Substitution between health and social care services in the community: the ECCEP study

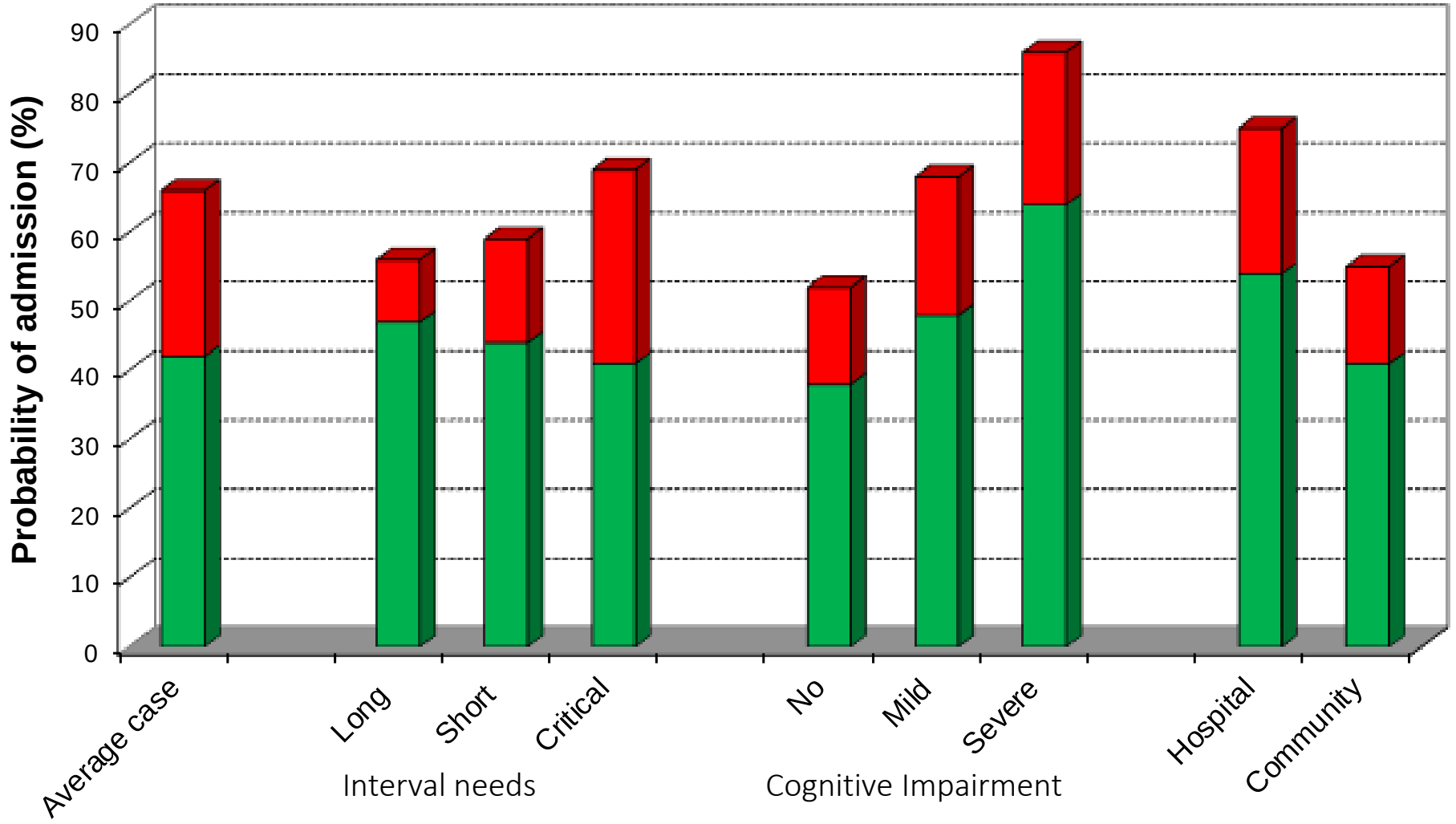
- Evaluation of the effect of community services on care outcomes
- Sample of 286 older people receiving social care services in the community followed for 2 years from first assessment
- Analysis of the impact of risk factors and social care services on acute care use over 2 years
- Estimation: Two-Part Models, Logit and GLM
- Ref: Fernandez and Davies (2007)

Predictors of probability of admission

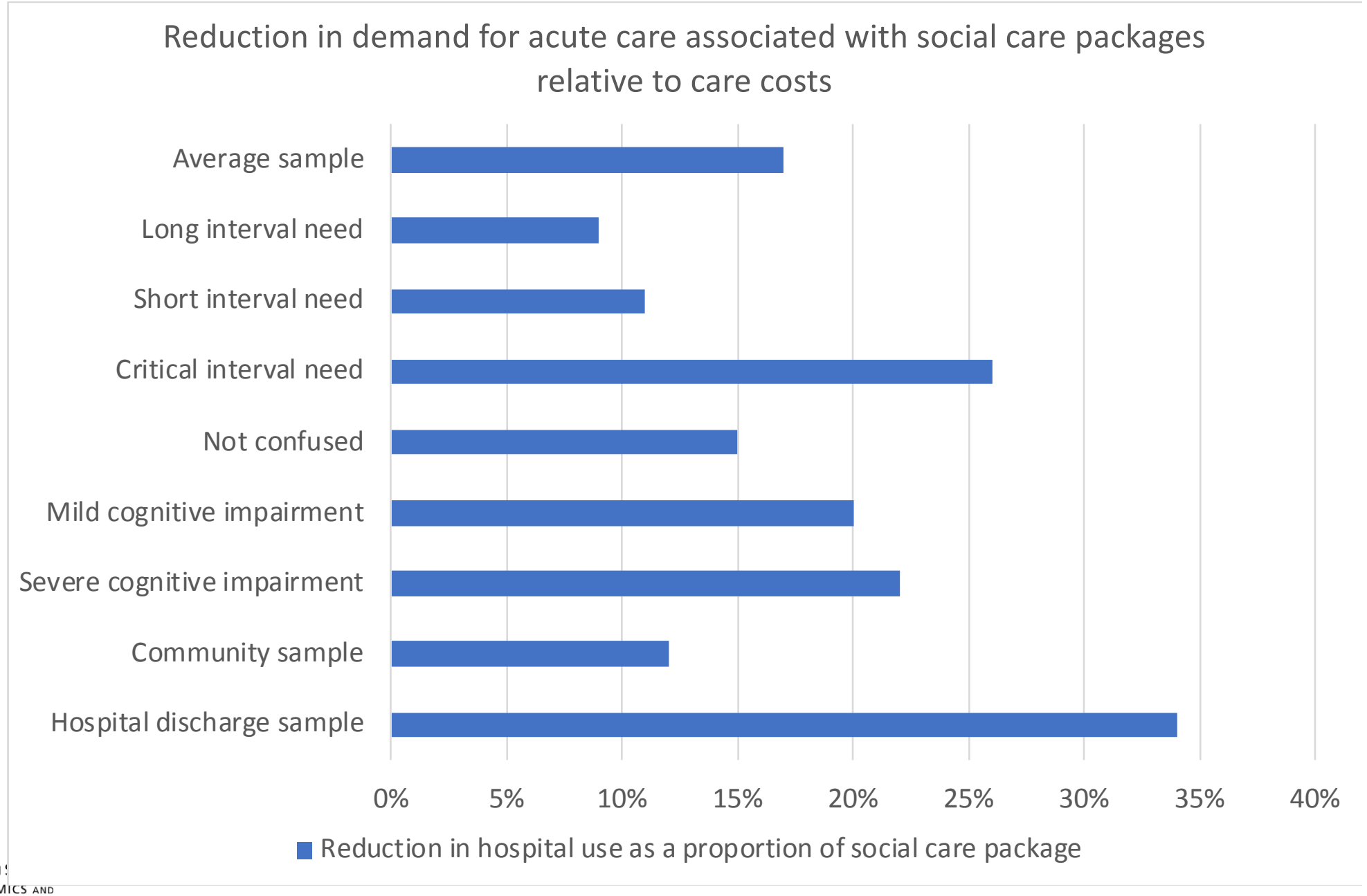
	Logit model		
	Coeff.	Robust Std. Err.	P>[z]
User discharged from hospital	1.21	.011	.00
Count problems with IADL tasks (squared)	.08	.001	.00
Cog. Imp. Score (squared)	.002	.001	.12
Count user fears (squared)	.03	.008	.00
Count risks to user	.25	.024	.00
User is male	.79	.067	.00
Carer is stressed	.53	.241	.03
Carer's health affects caring	1.15	.656	.08
Home Care level, stroke victims	-.01	.005	.02
Home Care level, high dependency IADLs (log)	-.41	.115	.00
Day Care level, user lives alone	-.02	.008	.04
Respite care level, hospital discharge (log)	-.57	.037	.00
Nursing visits, PIC co-resident (log)	-.47	.010	.00

