Supplementary table S1 Definition of respiratory symptoms based on questions adopted from the ECRHSIII screening questionnaire. Respiratory symptoms were defined according to the ECRHS definition*.

Symptom	Definition symptom
Current asthma	A positive answer to at least one of the questions: • Have you had an attack of asthma in the last 12 months? • Have you been woken by an attack of shortness of breath at any time in the last 12 months? • Are you currently taking any medicine (including inhalers, aerosols or tablets) for asthma?
COPD	A positive answer to the following question: • Have you ever been told by a doctor that you had chronic obstructive pulmonary disease or emphysema?
Nasal allergies	A positive answer to the following question: • Do you have any nasal allergies including 'hay fever'?
Wheeze	A positive answer to the following question: • Have you had wheezing or whistling in your chest at any time in the last 12 months?
Usage of inhaled corticosteroids	A positive answer to the following question: • In the last 12 months, have you regularly (on most days) taken budesonide, fluticason, beclomethason, ciclesonide or any other corticosteroid inhaler?

*ECRHS: European Community Respiratory Health Survey: http://www.ecrhs.org/

Supplementary table S2 Comparison of associations between different farm exposure estimates and asthma, COPD and allergic rhinitis based on electronic medical records (EMR) in the total invited "source" population, responders including farmers, and responders excluding farmers.

		Total population (n = 22377)		Responders incl. farmers (n = 11862)		Responders excl. Farmers (n = 11244)	
Outcome	**Exposure variable**	**OR (95% CI)** Unadjusted	**OR (95% CI)** Adjusted	**OR (95% CI)** Unadjusted	**OR (95% CI)** Adjusted	**OR (95% CI)** Unadjusted	**OR (95% CI)** Adjusted
Asthma (R96)	**Presence of livestock farms**						
	Within 100 m	0.62 (0.39-1.00)	0.79 (0.63-1.00)	0.91 (0.68-1.22)	0.90 (0.67-1.21)	0.78 (0.51-1.20)	0.78 (0.51-1.19)
	Within 500 m	**0.89 (0.80-0.99)**	**0.89 (0.80-0.99)**	0.91 (0.79-1.05)	0.91 (0.79-1.05)	0.90 (0.77-1.04)	0.90 (0.77-1.04)
	within 1000 m	**0.79 (0.64-0.98)**	**0.80 (0.64-0.99)**	0.78 (0.57-1.06)	0.78 (0.57-1.06)	0.79 (0.58-1.08)	0.79 (0.58-1.09)
	Distance to the nearest farm (quartiles)						
	> 640 m	1	1	1	1	1	1
	450-640 m	0.97 (0.84-1.12)	0.99 (0.86-1.15)	0.95 (0.78-1.16)	0.95 (0.78-1.16)	0.94 (0.77-1.15)	0.94 (0.77-1.15)
	290-450 m	**0.85 (0.73-0.98)**	**0.85 (0.73-0.99)**	0.85 (0.69-1.04)	0.84 (0.69-1.04)	0.84 (0.69-1.04)	0.84 (0.68-1.03)
	< 290 m	**0.86 (0.74-0.99)**	0.87 (0.75-1.00)	**0.81 (0.67-0.99)**	**0.81 (0.67-0.99)**	**0.79 (0.64-0.97)**	**0.79 (0.64-0.97)**
	Number of livestock farms within 1000 m (quartiles)						
	< 4	1	1	1	1	1	1
	4 to 7	0.97 (0.84-1.11)	0.99 (0.86-1.13)	1.04 (0.85-1.25)	1.04 (0.86-1.26)	1.04 (0.85-1.26)	1.05 (0.86-1.27)
	7 to 11	**0.85 (0.74-0.99)**	**0.85 (0.74-0.99)**	**0.76 (0.61-0.93)**	**0.76 (0.61-0.93)**	**0.77 (0.62-0.95)**	**0.77 (0.62-0.95)**
	> 11	0.90 (0.78-1.05)	0.91 (0.79-1.05)	0.96 (0.79-1.17)	0.96 (0.79-1.16)	0.94 (0.77-1.15)	0.94 (0.76-1.15)
COPD (R95 or R91)	**Presence of livestock farms**						
	Within 100 m	**0.66 (0.45-0.95)**	0.73 (0.50-1.07)	**0.55 (0.33-0.92)**	0.68 (0.41-1.13)	0.86 (0.49-1.50)	0.90 (0.51-1.60)
	Within 500 m	**0.77 (0.66-0.90)**	**0.79 (0.68-0.93)**	**0.74 (0.61-0.90)**	**0.79 (0.65-0.97)**	**0.76 (0.62-0.93)**	**0.80 (0.65-0.98)**
	within 1000 m	1.02 (0.72-1.44)	0.95 (0.66-1.35)	0.78 (0.51-1.18)	0.75 (0.49-1.16)	0.80 (0.52-1.21)	0.76 (0.49-1.17)
	Distance to the nearest farm (quartiles)						
	> 640 m	1	1	1	1	1	1
	450-640 m	**0.79 (0.65-0.98)**	0.81 (0.66-1.00)	0.81 (0.66-1.00)	0.86 (0.66-1.13)	0.84 (0.64-1.10)	0.86 (0.66-1.14)
	290-450 m	**0.81 (0.66-0.99)**	0.84 (0.68-1.04)	0.84 (0.68-1.04)	0.84 (0.64-1.11)	0.79 (0.60-1.03)	0.84 (0.63-1.11)
	< 290 m	**0.63 (0.51-0.78)**	**0.64 (0.51-0.80)**	**0.64 (0.51-0.80)**	**0.69 (0.52-0.91)**	**0.68 (0.51-0.90)**	**0.70 (0.52-0.93)**
	Number of livestock farms within 1000 m (quartiles)						
	< 4	1	1	1	1	1	1

