

Statistics 1B Interludes

15. Statistics and a mass murderer



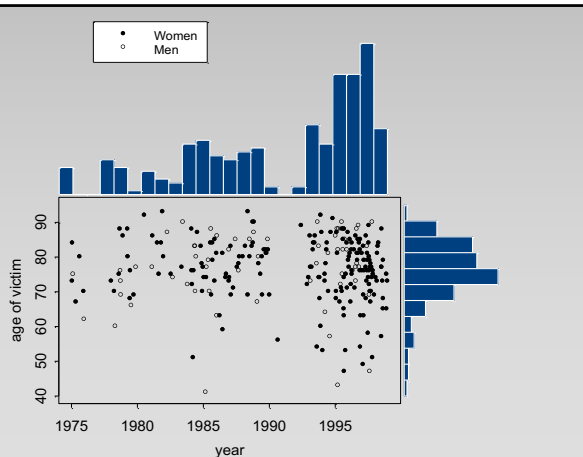
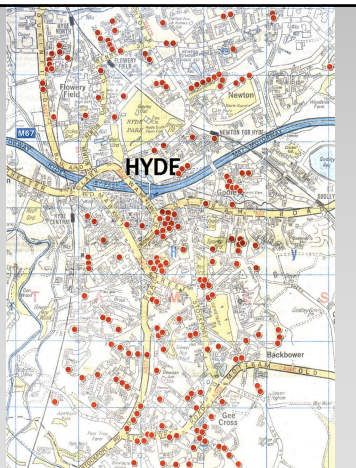
'I have nothing to hide'

Dr Harold Shipman, general practitioner, on his arrest in September 1998

Shipman Inquiry
July 2002:

215 definite
victims,

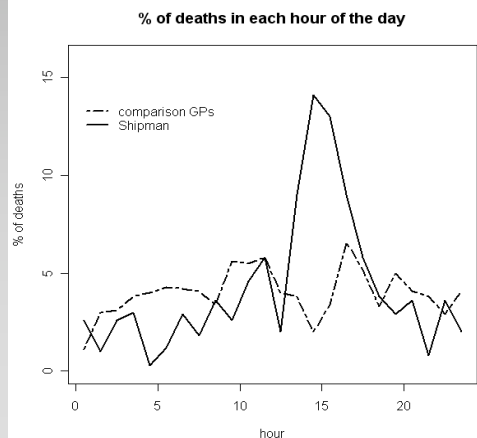
45 probable

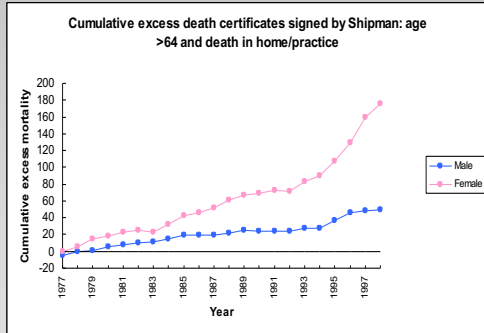


People
die at all
hours



People
die at all
hours
- but not
Shipman's
victims





(NB: Shipman Inquiry total of definite or probable victims:
189 female > 65, 55 male over 65)

Fortunately, back in 1943.....

- A group of statisticians called *SR17* were working in the Ministry of Supply
- Included Barnard, Lindley, Plackett, Armitage etc
- Barnard developed the 'Sequential probability ratio test'
- Simultaneously discovered by Abraham Wald in the US



A useful statistician

- George Barnard later wrote *British Standard 3704* for condoms

UK Careline 0800 338 739
 SSL International Head Office
 Toft Hall, Knutsford WA16 9PD UK
www.durex.com BS EN600:1996

- Replaced in 1996 by *BS EN600*

Barnard, GA (1964). On condoms, *British Standard 3704*. (UDC 615, 477, 86: 678, 4-46).

Sequential probability ratio test (SPRT)

- Most powerful sequential test between two hypotheses H_0 and H_1
- Based on log(likelihood ratio)

$$LLR = \log [p(\text{data} | H_1) / p(\text{data} | H_0)]$$
- Straightforward to adapt to 'risk-adjustment' model
- Horizontal thresholds set by required error rates

Shipman: older females would have set off 'alarm' in 1985, after only 40 deaths

