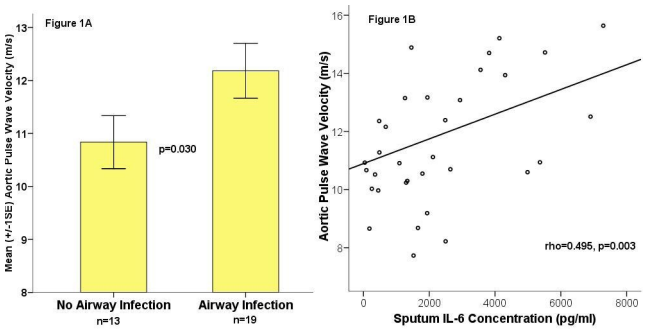
mean±SD age 72.4±8.1 years; FEV1 1.18±0.41L and 46.8±18.0%predicted; FEV1/FVC ratio 0.44±0.15 and BMI 25.4±3.8 kg/m$^2$.

Arterial stiffness was higher in patients with airway infection at exacerbation presentation (mean ±SD aPWV 12.3±2.3 (n=19) vs 10.8±1.8 (n=13) m/s, p=0.030) (Figure 1A).

Arterial stiffness was strongly correlated with sputum IL-6 at exacerbation (n=32, rho=0.495, p=0.003) (Figure 1B) but not IL-8 (n=31, rho=0.100, p=0.591).

**Conclusions** Arterial stiffness is related to airway infection and inflammation during COPD exacerbations. Interventions to prevent and reduce airway infection and inflammation may lower cardiovascular risk during COPD exacerbations.




Abstract S25 Figure 1

## S26 INDIVIDUALISING THE MORTALITY RISK FOR LUNG VOLUME REDUCTION SURGERY

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**Background** Despite the positive results of the NETT trial in favour of lung volume reduction surgery (LVRS) uptake of the technique has been limited largely due to an exaggerated fear of the associated mortality risk. We have analysed our 18 year experience of LVRS to provide a more sophisticated personalised risk profile based on individual patient data.

**Methods** Since 1994 we have performed 250 lung volume reduction procedures on 220 patients: 153M:97F, age 61 (39–74) years. The initially approach was through median sternotomy (20 patients), with the subsequent 230 procedures performed by video-assisted thoracoscopic surgery (VATS), 3 of which required conversion to open thoracotomy. All patients underwent standard physiological and anatomical selection techniques with 51 (20%) falling outside recognised safety limits (FEV1 or DLCO <20% predicted). All patients were offered surgery after discussion in our LVRS MDT panel and counselled on risk on their basis of their physiological status. We analysed data collected prospectively using logistic regression to identify the factors predicting early postoperative mortality.

**Results** Open surgery significantly increased the risk of 30 day mortality 22% vs VATS 3.6% (p=0.005). Bilateral vs unilateral VATS had no influence. At 30 days mortality was associated with low BMI, DLCO and KCO At 90 days, mortality was also associated with FEV1 and RV:TLC DLCO was the only significant independent predictor of 30 day (OR 0.88, CI 0.80–0.97) and 90 day (OR 0.92, CI 0.88–0.98) mortality after VATS (table 1).

The causes of death after 30 days in the VATS group were mainly due to pneumonia (5 cases) with cardiac complications (2); tension pneumothorax (1) and fatal pulmonary haemorrhage (1) in the remainder.

**Conclusion** LVRS is primarily a procedure to improve health status so accurately informed consent is imperative. Careful consideration of preoperative physiological characteristics and operative technique allows estimation of an individualised mortality risk for LVRS which may be lower than the commonly perceived overall figure.

Abstract S26 Table 1

| DLCO (%pred) | 30 day mortality VATS | 90 day mortality VATS |
|---|---|---|
| <20%pred (n=19) | 16% | 32% |
| 20–40%pred (n=102) | 5% | 11% |
| 40–60%pred (n=76) | 0% | 0% |
| >60%pred (n=16) | 0% | 6% |

## S27 CARDIOVASCULAR EVENTS FOLLOWING CLARITHROMYCIN USE IN LOWER RESPIRATORY TRACT INFECTIONS: ANALYSIS OF TWO PROSPECTIVE COHORT STUDIES

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**Background** Previous studies have suggested that use of macrolide antibiotics may increase cardiovascular risk.