	4 to 7	0.98 (0.81-1.19)	0.96 (0.79-1.18)	0.93 (0.72-1.21)	0.92 (0.71-1.20)	0.94 (0.72-1.23)	0.93 (0.71-1.21)
	7 to 11	0.83 (0.67-1.02)	0.81 (0.65-1.01)	0.83 (0.63-1.08)	0.84 (0.64-1.11)	0.85 (0.65-1.12)	0.85 (0.65-1.13)
	> 11	**0.69 (0.56-0.87)**	**0.72 (0.57-0.90)**	**0.68 (0.51-0.91)**	0.78 (0.58-1.04)	**0.71 (0.53-0.95)**	0.79 (0.58-1.06)
Allergic rhinitis (R97)	**Presence of livestock farms**						
	Within 100 m	**0.69 (0.54-0.90)**	**0.69 (0.53-0.89)**	0.73 (0.52-1.01)	**0.69 (0.49-0.97)**	0.94 (0.63-1.41)	0.93 (0.62-1.40)
	Within 500 m	0.95 (0.85-1.06)	0.94 (0.84-1.05)	0.97 (0.84-1.13)	0.96 (0.82-1.11)	1.01 (0.87-1.18)	1.00 (0.86-1.16)
	within 1000 m	0.89 (0.70-1.13)	0.93 (0.73-1.18)	0.79 (0.57-1.09)	0.81 (0.59-1.12)	0.81 (0.59-1.12)	0.83 (0.60-1.15)
	Distance to the nearest farm (quartiles)						
	> 640 m	1	1	1	1	1	1
	450-640 m	1.12 (0.97-1.30)	1.13 (0.97-1.31)	**1.24 (1.01-1.53)**	**1.25 (1.01-1.53)**	**1.25 (1.02-1.54)**	**1.25 (1.02-1.54)**
	290-450 m	0.92 (0.79-1.08)	0.90 (0.77-1.05)	0.91 (0.73-1.13)	0.90 (0.72-1.12)	0.91 (0.73-1.14)	0.90 (0.72-1.12)
	< 290 m	0.87 (0.75-1.01)	0.88 (0.75-1.03)	0.96 (0.78-1.18)	0.95 (0.77-1.17)	1.05 (0.85-1.30)	1.05 (0.85-1.30)
	Number of livestock farms within 1000 m (quartiles)						
	< 4	1	1	1	1	1	1
	4 to 7	0.95 (0.82-1.10)	0.95 (0.82-1.10)	0.85 (0.69-1.04)	0.86 (0.70-1.05)	0.87 (0.71-1.07)	0.88 (0.71-1.08)
	7 to 11	0.91 (0.78-1.06)	0.93 (0.80-1.09)	0.83 (0.67-1.02)	0.83 (0.67-1.02)	0.83 (0.67-1.03)	0.83 (0.67-1.03)
	> 11	1.02 (0.88-1.18)	1.01 (0.87-1.17)	0.95 (0.78-1.16)	0.92 (0.75-1.12)	1.03 (0.84-1.26)	1.00 (0.82-1.23)

OR and 95% CI were adjusted for age and gender. Bold type indicates statistical significance ($p < 0.05$). Farmers were defined as working or living on a farm.

Supplementary table S3 Associations between livestock farm exposures and wheezing within asthma patients stratified by nasal allergies. The combination nasal allergy with current asthma could be an indication for atopic asthma.

