non-smokers and smokers were analysed separately.
- Descriptive statistics was used due to the reduced sample size.
- Prevalence rate of OVD was higher in individuals with longer exposure (31.7%) whether they were smokers (17.1%) or non-smokers (14.6%).
- No significant differences were found concerning the duration of exposure, in spirometric parameters, in both smokers or non- smokers.






- Age: 44.5 ± 12.41 years
- Duration of exposure: 18.3 ± 11 years

| | | | Exposure | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <10 | | | | | >=10 | | | | |
| | | | Count | Minimum | Maximum | Mean | Standard Deviation | Count | Minimum | Maximum | Mean | Standard Deviation |
| smoking | yes | % Pr FEF25 | 8 | 80 | 131 | 101 | 15 | 12 | 57 | 148 | 87 | 24 |
| | | % Pr FEF50 | 8 | 56 | 92 | 79 | 11 | 12 | 41 | 102 | 67 | 23 |
| | | % Pr FEF75 | 8 | 26 | 95 | 70 | 22 | 12 | 18 | 87 | 54 | 25 |
| | | % Pr FEF25/75 | 8 | 42 | 87 | 74 | 14 | 12 | 31 | 91 | 64 | 24 |
| | | % Pr FEV1 | 8 | 70 | 109 | 96 | 13 | 12 | 67 | 108 | 93 | 12 |
| | | % Pr FVC | 8 | 65 | 121 | 100 | 19 | 12 | 79 | 118 | 102 | 11 |
| | | Base FEV1/FVC | 8 | 71 | 93 | 82 | 7 | 12 | 62 | 85 | 74 | 8 |
| | | % Pr PEF | 8 | 71 | 123 | 100 | 17 | 12 | 70 | 136 | 103 | 19 |
| | no | % Pr FEF25 | 6 | 82 | 119 | 100 | 15 | 20 | 43 | 131 | 95 | 25 |
| | | % Pr FEF50 | 6 | 58 | 155 | 99 | 33 | 20 | 24 | 149 | 89 | 33 |
| | | % Pr FEF75 | 6 | 55 | 153 | 97 | 44 | 20 | 15 | 140 | 77 | 35 |
| | | % Pr FEF25/75 | 6 | 57 | 147 | 96 | 34 | 20 | 22 | 137 | 82 | 30 |
| | | % Pr FEV1 | 6 | 88 | 132 | 105 | 15 | 20 | 54 | 130 | 100 | 22 |
| | | % Pr FVC | 6 | 87 | 122 | 104 | 12 | 20 | 65 | 141 | 103 | 20 |
| | | Base FEV1/FVC | 6 | 77 | 93 | 85 | 6 | 20 | 58 | 92 | 81 | 9 |
| | | % Pr PEF | 6 | 83 | 130 | 98 | 17 | 20 | 65 | 118 | 98 | 15 |

## Discussion:

- Both smokers and non-smokers with higher exposure showed a higher prevalence rate of obstructive ventilatory defect. This can be related to the presence of several inflammatory agents in poultry houses dust. This finding agrees with other studies [5,6,7] but prevalence cannot be compared because criteria used to identify lung function abnormalities are not entirely stated. Rimac et al founded no ventilatory defects but they used a 70% cut-off for FEV1/FVC[8] instead of the 80% or the 5th percentile proposed by ATS/ERS[4].
- No other lung function abnormalities were found. These results may be related to the small sample size, since restrictive and mixed defects are also described in this type of workers[2, 9]. However, findings should be based on good quality spirometries and the presence of a FEV1% higher than FVC% suggests poor cooperation which may lead to confounding conclusions.
- The healthy worker effect (HWE) may have, also, contributed to the results of this study because we excluded workers that had previous lung diseases. Furthermore, we were not aware of the admission policy of the poultry farms, we only studied the active workers and we did not get data about workers that eventually had left their jobs due to health problems [10, 11] .

## Conclusion:

An obstructive ventilatory defect was found in poultry workers with higher exposure time. In Portugal, further studies concerning influence of occupational exposure to fungi and particles in workers lung function must be developed with larger sample sizes. This will allow not only to better describe this population, but also to raise awareness about the need of regular lung function screening.

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