

HES data overview: more than just counting admissions

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Talk outline

- Brief intro to the Dr Foster Unit
- The context of my HF studies: HF and multimorbidity
- The HF studies:
 1. Assessment of NICE guideline CG187
 2. Emergency return to care metrics
 3. Comparison of England and Lombardy

Background to my unit

- Aim of Dr Foster Unit is to measure, describe & explain variations in outcomes using routine data
- We develop and test quality indicators, risk-adjustment & risk-prediction models
- We created national HES-based in-hospital mortality monitoring scheme with DFI that detected Mid Staffs

A few HES basics

- Available electronically since 1989 (IP&DC); OPD, A&E, ACC, DID came later. NHS hospitals and patients
- Administrative aim, but other uses
- IP records are consultant episodes so internal linkage needed
- Linkage with ONS deaths with delay
- Linkage to PROMS, CPRD etc for some conditions / practices

Background: heart failure

- Syndrome with various causes
- 900,000+ patients in UK
- Chronic, with high mortality and multiple readmissions
- Comorbidity very common -> most readms are for causes other than HF
- HES handy for examining readms, e.g.
Bottle A, Aylin P, Bell D. Effect of the readmission primary diagnosis and time interval in heart failure patients: analysis of English administrative data. Eur J Heart Fail 2014

NICE GUIDELINE 187: POST-DISCHARGE CARDIOLOGY OPD FOLLOW-UP

Bottle A, Goudie R, Bell D, et al. Use of hospital services by age and comorbidity after an index heart failure admission in England: an observational study. *BMJ Open* 2016;6:e010669.

Aims and methods

- Can we use ED and OPD data to give more complete picture of hospital use?
- NICE guideline 187: specialist follow-up within 2/52 of hospital discharge. What % had cardiology OPD appt?
- Track forward 365 days from index to capture ED, OP, IP activity
- Overall, but also by age and #comorbs

Results: outpatient appointments

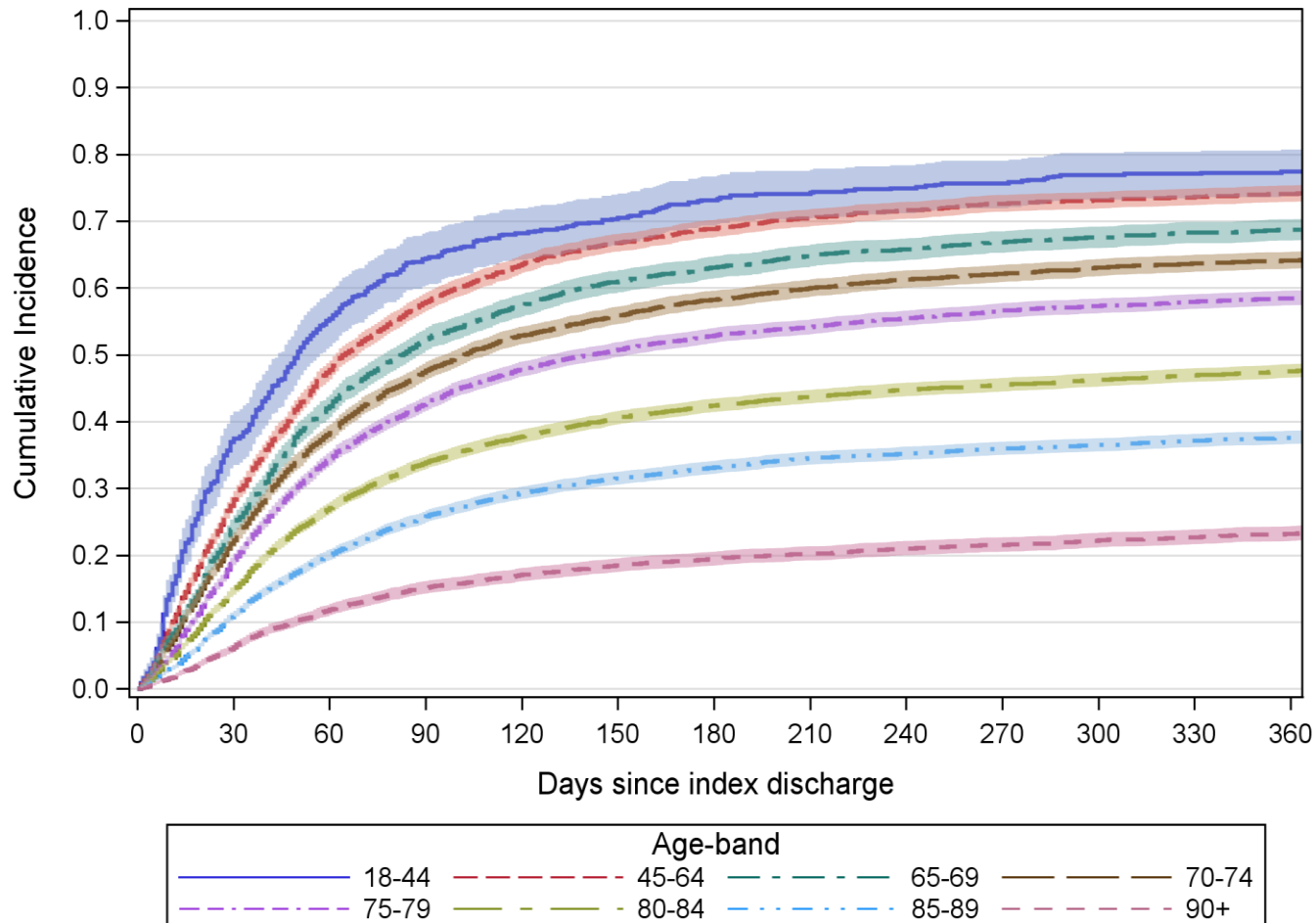
- 79% had 1+ OPD appts in year before index admission, 85% in year after
- 33% attended 3+ specialties in year before index, 39% in year after

