7 COPD results (standard output graphs can be found in Appendix A7)

Summary

Type of variation	Consistent across data sources?	Consistent within data sources?	Comments
Age	Yes	N/A	Increases with age
Sex	Yes	N/A	M>F from ~age 40
Year on year	No	N/A	GPRD ↑, HES ↑ then ↓, mortality ↓
Week of year	Yes: mortality, HES, patient consultations in GPRD No: within GPRD	N/A	Highest in winter in mortality, HES and patient consultations in the GPRD. No seasonal variation seen in patient inhaler prescriptions in GPRD.
Regional	Yes	N/A	North>South
Urban-rural	Yes	N/A	Urban>Rural, attenuated after adjustment for smoking and social class
Geographical correlation across data sources	Yes	N/A	Consistently good correlations across sources

The following results are considered:

Variations by age and sex
Seasonality
Regional and urban rural distribution
Regional and urban rural variations adjusted for smoking and social class
Comparisons across data sources

Variations by age and sex

Symptoms of chronic bronchitis peaked at ages 70-75 in men and ages 80-85 in women. A higher percentage of males than female experienced symptoms except for ages 5-24 where percentages were similar (Figure 7.1) and surprisingly high numbers of people aged 20-30 experienced symptoms.

Prescriptions of inhalers for COPD, emergency hospital admission and deaths all showed similar patterns with a peak in old age and higher rates in males than females, but while prescriptions and admissions peaked around age 80-85, the overall number of deaths continued to rise (Figure 7.2, note log scale to show deaths in ages 0-4).

Figure 7.1 Symptoms of chronic bronchitis in the Health Survey for England 1995

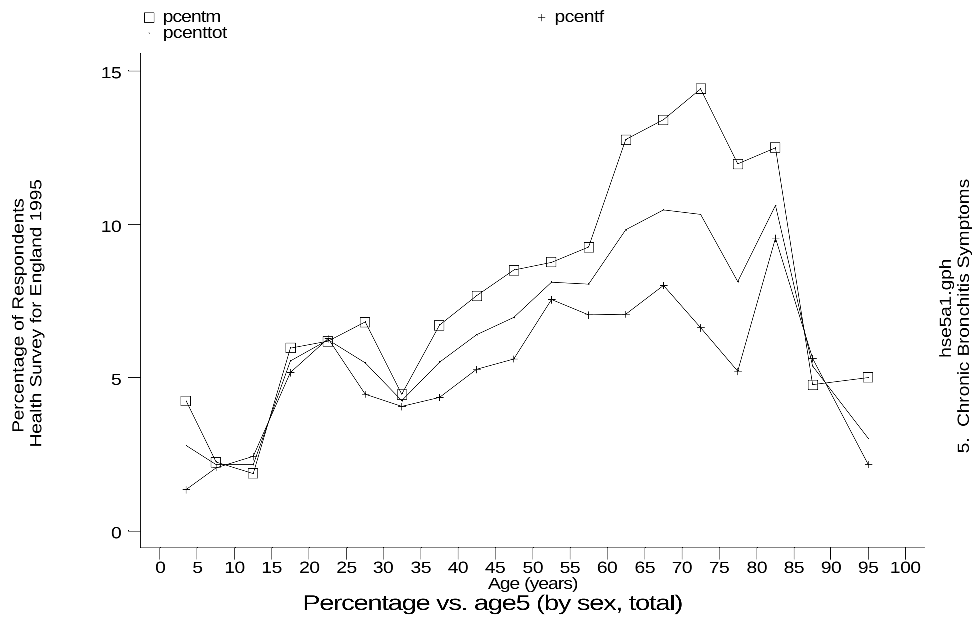
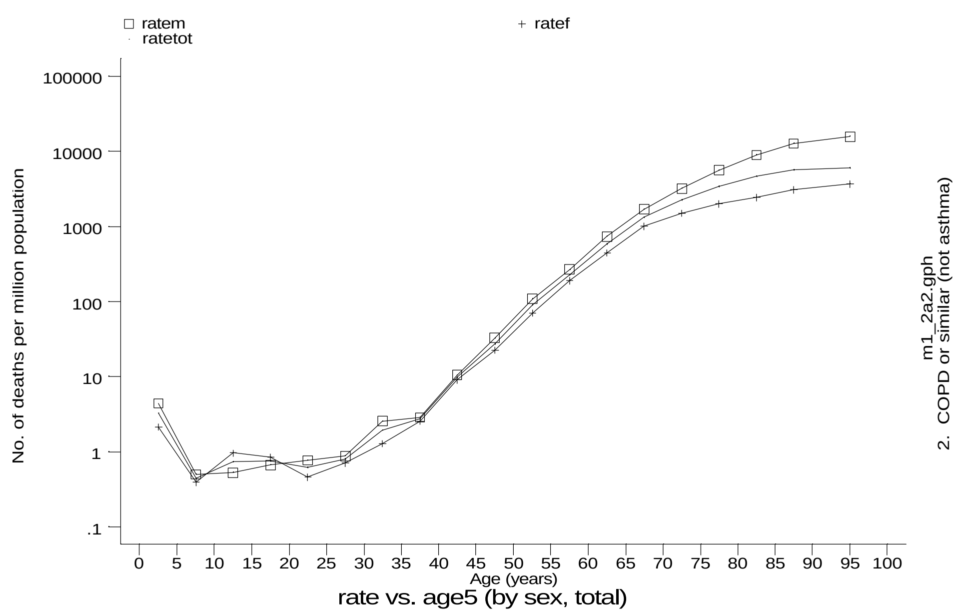


