

Lessons learned from the Western Australian experience with mesothelioma

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In partnership with

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And many others

Outline of this talk





- Discuss sources of asbestos exposure
- Assess the long term risk of developing mesothelioma after being exposed to asbestos
- Examine mesothelioma treatment and survival at a population level

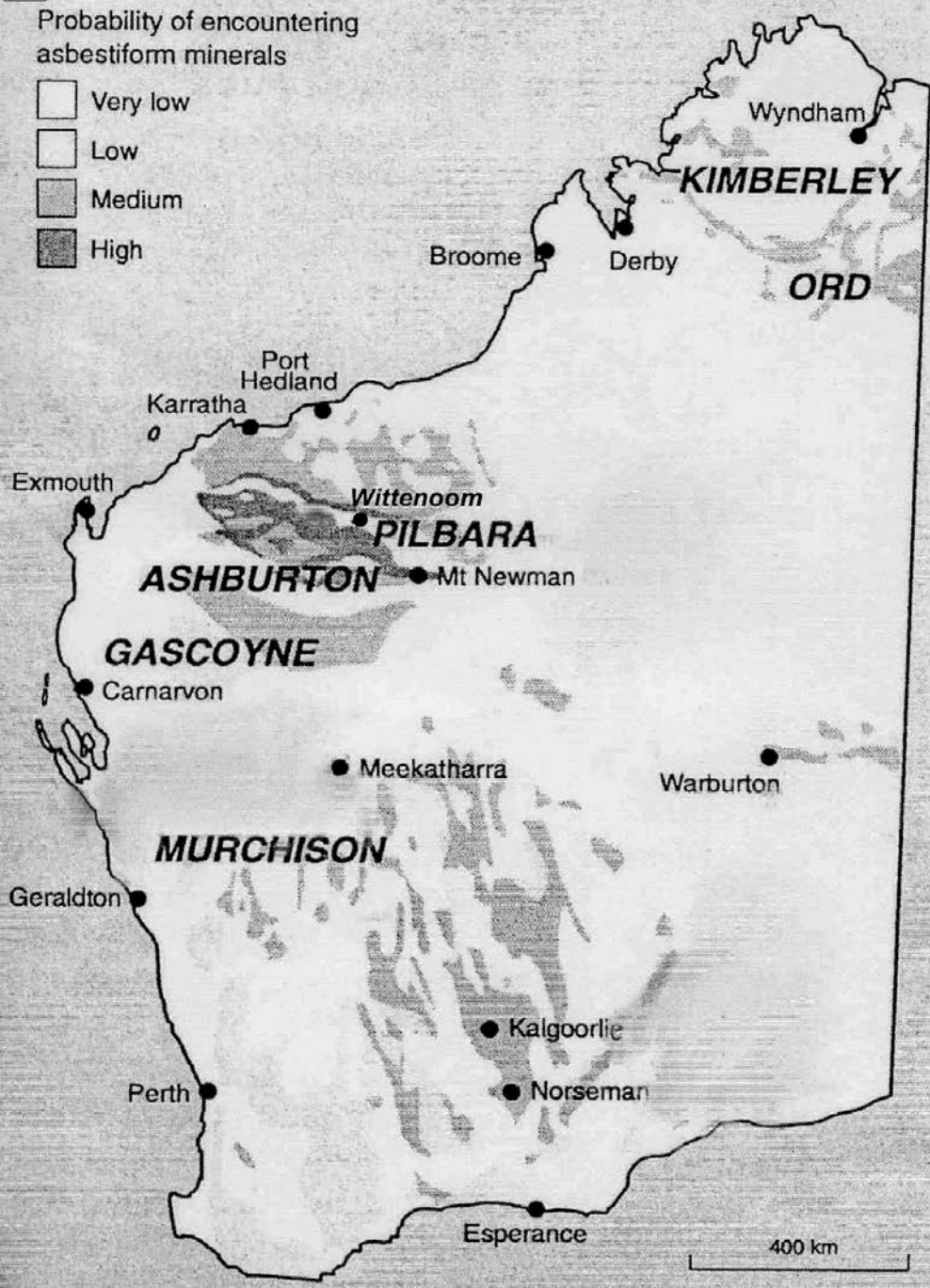
Malignant mesothelioma

- Cancer of the pleura or peritoneum
- Very rare
- Caused by asbestos, erionite, radiation
- Painful, debilitating, no treatment, no cure
- Median survival 9 months
- Universally fatal
- Risk of disease increases the longer time passes after exposure



