Comparative studies across centres

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Why do them?

How might they be done?

Data Linkage: Oxford linkage group

- Oxford record linkage – all hospitalisations, all deaths:

  1964-1999 (local data collection)

  1999-2007 (as the Oxford subset of national linkage, see below)

- English national linkage of all hospitalisations, all deaths:

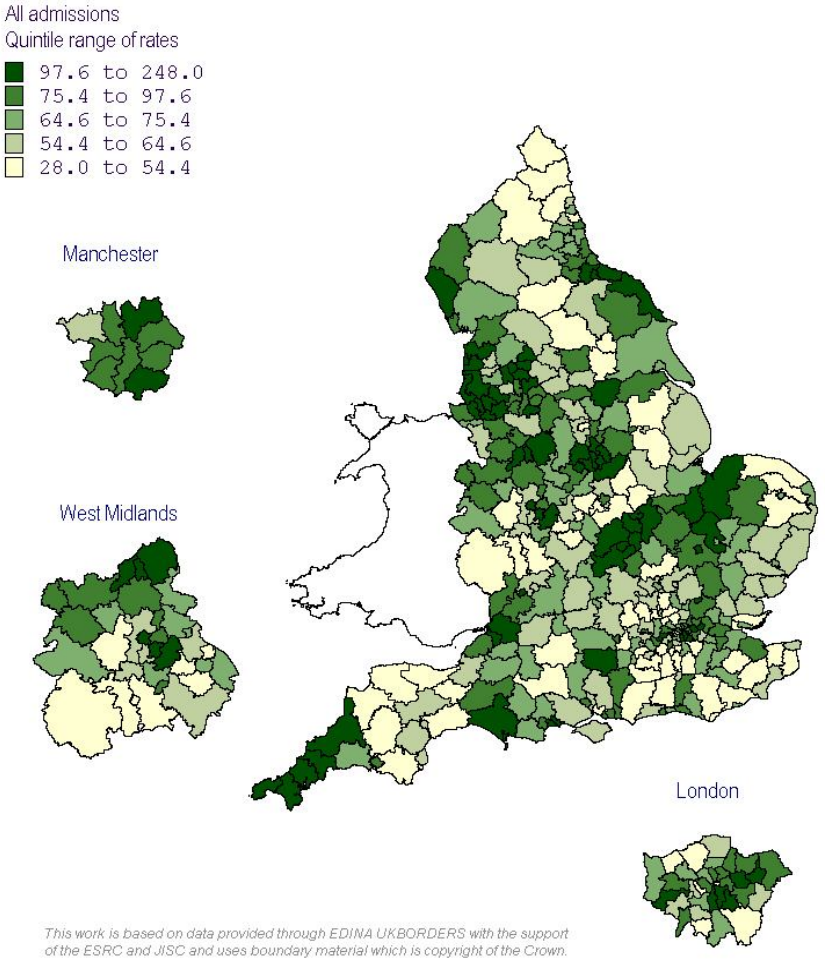
  1998-2007

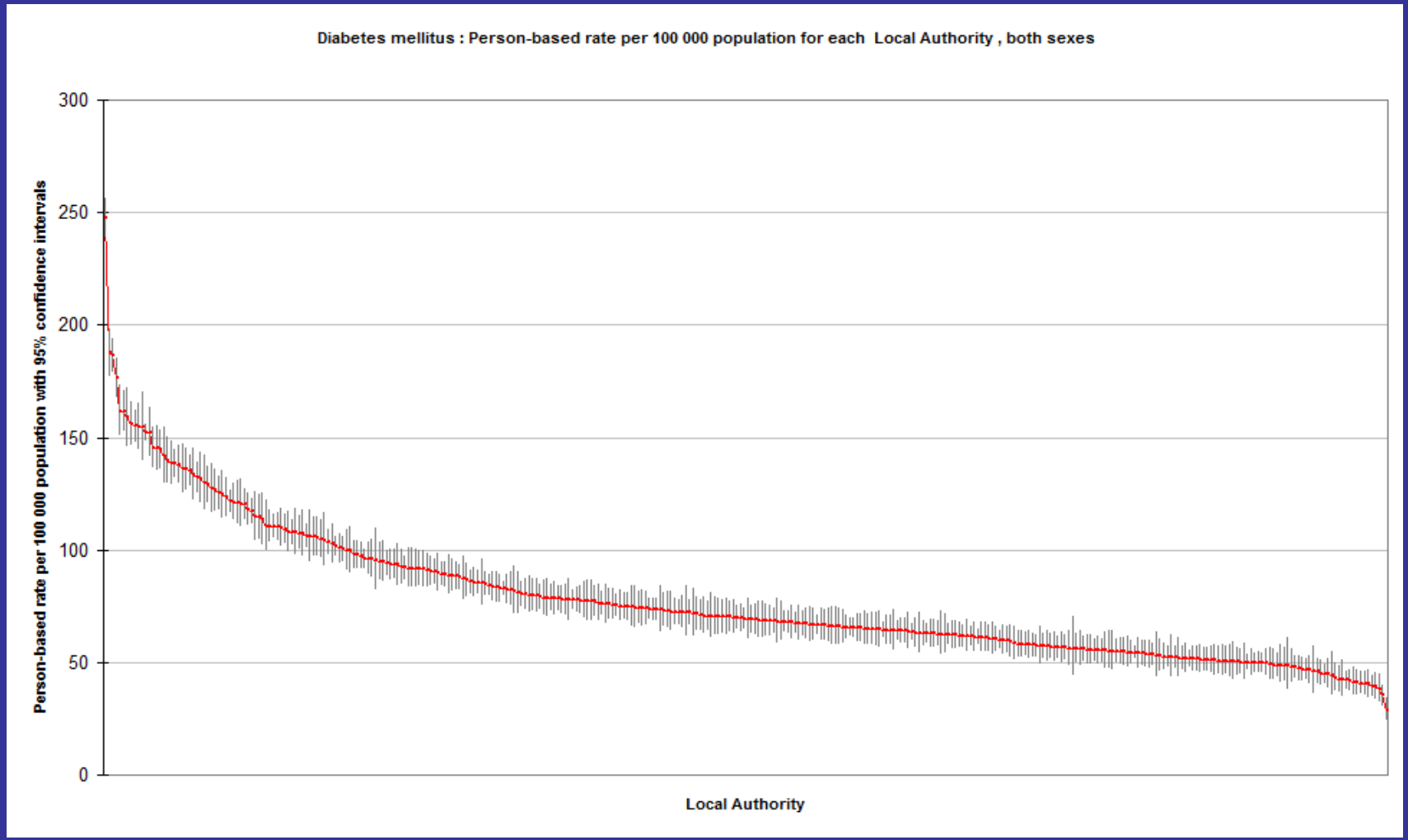
- Geographical variation, and trends, in admission rates
- Geographical variation, and trends, in outcomes, eg survival