Effect of observed allocations on 2-year probability of admission into hospital

Estimates based on Logit model results

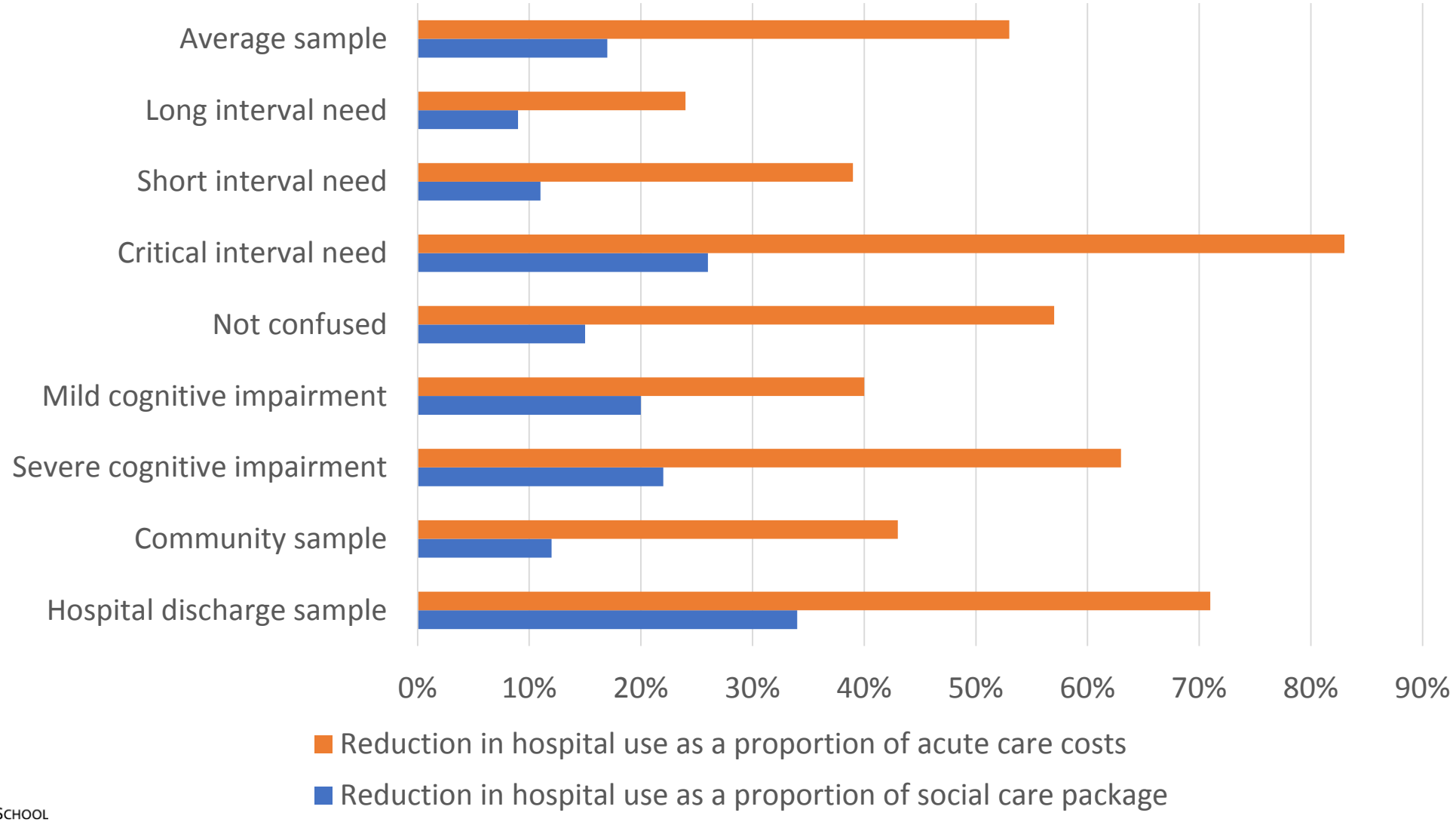


Source: Fernandez and Davies (2007)



Source: Fernandez and Davies (2007)

Reduction in demand for acute care associated with social care packages relative to care costs



Source: Fernandez and Davies (2007)

Summary of key points

- There is now significant and growing evidence of the substitution effects between acute health and social care services
- The reduction in demand for acute health care seems to be greater for people with greater levels of need
- However, the reduction in acute care demand is significantly below the cost of social care services
- The substitution effects work on both directions: investment in health care services can reduce the need for social care
- So the justification for social care services cannot be made purely on the grounds of their impact on the acute care sector

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Hospital coordination and integration with social care in England: The effect on post-operative length of stay☆,☆☆

