

**Why are heart failure admissions
falling?
A national observational study.**

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Outline of Presentation

Who am I?!

My research project

- Work in progress!
- Trends in heart failure admissions
- Risk and protective factors for hospital admission for heart failure

Personal reflections on 4 months as an Academic F2

Questions/Suggestions

Who am I?!

Foundation Year 2 Doctor

4 month 'Academic GP' placement

3d week in DPCPH – research and teaching

2d week in GP – Chartfield surgery

From August I will be

- Academic Clinical Fellow in General Practice (4y)
- Oxford
- Continue research... (in what?!)



Background to Study – why heart failure (HF) ?

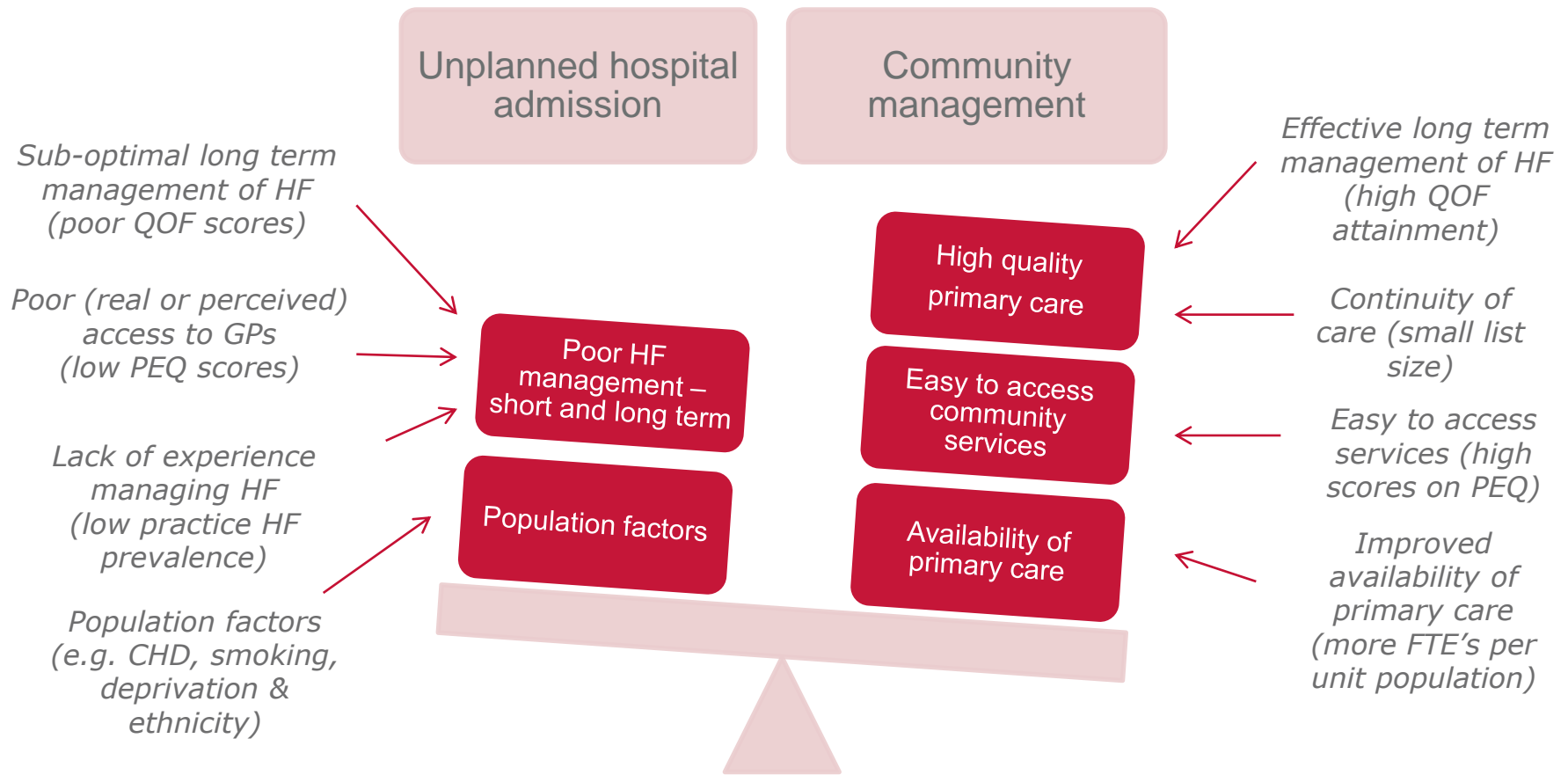
Important clinical syndrome

- 900,000 currently affected (UK)
- Dramatic impairment on QOL
- Poor prognosis
- High burden of admissions on NHS and emergency departments
- Costly for the NHS

Primary Care Sensitive Condition

- Unplanned hospital admission may be reduced by high quality primary care.