Diabetes mellitus : people: males and females

Indirectly standardised rate per 100 000: each local authority in England

Principal diagnosis on admission or discharge: 2000/01-2004/05




Diabetes mellitus : Person-based rate per 100 000 population for each Local Authority , both sexes
Person-based rate per 100 000 population with 95% confidence intervals
300
250
200
150
100
50
0
Local Authority

Diabetes mellitus: average annual admission rates per 100,000 population (age-standardised, and person-based)

English local authority areas

Chiltern	29	(24-34)
York	47	(43-52)
Manchester	221	(214-228)
Nottingham	255	(247-264)

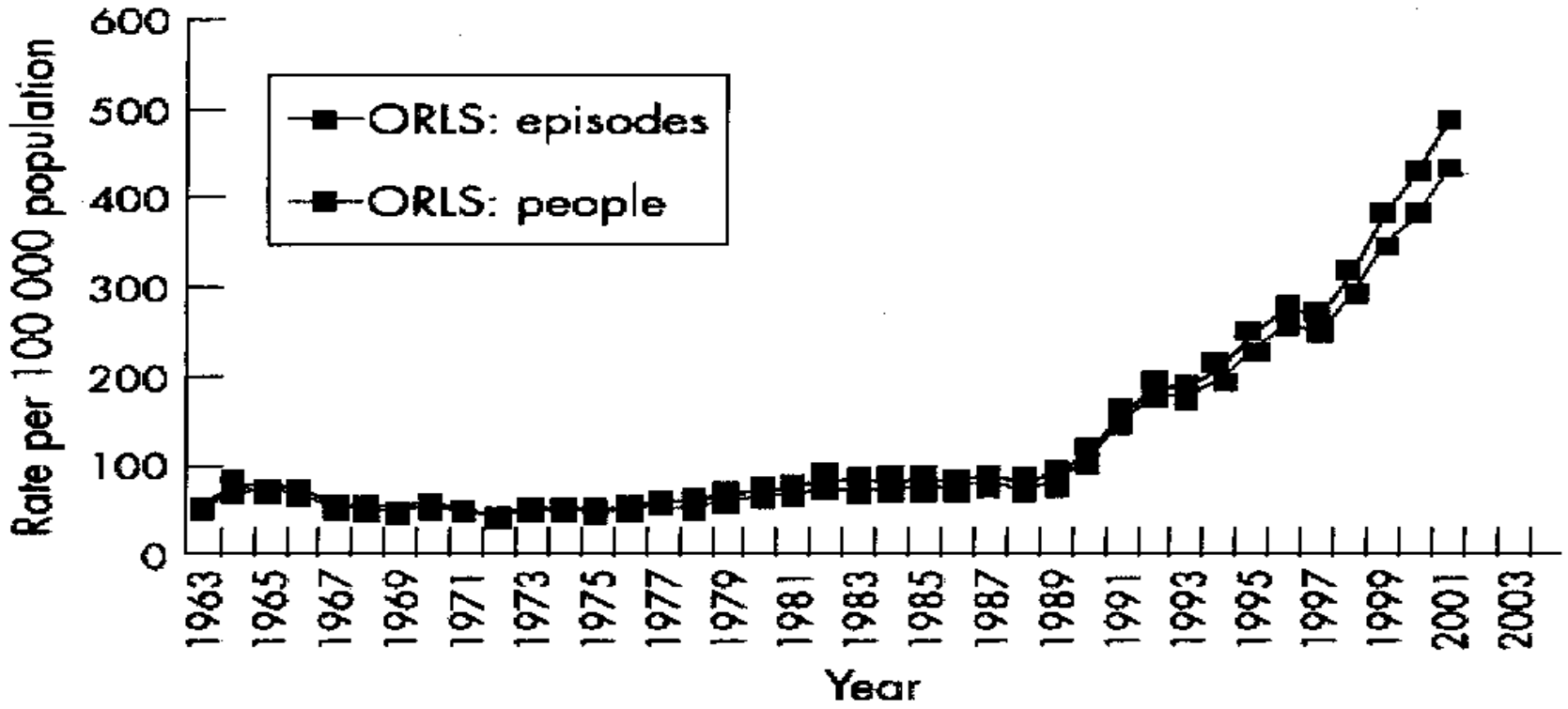
Reasons for variation: variation in incidence/prevalence; clinical thresholds for referral/admission; etc