Figure 7.2 Deaths from COPD in 1991-1995 (log scale)



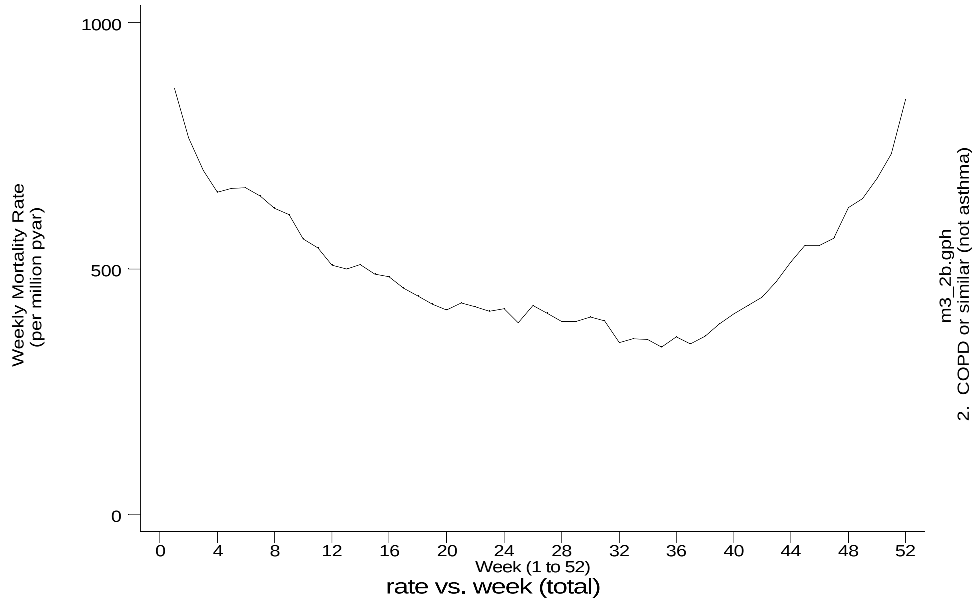
Time trends: Time trends were not consistent. Prevalence (patients receiving inhalers for COPD) rose over 1991-5, while hospital admissions rose slightly between 1991 to 1992, more steeply in 1993 and dropped in 1994. There was an overall downward trend in deaths from COPD in men, with a slightly greater dip in 1994, but a slight rise in women, again with a dip in 1994.

Cohort effect: No convincing cohort effect was detected in mortality data. Hospital admissions peaked in those born in 1910 to 1914. A cohort effect was suggested in the GPRD data in men only with a peak in inhalers prescribed for COPD for those born in 1899 and troughs in 1902 and 1916. However, further analysis by year of data showed that 95% confidence intervals for these birth cohorts overlapped those born in surrounding years (except in one of the 15 comparisons made which may have been a chance finding).

Seasonality

Mortality and hospital admissions showed a similar seasonal pattern with a highest levels in the autumn and winter months and peaks at the end of the year (Figure 7.3).