Probability of encountering
asbestiform minerals

-  Very low
-  Low
-  Medium
-  High



Wittenoom

Asbestos mine and mill 7,000 employees, 1943 – 1966

Australian Blue Asbestos Company (ABA)

5,000 residents in township, not employed by ABA

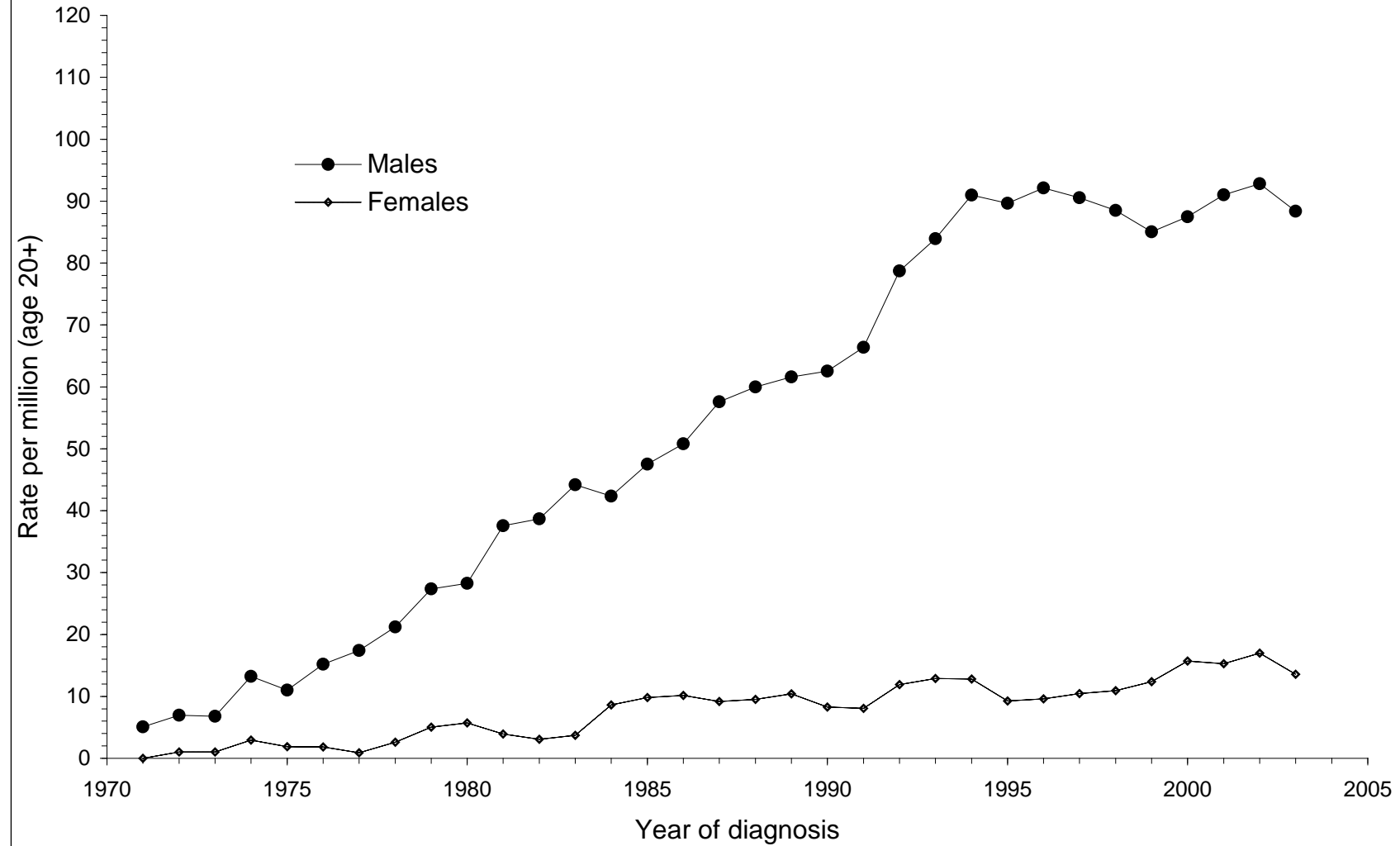
Tailings from mine distributed around the township

