## Online supplementary material

**Metabolic effects associated with ICS in patients with COPD and comorbid type 2 diabetes: a historical matched cohort study**

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## Supplementary methods

### Codes use to select patient population

*COPD included*

|  |  |
| --- | --- |
| **Read Code** | **Definition** |
| H3... | Chronic obstructive pulmonary disease |
| H3... | Chronic obstructive airways disease |
| H31.. | Chronic bronchitis |
| H310. | Simple chronic bronchitis |
| H3100 | Chronic catarrhal bronchitis |
| H3101 | Smokers' cough |
| H310z | Simple chronic bronchitis NOS |
| H311. | Mucopurulent chr.bronchitis |
| H3110 | Purulent chronic bronchitis |
| H3111 | Fetid chronic bronchitis |
| H311z | Mucopurulent chr.bronchit.NOS |
| H312. | Obstructive chronic bronchitis |
| H3120 | Chronic asthmatic bronchitis |
| H3120 | Chronic wheezy bronchitis |
| H3121 | Emphysematous bronchitis |
| H3122 | Acute exacerbation of COAD |
| H3123 | Bronchiolitis obliterans |
| H312z | Obstructive chr.bronchitis NOS |
| H313. | Mixd simp+mucopur chron bronch |
| H31y. | Other chronic bronchitis |
| H31y0 | Chronic tracheitis |
| H31y1 | Chronic tracheobronchitis |
| H31yz | Other chronic bronchitis NOS |
| H31z. | Chronic bronchitis NOS |
| H32.. | Emphysema |
| H320. | Chronic bullous emphysema |
| H3200 | Segmental bullous emphysema |
| H3201 | Zonal bullous emphysema |
| H3202 | Giant bullous emphysema |
| H3203 | Bullous emphysema + collapse |
| H3203 | Tension pneumatocoele |
| H320z | Chronic bullous emphysema NOS |
| H321. | Panlobular emphysema |
| H322. | Centrilobular emphysema |
| H32y. | Other emphysema |
| H32y0 | Acute vesicular emphysema |
| H32y1 | Atrophic (senile) emphysema |
| H32y1 | Acute interstitial emphysema |
| H32y2 | MacLeod's unilateral emphysema |
| H32yz | Other emphysema NOS |
| H32yz | Sawyer - Jones syndrome |
| H32z. | Emphysema NOS |
| H36.. | Mild chron obstr pulm disease |
| H37.. | Mod chron obstr pulm disease |
| H38.. | Sev chron obstr pulm disease |
| H39.. | Very severe COPD |
| H3y.. | Chronic obstr.airway dis.OS |
| H3y.. | OS chron obstruct pulmon dis |
| H3y0. | Chr obs pulm dis+ac l resp inf |
| H3y1. | Chr obs pulm dis+ac exac,unspc |
| H3z.. | Chronic obstr.airway dis.NOS |
| H3z.. | Chr obstruc pulmonary dis NOS |
| H4640 | Chronic chemical emphysema |
| H4641 | Chemical obliter.bronchiolitis |
| H582. | Compensatory emphysema |
| Hyu30 | [X]Other emphysema |
| Hyu31 | [X]O spcf chron obs pulmon dis |
| X101j | Occupational chr bronchitis |
| X101k | Byssinosis grade 3 |
| X101m | Drug-induced bronchiolit oblit |
| X101n | Pulmonary emphysema |
| X101o | Pulm emphysema, alpha-1 PI def |
| X101p | Toxic emphysema |
| X101q | Congenital lobar emphysema |
| X101r | Scar emphysema |
| X102z | Bronchiolitis oblit with UIP |
| XE0ZN | Chronic: [bronchitis NOS] or++ |
| XaIND | End stag chron obst airway dis |
| XaIQg | Interstit pulmonary emphysema |