Figure 7.3 Seasonal pattern in mortality for COPD, 1991-1995



Prescriptions of inhalers for COPD showed very little variation all year (Figure 7.4), remaining around 1,000 per 10,000 pyar except in the last week of the year when rates halved followed by a small increase in the first week in January, obviously related to the opening times of GP surgeries during the Christmas and New Year bank holidays. However, consultations for COPD showed a similar pattern to mortality and hospital admissions apart from the last week of the year (Figure 7.5), while non-repeat inhaler prescriptions for COPD showed a pattern intermediate between mortality and all inhaler prescriptions for COPD (see Appendix A7).

Figure 7.4 Prescriptions for COPD in the GPRD, 1991-1995

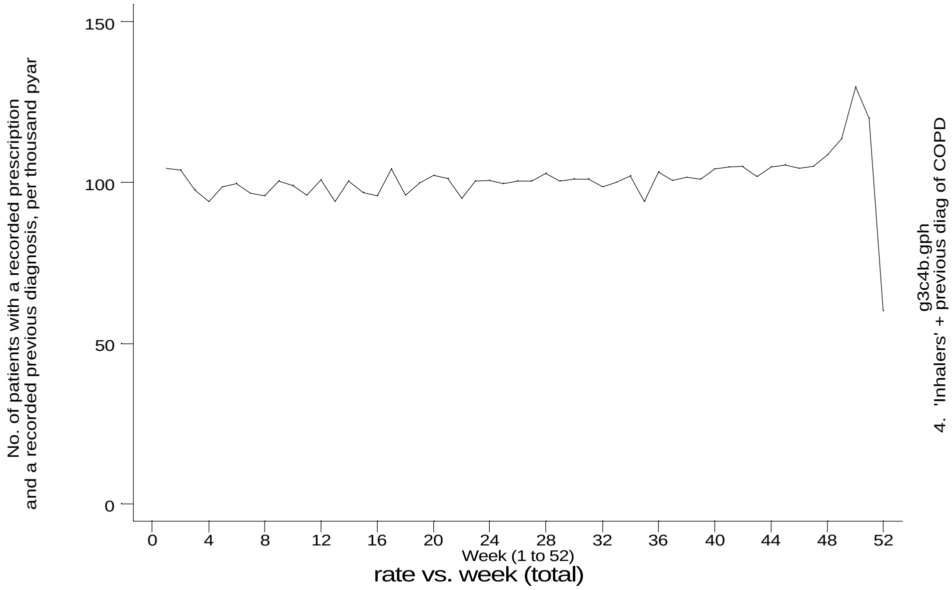
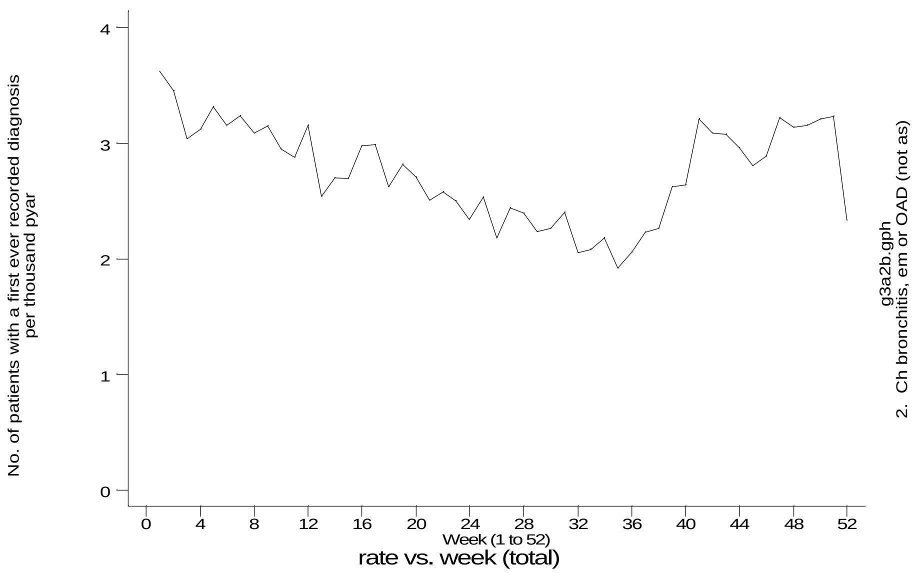


Figure 7.5 Consultations for COPD in the GPRD, 1991-1995



Regional and urban rural distribution

A north south divide was seen in all data sources. Northern, Yorkshire, Mersey and North Western had SERs consistently significantly higher than average in mortality, HES and GPRD data, while East Anglia, all Thames regions except North East Thames, Oxford and West Midlands were consistently significantly lower than average (Table 7.1). Confidence intervals were wide for symptoms of cough or phlegm in the HSE95, but these patterns were broadly preserved.