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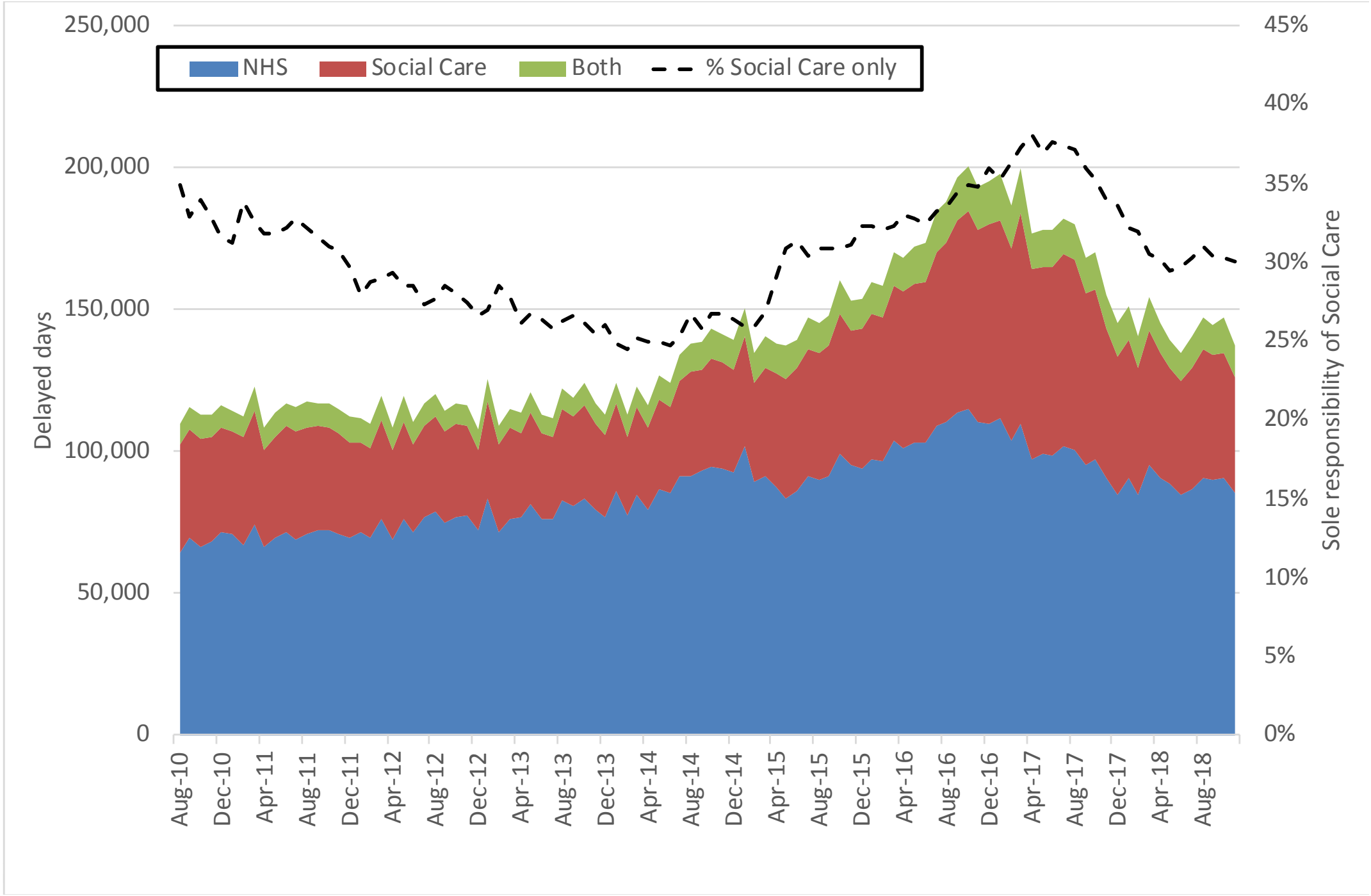
[b] LSE Health, LSE, UK
[c] Department of Economics, University of Piraeus, Athens, Greece