Consequences of variation: costs; clinical quality; etc

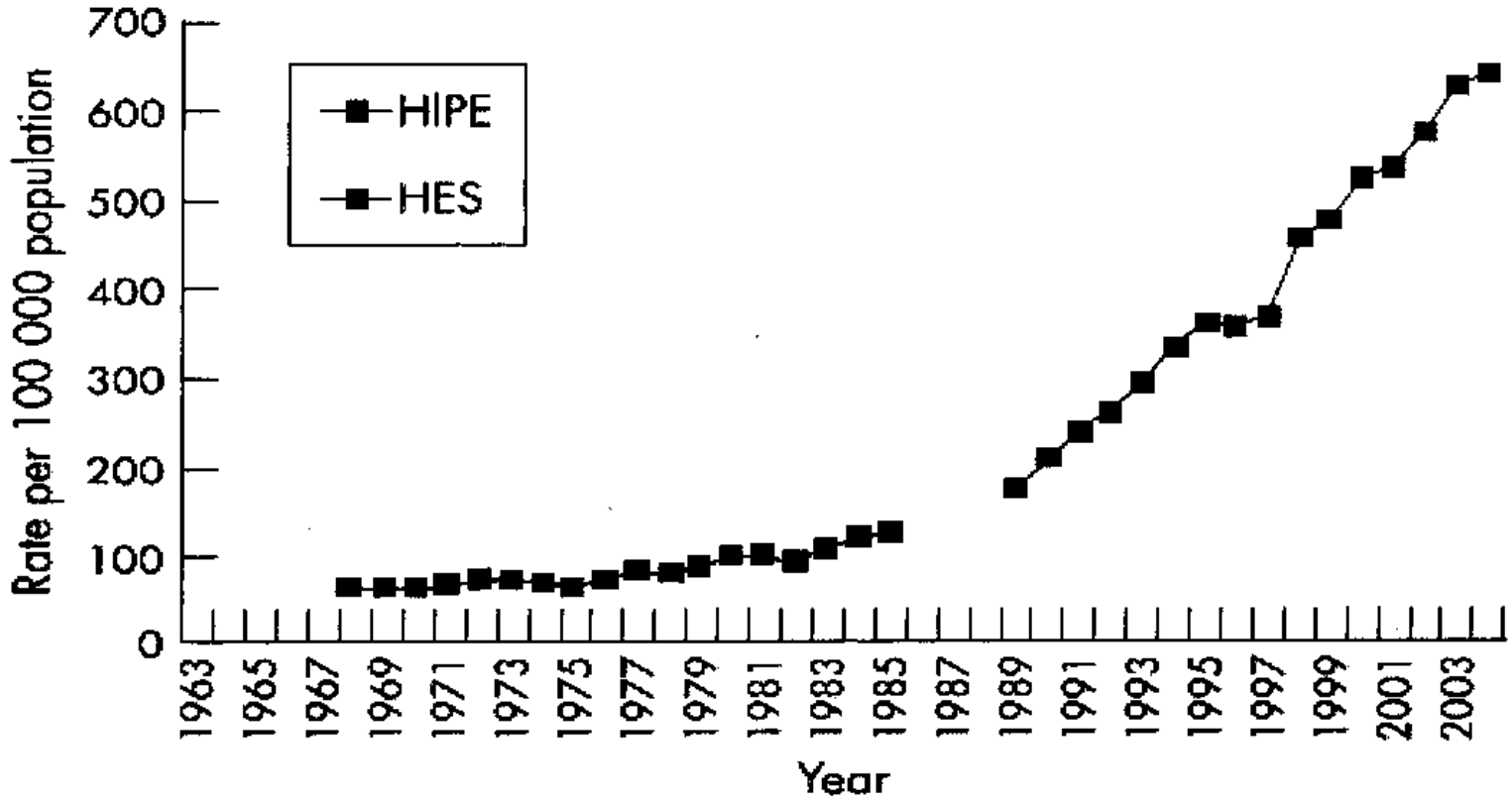
International comparisons between centres: age- and sex-specific hospitalisation rates, analysed to the same specification, in ‘spreadsheets’