Only mined crocidolite (blue asbestos)

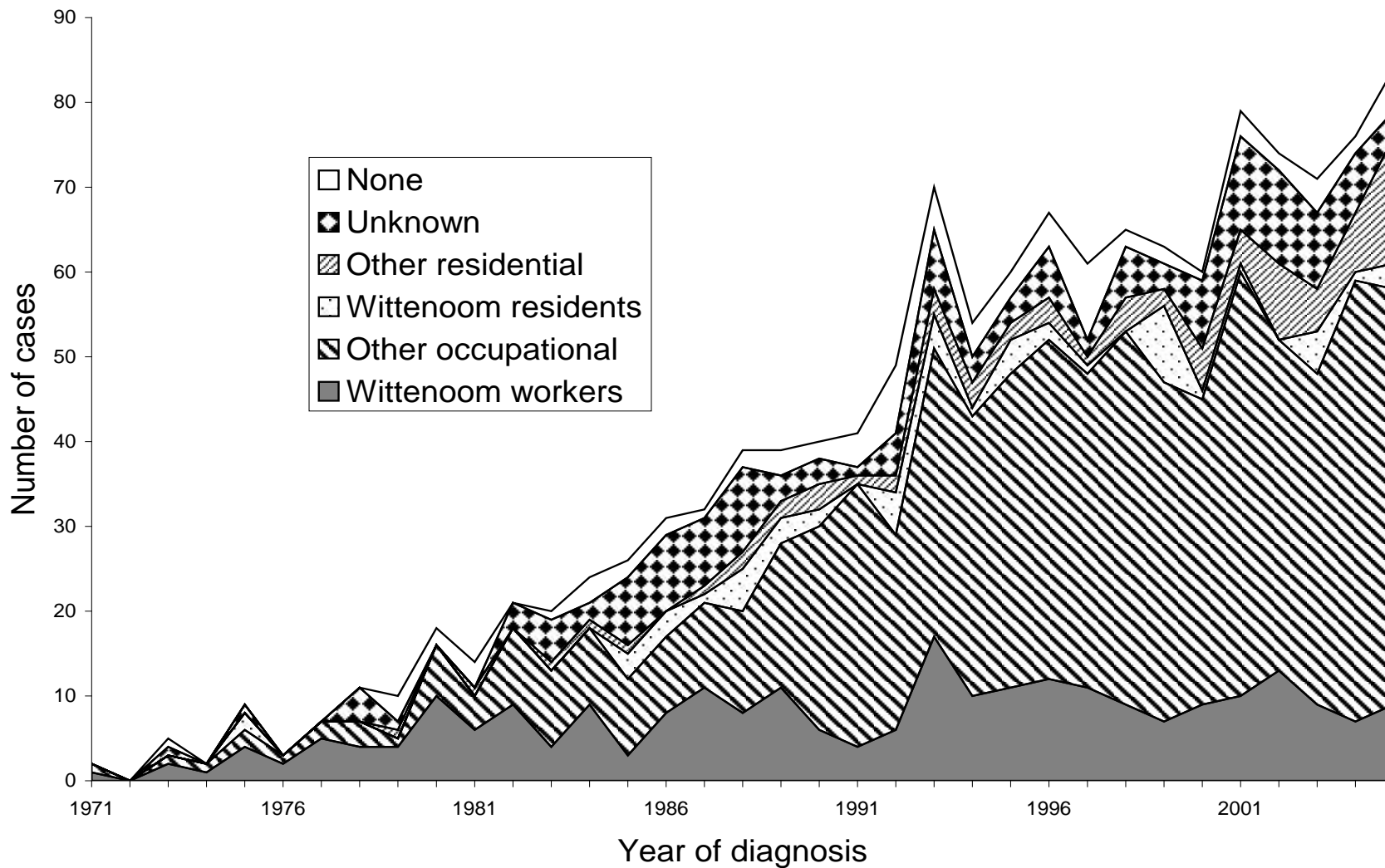
Western Australian Mesothelioma Registry

- Cancer is a notifiable disease in Western Australia
- All incident cases of mesothelioma are reviewed by a committee to document dates and methods of diagnosis, site, treatment received, and date of death, as well as asbestos exposure status

