The Kings Fund
Ideas that change health care

DATA **Briefing**

April 2012

Emergency hospital admissions for ambulatory care-sensitive conditions: identifying the potential for reductions

Summary

- **Ambulatory care-sensitive conditions (ACSCs) account for one in every six emergency hospital admissions in England.**
- **The proportion of emergency admissions for ACSCs is larger in under-5s and over-75s. Children are predominantly admitted for acute conditions, older people for chronic conditions, and both groups for vaccine-preventable conditions.**
- **The rate of emergency admissions for ACSCs varies among local authorities from 9 to 22 per 1,000 population.**
- **The rate in the most deprived areas is more than twice the rate in the least deprived areas in England.**
- **Emergency admissions for ACSCs cost the NHS £1.42 billion annually. Influenza, pneumonia, chronic obstructive pulmonary disease (COPD), congestive heart failure, dehydration and gastroenteritis account for more than half of the cost.**
- **Older people (aged 75 years and over) account for 40 per cent (£563 million) of total spend.**
- **Influenza and pneumonia account for the largest proportion of admissions (13 per cent) and expenditure (£286 million). Many of these cases are vaccine-preventable.**
- **According to our estimates, emergency admissions for ACSCs could be reduced by between 8 and 18 per cent. We estimate this would result in savings of between £96 million and £238 million per year.**

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Reducing emergency hospital admissions for ambulatory care-sensitive conditions (ACSCs) is listed as a key indicator for transforming care for people with long-term conditions in *The Operating Framework for the NHS in England 2012/13* (Department of Health 2011b). ACSCs are defined as conditions for which hospital admissions could be avoided by interventions in preventive and primary care (Purdy *et al* 2010).

This data briefing aims to highlight for commissioners the opportunity for improving the quality of care and saving costs that reducing emergency hospital admissions for ACSCs presents. It uses Hospital Episode Statistics (HES) data to examine the sociodemographic patterns of emergency admissions for each ACSC and calculates the cost of these admissions. It also investigates variations in admissions for ACSCs among local authority districts in England and estimates the potential for reducing these admissions and associated costs. Details of the methods used can be found in the Appendix (*see* p 13).

What are ACSCs?

ACSCs are conditions for which effective management and treatment should prevent admission to hospital. They can be classified as: chronic conditions, where effective care can prevent flare-ups; acute conditions, where early intervention can prevent more serious progression; and preventable conditions, where immunisation and other interventions can prevent illness (Ham *et al* 2010). The box below lists the 19 ACSCs[1] (NHS Institute for Innovation and Improvement).

The 19 ambulatory care-sensitive conditions

Vaccine-preventable	**Acute**
1. Influenza and pneumonia	11. Dehydration and gastroenteritis
2. Other vaccine-preventable conditions	12. Pyelonephritis
Chronic	13. Perforated/bleeding ulcer
3. Asthma	14. Cellulitis
4. Congestive heart failure	15. Pelvic inflammatory disease
5. Diabetes complications	16. Ear, nose and throat infections
6. Chronic obstructive pulmonary disease (COPD)	17. Dental conditions
7. Angina	18. Convulsions and epilepsy
8. Iron-deficiency anaemia	19. Gangrene
9. Hypertension	
10. Nutritional deficiencies	

Why look at emergency hospital admissions for ACSCs?

High levels of admissions for ACSCs often indicate poor co-ordination between the different elements of the health care system, in particular between primary and secondary care. An emergency admission for an ACSC is a sign of the poor overall quality of care, even if the ACSC episode itself is managed well. The wide variation of emergency hospital admissions for ACSCs implies that they, and the associated costs for commissioners, can be reduced.