NHS
Social Care
Both
% Social Care only
Delayed days
Sole responsibility of Social Care
250,000
200,000
150,000
100,000
50,000
0
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Aug-10
Dec-10
Apr-11
Aug-11
Dec-11
Apr-12
Aug-12
Dec-12
Apr-13
Aug-13
Dec-13
Apr-14
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Dec-14
Apr-15
Aug-15
Dec-15
Apr-16
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Apr-17
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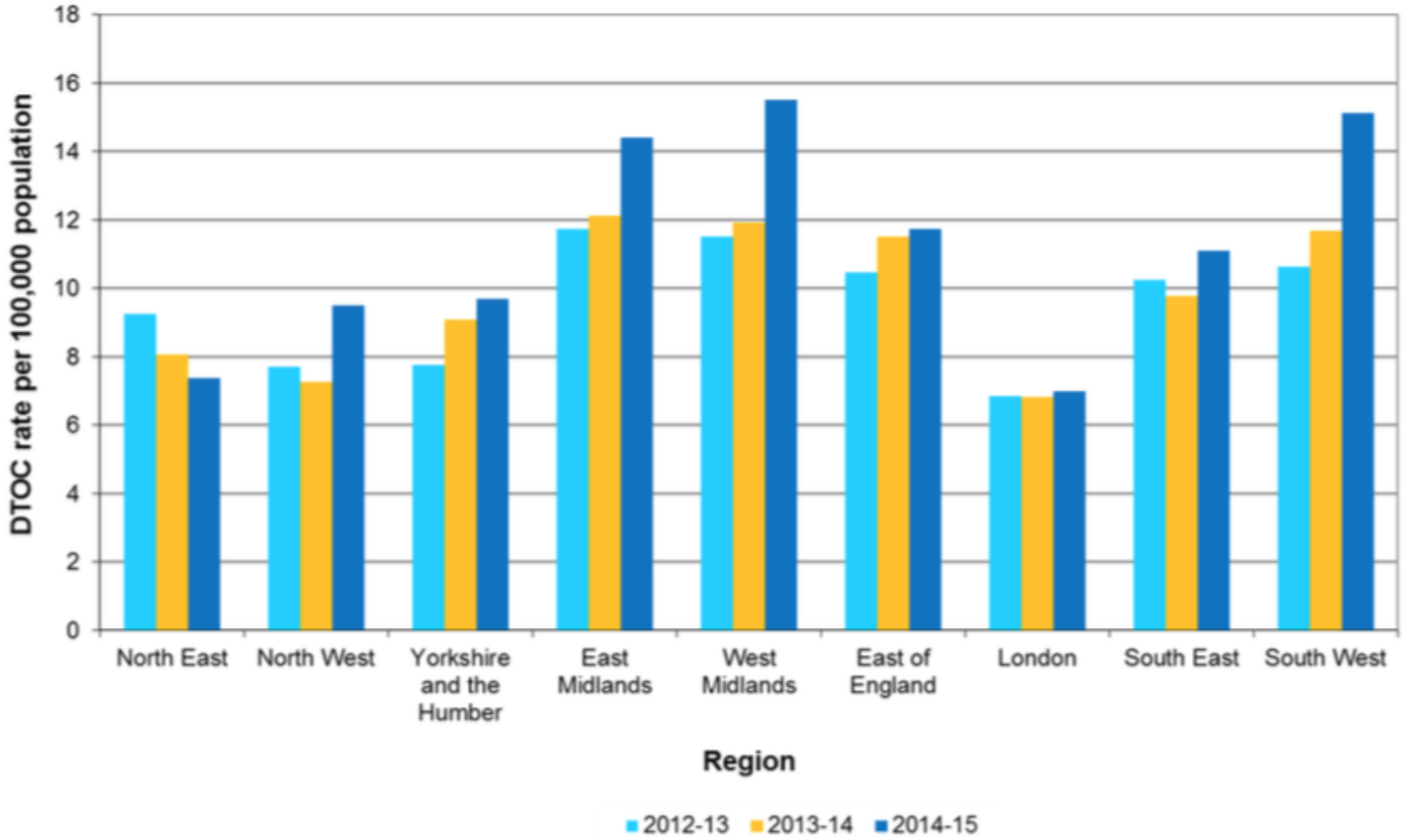
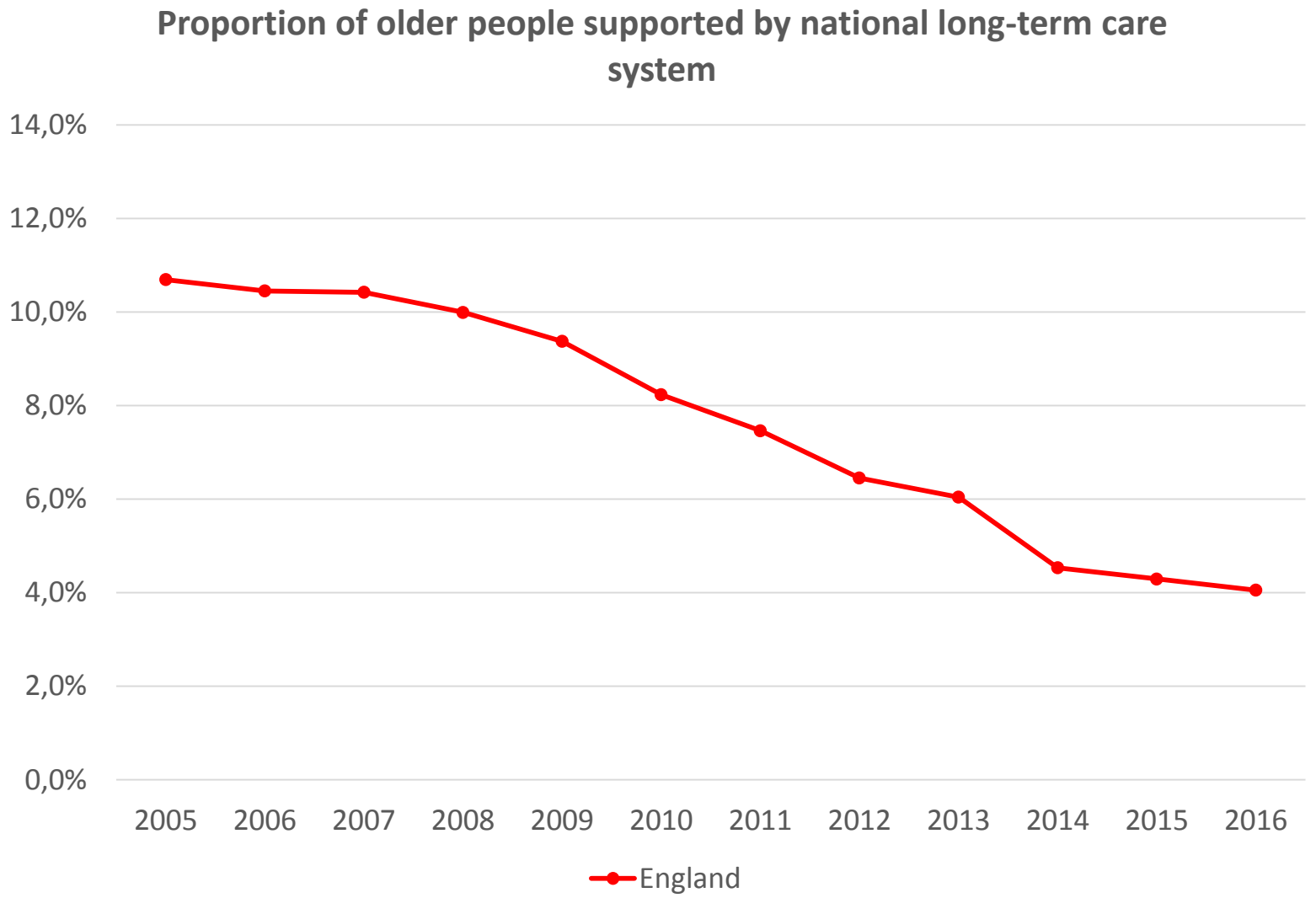
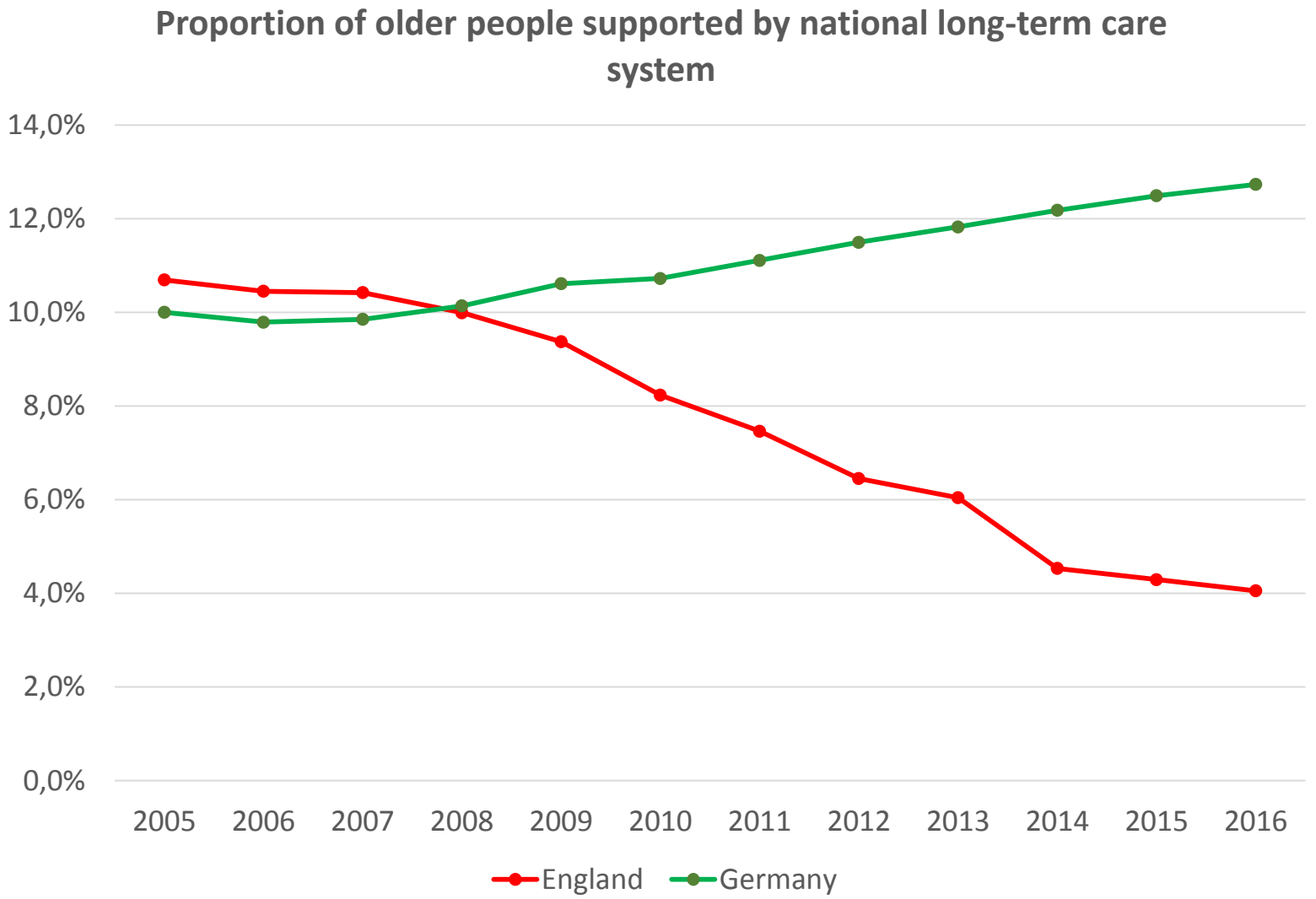
Dec-17
Apr-18
Aug-18

Chart 7: Daily DTOC rate for all delays by region for 2012/13 to 2014/15[1]



[1] 2013 ONS Population estimates have been used in the above calculations for both 2013/14 and 2014/15


Proportion of older people supported by national long-term care system
14,0%
12,0%
10,0%
8,0%
6,0%
4,0%
2,0%
0,0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
England


