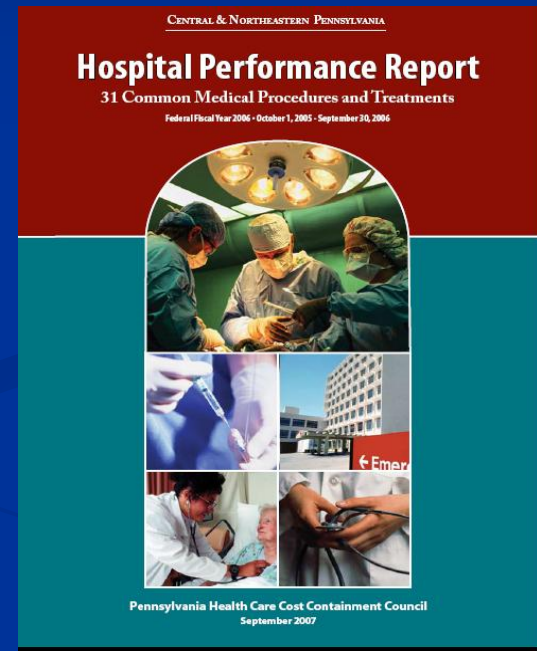# Using indicators to describe the quality and safety of New Zealand hospitals

Enhancing Hospital Outcomes (EcHO) study - Work in progress

- P Davis, R Lay-Yee, G Cotterell, M VonRandow (Auckland Uni); P Hider, P Graham (Otago, Chch); J Cummings, J Desai (HSRC, Victoria); C Lewis (MoH, Wellington).

Indicators using administrative data

- Many advantages
  - International experience developing, measuring and reporting indicators as key measures of hospital quality
  - All hospitals included
  - Existing definitions, collection processes.
  - Easy/cheap

Study aim and hypotheses

- Use indicators to describe inpatient quality and safety across hospitals and time (1994-2009)

- For each indicator it is hypothesised that there is variation in appropriately adjusted results for:

  - Hospitals in the same year

  - A hospital over the study period

  - Similar groups of hospitals in a year and over the study period

  - Populations in different regions with particular socio-demographic groupings in one year and over the study period.

Key study methods

- Identification and selection of indicators
- Preparation of datasets and data linkage
- Use of Bestgrid computing platform
- Risk adjustment - case mix
- Bayesian modeling - random variation

Identification and selection of indicators

- Identification – systematic search published and unpublished sources
- Selection using criteria:
    - Represent at least one dimension of quality
    - Relevant for hospital care (reported elsewhere)
    - Use available datasets (with linkage) at NZHIS (i.e. feasible in NZ)
    - Validated (face, case note, construct)
    - Reliable (data on variation)

Basket of 137 Indicators

- 18 Patient safety indicators (perioperative, medical adverse events)

- 15 Other specific indicators – e.g. ulcers, SMR, cost per case mix

- 26 Mortality (all admissions; med/surg admissions; 23 conditions/procedures)

- 26 Readmission (all; med or surg; 23 conditions)

- 26 Length of stay (all; med or surg; 23 conditions)

- 26 Throughput (all; med or surg; 23 conditions)

23 Conditions and procedures

- Asthma, CHF, MI, CVA, pneumonia, COPD, diabetes, GI haem, 3 cancers

- Appendectomy, cholecystectomy, CABG, PTCA, bowel resection, prostatectomy, hip and knee replacements, hysterectomy, cataract removal, tonsillectomy, c section.

Quality Dimensions -NZ Health Strategy				
Indicator group	***Effectiveness***	***Efficiency***	***Safety***	***Equity***
Throughput		√		√
Readmission	√	√	√	√
Mortality	√		√	√
Length stay	√	√		√
PSI	√		√	
Other	√	√	√	√

Preparation of datasets and indicators

- **Stage 1** (NMDS; Mortality)

  - **Stage 2** (Non-admitted NNPACS; Cancer Registry; Bookings NBRS)

- **Data filtering NMDS** (deletion duplicates, errors, well babies, rehab etc)

- **Selection of core list of 37 hospitals** (3 groups; ED; >500 admissions/yr; closures)

- **Coding of indicators** - SAS ICD-9-AM & ICD-10-AM

Preliminary descriptive results

|	2002	2003	2004	2005	2006	2007	2008
Full data set	776,145	783,404	798,193	815,900	844,538	858,618	893,147
37 facilities	689,742	727,790	768,004	782,954	810,465	823,728	856,906