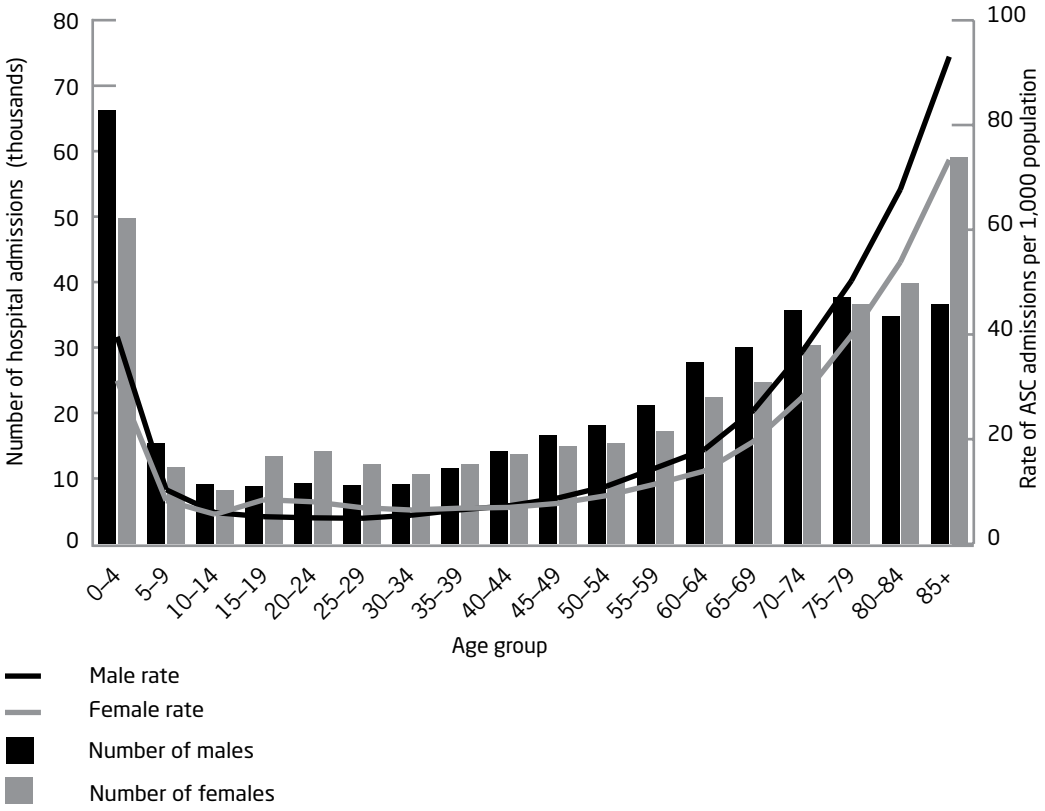
1 Different sets of ACSCs are used for research and health policy analysis (Purdy *et al* 2009). The list of ACSCs that is most frequently used in England is based on a set of conditions initially derived to measure access to primary care in the United States; these were then refined for use in Australia (Purdy 2010).

Patterns of emergency admissions for ACSCs

There were 5,135,794 emergency hospital admissions in England in 2009/10 (ie, April 2009 to March 2010), of which 816,433 (15.9 per cent) were for ACSCs. This is equivalent to 15.6 hospital admissions for ACSCs per 1,000 population.

Age and sex

Figure 1: Age and sex distribution of patients admitted for ACSCs, England, 2009/10



Data source: HES 2009/10

- The proportion of hospital admissions for ACSCs was higher among very young children (14 per cent of all admissions were patients under 5 years old) and older people (30 per cent of all admissions were patients who were 75 years old and above).
- The rate of admissions for ACSCs (lines in Figure 1) was slightly higher in males (15.9 per 1,000 population) than in females (15.3 per 1,000 population). The gap between males and females widened from 50–54 years old onwards. The gap was greatest in the 85-and-over age group (male/female gap at 20 per 1,000 population). However, as the female population was larger in the very elderly age group (aged 80 and over), the actual number of admissions (bars in Figure 1) was larger in older females than in older males.