Proportion of older people supported by national long-term care system
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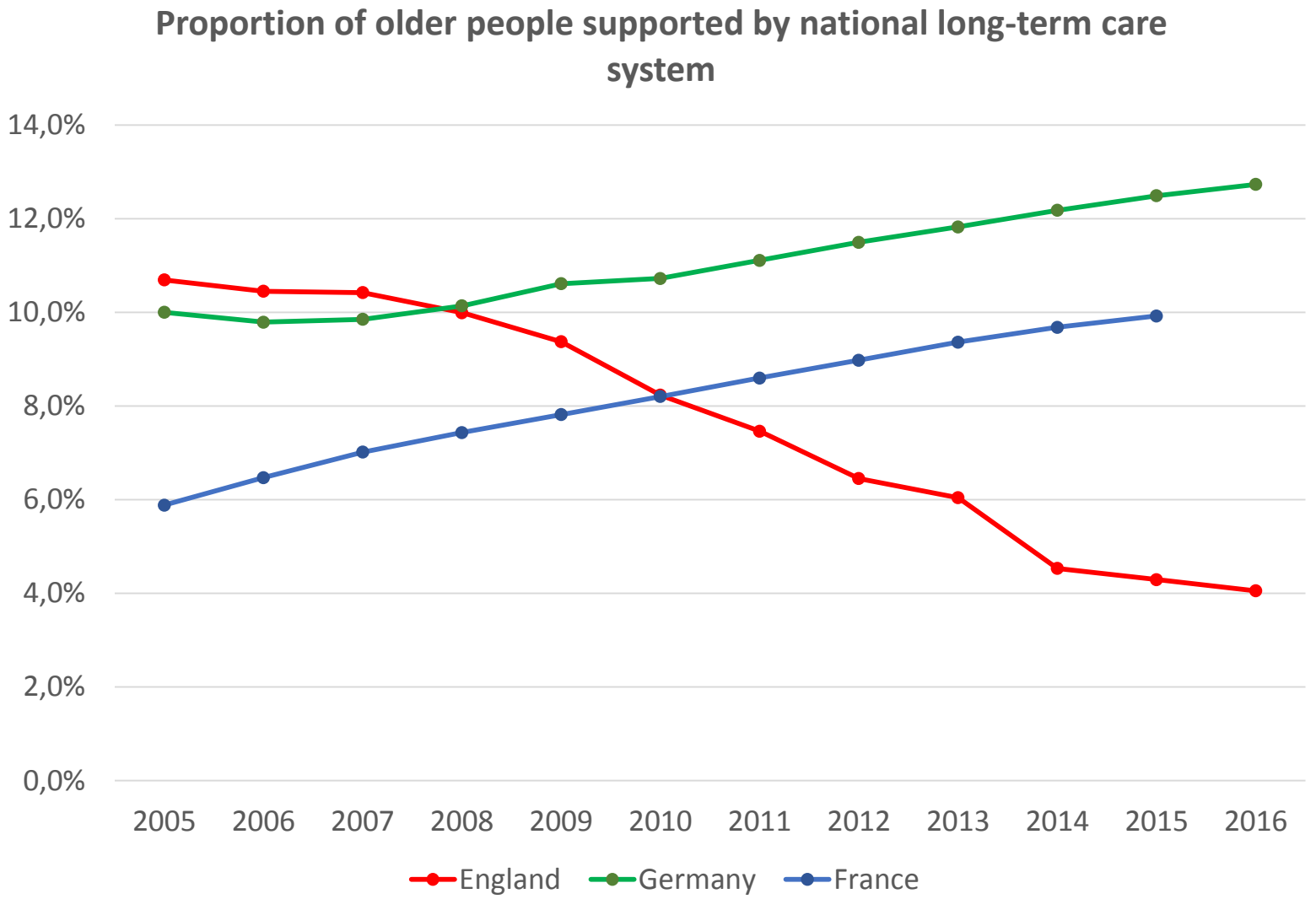
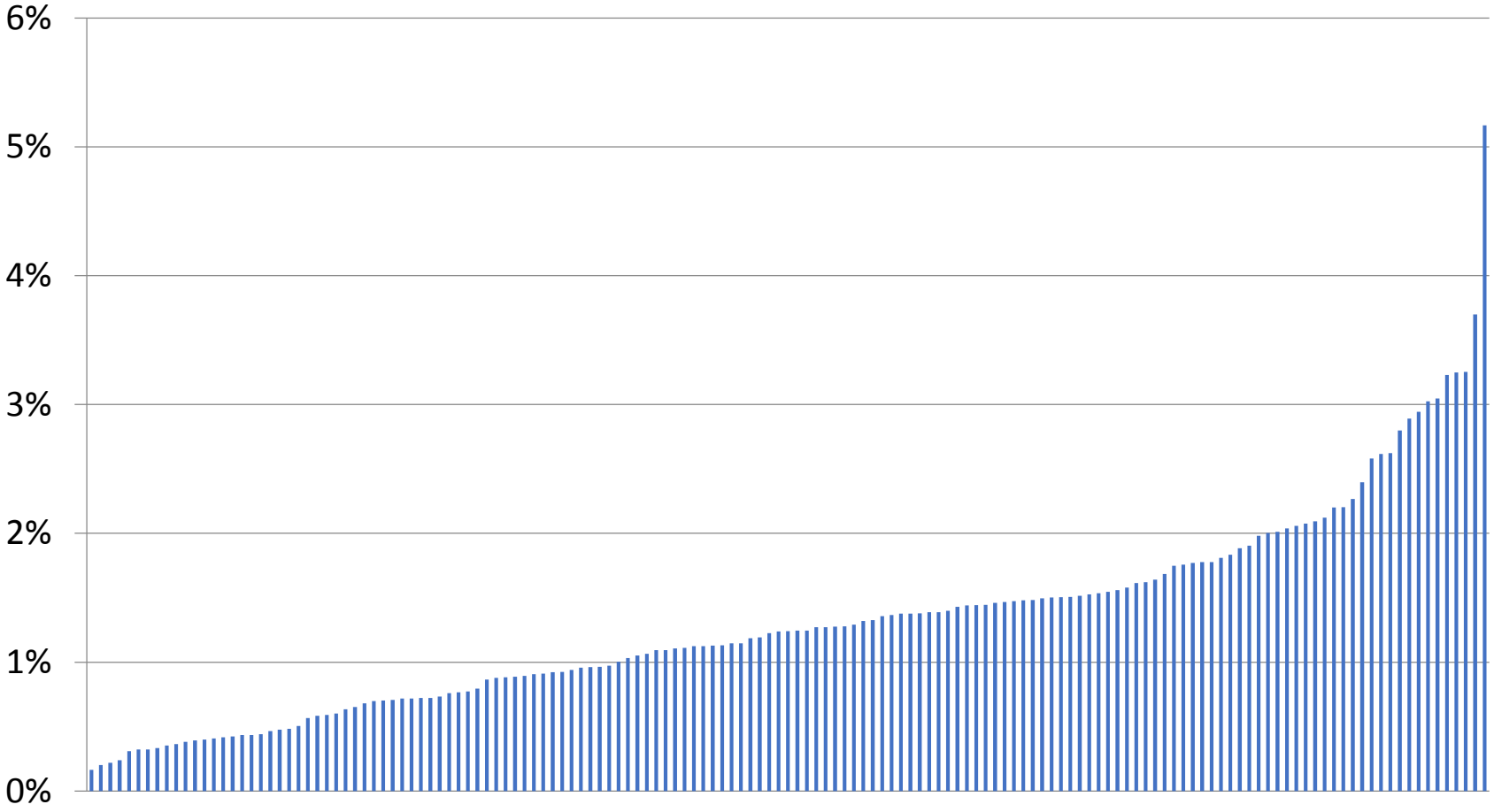
10,0%
8,0%
6,0%
4,0%
2,0%
0,0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
England
Germany


Proportion of older people supported by national long-term care system
14,0%
12,0%
10,0%
8,0%
6,0%
4,0%
2,0%
0,0%
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
England
Germany
France

Proportion of population supported to live independently by social care services across local authorities