Separations

- Average separations per year for each hospital type (tertiary, base, satellite) for each study year

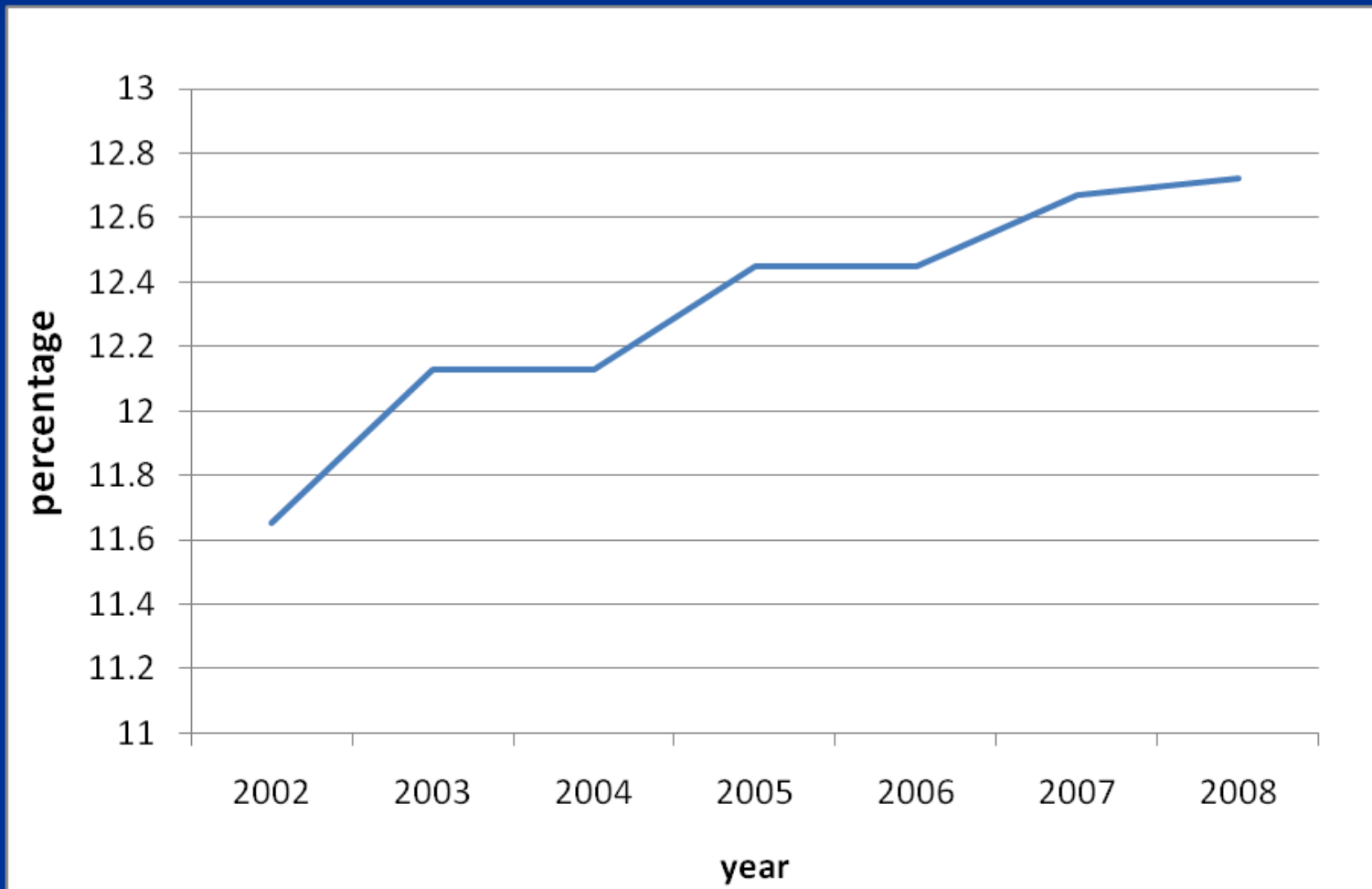|	2002	2003	2004	2005	2006	2007	2008
Base	17,327	17,515	17,575	18,485	19,301	20,044	20,994
Tertiary	52,771	57,607	62,840	62,908	65,160	65,234	67,531
Satellite	4,029	4,121	4,300	4,355	4,322	4,428	4,618