WA Mesothelioma (all types) - 3 year moving average



Asbestos exposure - WAMR



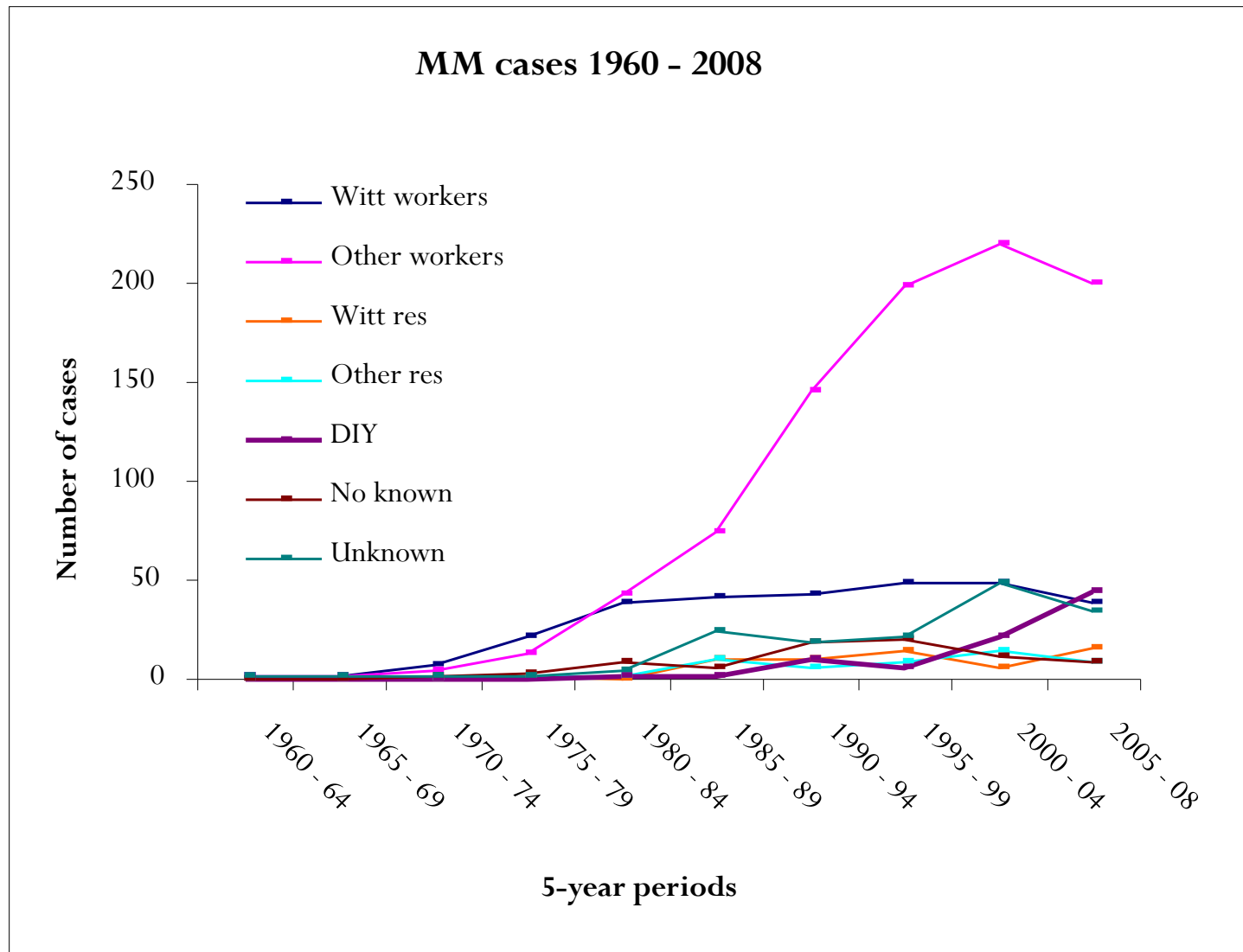
Three waves of malignant mesothelioma

- First wave: workers in mining and milling of asbestos and manufacture of asbestos products
- Second wave: persons who used asbestos products e.g. insulators, carpenters,
- Third wave: 'In place' exposure – e.g. exposure from asbestos in buildings.....Do-it-yourself renovators