*Type II diabetes included*

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| --- | --- |
| **Read Code** | **Definition** |
| 66Ao.00 | Diabetes type 2 review |
| 66A3.00 | Diabetic on diet only |
| 66A4.00 | Diabetic on oral treatment |
| 66AV.00 | Diabetic on insulin+oral treat |
| C100112 | Non-insulin depend.diabet.mell |
| C109.00 | Non-insulin depd diabetes mell |
| C109.11 | NIDDM - Non-insu dep diab mel |
| C109.12 | Type 2 diabetes mellitus |
| C109.13 | Type II diabetes mellitus |
| C109000 | Non-ins-dp diab mel+renal comp |
| C109011 | Type II diab mell renal compl |
| C109012 | Type 2 diab mell renal compl |
| C109100 | Non-ins-dp diab mel+ophth comp |
| C109111 | Type II diab mell ophthal comp |
| C109112 | Type 2 diab mell ophthal comp |
| C109200 | Non-ins-dp diab mel+neuro comp |
| C109211 | Type II diab mell neurol comp |
| C109212 | Type 2 diab mell neurol comp |
| C109300 | Non-ins-dp diab mel+multi comp |
| C109311 | Type II diab mell multip comp |
| C109312 | Type 2 diab mell multip comp |
| C109400 | Non-insul depen diab mel+ulcer |
| C109411 | Type II diab mell with ulcer |
| C109412 | Type 2 diab mell with ulcer |
| C109500 | Non-insulin dep diab mell+gang |
| C109511 | Type II diab mell + gangrene |
| C109512 | Type 2 diab mell + gangrene |
| C109600 | Non-insul dep diab mel+retinop |
| C109611 | Type II diab mell retinopathy |
| C109612 | Type 2 diab mell retinopathy |
| C109700 | Non-insul dep diab-poor contr |
| C109711 | Type II diab mell poor control |
| C109712 | Type 2 diab mell poor control |
| C109900 | Non-insul-dep diab mel no comp |
| C109911 | Type II diab mell no complic |
| C109912 | Type 2 diab mell no complic |
| C109A00 | NIDDM with mononeuropathy |
| C109A11 | Type II diab mell mononeurop |
| C109A12 | Type 2 diab mell mononeurop |
| C109B00 | NIDDM with polyneuropathy |
| C109B11 | Type II diab mell polyneurop |
| C109B12 | Type 2 diab mell polyneurop |
| C109C00 | NIDDM with nephropathy |
| C109C11 | Type II diab mell nephropathy |
| C109C12 | Type 2 diab mell nephropathy |
| C109D00 | NIDDM with hypoglycaemic coma |
| C109D11 | Type II diab mell hypogly coma |
| C109D12 | Type 2 diab mell hypogly coma |
| C109E00 | NIDDM with diabetic cataract |
| C109E11 | Type II diab mell diab catarct |
| C109E12 | Type 2 diab mell diab catarct |
| C109F11 | Type II diab mell perip angiop |
| C109F12 | Type 2 diab mell perip angiop |
| C109G00 | NIDDM with arthropathy |
| C109G11 | Type II diab mell arthropathy |
| C109G12 | Type 2 diab mell arthropathy |
| C109H11 | Type II diab mell neurop arthr |
| C109H12 | Type 2 diab mell neurop arthr |
| C109J00 | Insul treated Type 2 diab mell |
| C109J11 | Ins treat non-ins dep diab mel |
| C109J12 | Insul treat Type II diab mell |
| C109K00 | Hyperos non-ket stat typ 2 d m |
| C10F.00 | Type 2 diabetes mellitus |
| C10F.11 | Type II diabetes mellitus |
| C10F000 | Type 2 diab mell + renal compl |
| C10F011 | Type II diab mell renal compl |
| C10F100 | Type 2 diab mell+ophthal comp |
| C10F111 | Type II diab mell ophthal comp |
| C10F200 | Type 2 diab mell + neurol comp |
| C10F211 | Type II diab mell neurol comp |
| C10F300 | Type 2 diab mell + multip comp |
| C10F311 | Type II diab mell multip comp |
| C10F400 | Type 2 diab mell with ulcer |
| C10F411 | Type II diab mell with ulcer |
| C10F500 | Type 2 diab mell + gangrene |
| C10F511 | Type II diab mell + gangrene |
| C10F600 | Type 2 diab mell + retinopathy |
| C10F611 | Type II diab mell retinopathy |
| C10F700 | Type 2 diab mell+poor control |
| C10F711 | Type II diab mell poor control |
| C10F900 | Type 2 diab mell without comp |
| C10F911 | Type II diab mell without comp |
| C10FA00 | Type 2 diab mell mononeurop |
| C10FA11 | Type II diab mell mononeurop |
| C10FB00 | Type 2 diab mell + polyneurop |
| C10FB11 | Type II diab mell polyneurop |
| C10FC00 | Type 2 diab mell + nephropathy |
| C10FC11 | Type II diab mell nephropathy |
| C10FD00 | Type 2 diab mell+hypogly coma |
| C10FD11 | Type II diab mell hypogly coma |
| C10FE00 | Type 2 diab mell+diab catarct |
| C10FE11 | Type II diab mell diab catarct |
| C10FF00 | Type 2 diab mell+perip angiop |
| C10FF11 | Type II diab mell perip angiop |
| C10FG00 | Type 2 diab mell + arthropathy |
| C10FG11 | Type II diab mell+arthropathy |
| C10FH00 | Type 2 diab mell neurop+arthr |
| C10FH11 | Type II diab mell neurop+arthr |
| C10FJ00 | Insul treated Type 2 diab mell |
| C10FJ11 | Insul treat Type II diab mell |
| C10FK00 | Hyperos non-ket stat typ 2 d m |
| C10FL00 | Type 2 d m + persist proteinur |
| C10FL11 | Type II d m + persist protein |
| C10FM00 | Type 2 d m + persist microalb |
| C10FN00 | Type 2 d m with ketoacidosis |
| C10FP00 | Type 2 d m+ketoacidotic coma |
| C10FQ00 | Type 2 d m + exudat maculopath |
| C10FR00 | Type 2 dm with gastroparesis |
| C10FM00 | Type 2 d m + persist microalb |
| C10FM11 | Type II d m + persist microalb |
| ZC2CA00 | Dietary advice for type II diabetes |