**Objective** To study the effects of clarithromycin on cardiovascular events in the setting of acute exacerbations of chronic obstructive pulmonary disease (AECOPD) and community acquired pneumonia (CAP).

**Design** Cohort study of two prospectively collected datasets; a multicentre observational study of patients hospitalised with AECOPD and the Edinburgh pneumonia study cohort.

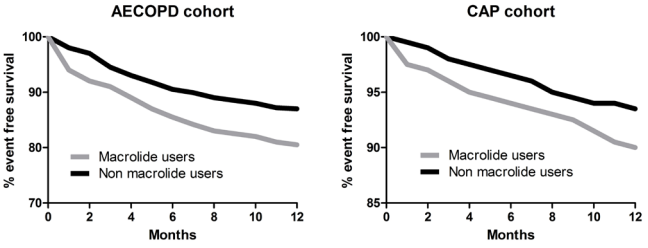
**Setting** COPD dataset includes patients admitted to one of 12 hospitals around the United Kingdom between 2009–2011. The Edinburgh pneumonia study cohort includes patients admitted to NHS Lothian Hospitals between 2005–2009.

**Main outcome measures** Hazard ratios (HR) for cardiovascular events at 1 year (defined as hospitalised with acute coronary syndrome (ACS), decompensated cardiac failure, serious arrhythmia or sudden cardiac death) and hospitalisation for acute coronary syndrome (acute ST elevation myocardial infarction, non-ST elevation MI and unstable angina). Secondary outcomes were all cause and cardiovascular mortality at 1 year. Cox proportional hazard regression was used to calculate hazard ratio's and 95% confidence intervals after adjusting for significant covariates.

**Results** There were 1323 and 1631 patients in the AECOPD and CAP cohorts with 268 and 171 cardiovascular events respectively over 1 year. Macrolide use in AECOPD was associated with increased risk of cardiovascular events HR 1.60 (1.17–2.20) and ACS HR 1.88 (1.16–3.01). Macrolide use in CAP was associated with increased risk of cardiovascular events HR 1.81 (1.28–2.55) and ACS HR 1.90 (1.07–3.33). There was a significant association between macrolide use and cardiovascular but not all cause mortality in AECOPD HR 1.67 (1.11–2.51) and 1.24 (0.96–1.61). Macrolide use in CAP was associated with a trend towards increased risk of all cause and cardiovascular mortality HR 1.13 (0.85–1.51) and 1.57 (0.84–2.82). These relationships persisted after propensity matching. Statins and other cardiac drugs attenuated this increased risk. Longer durations of macrolide use were associated with more cardiovascular

events. The effect of macrolides was most evident in patients with pre-existing cardiovascular disease or at high risk of cardiovascular disease according to the QRISK2 score.

**Conclusions** The use of clarithromycin in the setting of AECOPD or CAP is associated with increased cardiovascular events.




Abstract S27 Figure 1

## S28 INCREASED INCIDENCE OF COPD EXACERBATIONS FOLLOWING INFLUENZA VACCINATION

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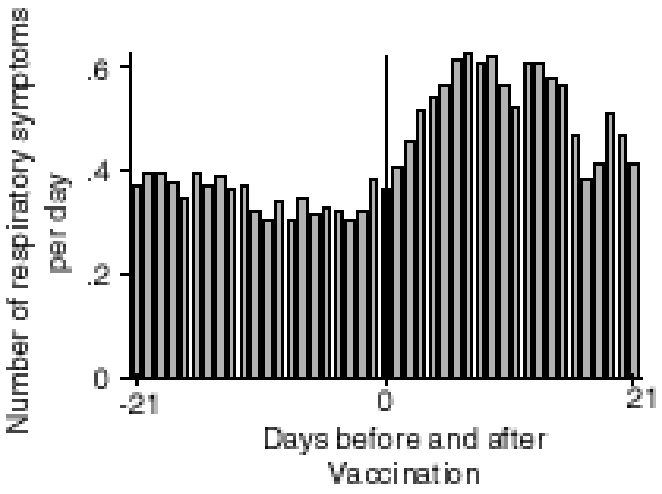
**Introduction** Influenza vaccination prevents substantial morbidity, and mortality, and the spread of infection, but patients still sometimes refuse vaccinations due to concerns over adverse reactions. Our aim was to determine the relative risk of COPD exacerbations post-vaccination.