Rising trend in cataract surgery: Br J Ophthalmology 2007, 91: 901-904

Keenan, Rosen, Yeates, et al



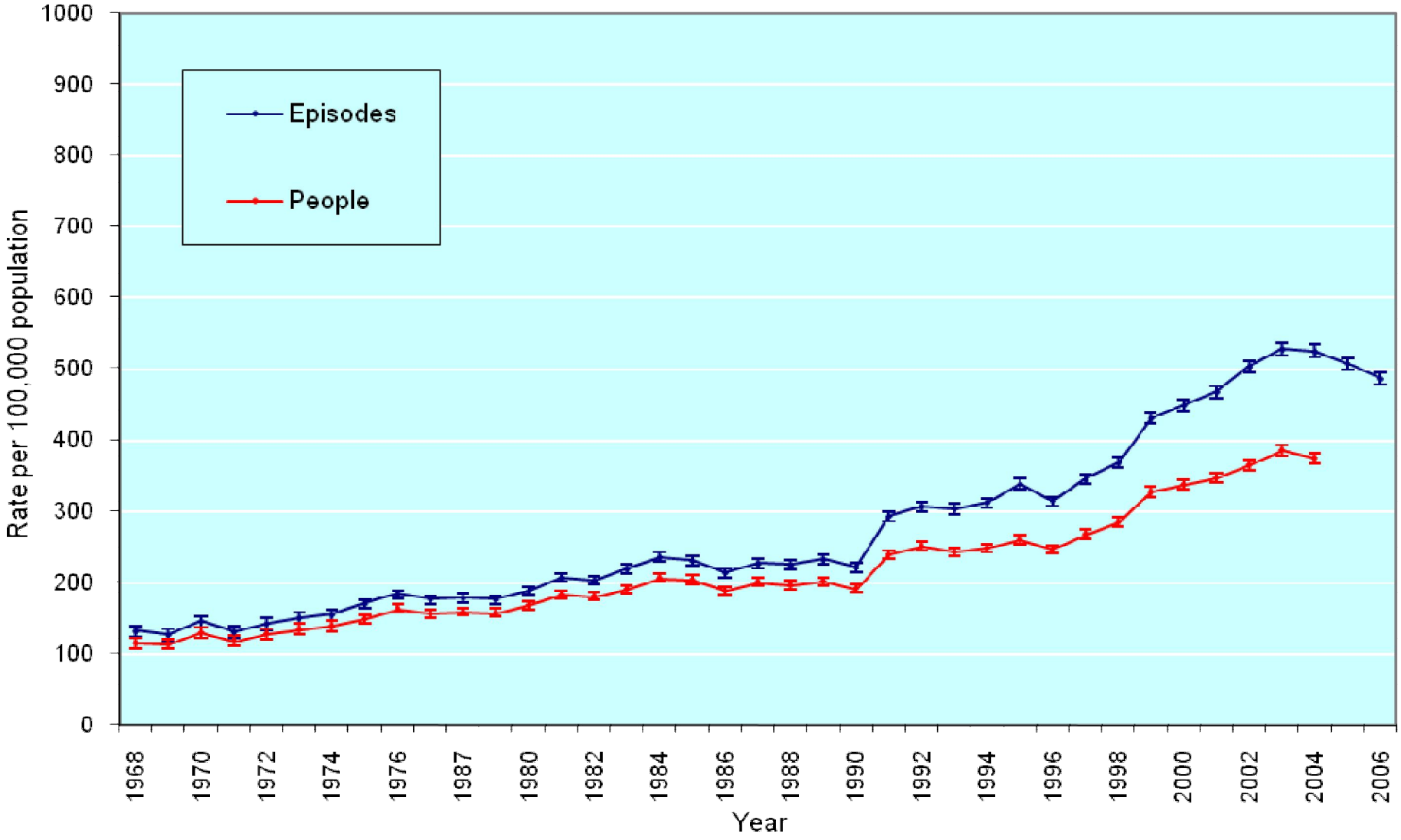
Hospital admission rates for cataract surgery in the Oxford record linkage study (ORLS) area: rates per 100 000 population, 1963–2003.