Table 7.1 Number of events and SERs for COPD ranked (high-low) following order of emergency hospital admission SERs in 1994

Region	Mortality		HES: Emergency admissions		GPRD: Inhalers for COPD		HSE95: Symptoms (cough & phlegm)	
	Number	SMR	Number	SER	Number	SER	Number	SER
Yorkshire	1,597	114.7*	6,898	171.4*	814	128.1*	97	102.8
Mersey	1,110	124.5*	4,094	157.1*	1,492	140.2*	73	122.9
Northern	1,409	128.7*	4,526	140.5*	2,058	156.8*	102	132.4*
N Western	2,103	135.4*	5,701	126.6*	2,049	177.1*	138	134.7*
NW Thames	910	90.9*	3,483	119.9*	938	70.0*	65	96.9
SE Thames	1,468	99.7	4,172	100.4	350	76.2*	87	105.6
Trent	1,883	102.4	5,324	100.3	1,453	97.1	123	96.3
NE Thames	1,330	99.6	3,653	94.5*	392	111.4*	93	106.7
W Midlands	1,990	101.4	5,412	94.5*	2,430	93.0*	132	99.3
SW Thames	1,012	86.1*	2,494	75.2*	873	59.0*	72	91.9
Wessex	1,012	77.0*	2,547	68.9*	836	85.8*	72	90.4
S Western	1,062	72.0*	2,668	64.6*	1,027	78.7*	75	79.1*
E Anglia	745	71.3*	1,180	39.7*	926	71.9*	42	57.5*
Oxford	757	90.6*	746	30.3*	315	66.3*	51	77.8

*SER significantly different from 100 (p<0.05)

Time trends: Regional patterns in year on year time trends were generally consistent with the overall patterns in mortality and inhaler prescriptions for COPD, but the regional pattern in yearly trends in emergency hospital admissions was very variable.

Urban rural: A clear urban rural gradient was seen in mortality, emergency hospital admissions and chronic bronchitis symptoms from the HSE95 (Figure 7.6), with lower SERs in rural areas. This gradient was not seen in the GPRD data, but conurbations were significantly higher and other areas significantly lower than the national average. Individual level data from the HSE95 also showed a small, but statistically significant excess of symptoms of cough or phlegm in those living in households which the interviewer judged to be in an urban setting (prevalence in urban setting 6.6%, rural setting 5.0%, p<0.001).

Regional and urban rural variations adjusted for smoking and social class

Further adjustment of regional and urban rural SERs for symptoms in the HSE95 for cigarette smoking and social class produced minor attenuation, bringing SERs closer to 100, but the north:south differences persisted. The urban rural gradient was attenuated more than the regional SERs, but rural and mixed areas continued to have lower SERs than the average, while urban and conurbation areas had higher SERs (Figures 7.6 and 7.7).