Top 10 outpatient specialties in year after index adm

Specialty	Total # appts (% of total)	Number (%) patients with appt	Ranking of specialties (# patients)	DNA rate: % appointments not attended
Cardiology	113398 (24.7)	34702 (49.7)	1	11.9
Anticoagulant services	57090 (12.5)	5489 (7.9)	8	8.2
Ophthalmology	32657 (7.1)	13618 (19.5)	2	13.4
General Medicine	23674 (5.2)	9647 (13.8)	3	10.4
Nephrology	23182 (5.1)	5796 (8.3)	6	10.6
Clinical Haematology	20720 (4.5)	4905 (7.0)	12	8.7
Geriatric Medicine	19230 (4.2)	8393 (12.0)	4	14.0
Respiratory Medicine	17130 (3.7)	7985 (11.4)	5	14.0
Endocrinology	16244 (3.5)	5216 (7.5)	9	12.7

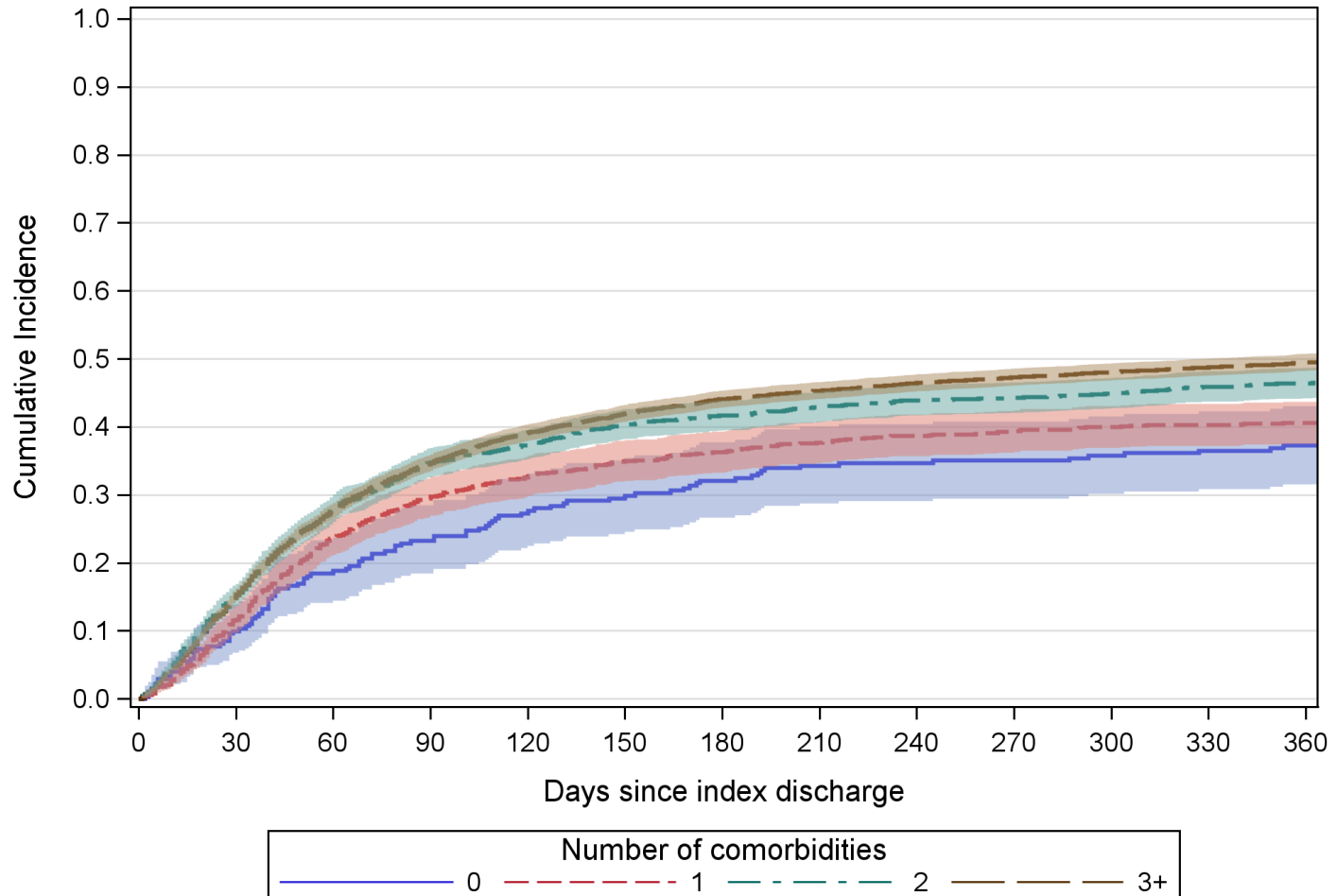
NICE CG 187: cardiology OPD follow-up by age