*Type II diabetes included*

|  |  |
| --- | --- |
| **Read Code** | **Definition** |
| C10FS00 | Matern inherited diabetes mell |

### Measures of COPD severity

Chronic obstructive pulmonary disease (COPD) severity was assessed during the baseline period using the forced expiratory volume in 1 second (FEV1) and the modified Medical Research Council (mMRC) score closest to the index date. FEV1 was measured via spirometry and expressed as a percentage of the predicted normal value. The mMRC score assesses breathlessness, graded from 0 (lowest score) to 4 (severe breathlessness).1 Patients were then divided into groups A–D according to the symptom and exacerbation risk management model of the Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD), 2014.1 Allocation into GOLD groups closest to the index date was carried out according to the following criteria:

**Group A** (low risk, fewer symptoms)

* mMRC score ≤1 AND
* FEV1 ≥50% AND/OR
* ≤1 exacerbation per year with no hospitalisations for exacerbations

**Group B** (low risk, more symptoms)

* mMRC score ≥2 AND
* FEV1 ≥50% AND/OR
* ≤1 exacerbation per year with no hospitalisations for exacerbations

**Group C** (high risk, fewer symptoms)

* mMRC score ≤1 AND
* FEV1 <50% AND/OR
* ≥2 exacerbations per year or ≥1 hospitalisation for exacerbation

**Group D** (high risk, more symptoms)

* mMRC score ≥2 AND
* FEV1 <50% AND/OR
* ≥2 exacerbations per year or ≥1 hospitalisation for exacerbation

### Potential confounders examined

*Demographic characteristics***(**at or closest to the index date)

* Age
* Sex
* Body mass index (BMI)
* Smoking status

*Measures of COPD severity and COPD-related therapies*

* Lung function measurements (FEV1)
* GOLD group classification† closest to the index date
* Moderate and severe COPD exacerbations within the baseline period‡
* COPD-related therapies prescribed within the year prior to index date§
* All acute oral corticosteroid courses prescribed in baseline period and prior to baseline HbA1c

*Measures of diabetic control*(during baseline period)

* Duration of medication-treated diabetes
* HbA1c value prior to index date
* Antidiabetic medication and glucose strip prescriptions
* Diabetes-related hospitalisations

*Comorbidities*

* Asthma
* Cardiovascular disease
* Ischaemic heart disease
* Hypertension
* Charlson Comorbidity Index score for the year prior to the index date

## References

1. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease 2015. <http://www.goldcopd.org/guidelines-global-strategy-for-diagnosis-management.html>

2. British Medical Association and NHS England. 2016/16 General Medical Services (GMS) contract Quality and Outcomes Framework (QOF). Guidance for GMS contract 2015/16. March 2015. [http://bma.org.uk/support-at-work/contracts/gp-contracts-and-funding/independent-contractors/qof-guidance](%20http:/bma.org.uk/support-at-work/contracts/gp-contracts-and-funding/independent-contractors/qof-guidance).