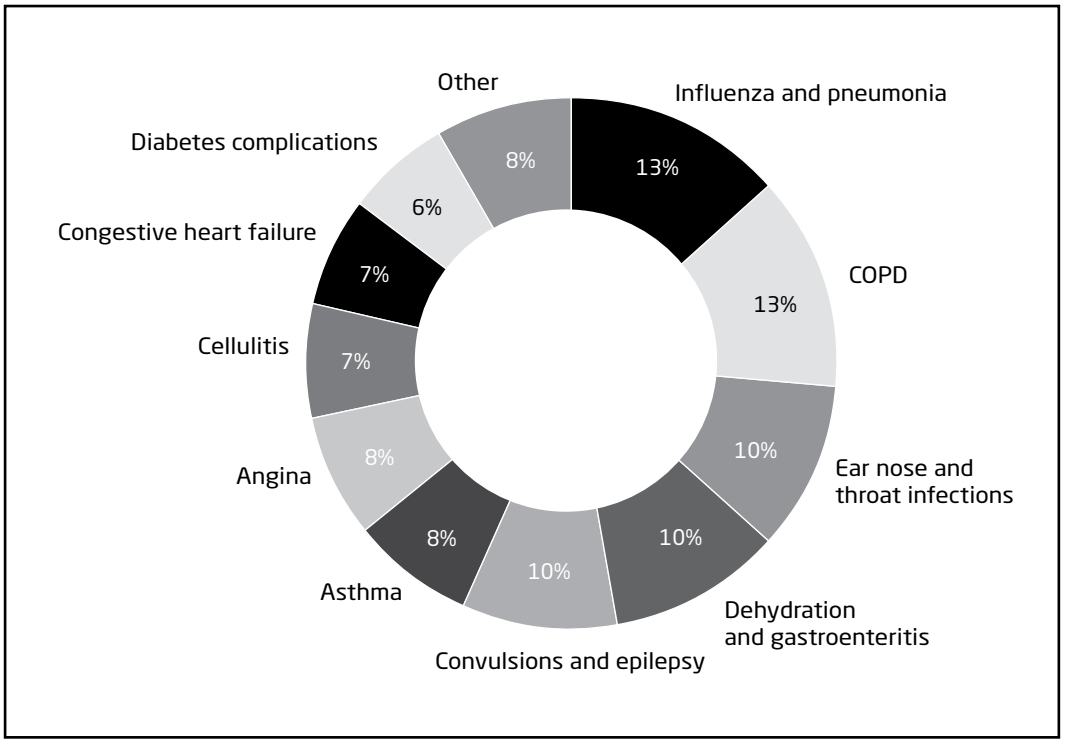
Condition

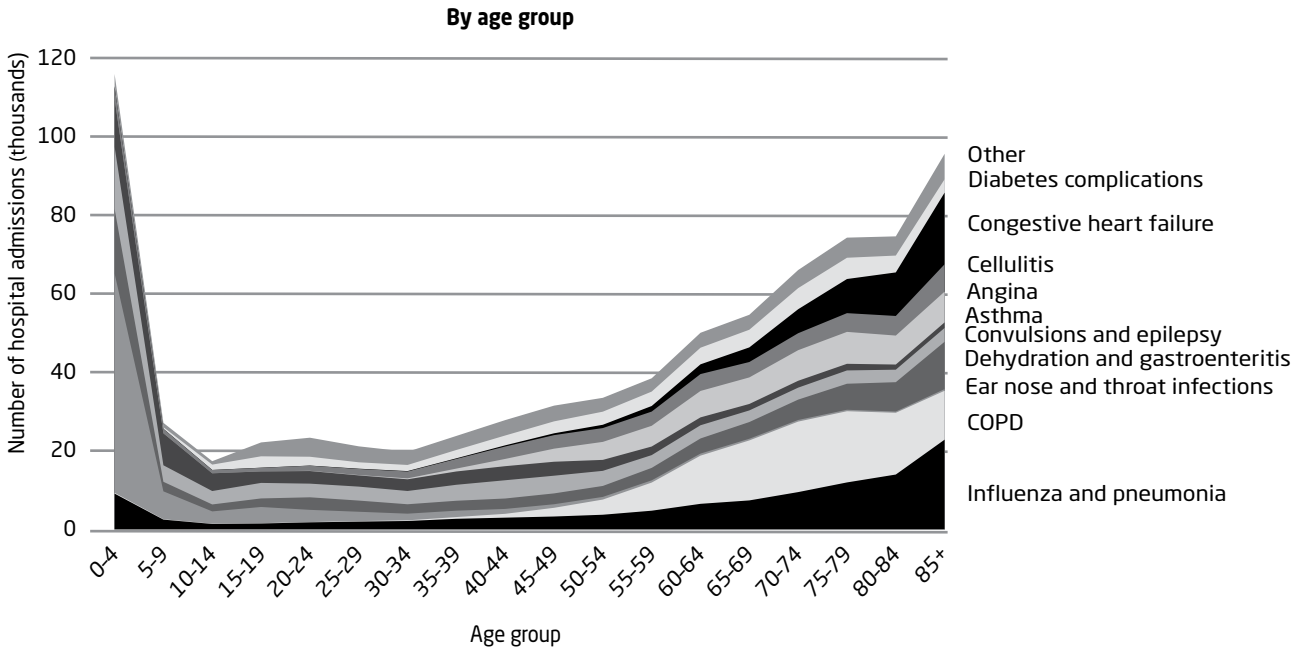
The leading causes of emergency admissions for ACSCs (*see* Figure 2 overleaf) were:

- influenza and pneumonia (13.4 per cent); chronic obstructive pulmonary disease (COPD) (13.2 per cent); ear, nose and throat infections (10.4 per cent); dehydration and gastroenteritis (10.4 per cent); and convulsions and epilepsy (9.5 per cent). These five conditions account for more than half (56.8 per cent) of all admissions for ACSCs.

- The age distribution of admissions varied by condition. Admissions for acute conditions (eg, ear, nose and throat infections) were predominantly in young children; admissions for chronic conditions (eg, COPD, angina and congestive heart failure) were higher in older patients; admissions for vaccine-preventable conditions were higher in both the very young and the old.

Figure 2: Proportion of emergency admissions for ACSCs by condition and age group, England, 2009/10