**Methods** We analysed data before and after 162 vaccinations given to 112 patients in the London COPD cohort between 2009 and 2011. Patients recorded on daily diary cards increase in respiratory symptoms. Exacerbations were defined as ≥2 days of 2 major symptoms (new or increased breathlessness, sputum volume or purulence) or 1 major and 1 minor symptom (cold, increased cough, increased wheeze, sore throat). Patients were telephoned in Oct 2011 and asked about recent or forthcoming vaccinations; other dates were known from previous years when recorded diary cards or reported at clinic visits.

The risk of COPD exacerbation in the two post-vaccination periods, days 1–2 and 3–14 were calculated relative to the patient's baseline risk assessed over the year before and after vaccination using a self-controlled case series approach. The data was also simply analysed with a Chi-squared test of the proportion of exacerbations in the two weeks before and after vaccination.

**Results** There was a 3.31 fold (95% CI 1.5–7.4; P=0.004) increased risk of COPD exacerbation 1–2 days post influenza vaccination, and a 1.8 fold risk (1.2–2.9; p=0.007) 3–14 days afterwards. In the two weeks prior to vaccination there were 5/162 exacerbations and 26/162 in the two weeks post vaccination (p<0.001). All 5 of the exacerbations before and 17/26 exacerbations after vaccination were treated with antibiotics and/or oral steroids. Using thie healthcare utilisation definition of COPD exacerbations, there were still significantly more events post vaccination (p=0.008). Figure 1 shows the average number of new or increased respiratory symptoms recorded by the patients during the 3 weeks before and after vaccination.

**Conclusion** The incidence of COPD exacerbation increases immediately after influenza vaccination. COPD patients should be warned about increased respiratory symptoms after their influenza vaccination. Future studies should investigate the mechanisms underlying these increased symptoms in order to intervene and prevent them effectively.




Abstract S28 Figure 1

## S29 THE PROPOSED NATIONAL EARLY WARNING SYSTEM (NEWS) COULD BE HAZARDOUS FOR PATIENTS WHO ARE AT RISK OF HYPERCAPNIC RESPIRATORY FAILURE

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**Introduction** Early Warning Scoring systems (EWS) identify critical illness at an early stage. The Royal College of Physicians has proposed use of a 'National Early Warning Score' (NEWS) across UK hospitals. The NEWS allocates EWS points for oxygen saturation <96% (see Table) and does not take account of target oxygen saturation range which should be set for each patient according to the BTS oxygen guidelines. This is particularly important for patients at risk of hypercapnic respiratory failure (T2RF) who are safest with a target range of 88–92% or less. We compared the NEWS with a proposed alternative based on the Salford Royal Hospital EWS system (AltNEWS, see Table) to identify how many patients with COPD would be placed at risk of hyperoxaemia using the NEWS system.

**Methods** We calculated EWS scores using the NEWS and AltNEWS for 108 unselected acute medical patients at a single time point.

**Results** 34/108 general medical patients (31%) had risk factors for T2RF (30 COPD, 4 obstructive sleep apnoea). Nineteen of these 34 patients had saturations within their target range of 88–92% either on air or oxygen. The NEWS system allocated these patients 2 or 3 EWS points for "low" oxygen levels which could prompt nursing staff to increase supplemental oxygen, potentially precipitating dangerous hypercapnia. Three of these 34 patients had saturations >92% on oxygen. The NEWS did not alert nursing staff that supplemental oxygen should be reduced for these patients; saturations of 93–94% were actually scored as "too low". This could prompt nursing staff to further increase supplemental oxygen which could harm these patients. The AltNEWS allocated EWS points according to whether patients were in or out of range and no patients were placed at risk of T2RF.

**Conclusion** The NEWS system makes no allowance for patients at risk of T2RF. This may lead to potentially dangerous use of oxygen in this substantial group of patients. We recommend that a target oxygen saturation range should be set for all hospital patients on admission and oxygen scores within EWS systems should be adjusted to alert clinicians to scores above and below the target range.