Cumulative Incidence Functions with 95% Confidence Intervals



NICE CG 187: cardiology OPD follow-up by # comorbs

Cumulative Incidence Functions with 95% Confidence Intervals



**SHOULD A&E ATTENDANCE AND
REATTENDANCE DATA BE CONSIDERED
ALONGSIDE READMISSION METRICS?**

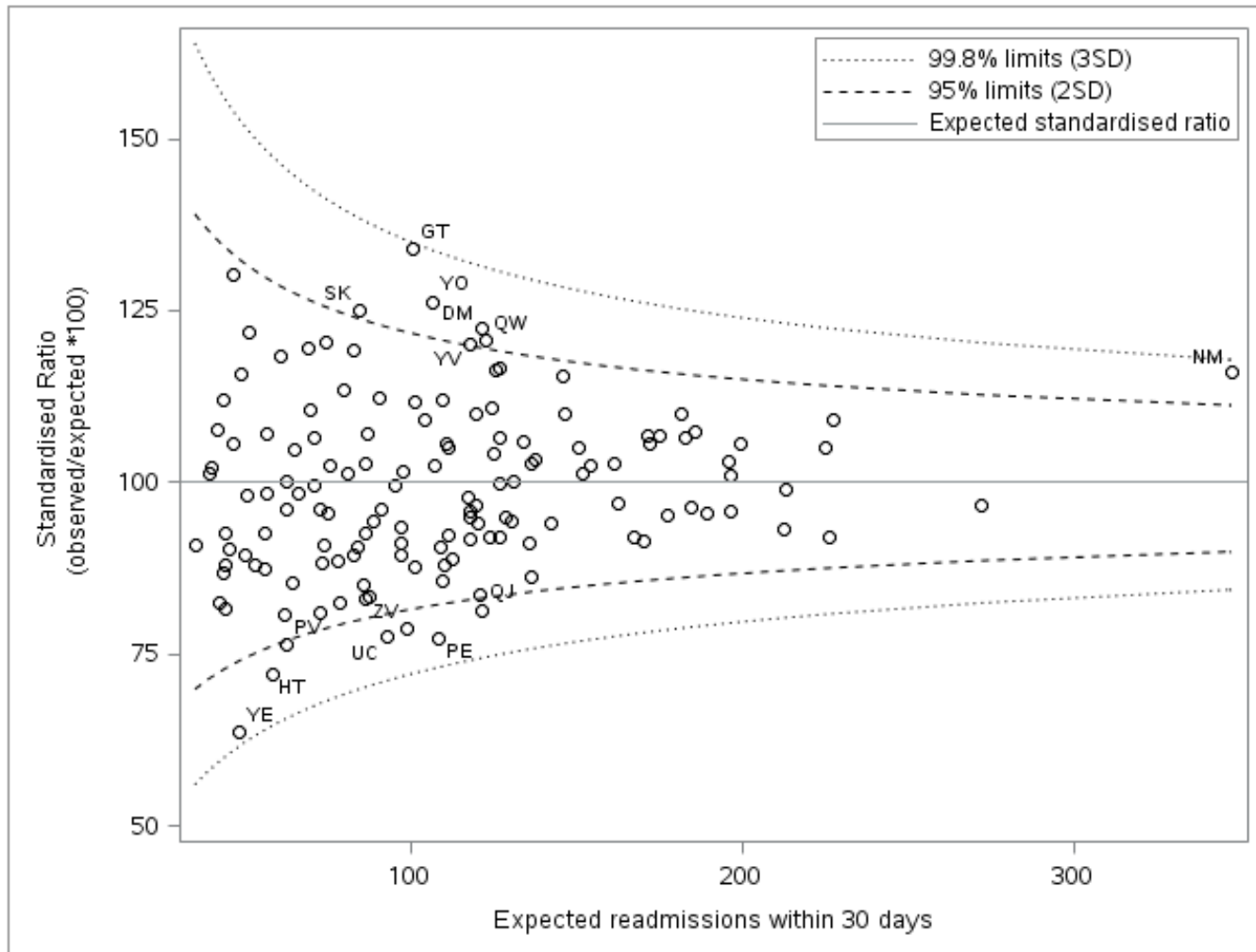
Background to this part of HS&DR 14/19/50

- Readm rates are common but ignore A&E visits not ending in admission

Stats criteria include:

- discrimination between levels of performance (the amount of variation between hospitals)
- power to detect differences
- signal vs noise (can observed variation all be ascribed to randomness and/or differences in patient factors?)

Variation by hospital: 30-day ED attendance rates



Hospital footprints for readms vs A&E visits w/o adm

	Dispersion Parameter		Cov parm estimate	SE	ICC (%)	Cov parm estimate	SE	ICC (%)
Outcome	HF	COPD	HF			COPD		
Readmission								
7 days	1.23	1.39	0.011	0.005	0.35	0.012	0.005	0.38
30 days	1.12	1.41	0.005	0.002	0.16	0.008	0.002	0.24
90 days	0.84	1.28	0.002	0.001	0.08	0.007	0.002	0.20
365 days	0.68	0.95	0.004	0.001	0.13	0.006	0.001	0.18
A&E attendance								
7 days	2.53	3.51	0.074	0.015	2.22	0.103	0.018	3.06
30 days	5.08	6.28	0.113	0.017	3.33	0.134	0.020	3.90
90 days	7.01	8.45	0.142	0.020	4.16	0.142	0.019	4.13
365 days	8.18	10.67	0.168	0.022	4.85	0.170	0.022	4.93