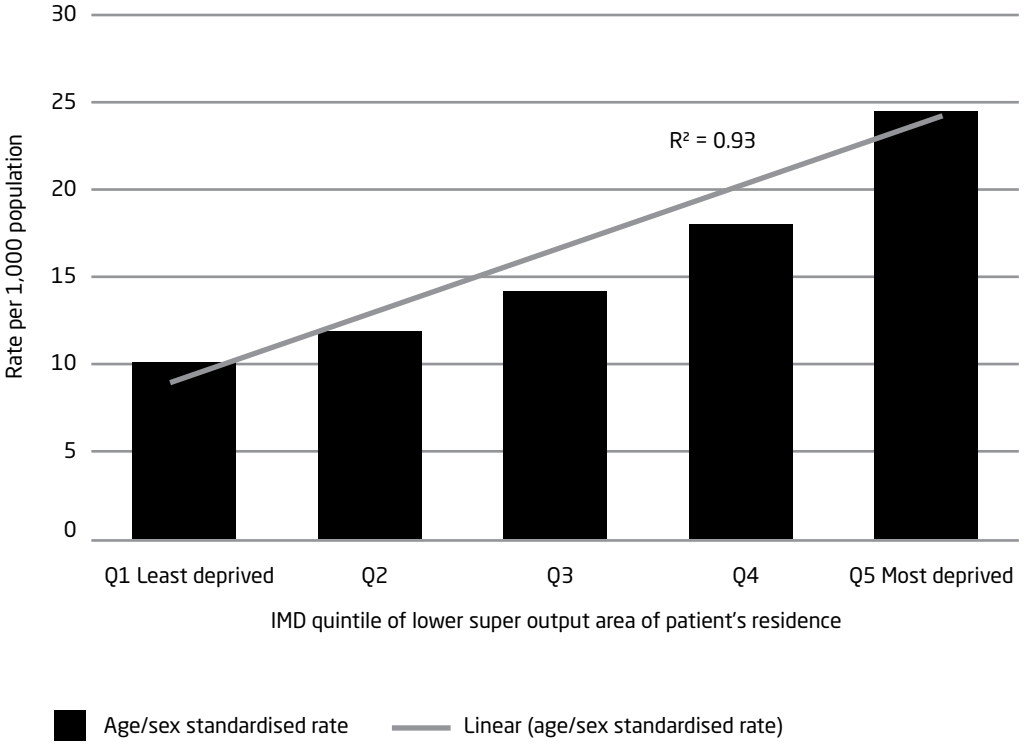




Data source: HES 2009/10

Socio-economic

Figure 3: Rate of emergency hospital admissions for ACSCs by deprivation quintile[2] of patients' area of residence,[3] England, 2009/10



Data sources: HES 2009/10; Indices of Multiple Deprivations (IMD 2010)

- People from more deprived areas were more likely to be admitted for ACSCs.
- The rate of emergency admissions in the population from the most deprived quintile (24.5 admissions per 1,000 population) was more than twice the rate in the population from the least deprived quintile (10.1 admissions per 1,000 population).

This strong positive association between ACSCs admissions and deprivation may be related to a range of factors in more deprived areas:

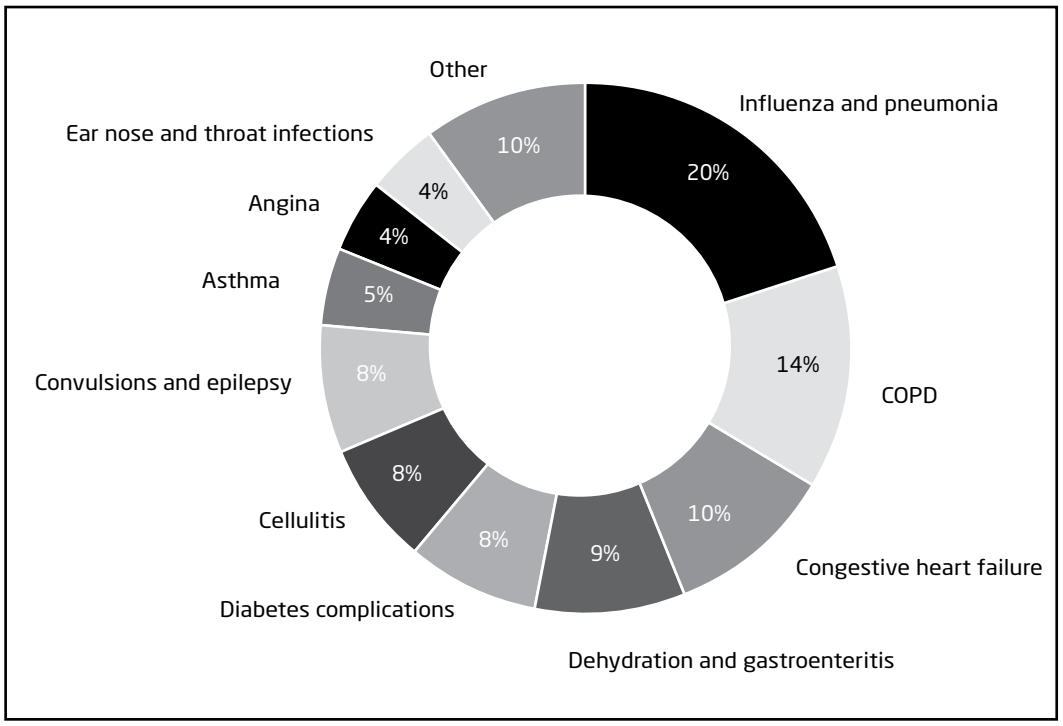
- higher prevalence of ACSCs, eg, higher prevalence of COPD in the most deprived communities in England (Simpson and Hippisley-Cox 2010)
- poorer access to primary care and preventive interventions, eg, socio-economic inequalities in the provision of health care to people with diabetes (Ricci-Cabello *et al* 2010)
- higher prevalence of presenting risk behaviour in patients, eg, smoking is more prevalent in deprived populations (Lakshman *et al* 2011) as well as being associated with hospital admissions for respiratory conditions (Purdy *et al* 2011).