How might primary care factors influence HF admissions?



HF = heart failure, QOF = Quality Outcomes Framework, PEQ = patient experience questionnaire, FTEs = full time equivalents.

Study aims and objective

National observational study of the English population registered with GP practices.

Aims

Investigate the trend in heart failure admissions over time

Investigate associations between heart failure admissions and:

- Population factors
- Primary healthcare resourcing
- Quality of primary care

Objective:

To determine if the risk of hospital admission for heart failure is reduced by more effective management of heart failure in primary care.

Methods – Data Sources

Information about all GP practice in England (2004 -2010) – variety of sources:

Hospital Episodes Statistics (HES) Database

- Annual heart failure admission counts (HF as 1^o diagnosis)
- Ethnicity breakdowns of each practice population

National Information Centre

- Indirectly standardised expected annual heart failure admission counts (standardised using age/sex breakdown of practice.)
- GP full time equivalents (FTEs) per 100000 patients
- Practice list size

English Indices of Deprivation

- Index of multiple deprivation (IMD) weighting – produced by aggregating postcodes of individual registered patients

Quality Outcomes Framework

- Score on HF3 indicator, i.e. % of patients with a Dx of HF treated with an ACEi or ARB
- National Patient Survey (NPS) patient reported access scores
- Coronary heart disease (CHD) and smoking prevalence

Methods – Statistical analysis

STATA 11 used for statistical analysis

Trend in actual (i.e. observed) HF admissions over time

Baseline characteristics of GP practices

Change in key covariates over time – paired t test used to assess significance

Clustered negative binomial regression analysis

- Used to produce incidence rate ratios (in this case, admission risk ratios) and assess the significance of potential covariates.
- Non significant factors were removed from the model using the likelihood ratio test.
- Due to lack of independence, the clustering effect of GP practice was adjusted for in the model.
- Standard Wald test was used to evaluate the model goodness-of-fit (as used robust standard errors)

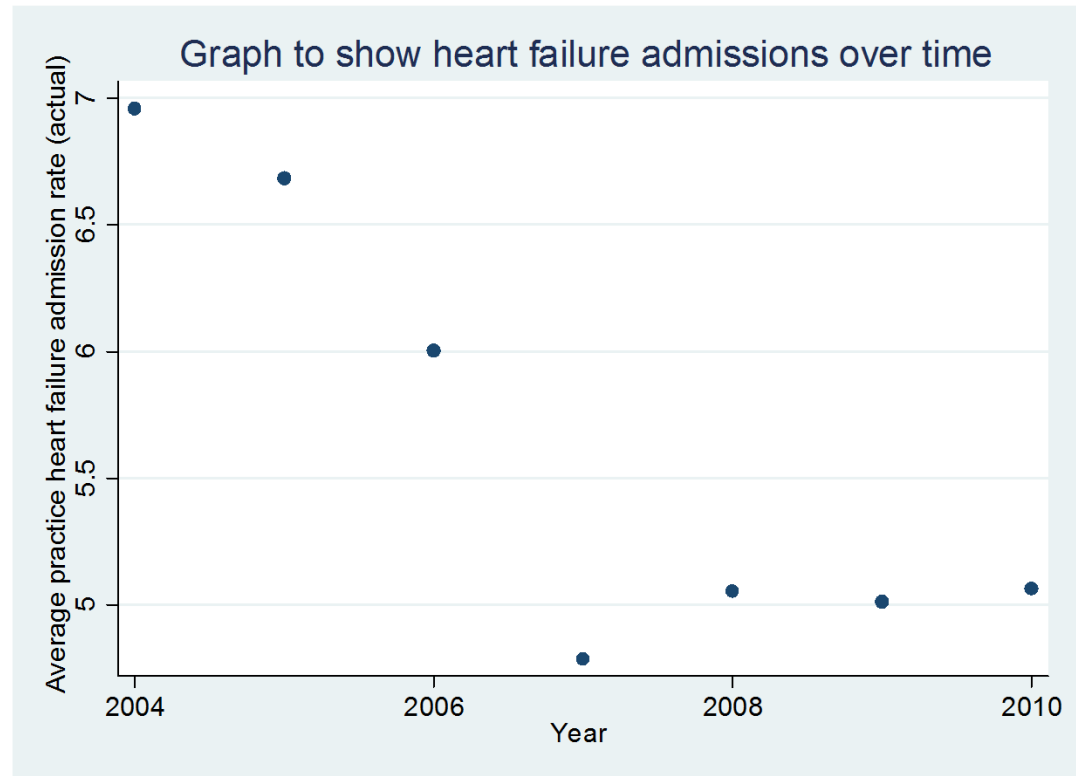
Results – time trend

Heart failure admissions fell significantly over study period

Average practice HF admissions reduced from 6.96 (2004) to 5.04 (2010)