	Nasal allergy	**No nasal allergy**
	Current asthma (n=612)	**Current asthma (n=732)**
Exposure	**OR (95% CI)**	**OR (95% CI)**
Presence of livestock farms		
Within 100 m	0.62 (0.34-1.13)	0.73 (0.46-1.16)
Within 500 m	0.96 (0.80-1.16)	0.95 (0.81-1.10)
Within 1000 m	0.86 (0.60-1.23)	0.86 (0.63-1.17)
Presence of farm animals in 500 m (yes or no)		
Pigs	0.90 (0.71-1.14)	**0.78 (0.64-0.96)**
Poultry	**1.46 (1.14-1.88)**	0.97 (0.77-1.22)
Cattle	0.95 (0.78-1.15)	1.03 (0.88-1.22)
Goats	0.48 (0.20-1.17)	1.34 (0.72-2.51)
Mink	**0.31 (0.11-0.87)**	0.98 (0.51-1.88)
Presence of farm animals in 1000 m (yes or no)		
Pigs	0.96 (0.75-1.22)	0.91 (0.75-1.11)
Poultry	1.06 (0.87-1.29)	1.01 (0.85-1.19)
Cattle	1.00 (0.72-1.38)	1.10 (0.83-1.45)
Goats	**0.69 (0.49-0.98)**	0.88 (0.66-1.16)
Mink	0.76 (0.50-1.14)	1.19 (0.88-1.59)
Distance to the nearest farm (quartiles)		
> 640 m	1	1
450 - 640 m	**0.74 (0.58-0.96)**	0.97 (0.79-1.20)
290 - 450 m	0.84 (0.66-1.08)	0.85 (0.69-1.06)
< 290 m	0.83 (0.64-1.07)	0.89 (0.72-1.10)
Test for trend (p-value)	0.2496	0.1554
Number of livestock farms in 1000 m (quartiles)		
< 4	1	1
4 to 7	1.00 (0.78-1.27)	1.04 (0.84-1.28)
7 to 11	0.86 (0.67-1.10)	1.09 (0.88-1.33)
> 11	0.87 (0.67-1.13)	1.05 (0.84-1.31)
Test for trend (p-value)	0.1713	0.5523
Fine dust emission from farms		
Log weighted fine dust emission from farms within 500 m*	1.00 (0.84-1.18)	0.94 (0.81-1.08)
Log weighted fine dust emission from farms within 1000 m*	0.93 (0.85-1.03)	0.99 (0.91-1.07)

OR and 95% CI were adjusted for gender, age and smoking habits. The presence of a type of farm animal is adjusted for the presence of other types of farm animals. Bold type indicates statistical significance ($p < 0.05$)

*OR and 95% CI for an IQR increase in log-transformed exposure, IQR for ln (fine dust g/y/m²) for farms within 500 m = 7.54 corresponding to a 1881-fold increase (exp. 7.54) for non-transformed values and IQR for ln (fine dust g/y/m²) for farms within 1000 m = 3.08 corresponding to a 22-fold increase for non-transformed values.

Supplementary table S4 Associations between livestock farm exposures and use of inhaled corticosteroids within COPD patients.

Use of ICS in the last 12 months in individuals with:	
Exposure	**COPD OR (95% CI)**
Presence of livestock farms	
Within 100 m	1.57 (0.38-6.46)
Within 500 m	1.32 (0.93-1.89)
Within 1000 m	1.21 (0.62-2.35)
Presence of farm animals in 500 m (yes or no)	
Pigs	1.20 (0.74-1.92)
Poultry	0.73 (0.43-1.25)
Cattle	**1.50 (1.01-2.23)**
Goats	0.84 (0.17-4.20)
Mink	3.28 (0.33-32.83)
Presence of farm animals in 1000 m (yes or no)	
Pigs	0.87 (0.54-1.42)
Poultry	1.26 (0.86-1.85)
Cattle	1.05 (0.54-2.04)
Goats	0.93 (0.49-1.77)
Mink	0.85 (0.41-1.74)
Distance to the nearest farm(quartiles)	
> 640 m	
450 - 640 m	1.06 (0.64-1.73)
290 - 450 m	1.37 (0.86-2.18)
< 290 m	1.12 (0.68-1.84)
Test for trend	0.40
Number of livestock farms in 1000 m(quartiles)	
< 4	
4 to 7	0.90 (0.57-1.44)
7 to 11	0.95 (0.59-1.54)
> 11	1.64 (0.97-2.76)
Test for trend	0.11
Fine dust emission from farms	
Log weighted fine dust emission from farms within 500 m*	1,26 (0,90-1,77)
Log weighted fine dust emission from farms within 1000 m*	1,05 (0,88-1,26)

OR and 95% CI were adjusted for age, gender and smoking habits. The presence of a type of farm animal is adjusted for the presence of other types of farm animals. Bold type indicates statistical significance ($p < 0.05$).