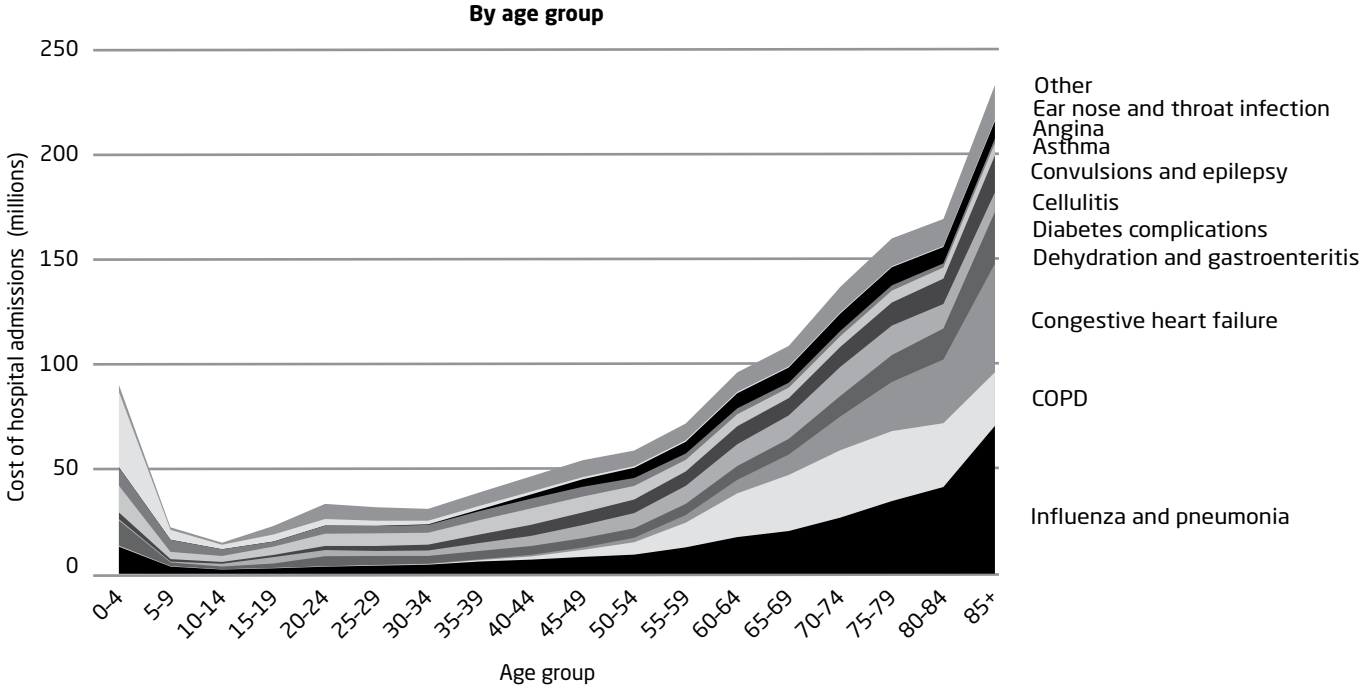
Further research is needed to understand how deprivation affects emergency hospital admissions for ACSCs and the role other factors, such as social capital, play.

2 Calculated based on the Indices of Multiple Deprivations (IMD 2010).

3 Lower Super Output Areas (LSOAs) of patients' residence. A LSOA is a geographical area designed for the collection and publication of small area statistics. It is used on the Neighbourhood Statistics site, and has a wider application throughout national statistics.

Figure 4: Proportion of the cost of emergency admissions for ACSCs by conditions and age group, England, 2009/10





Data source: HES 2009/10; National Tariff 2009/10

Cost of emergency admissions for ACSCs

The total cost of inpatient hospital admissions to the NHS in England in 2009/10 is estimated at £20.5 billion, of which emergency admissions alone cost about £12.2 billion (60 per cent) (Department of Health 2011a, NHS reference costs 2009/10[4]). The estimated cost to commissioners of emergency admissions for ACSCs is £1.42 billion (based on the

4 Reference costs are a cost collection exercise that produces data which informs the national tariff under Payment by Results (PbR). Reference costs are the average unit cost of a Health Resource Group (HRG) or similar unit of health care activity, as reported as part of the reference costs annual mandatory collection from all NHS organisations in England.

National Tariff 2009/10[5]), which accounts for 11.6 per cent of the total cost of all emergency admissions.[6] This is equivalent to an average cost of £1,739 per ACSCs admission and an average cost of £170,590 for ACSCs admissions per general practice per year in England.

Cost of admissions for ACSCs by condition

- Figure 4 shows that emergency admissions for influenza and pneumonia (20 per cent), COPD (14 per cent), congestive heart failure (10 per cent) and dehydration and gastroenteritis (9 per cent) cost £755 million (53 per cent of the cost of all admissions for ACSCs).
- The average cost of an emergency hospital admission for ACSCs varied from £734 for ear, nose and throat infections to £4,002 for gangrene.
- The cost of emergency admissions for ACSCs was strongly associated with patients' age, with 40 per cent (£563 million) of expenditure on patients who were 75 years old and over.