Source: Information Centre, 2012

Motivation of analysis

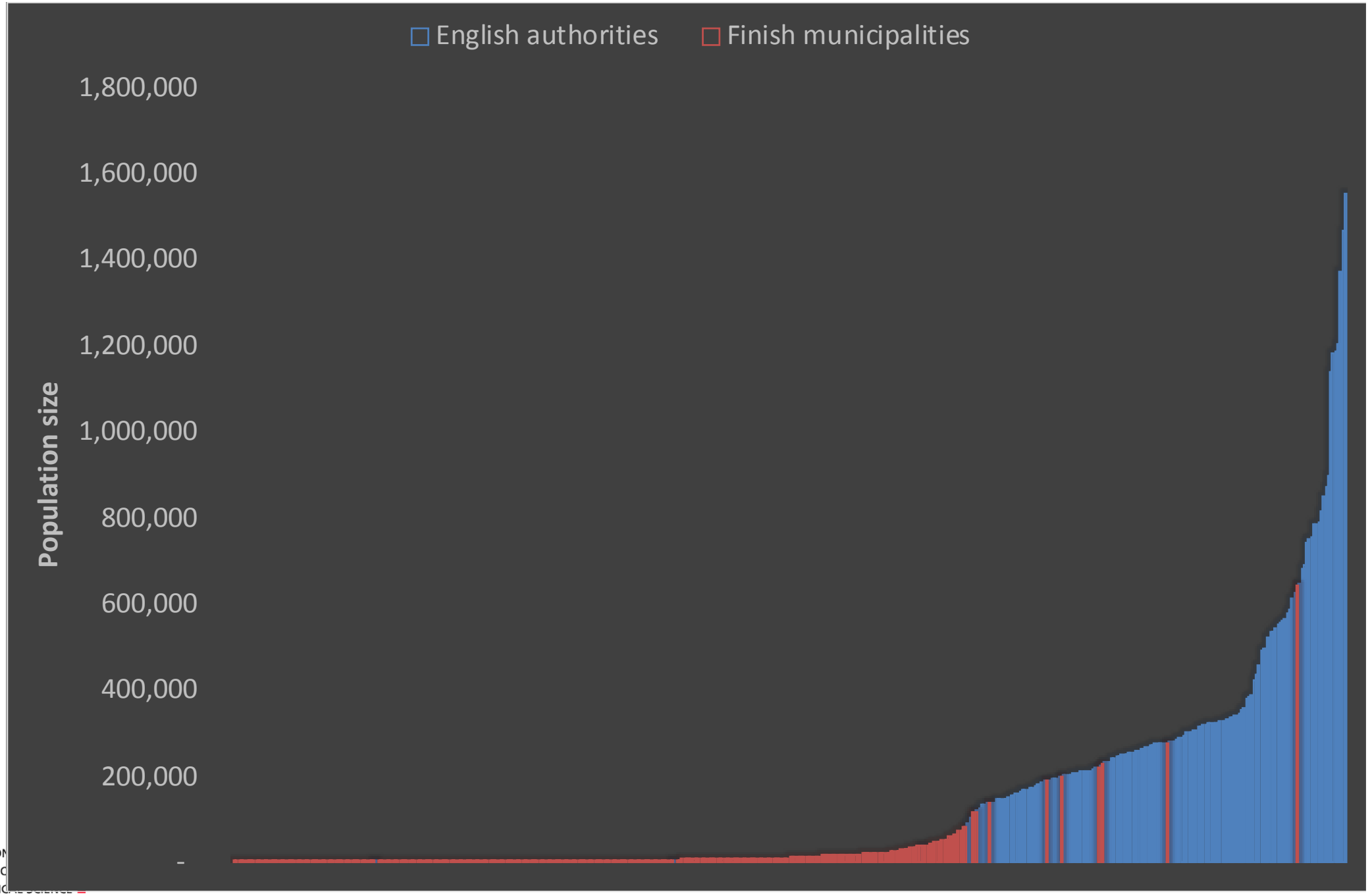
- Concern with acute care performance, and impact of bed-blocking and inappropriate discharges
- Separation in UK of health and social care (Funding, Professional, Administrative)
- Significant variability in local systems, in particular in social care
  - Size of LAs (e.g. much smaller in London)
  - Organisation (e.g. pooling of funds, assessment processes)
  - Coverage (how many people receive what support)
- Objective of the paper was to understand whether the complexity of coordination arrangements between health and social care affects significantly acute care performance