Descriptive results

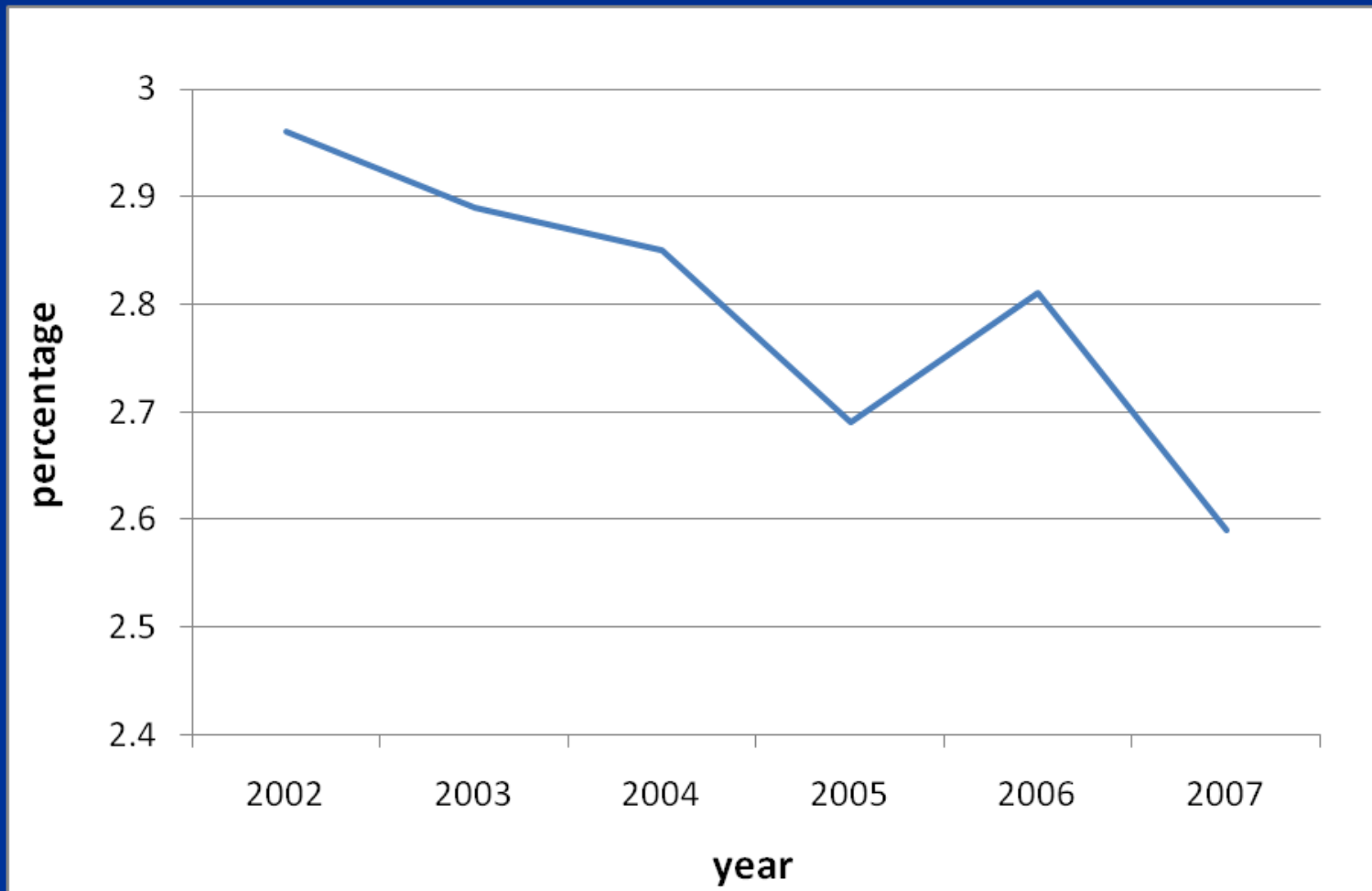- Average length of stay across 37 facilities '02–'08
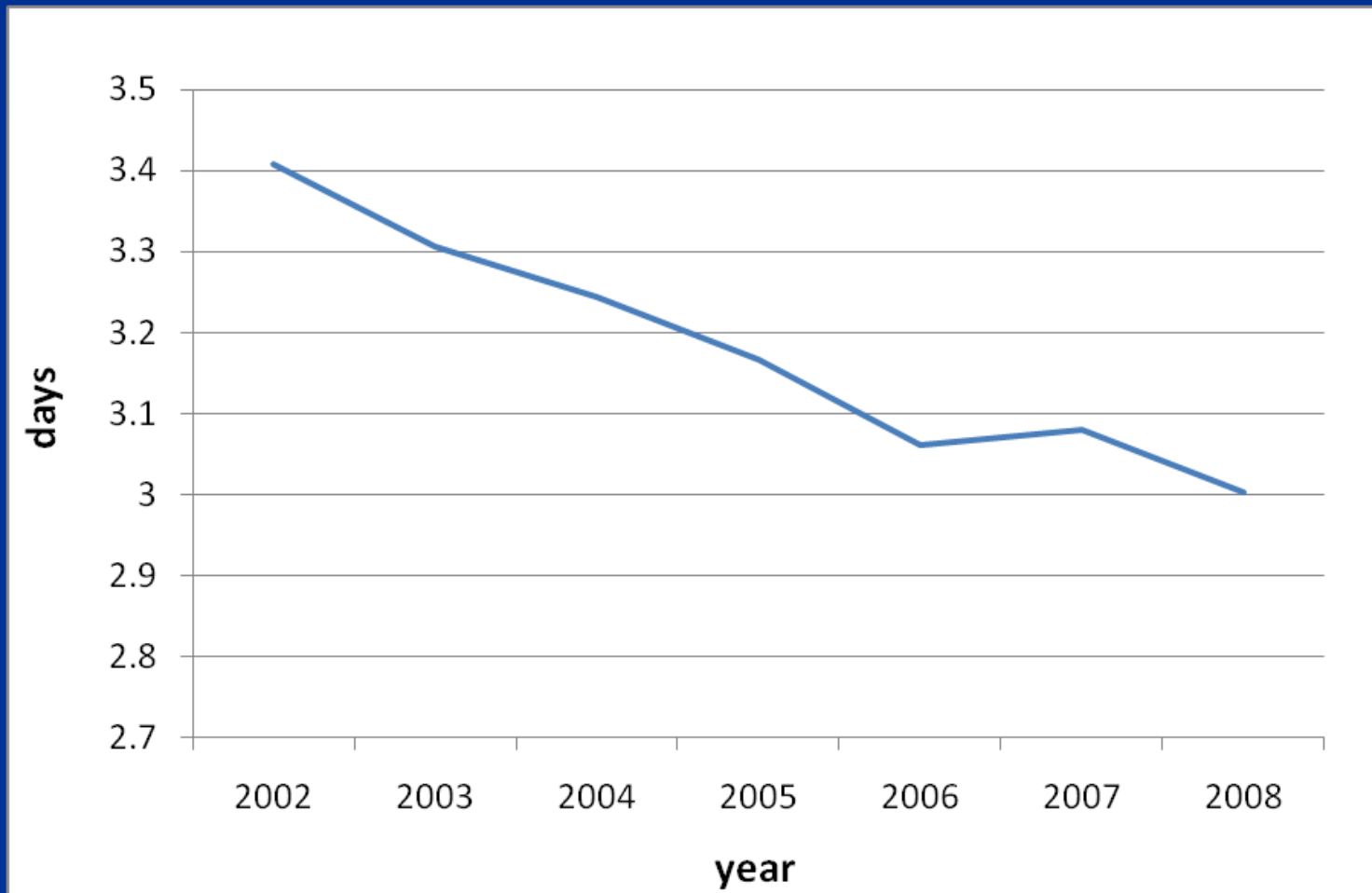
Descriptive rates

■ Readmission rates across 37 filtered facilities '02–'08

Descriptive results

■ 30-day mortality rates across 37 facilities '02–'07

Next stages - risk adjustment and Bayesian modeling

Risk adjustment – propensity scores

Hierarchical Bayesian models – allows for pooling of information across levels.

- Individual – age, sex, ethnicity, comorbidities
- Staff – numbers, turnover
- Hospital – type, size