Figure 7.6 Urban rural pattern for symptom SERs seen in the HSE95

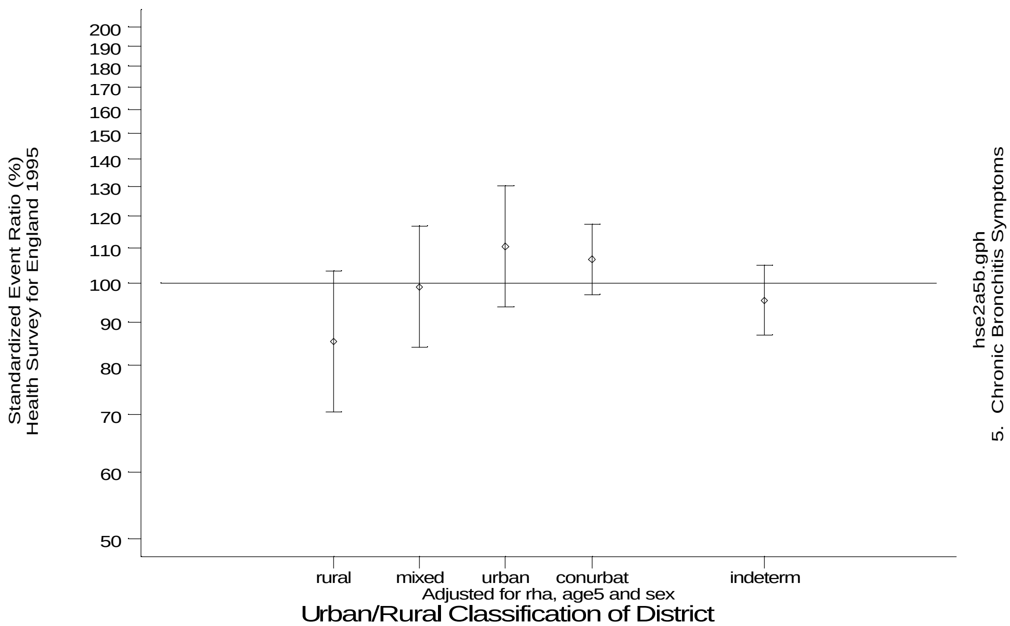
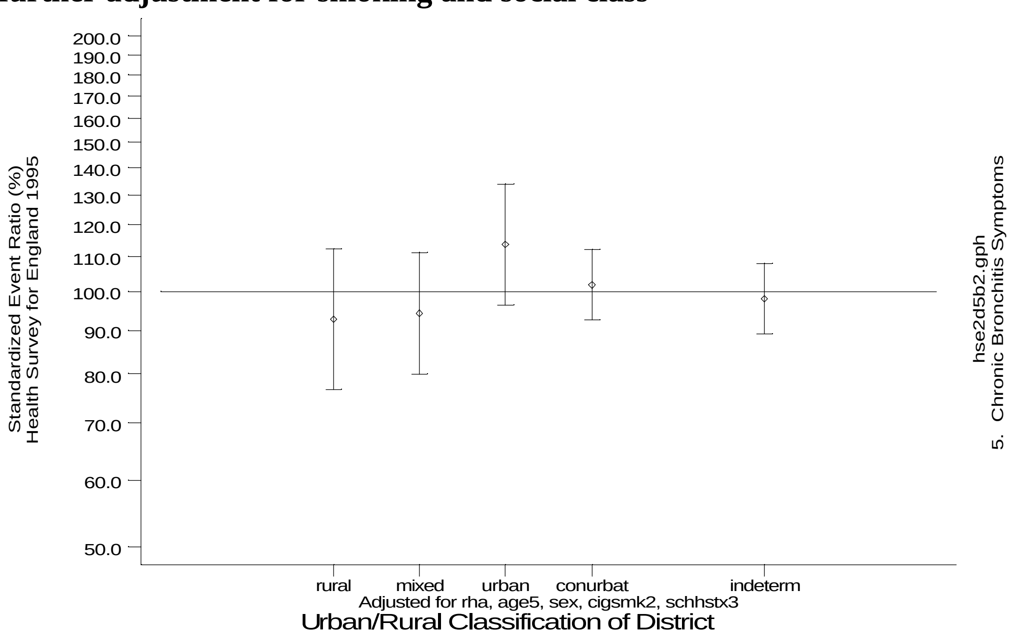


Figure 7.7 Urban rural pattern for symptom SERs seen in the HSE95 after further adjustment for smoking and social class



Comparisons across data sources

Correlations

There were consistently good correlations across different data sources for symptoms, primary care consultations and prescribing for COPD, hospital admissions and mortality (Table 7.2). The correlation with all inhaler prescriptions was poor, but this was not unexpected as it will include inhalers prescribed for other conditions such as asthma and symptoms.