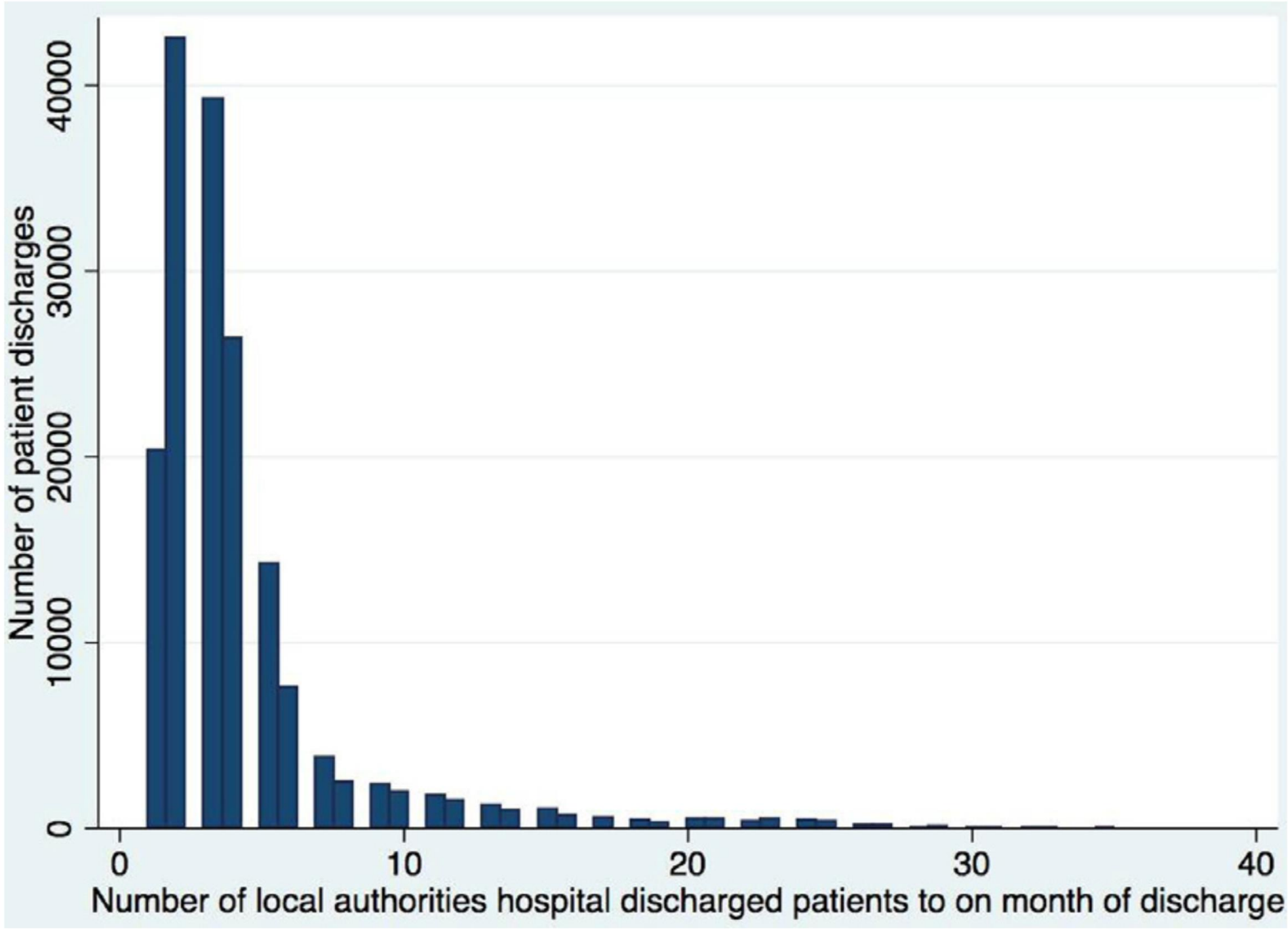
A model of hospital discharge

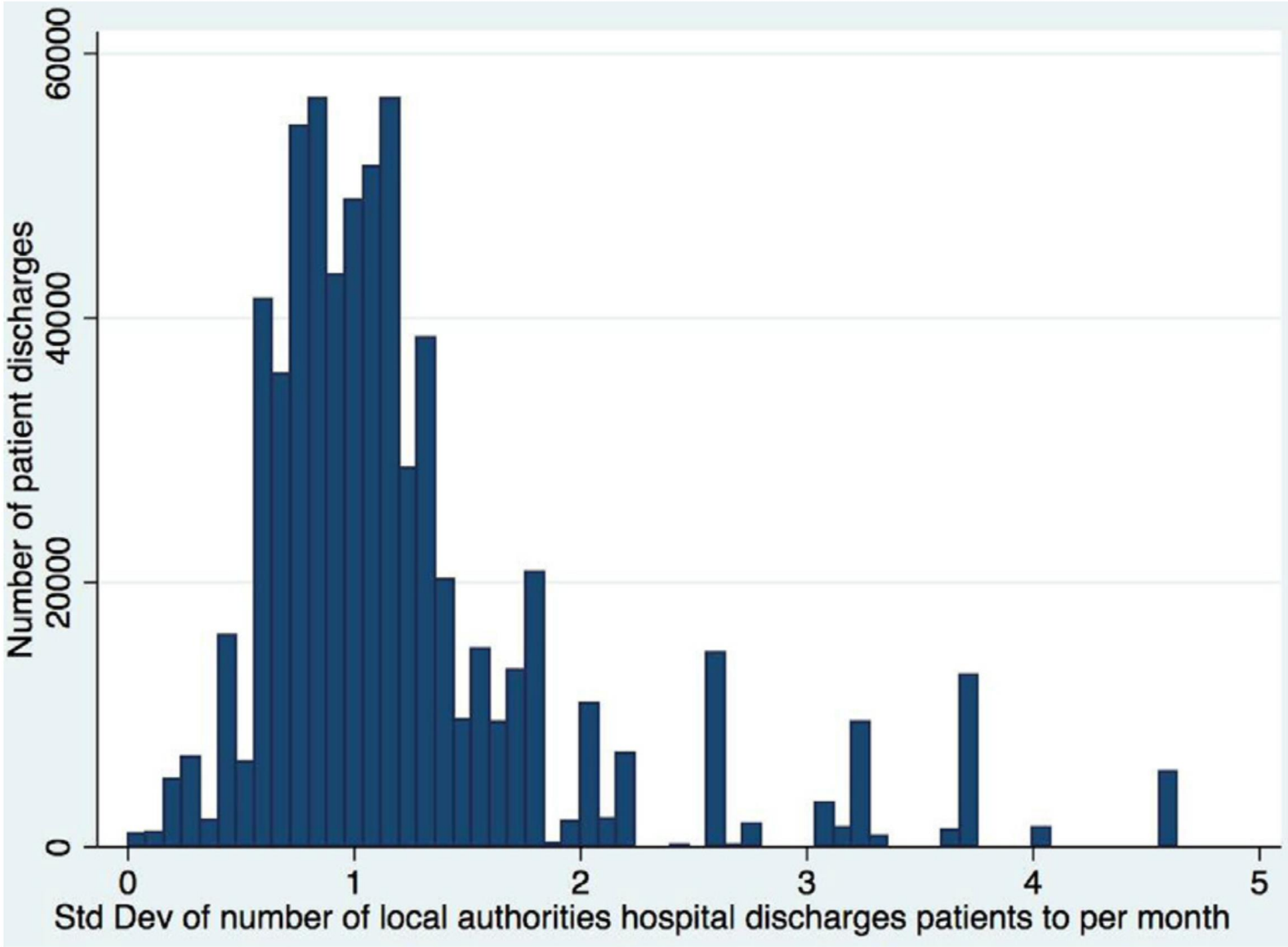
- **Hypothesis** that hospitals transacting costs over discharge will increase as hospitals deal with
  - Increasing numbers of LAs
  - Volatility of the numbers of LAs
- Flexible parametric survival model approach, (Royston & Parmar, 2002)
  - Flexibility in the specification of the underlying hazard function
  - Smoothing baseline cumulative hazard function across a number of linear splines
- Competing risks model of hospital discharge (Wei, Lin, & Weissfeld, 1989)
  - Discharge to usual place of residence, discharge to nursing home or discharge to residential home
- Range of specifications of LA and hospital FEs

Data

- Dependent variable: post-operative time to discharge
- Sample: Over 74 year-olds undergoing elective hip operations
- Hospital Episode Statistics data between 2002 to 2013
- 172,442 patients
- 152 local authorities and 192 NHS hospitals in England


English authorities
Finish municipalities
Population size
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-





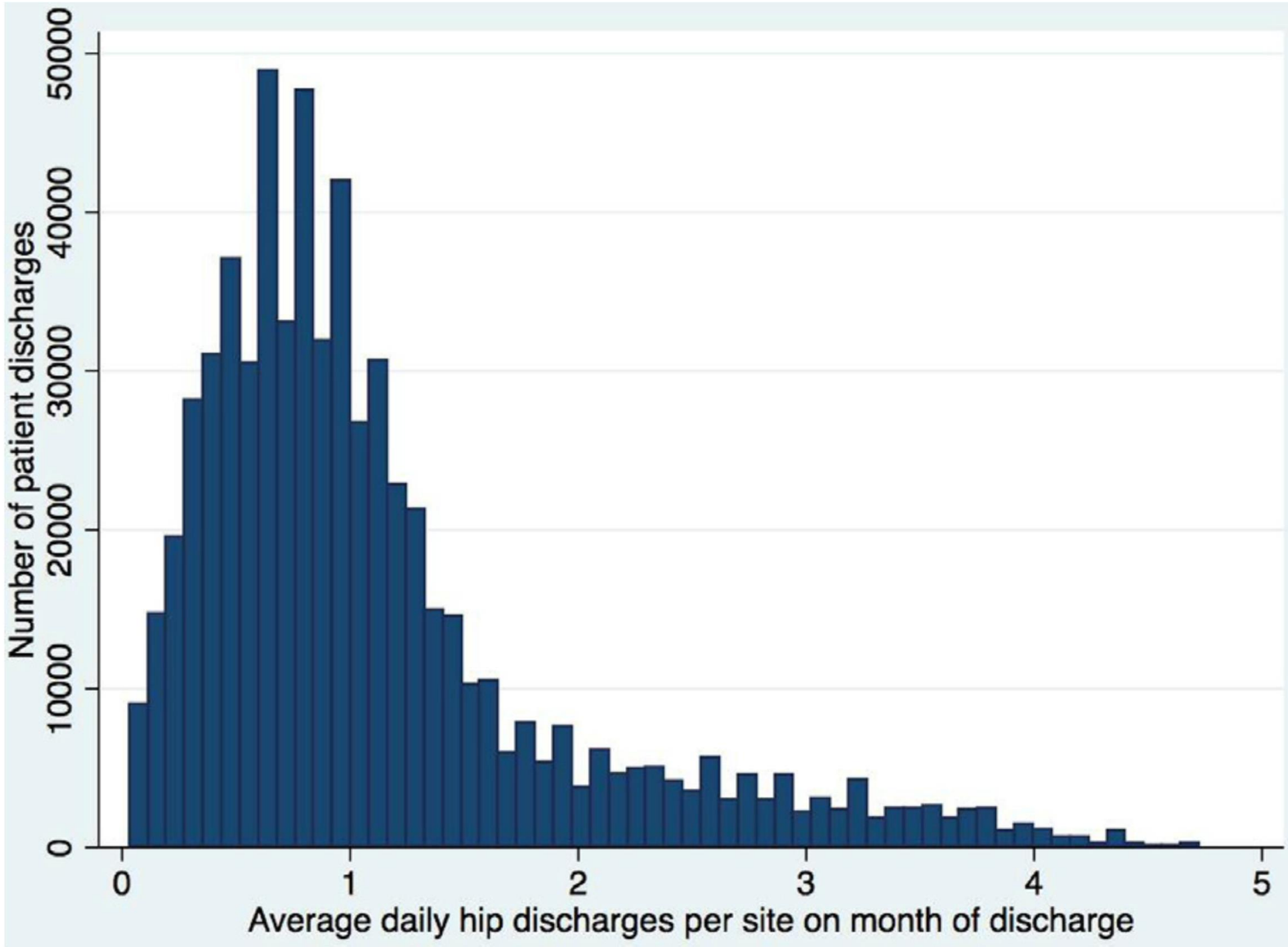


Table 2
Main results.