Average 2.02 fewer admissions per practice ($p < 0.001$, 95% CI 1.90-2.14)

Corresponds to a 27.3% fall in admissions over study period



Results – practice characteristics

	mean	median	IQR	Range	Year(s) ^f
Observed HF admissions	5.66	4	1-8	0-56	2004-10
Expected HF admissions ^a	5.66	5.55	2.38-7.96	0.02-42.83	2004-10
Heart failure prevalence	0.742%	0.7%	0.42-0.92%	0-21.4%	2006-10
CHD prevalence	5.71%	5.72%	4.72-6.68%	0-14.74%	2010
Smoking prevalence	21.00%	20.96%	16.42-25.77%	0-51.21%	2010
QOF attainment (HF3) ^b	90.22%	91.36%	87.64-95.54%	0-100%	2006-10
PE07 attainment ^c	82.75%	85.39%	77.25-91.79%	0-100%	2008-10
PE08 attainment ^d	75.68%	78.57%	65.96-88.57%	0-100%	2008-10
GP FTEs/100000 pt pop.	3.55	3	1.72-4.92	0.315-21.88	2004-10
List size	6488.91	5673	3294-8892	501-40228	2004-10
IMD weighting ^e	23.52	21.37	12.43-31.56	2.49-68.97	2004, 07, 10
White population (%)	71.09%	77.15%	64.07-84.72%	0.31-100%	2010
Asian population (%)	6.57%	1.27%	0.33-5.40%	0-93.03%	2010
Other (population (%))	1.94%	0.73%	0.32-2.26%	0-39.51%	2010
Mixed population (%)	1.00%	0.56%	0.24-1.36%	0-27.71%	2010
Ethnicity data missing (%)	15.68%	13.78%	9.99-19.31%	0-93.90%	2010

^a Admissions are adjusted for age and sex (indirectly standardized), calculated as [standardized admission ratio (observed admission counts/expected admission counts)] x [national admission rate/100,000]

Results – Changes in key covariates over time

	2004*		2010		% change	P-value
	Mean	IQR	Mean	IQR		
Observed admissions/100,000 pts	6.96	3-10	5.06	1-8	-27.30	<0.001
Expected admissions/100,000 pts	5.31	2.31-7.43	6.00	2.46-8.50	12.99	<0.001
Heart failure prevalence	0.77	0.51-0.97	0.71	0.50-0.90	-7.79	<0.001
HF3 attainment	91.19	86-100	90.68	86-100	-1.41	0.029
PE07 attainment	83.94	79.29-92.98	82.18	76.42-91.00	-2.10	<0.001
PE08 attainment	74.80	64.89-87.61	75.34	66.03-87.50	0.72	<0.001
GP FTEs/100000 pt pop.	3.31	1.6-4.6	3.76	2-5	13.60	<0.001
List size	6248.57	3141-8540	6697.58	2239-9197	7.19	<0.001
IMD weighting ^c	23.84	13.36-32.43	23.75	13.63-32.25	-0.38	0.5035

* 2004 or earliest year for which results were available for analysis. Variables where only 1y of data available were omitted.