Table 7.2 Spearman rank correlation coefficients for comparison of standardised event ratios for COPD from different data sources for region+urban rural combinations in 1991 and regions in 1994

	GPRD: aged 0-84 Inhaler + COPD diagnosis		HES: aged 0-84		Mortality: aged 0-84	
	1991	1994	1991	1994	1991	1994
HSE95 symptoms, ages 2-84		0.78		0.84		0.88
GPRD inhaler + diagnosis of COPD, ages 0-84			0.70	0.70	0.59	0.81
GPRD diagnosis only, ages 0-84			0.71		0.62	
GPRD inhaler prescription			0.38		0.38	
HES: aged 0-84					0.91	0.85

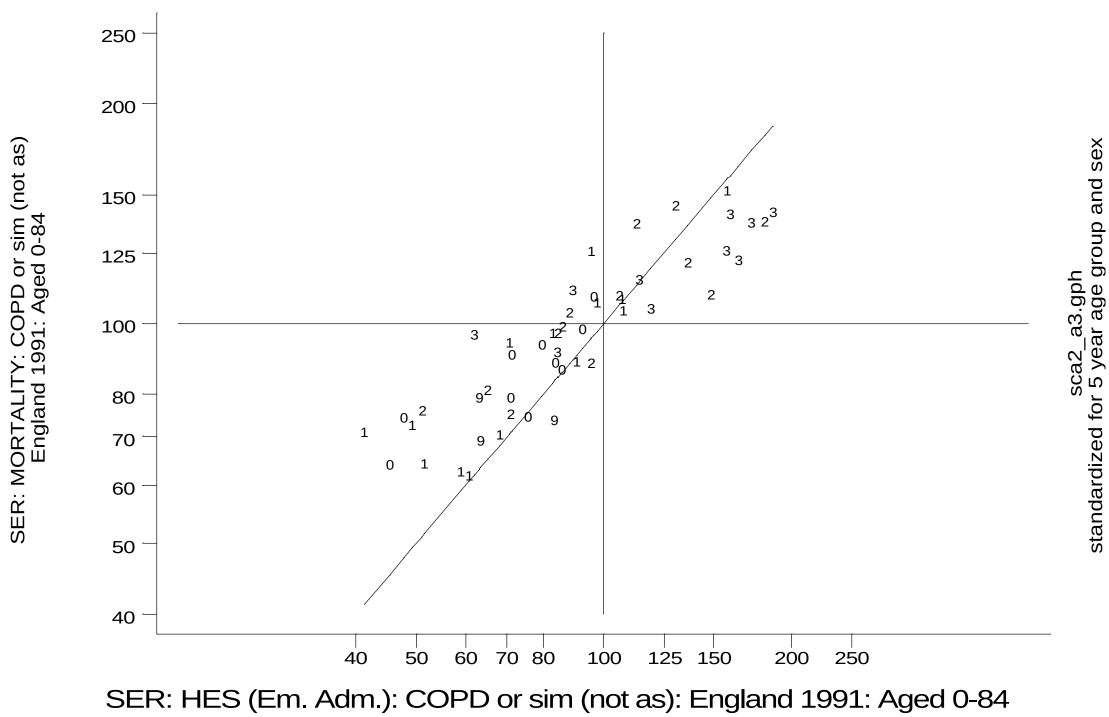
Scatterplots

The scatterplot between hospital admissions and mortality for 1991 data (region and urban-rural breakdown) illustrates the findings for COPD (Figure 7.8). This showed a four-fold variation in emergency hospital admissions and a three-fold variation in mortality between different regional urban-rural divisions.

The urban rural pattern between hospital admissions and mortality mentioned above could be clearly seen. For example, in the comparison between hospital admission SERs and SMRs, lower admissions and mortality was seen in rural and mixed areas (represented by symbols ‘0’ and ‘1’ concentrated in the left lower quadrant in Figure 7.3). Conurbations showed higher hospital admissions SERs and SMRs (represented by symbol ‘3’ and concentrated in right upper quadrant).

The regression line was not on the line of equivalence - the hospital admissions SERs were higher than the SMRs in conurbations (below the line of equivalence), while SMRs were generally higher than hospital admissions SERs in rural areas (above the line of equivalence).

Figure 7.8 SMRs for COPD (ages 0-84) compared with hospital admissions SERs for COPD (ages 0-84)*



* Footnote: The line added to scatterplot graphs is the line of equivalence.
Key to points: 0 = rural, 1 = mixed, 2 = urban, 3 = conurbations, 9 = indeterminate