Forthcoming in HS&DR journal and Medical Care

Conclusions to this part of the study

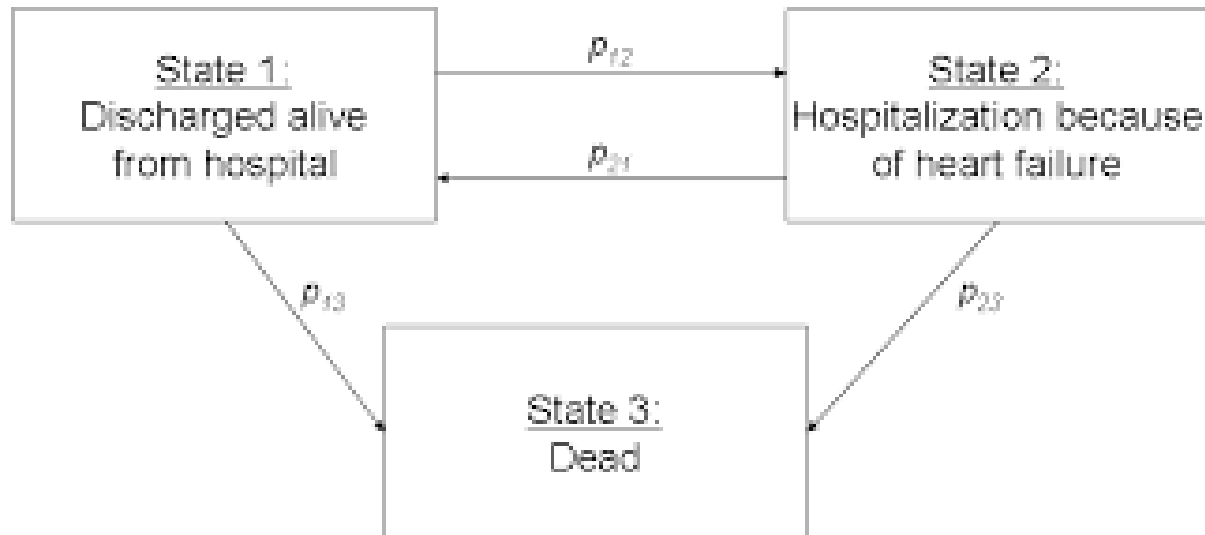
- A&E visits not ending in admission are very common in HF and COPD
- A&E rates are overdispersed but hospital footprint is greater than for readm rates
- Good to monitor their A&E visit rates not ending in admission, not just readm rates. Shame the A&E dx coding is poor

COMPARISON OF HOSPITALISATION AND MORTALITY FOR PATIENTS WITH HEART FAILURE IN ENGLAND AND NORTHERN ITALY USING MULTISTATE MODELLING

Study questions

- England and Lombardy have similar healthcare systems. How do the sojourn times (stay durations) and transition rates for HF patients differ between England and Lombardy?
- In this comparison, is it useful to extend model from 3 to 8 states?

Simple MSM for HF admissions (Postmus et al)



Patients make transitions between states over time. Assume either constant or changing transition intensity rate with time

Data

- National / regional admin hospital data for England (HES) and Lombardy for 2006 to 2011, with linkage to death registry
- Each patient's first emergency hospital admission for HF and all later HF ones
- Elective adms and adms for non-HF dxx ignored

Mean sojourn and total stay times for 3-state model

- Alive in hospital: 14.0 days (CI 13.9-14.1) for Lombardy, 12.3 days (CI 12.2-12.3) for England
- Mean total time in hospital: 34.9 days for Lombardy, 19.4 days for England
- Overall follow-up time for Lombardy was longer, so unfair to compare out-of-hospital sojourns

Mean sojourn times for 8-state model

State	Lombardy mean (days)	95% CI	England mean (days)	95% CI
Admission 1	14.0	13.9-14.2	12.2	12.1-12.2
Admission 2	13.6	13.3-13.8	12.7	12.6-12.8
Admission 3	13.9	13.6-14.2	12.8	12.6-13.0
Alive after discharge 1	591	584-598	933	928-939
Alive after discharge 2	395	388-403	516	510-523
Alive after discharge 3	298	291-306	365	357-374

Summary

- HES has some great data for HSR and outcomes monitoring beyond just its inpatient portion
- Linkage to other data sets vital and growing
- Some data quality issues are major (e.g. A&E dx coding)

Acknowledgements

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