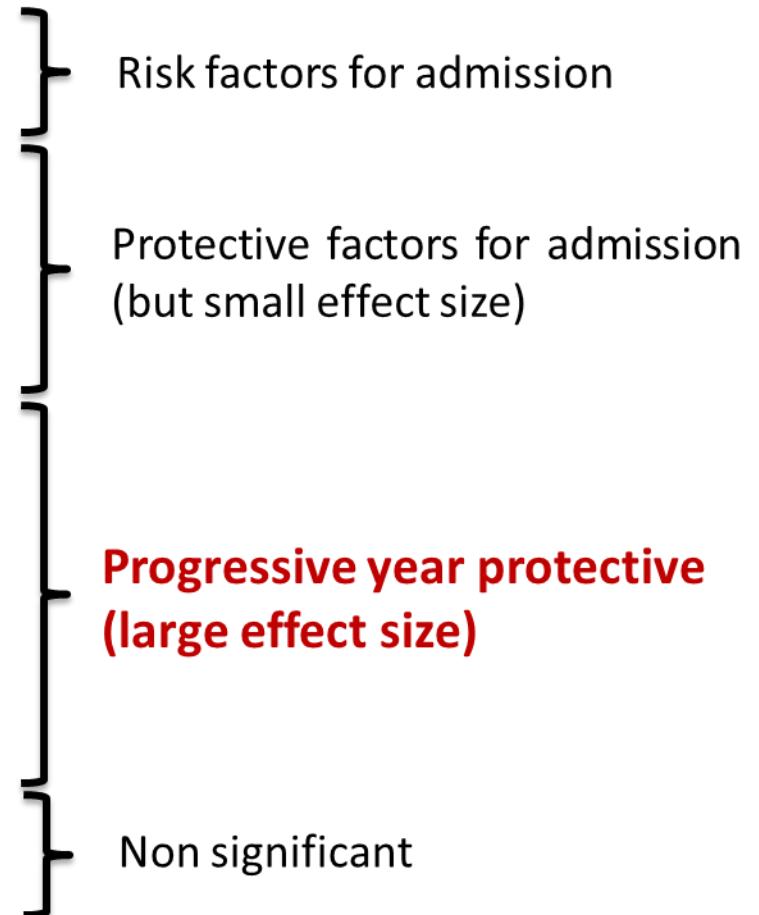
HF3 attainment = % of patients with a dx of HF treated with an ACEi or ARB

PE 07 attainment = % of patients who indicate that they were able to obtain a consultation with their GP

PE 08 attainment = % of patients who indicate that they were able to book an appointment with their GP more than 2 days ahead

Results – clustered negative binomial regression analysis

	IRR	P value	95% CI
Deprivation	1.0144	<0.001	1.013-1.016
HF prevalence	1.0722	<0.001	1.049-1.096
CHD prevalence	0.9758	<0.001	0.967-0.985
PE07 attainment	0.9984	<0.001	0.998-0.999
PE08 attainment	0.9982	<0.001	0.998-0.999
GP supply	0.9909	<0.001	0.986-0.996
2005 (vs 2004)	0.9509	<0.001	0.937-0.965
2006 (vs 2004)	0.8316	<0.001	0.818-0.846
2007 (vs 2004)	0.6469	<0.001	0.634-0.661
2008 (vs 2004)	0.6642	<0.001	0.650-0.678
2009 (vs 2004)	0.6517	<0.001	0.638-0.665
2010 (vs 2004)	0.6503	<0.001	0.637-0.664
Smoking prevalence	1.0005	0.593	0.999-1.002
QOF attainment	0.9998	0.625	0.998-0.999



IRR = Incidence rate ratio (in this case, admission risk ratio)

NB: List size and GP FTE's dropped from the model

Discussion

- Time was progressively protective against admission – MUCH larger effect size than all other variables
- Cannot be explained by any of the explanatory covariates we considered, including a range of markers of primary care quality.
- Suggests the potential for significant further reductions in emergency HF admissions by improving the clinical quality of primary care (at least as measured by QOF) may be limited.
- QOF attainment for a key heart failure domain (HF3) has fallen over the study period and is not significantly associated with the risk of admission.
 - Is QOF fit for purpose?!
- Further work is needed to identify the reason behind the reduction over time
 - Identify other initiatives that may have greater impact on admission rates.
 - May also inform more sensitive markers of primary care quality.

Conclusions

- HF admissions are decreasing over time
- Deprivation and high practice HF prevalence increase risk of admission.
- Greater GP supply and better access to GPs protect against admission.
- However, despite significance, these effects are very small
- QOF attainment (a proposed marker of primary care quality) does not affect the risk of admission
- Overall, year has by far the strongest protective effect against admission, with a steady reduction in admission risk from 2004-10.
- This reduction cannot be explained by available markers of primary care quality (i.e. QOF scores), access to primary care or population factors.
- Further work is required to identify the reason behind this reduction in admissions over time to enable us to improve care quality and assessment of care quality, and to and prevent unnecessary admissions.

Personal Reflection's

Nervous (but unfounded)

- Career choice?
- Research component?

Very different!

- No 'on calls'
- Self directed learning
- Time management
- Lack of day to day feedback on progress and achievement

Wide variety

Opportunity to work with non-medics

4 months – goes very quickly...

Learnt A LOT!

- Developing a research question
- Research methods and stats!
- Teaching and assessment
- Life as a GP
- Clinical knowledge&consultation skills
- Courses: including systematic review, teaching skills, research methods, coaching, more stats...
- What I enjoy doing
- What I don't enjoy doing
- What I'm not very good at...

Overall great experience!

Acknowledgements

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Any questions or comments?