Compared with the pattern of admissions for ACSCs shown in Figure 2 (see p 4), the main difference in the pattern of costs is that these are amplified in the older age groups. One explanation is that older patients usually have more co-morbidities, so cases are often more clinically complex and thus more costly.[7] The proportion of expenditure due to elderly patients is higher still once the cost of excess bed days[8] is taken into account, as nearly 80 per cent of patients who stay in hospital for more than two weeks are those who are 65 years old and above (Poteliakhoff and Thompson 2011).

Variations among local areas

We examined the variations of emergency admissions for ACSCs among local authority districts in England in order to identify areas for improvement. Local authorities were selected as the local geographical area of analysis because the boundaries of the future clinical commissioning groups will not normally cross those of local authorities (The King's Fund 2011).

In addition to the quality of services and the system at the local level, emergency hospital admissions can be affected by a number of other factors. These include population age, social deprivation, morbidity levels (prevalence), area of residence (urban vs rural), ethnicity and environmental factors (Purdy 2010). In order to give us more confidence that we were looking at the variation caused by the quality of care rather than these other factors, we adjusted the rate of admissions for ACSCs for the characteristics of the local population. The characteristics we adjusted for included population age, gender and deprivation level.

There were 805,486 emergency hospital admissions for ACSCs recorded for 326 local authorities in England in the year 2009/10,[9] equivalent to 2,470 admissions per local authority. Figure 5 overleaf shows a funnel plot[10] (Association of Public Health

5 The nationally mandated price(s) for a unit of health care activity as published by the Department of Health.

6 This figure is underestimated because (i) the national tariff 2009/10 does not include Health Resource Groups (HRG4) for 3,433 admissions for ACSCs recorded on HES 2009/10 (0.4 per cent of all ACSCs admissions) and (ii) excess bed days payment that account for approximately 8.8 per cent of the total cost of emergency hospital admissions (based on the PbR Reference Costs 2009/10) is not included.

7 This is captured in the allocated Health Resource Groups (HRGs).

8 Each HRG has a maximum expected length of stay (the upper trim point) and any stay in hospital beyond this upper trim point is paid on a per day basis using a tariff specific to excess bed days.

9 Local authorities for 10,965 ACSCs admissions were either not recorded or recorded as local authorities outside England (ie, cross-border patients). These admissions were excluded from this analysis.

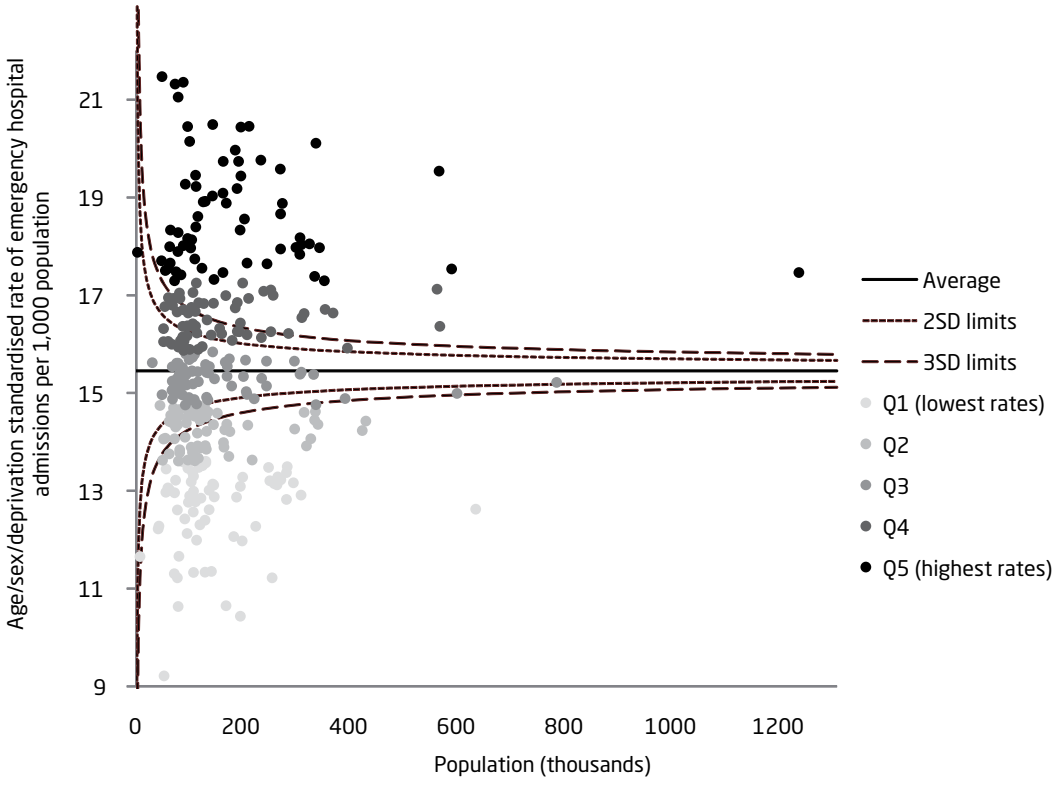
10 Funnel plot is a type of chart where the indicator of interest is plotted against the denominator or sample size – this gives the characteristic funnel shape. The solid line represents the average of all local authorities. The dashed funnel lines represent the upper and lower limits given the assumption that the expected admissions rate is the same for every local authority (ie, the average), the probability that each point falls above the upper lines is 2.5 per cent for 2SD limit (two standard deviations) and 0.1 per cent for 3SD limit (three standard deviations); as is the probability that each point falls below the lower lines.