	R-P estimates; >74 Trust and LA FEs			R-P estimates; >74 Trust FEs			R-P estimates; >74 LA FEs		
	Coeff.	OR	*Z*	Coeff.	OR	*Z*	Coeff.	OR	*Z*
Age at discharge	−0.119***	0.888	(−91.17)	−0.119***	0.888	(−89.82)	−0.117***	0.890	(−91.61)
Gender: female	−0.370***	0.691	(−36.86)	−0.369***	0.691	(−36.63)	−0.361***	0.697	(−36.31)
Charlson index	−0.0131***	0.987	(−5.56)	−0.0131***	0.987	(−5.57)	−0.0111***	0.989	(−4.77)
Count of diagnoses	−0.165***	0.848	(−63.01)	−0.164***	0.849	(−62.57)	−0.152***	0.859	(−60.24)
Count of procedures	−0.316***	0.729	(−62.60)	−0.316***	0.729	(−62.25)	−0.315***	0.730	(−64.15)
Cemented	−0.627***	0.534	(−33.40)	−0.627***	0.534	(−33.43)	−0.505***	0.603	(−29.71)
Uncemented	0.182***	1.200	(6.27)	0.178***	1.195	(6.16)	0.0611**	1.063	(2.54)
Hip fracture	−0.613***	0.542	(−7.74)	−0.612***	0.542	(−7.73)	−0.599***	0.549	(−7.67)
Open wound	−1.794***	0.166	(−28.44)	−1.794***	0.166	(−28.32)	−1.818***	0.162	(−29.11)
UTI	−1.070***	0.343	(−25.65)	−1.067***	0.344	(−25.55)	−1.070***	0.343	(−25.92)
Embolism	−0.913***	0.401	(−3.33)	−0.895***	0.409	(−3.26)	−0.867***	0.420	(−3.18)
Local deprivation	−0.710***	0.492	(−12.84)	−0.726***	0.484	(−13.84)	−0.690***	0.502	(−12.68)
Foundation trust	0.769***	2.158	(5.32)	0.975***	2.650	(10.57)	0.137***	1.147	(10.83)
Treatment centre	0.194***	1.214	(4.61)	0.193***	1.213	(4.70)	0.310***	1.363	(10.42)
LAs per month	−0.0102***	0.990	(−2.73)	−0.0100***	0.990	(−2.71)	−0.0378***	0.963	(−12.98)
Volatility LAs	−0.196***	0.822	(−6.35)	−0.192***	0.825	(−6.34)	−0.132***	0.876	(−8.29)
Nb hips per year	0.00152***	1.002	(22.66)	0.00152***	1.002	(22.68)	0.000191***	1.000	(3.66)
Occupancy rate	0.00276**	1.003	(2.18)	0.00279**	1.003	(2.20)	0.00212**	1.002	(2.19)
Waiting time site	−0.00969***	0.990	(−90.81)	−0.00973***	0.990	(−89.16)	−0.00997***	0.990	(−98.33)
Average daily disch	0.128***	1.136	(7.21)	0.128***	1.136	(7.22)	0.185***	1.203	(10.73)
Sunday	−0.377***	0.686	(−9.32)	−0.379***	0.685	(−9.37)	−0.371***	0.690	(−9.25)
Monday	−0.304***	0.738	(−13.22)	−0.302***	0.739	(−13.17)	−0.288***	0.750	(−12.63)
Tuesday	−0.403***	0.668	(−17.76)	−0.403***	0.669	(−17.75)	−0.388***	0.678	(−17.27)
Wednesday	−0.386***	0.680	(−17.04)	−0.384***	0.681	(−16.95)	−0.347***	0.707	(−15.48)
Thursday	−0.346***	0.707	(−15.38)	−0.347***	0.707	(−15.41)	−0.331***	0.718	(−14.84)
Friday	−0.201***	0.818	(−8.83)	−0.200***	0.819	(−8.81)	−0.194***	0.823	(−8.61)
Constant	12.58***		(23.12)	12.58***		(66.96)	12.16***		(24.02)
(*N*)		171,979			171,979			171,979	

t statistics in parentheses.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

Robustness checks

- Included supply effects (care homes)
- <1 or >1 discharge per day
- >1 LA on average
- Over 84

- Generally very consistent results

Table 3
Robustness checks.

	R-P; >74s old Trust and LA FEs LA supply Coeff
Age at discharge	-.1218938***
Gender: female	−.4392929***
Charlson index	−.0104011***
Count of diagnoses	−.2316296***
Count of procedures	−.34082***
Cemented	−.4917967***
Uncemented	−.2152165***
Hip fracture	−.7473417***
Open wound	−1.59379***
UTI	−1.088297***
Embolism	−.6821642
Local deprivation	−.6374804***
Foundation trust	1.087609***
Treatment centre	.6177007***
LAs per month	−.0100534
Volatility LAs	−.1121397
Nb hips per year	.0003911***
Occupancy rate	−.0002593
Waiting time site	−.0018218***
Average daily disch	.0685154**
LA care home beds	30.66764***
Sunday	−.2909044***
Monday	−.3145687***
Tuesday	−.3862319***
Wednesday	−.468752***
Thursday	−.4588319***
Friday	−.2576886***
Constant	.1059066***
(*N*)	55,172

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

Key findings

- Complexities in the discharge systems/processes reduces performance
- Effect of number of LAs significant but small (OR of .99)
- Large and significant effect of volatility of arrangements (OR of .82)
  - Predicted LOS no variation= 8.21 days
  - Predicted LOS observed variation = 8.64 days
  - Predicted LOS 2 Std Dev = 9.05 days
  - Applying the 0.43 extra days to the 4.4 million per year hospital admissions of over 75 year olds in England would result in an additional 1.9 million hospital days per year, approx. £430 million per year
- Further ongoing work on…
  - New conditions (e.g. emergency admissions)
  - New outcomes (e.g. 30-day readmission rates)

Policy implications cont…

- Implications for the reorganisation of health and social care? Relevant to ongoing Finnish reforms?
- Importance of investigating the cost-effectiveness of investments to reduce/manage transaction costs (e.g. joint assessment/information systems; care planning)

In summary

- The concept and aims of integration are much more complex in the care system than in the wider economy
  - The flows are much more varied
  - Many factors are likely to affect its successful implementation
  - Therefore not one ideal model of integration exists
- Evidence is mixed on outcomes and costs of different H&SC integration “schemes”
  - Need to understand the details of individual schemes and their implementation to judge relevance to local context
- However, good evidence of the interdependence between H&SC services

Implications for ongoing Finnish reforms?

- Consolidation of H&SC functions from municipalities to counties likely to lead to efficiency savings in the care system
- However, top down integration into single organisation is not a guarantee of improved costs and outcomes if not accompanied by:
  - Buy-in by all relevant professionals
  - Sharing of information across services
  - Service redesign and implementation of joint care processes