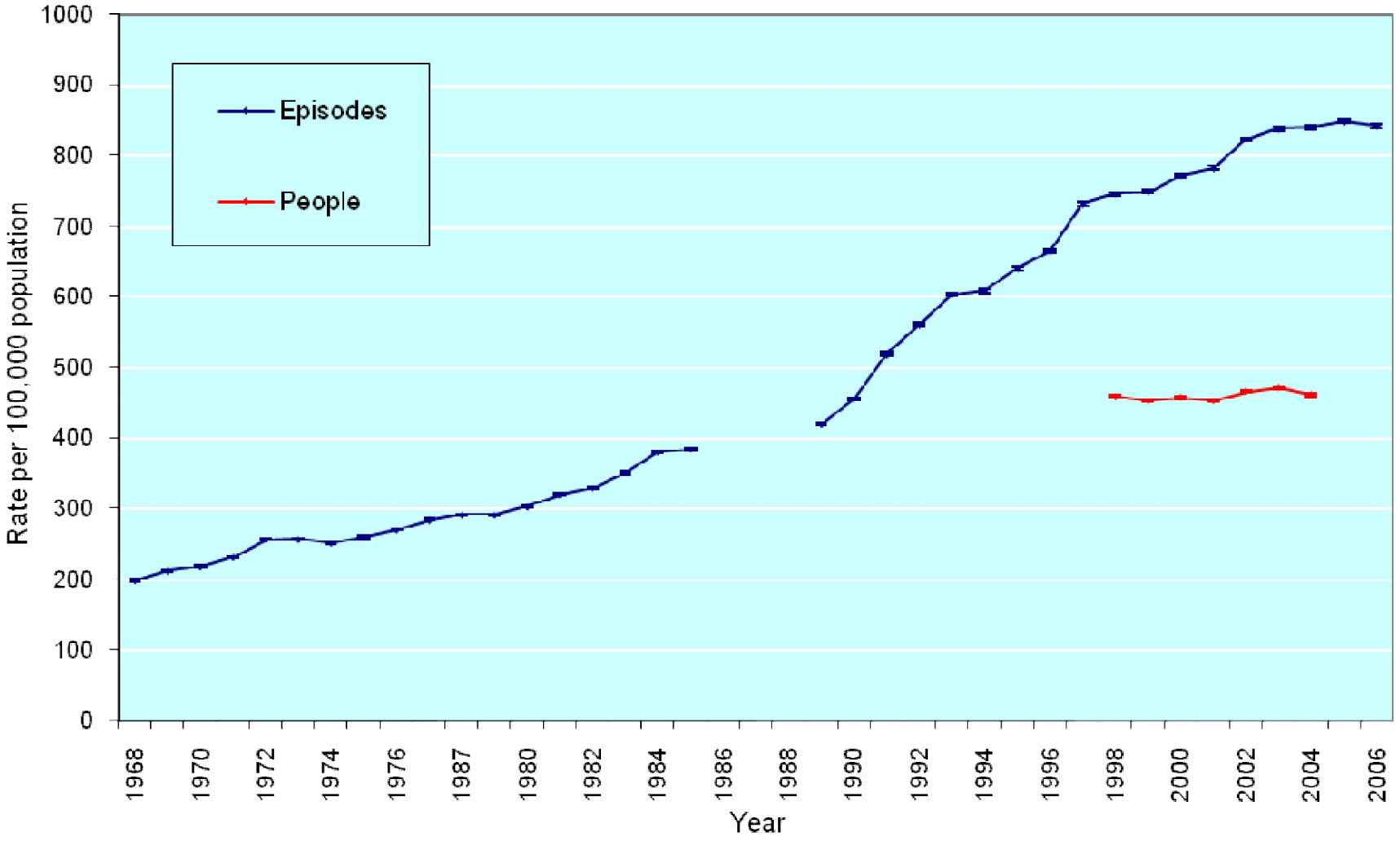
Hospital admission rates for cataract surgery in England: rates per 100 000 population, 1968–2003. HIPE, hospital inpatient enquiry; HES, hospital episode statistics.

Similar “epidemic” where you are? Similar rates?

Hospital admission rates (per 100,000 population) for CHD: Oxford region data 1968-2006 measured as episodes and people per year, all ages, males and females, all sources, principal diagnosis (similar pattern where you are?)