Observatories 2008) of the rate of emergency hospital admissions for ACSCs for each local authority against its population size. The rates shown are standardised (ie, adjusted) for age, sex and deprivation level (ie, quintile). Local authorities in England are colour-coded to five quintiles (20 per cent) according to their rank in the overall rate of admissions for ACSCs.

Figure 5 shows massive variation between the 326 local authorities in England, after adjusting for the differences in age, gender and deprivation of their local population. Emergency admissions for ACSCs in the local authorities varied from 9.2 to 21.5 per 1,000 population. Of all local authorities in England, 73 per cent (238) were either above or below the 2SD limits.

A proportion of this variation may be explained by the variation in the management of ACSCs in primary care. However, other factors, such as ethnicity, morbidity level and environmental factors, that were not adjusted for in the analysis could also explain the variation (Purdy 2010). There are quite a few risk factors for emergency hospital admissions, some of which we know and some we do not know, and their effect on hospital admissions may vary depending on the individual ACSC. More in-depth analysis of these figures for individual ACSCs is needed to explore and understand the local variations further.

Figure 5: Age/sex/deprivation standardised emergency hospital admissions rate (per 1,000 population) for ACSCs by local authority, England, 2009/10



Note: Population is adjusted due to standardisation calculations

Data source: HES 2009/10, ONS population estimate, Mid-2010

Table 1 and Table 2 opposite provide key figures for seven local authority groups: the local authority quintiles (Q1 to Q5) and the groups of local authorities with rates significantly higher or lower than the average (ie, above or below the 2SD limit). It is worth noting that there is significant variation even within each local authority group.

Table 1 Key figures for the local authority quintiles by rate of emergency admissions for ACSCs

Local authority groups	Observed number of admissions (A)	Standardised rate (B)	Rate difference from Q1 (Qn - Q1) (C)	Rate difference from the next lower quintile (Qn - Q(n-1)) (D)
Q1 (lowest rates)	122,510	12.7	-	-
Q2	128,750	14.2	1.6	1.6
Q3	156,746	15.3	2.6	1.0
Q4	170,073	16.5	3.8	1.3
Q5 (highest rates)	227,407	18.5	5.8	2.0

Data source: HES 2009/10

Table 2 Key figures for the local authorities with rate of emergency admissions for ACSCs significantly different from the national average

Local authority groups	Observed number of admissions (E)	Standardised rate (F)	Number of local authority districts (G)	Rate difference between the two groups (H)
Significantly lower (< 2SD limit)	263,525	13.5	125	-
Significantly higher (> 2SD limit)	375,769	17.7	113	4.2

Data source: HES 2009/10

What is the potential of reducing emergency hospital admissions for ACSCs?

We estimated the potential based on two questions:

- which areas can be improved?
- what level do we expect them to improve to?

Using the seven local authority groups in Table 1 and Table 2 as the unit of analysis, we made three estimates.

- **Being the best** We assume the higher four local authority quintiles (ie, Q2 to Q5) are able to reduce admissions to the same level as Q1 (*see* Column C, Table 1).
- **Moving up the ladder** We assume the higher four quintiles each reach the same level of the quintile below (*see* Column D, Table 1).
- **Poorer to better** We assume local authorities with significantly higher rates (than the average) as a group achieve the average rate of the local authorities with significantly lower rates (*see* Column H, Table 2).

Table 3 shows the estimated reduction in hospital admissions for ACSCs and cost after taking into account age, sex and deprivation level of the population. The number of emergency hospital admissions for ACSCs can be reduced by:

- 18 per cent (150,373 per year) in being the best – potential cost reduction £238 million
- 8 per cent (63,214 per year) in moving up the ladder – potential cost reduction £96 million
- 11 per cent (90,471 per year) in poorer to better – potential cost reduction £136 million a year.

Table 3 Estimated reduction in emergency hospital admissions for ACSCs and costs per year, England

	Estimated hospital admissions reduction			Estimated costs reduction	
	No	%	Rate per 1,000 population*	£ (million)	%
Being the best	150,373	18	3.52	237.6	17
Moving up the ladder	63,214	8	1.48	95.8	7
Poorer to better	90,472	11	4.32	136.3	10

*Rate in population in the areas for improvement

It is worth noting that our estimation approach is conservative as we used aggregated local authority groups (rather than individual local authorities) as unit of analysis.[11]

What the data shows

This data briefing has demonstrated that there can be improvements made in the quality of care and the productivity from reducing admissions for ACSCs.

- ACSCs account for 16 per cent (816,433) of all emergency hospital admissions in England. These admissions cost the NHS £1.42 billion annually.
- Our analysis shows that the number of emergency hospital admissions for ACSCs could be reduced by 18 per cent if all local authorities performed at the level of the best-performing quintile local authorities; by 8 per cent if each quintile local authorities performed at the level of the next best quintile local authorities; and by 11 per cent if the poorer (than the average) performing local authorities performed at the level of the better (than the average) ones.
- The cost that could be saved from emergency hospital admissions for ACSCs is estimated at £238 million, £96 million and £136 million per year according to the three estimates. Some of these savings would need to be spent in improving care and interventions to avoid these admissions.