*OR and 95% CI for an IQR increase in log-transformed exposure, IQR for ln (fine dust g/y/m²) for farms within 500 m = 7.54 corresponding to a 1881-fold increase (exp. 7.54) for non-transformed values and IQR for ln (fine dust g/y/m²) for farms within 1000 m = 3.08 corresponding to a 22-fold increase for non-transformed values.

Supplementary table S5 Sensitivity analysis for the age at diagnosis of COPD, only subjects were included who were 40 years or older at diagnosis of COPD.

		Wheezing or whistling on chest last 12 months	Use of ICS in the last 12 months
	COPD ≥ 40 year (n = 344)	COPD ≥ 40 year	COPD ≥ 40 year
Exposure	**OR (95% CI)**	**OR (95% CI)**	**OR (95% CI)**
Presence of livestock farms			
Within 100 m	1.14 (0.23-5.65)	0.61 (0.30-1.23)	0.81 (0.38-1.71)
Within 500 m	0.82 (0.54-1.24)	0.93 (0.74-1.15)	0.89 (0.71-1.11)
Within 1000 m	1.45 (0.70-3.00)	1.17 (0.76-1.80)	0.93 (0.59-1.46)
Presence of farm animals in 500 m (yes or no)			
Pigs	0.87 (0.50-1.51)	1.03 (0.55-1.93)	1.37 (0.72-2.60)
Poultry	1.03 (0.55-1.91)	1.44 (0.69-2.99)	0.78 (0.38-1.60)
Cattle	0.90 (0.57-1.43)	1.42 (0.86-2.35)	1.18 (0.70-1.97)
Goats	1.31 (0.20-8.64)	1.75 (0.17-18.26)	0.93 (0.13-6.68)
Mink	n.e.	1.88 (0.18-19.21)	3.03 (0.30-30.89)
Presence of farm animals in 1000 m (yes or no)			
Pigs	0.84 (0.47-1.51)	1.15 (0.78-1.71)	0.87 (0.58-1.32)
Poultry	1.33 (0.85-2.09)	1.05 (0.75-1.46)	1.07 (0.75-1.53)
Cattle	1.27 (0.60-2.72)	0.81 (0.47-1.41)	0.71 (0.40-1.27)
Goats	1.07 (0.48-2.40)	1.35 (0.76-2.38)	0.92 (0.50-1.72)
Mink	1.09 (0.45-2.64)	0.61 (0.34-1.12)	0.92 (0.48-1.74)
Distance to the nearest farm			
> 640 m	1	1	1
450 - 640 m	0.93 (0.51-1.70)	**1.89 (1.03-3.47)**	0.96 (0.52-1.79)
290 - 450 m	0.65 (0.38-1.11)	**2.18 (1.21-3.93)**	1.17 (0.65-2.12)
< 290 m	1.17 (0.64-2.11)	1.42 (0.78-2.58)	1.13 (0.60-2.11)
Test for trend	0.9024	0.0994	0.5853
Number of livestock farms in 1000 m			
< 4	1	1	1
4 to 7	1.05 (0.61-1.81)	1.24 (0.70-2.18)	0.68 (0.38-1.23)
7 to 11	1.36 (0.78-2.39)	0.93 (0.53-1.64)	0.97 (0.53-1.77)
> 11	0.93 (0.51-1.70)	**2.88 (1.36-6.11)**	**2.15 (1.02-4.53)**
Test for trend	0.8233	0.0541	0.0666
Fine dust emission from farms			
Log weighted fine dust emission from farms within 500 m*	0.84 (0.57-1.25)	1.01 (0.82-1.23)	0.96 (0.77-1.18)
Log weighted fine dust emission from farms within 1000 m*	1.06 (0.86-1.31)	0.98 (0.87-1.10)	0.97 (0.87-1.10)

OR and 95% CI were adjusted for gender, age and smoking habits. The presence of a type of farm animal is adjusted for the presence of other types of farm animals. Bold type indicates statistical significance ($p < 0.05$). n.e. not estimable.

*OR and 95% CI for an IQR increase in log-transformed exposure, IQR for ln (fine dust g/y/m²) for farms within 500 m = 7.54 corresponding to a 1881-fold increase (exp. 7.54) for non-transformed values and IQR for ln (fine dust g/y/m²) for farms within 1000 m = 3.08 corresponding to a 22-fold increase for non-transformed values.