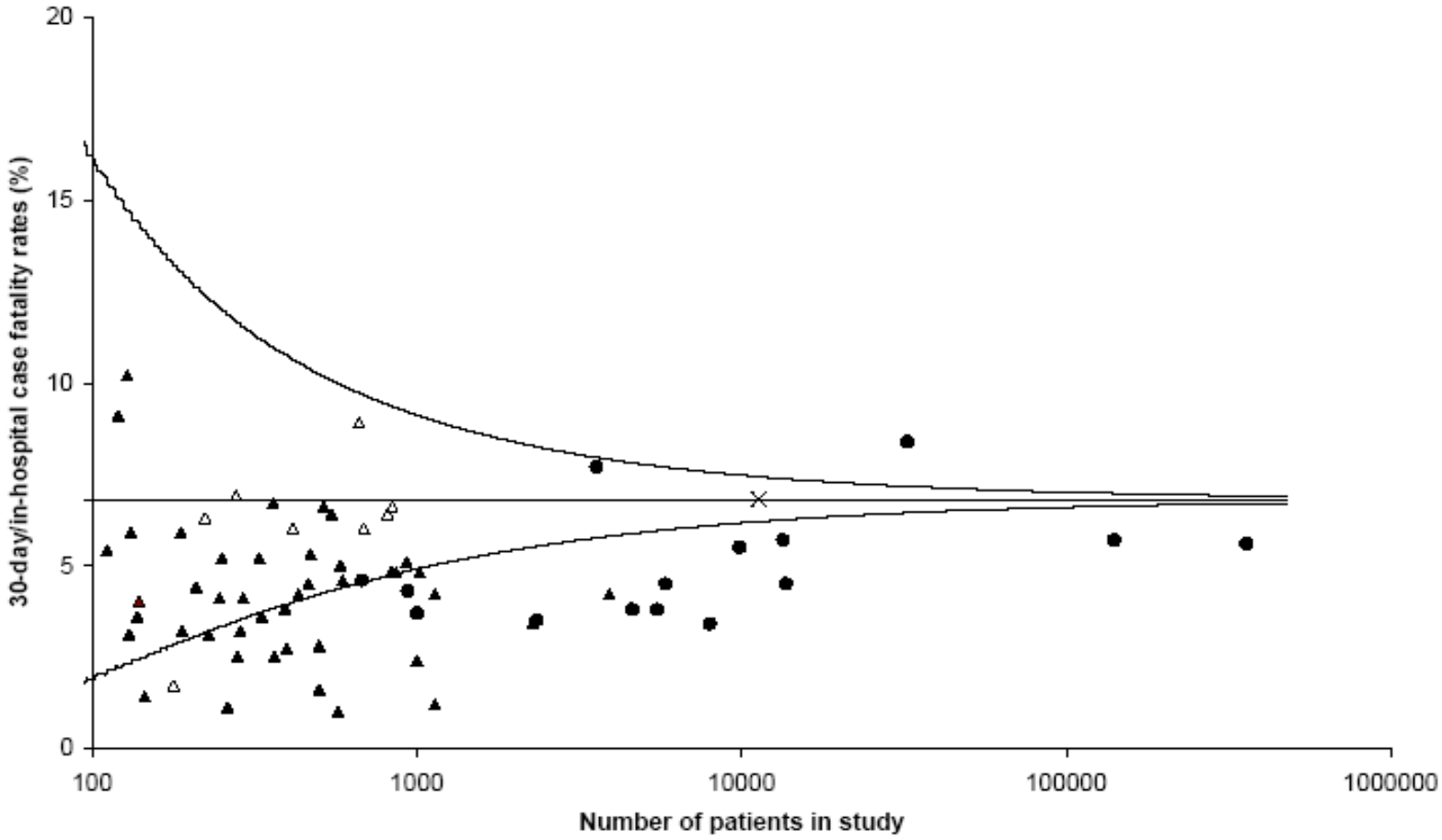
Hospital admission rates (per 100,000 population) for CHD: National data 1968-2006 measured as episodes and people per year, all ages, males and females, all sources, principal diagnosis



Outcome Study 1: international comparison. Case-fatality rates within 30 days of elective operation for abdominal aortic aneurysm

- England, national data linkage: 6.8%
- World literature (66 studies): 34 reported mortality rates within the 99% CI of England, 31 significantly below, 1 significantly above.
- Regular updating? Where does each country/centre fall in the ranking of CFRs?

Case fatality rates after elective surgery for abdominal aortic aneurism, comparing English national rates (x) with those from elsewhere



Outcome Study 2: trends. From "This week in the BMJ", 2003

Death rate after fractured neck of femur has stabilised

Deaths after fractured neck of femur declined from the early 1960s to the early 1980s, but not since then. In a time trend analysis for 1968 to 1998, Roberts and Goldacre (p 771) say that it is unclear whether mortality has fallen to an irreducible minimum, or whether further reduction is possible. It would be good to be able to compare English outcomes with those achieved by other health care systems.

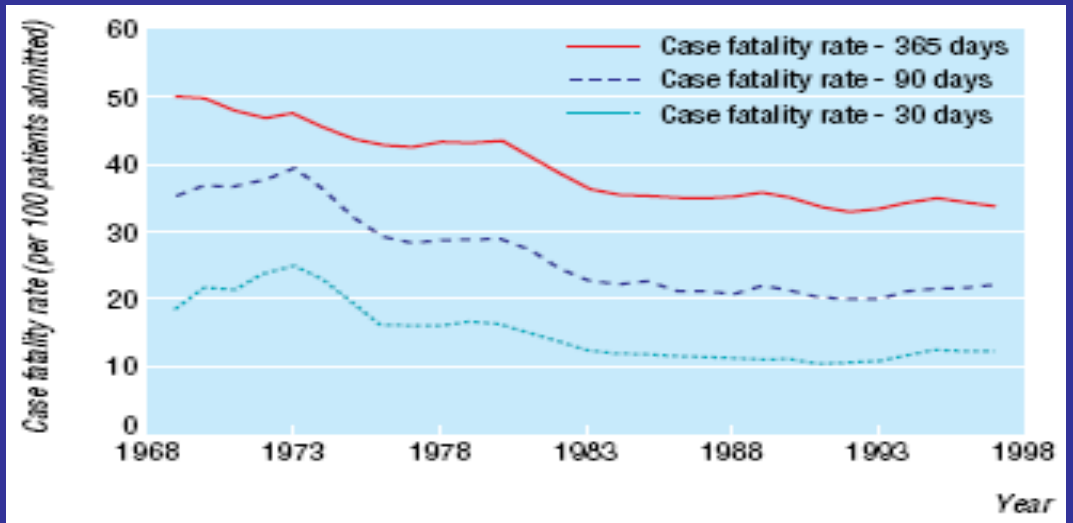


Fig 1 Age and sex adjusted trends in case fatality rates for fractured neck of femur 30, 90, and 365 days after hospital admission, 1968-98