This data briefing has also highlighted the disease areas and patient groups where the greatest reduction can be achieved.

- The proportion of emergency admissions for ACSCs is higher in children under 5 years old (14 per cent of all ACSCs admissions) and those aged 75 and over (30 per cent of all ACSC admissions). Children are predominantly admitted for acute conditions (eg, ear, nose and throat infections); older people for chronic conditions (eg, COPD, angina and congestive heart failure); and both groups for vaccine-preventable conditions (eg, influenza and pneumonia).
- The admissions rate for ACSCs in the most deprived areas is more than twice (2.4 times) the rate in the least deprived areas in England.
- Influenza, pneumonia, COPD, congestive heart failure, dehydration and gastroenteritis account for more than half (53 per cent) of the cost of emergency ACSCs admissions.
- Older people (aged 75 years and over) account for £563 million (40 per cent) of total spend.

11 There is more variation among individual local authorities and an estimate based on the individual local authorities would come up with larger estimated reductions in hospital admissions and cost. We used the aggregated local authority groups in our analysis to avoid the small numbers' issue in case-mix stratification in our analysis (Zaslavsky 2001). In addition, our estimates were variation-based and did not take into account the potential reductions over time from managing ACSCs more effectively. By applying the conservative approach, we aimed to make sure that these estimates are achievable. Details of the methods used for the estimates can be found in the Appendix (*see* p 13).

- A significant proportion (13 per cent) of admissions for ACSCs was individuals with influenza and pneumonia. These admissions cost £286 million per year. Many of these cases of influenza and pneumonia are vaccine-preventable.

Where to start?

In order to realise the potential savings, in the short to medium term better management of ACSCs in primary care is needed to reduce emergency hospital admissions (ie, secondary prevention). In the longer term, commissioners need to tackle the underlying causes of ACSCs (ie, primary prevention), for example, reducing prevalence of chronic diseases, such as diabetes, through public health and preventive measures. A good start would be for clinical commissioning groups to use data on variations in emergency admissions from ACSCs by constituent practices to understand variations in the quality of general practice as one of the causes.

Some progress can be made through relatively simple measures such as expanding vaccination, where available, to prevent the onset of a condition (Imison *et al* 2011). For chronic and acute conditions, commissioners will need to encourage self-care support, effective case management, and consistent chronic disease management in primary care (Ham *et al* 2010). A previous review of evidence (Purdy 2010) suggests that the following evidence-based interventions for avoidable admissions should be implemented and their impact evaluated in the local context:

- disease management and support for self-management for those with long-term conditions
- telephone health coaching
- other behavioural change programmes to encourage patient lifestyle change.

The review also suggested that improvements in the quality of primary and secondary care are needed, for example:

- increase continuity of care with a GP
- ensure local, out-of-hours primary care arrangements are effective
- for those with acute aggravated conditions, ensure there is easy access to urgent care
- conduct early senior review in A&E, and implement structured discharge planning.

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Appendix: Methods

Data sources

Table 4 Data sources used in this data briefing

	Datasets	Description
1	Hospital Episode Statistics (HES) 2009/10, final version	Hospital episode data for 2009/10
2	ONS Lower Super Output Area (LSOA) population estimates for England and Wales Mid-2010 www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-230902	LSOA population data by age group (0-15, 16-29, 30-44, 45-64, 65+) and gender (male, female)
3	The English Indices of Deprivation 2010: Overall www.communities.gov.uk/publications/corporate/statistics/indices2010	Overall Indices of Multiple Deprivations (IMD) score 2010 by LSOA
4	National mandatory tariff 2009/10 http://collections.europarchive.org/tna/20100509080731/http://dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_094091	Mandatory prices for admitted inpatient care: non-elective spell tariff

Data analysis

Standardised hospital admissions rate

All standardised rates are calculated using indirect standardisation. The age/sex-specific rates of a chosen standard population (national population) are applied to the age/sex structure of the subject population to give an expected number of events. The observed number of events is then compared to that expected and is expressed as a rate (observed/expected × crude rate in the standard population).

Cost calculation

Cost for each hospital admission is calculated using the mandated price(s) for a unit of health care activity as published by Department of Health (national tariff 2009/10) for the Health Resource Group (HRG4) of the first episode of the spell (HES field name: sushrg).

Reduction estimates

ACSCs hospital admission rates by five age groups (0–15, 16–29, 30–44,45–64, 65+), sex (male, female) and deprivation quintiles (based on IMD overall score) for each condition (19 conditions) for the reference level local authority groups are used to calculate the expected number of admissions for the local authority groups for which improvement is needed. The reduction is calculated as the difference between the observed number of ACSCs hospital admissions and the expected number of ACSCs admissions (ie, estimated reduction = observed – expected). Cost reduction is estimated by applying the average unit cost for each ACSC to the calculated reduction of hospital admissions for each condition.