Prognosis: case-fatality rates following fractured neck of femur – death rates per 100, within 30 days of admission

International **c**omparisons between centres: age- and sex-specific hospitalisation rates, analysed to the same specification, in 'spreadsheets'

Age (years)	Men (N=36,969)	Women (N=147,320)
65-69	7.9	4.6
70-74	10.7	6.2
75-79	16.1	8.2
80-84	21.1	10.7
85+	31.2	17.7

Cancer Incidence in Five Continents

http://www.iarc.fr/en/Publications/PDFs-online/Cancer-Epidemiology/IARC-Scientific-Publication-No.-155

International pooling of cancer incidence rates, 5-year age groups, by sex

International pooling of survival rates

Data available for secondary analysis

Example: Incidence rates of colorectal cancer: males, per 100 000 male population

- Australia 44.2
- Canada 43.7
- UK 33.2

- Spain 28.0
- Greece 13.8

Secondary analysis: Colorectal cancer and per capita food supply in each country

Appendix *Data on colorectal cancer (CRC) rates per 100 000 population and food supply per capita (pc) for the year 1990*

	CRC male x/100 000	*CRC female x/100 000*	*Total fat/g/day*	*Vegetable fat/g/day*	*Animal fat/g/day*	*Milk kg/yr/pc*	*Fruit kg/yr/pc*	*Vegetables kg/yr/pc*	*Meat kg/yr/pc*	*Fish kg/yr/pc*	*Cereal kg/yr/pc*	*Olive oil kg/yr/pc*
Australia	44.19	32.55	118.5	37.3	81.3	265.5	97.6	79	118.2	17.9	90.7	<0.01
Canada	43.70	32.15	128	58	69.9	223.4	116.2	109.7	97.2	23	90.1	<0.01
Czechoslovakia	43.48	25.25	130.7	40.5	90.2	172.5	61.9	78.9	100	6.0	146	<0.01
Austria	43.10	27.40	157.6	63.1	94.5	256.2	146.5	74.5	108.3	9.2	90.9	<0.01
Germany	41.70	30.10	140.9	49.3	91.7	226.8	115.6	87.7	98.5	12.6	98.2	0.11
USA	40.27	29.04	139.1	64.8	74.3	253.2	135.9	107.9	117.3	21.4	108.6	<0.01
New Zealand	40.13	32.08	131.5	32	99.5	277.3	102.2	80.6	104.9	20.3	93.9	<0.01
Denmark	37.40	30.20	180.8	37.5	143.4	233.8	79	77.2	101.7	19.1	98.2	<0.01
Netherlands	36.90	28.10	137.8	56	81.8	308.8	134	71.5	83.2	9.9	72.8	<0.01
Ireland	36.80	24.80	139.1	54.2	84.9	296	66.4	71	104.7	14.2	133.6	<0.01
Norway	36.70	28.80	129.3	45.4	84	269.5	100.6	58.7	52.8	44.3	115.4	<0.01
Japan	35.01	21.87	79.4	42.5	36.9	66.3	57.2	107.9	41.4	71.5	144.6	<0.01
France	34.00	20.50	163.3	56.1	107.2	284.3	82.4	120.4	110	29.5	111.9	0.48
UK	33.20	23.60	135.4	48.9	86.5	224.1	77.8	89.5	74.8	18.2	93.7	<0.01
Portugal	32.00	21.10	124.9	63	61.8	168.7	102.7	160.7	67.9	59.7	130.2	3.50
Italy	30.40	20.30	149.8	80.2	69.7	259.7	135.5	167.8	88.8	21.8	160.9	10.98
Israel	29.80	25.63	124	83.6	40.4	203.9	153.5	155.2	60.7	20.9	140.3	0.86
Sweden	29.60	24.10	120.5	42	78.5	352.7	101.6	63	61.1	27.1	81.8	<0.01
Spain	28.00	19.20	172.7	81.1	91.6	152.4	145.7	167.1	96.1	37.8	103.4	9.88
Hungary	27.45	21.95	151.9	37.8	114	154.5	72.8	87.5	104.7	4.6	144.3	<0.01
Yugoslavia	26.90	18.90	111.1	45.3	65.8	172.1	63.2	77.7	68.8	3.6	213.9	<0.01
Finland	22.70	17.90	125.7	29.6	96.1	329.7	95.9	55.3	66.8	31.8	91.6	<0.01
Poland	19.77	13.93	114.1	25	89.1	219.2	32.7	123.8	77.4	10.6	153.2	<0.01
Brazil	18.03	15.23	79.7	48.9	30.9	94.8	103.1	31.6	49.2	6.3	115.2	<0.01
China	14.62	12.50	49.3	22.8	26.5	5.3	21.3	81.3	26.3	11.8	226	<0.01
Greece	13.80	11.30	155	90.7	64.4	226.2	196.2	226.5	73.5	20.5	151.4	20.61
Colombia	10.00	10.00	61.2	31.3	29.8	96.8	88.2	42.6	41.7	2.6	95.9	<0.01
India	5.29	3.81	39.8	29.2	10.6	54.7	31.4	62.9	4.9	3.8	176.3	<0.01

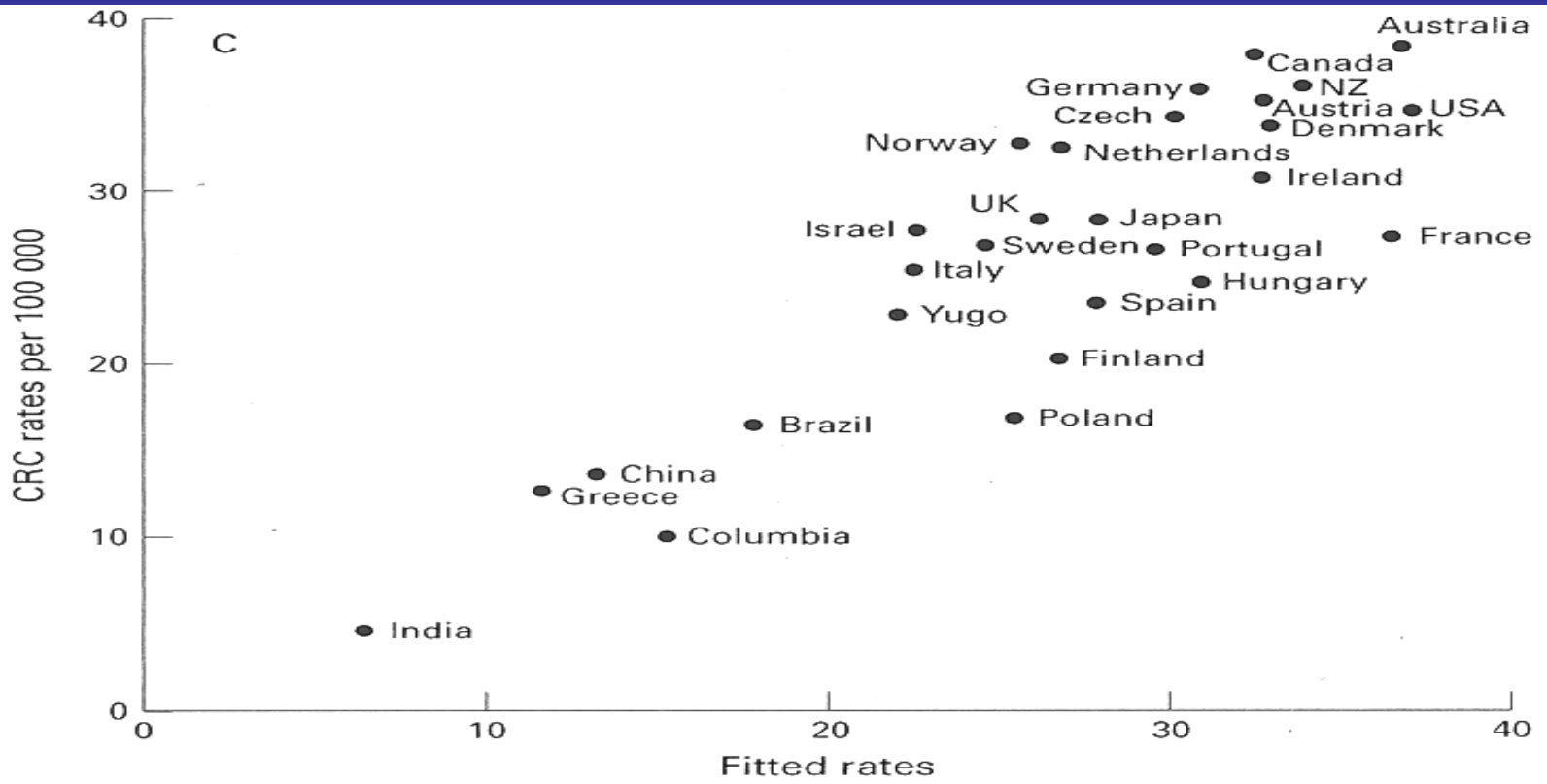


Figure 1 Comparison of observed rates of colorectal cancer (CRC) per 100 000 population with the rates obtained from each of the following three fitted models: models consisting of (A) meat; (B) meat + fish and (C) meat + fish + olive oil.

Possible approaches

- Centres agree specification, each centre develops analysis program, produces basic analyses, and pools the results:
  - routine analysis, simple rates, lots of clinical topics, regular updates

    (Ca I in 5 C model)
  - “ad hoc” individual topics, one-off studies, greater depth

- Centres agree specification, one centre develops analysis program and ‘networks’ it to others, each centre produces analyses on its own data [scope for efficiency in doing complex analyses]

- Exchange of information about study design, methodologies, definitions, ‘metadata’: if one centre does a study, do other centres have enough information about it to be able to replicate it in their own population?