Home renovation

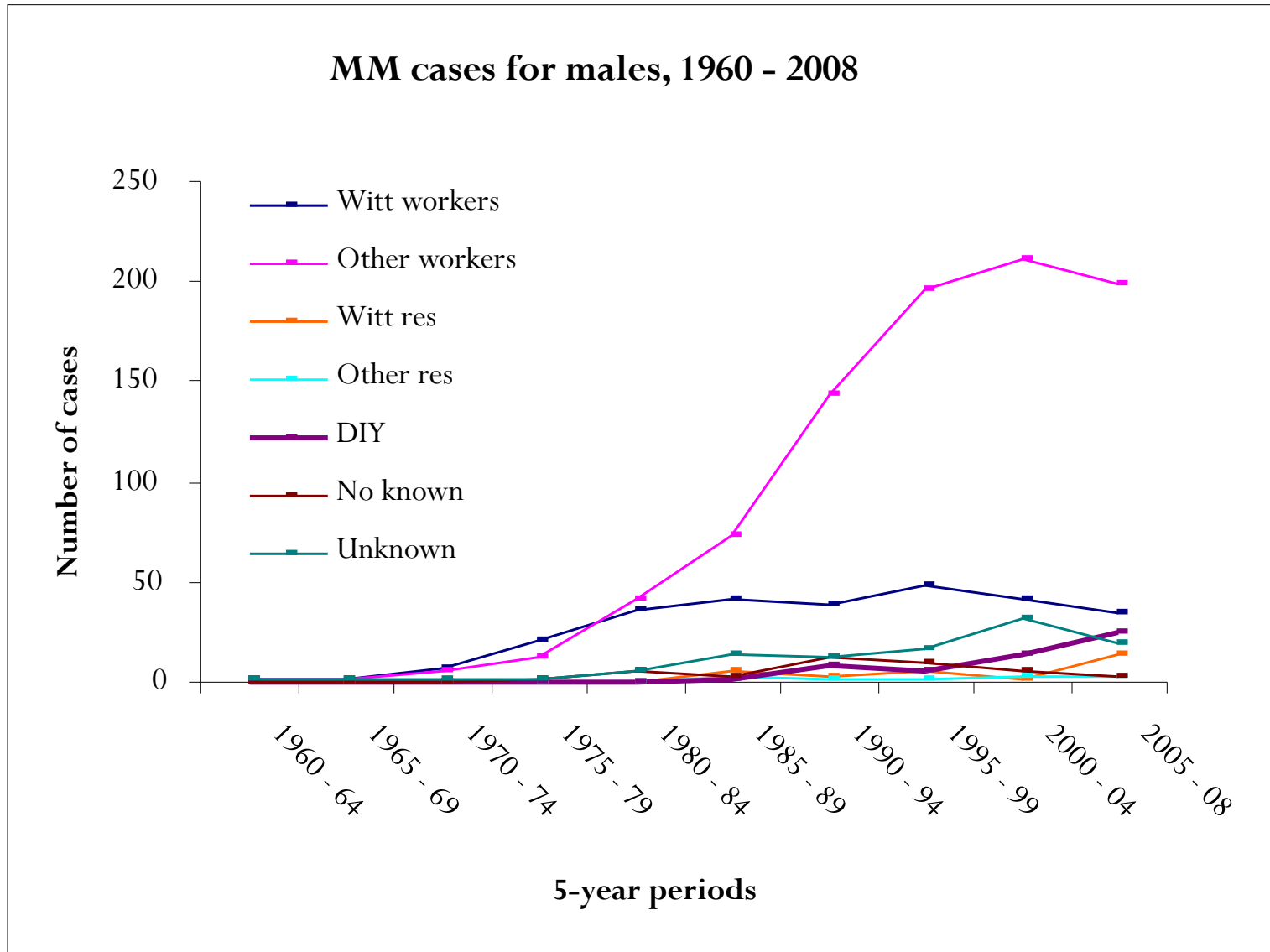
- Post WWII asbestos was used extensively as a building product in homes.
- Up until 1960's ~25% of homes clad with asbestos cement sheets
- Asbestos has not been used in domestic building materials since the (late) 1980s
- Little data on number of homes with asbestos
 - ACT: asbestos in 62.9% of surveyed homes
 - 70% homes built <1965 but 1% built >1984

Trend - All cases



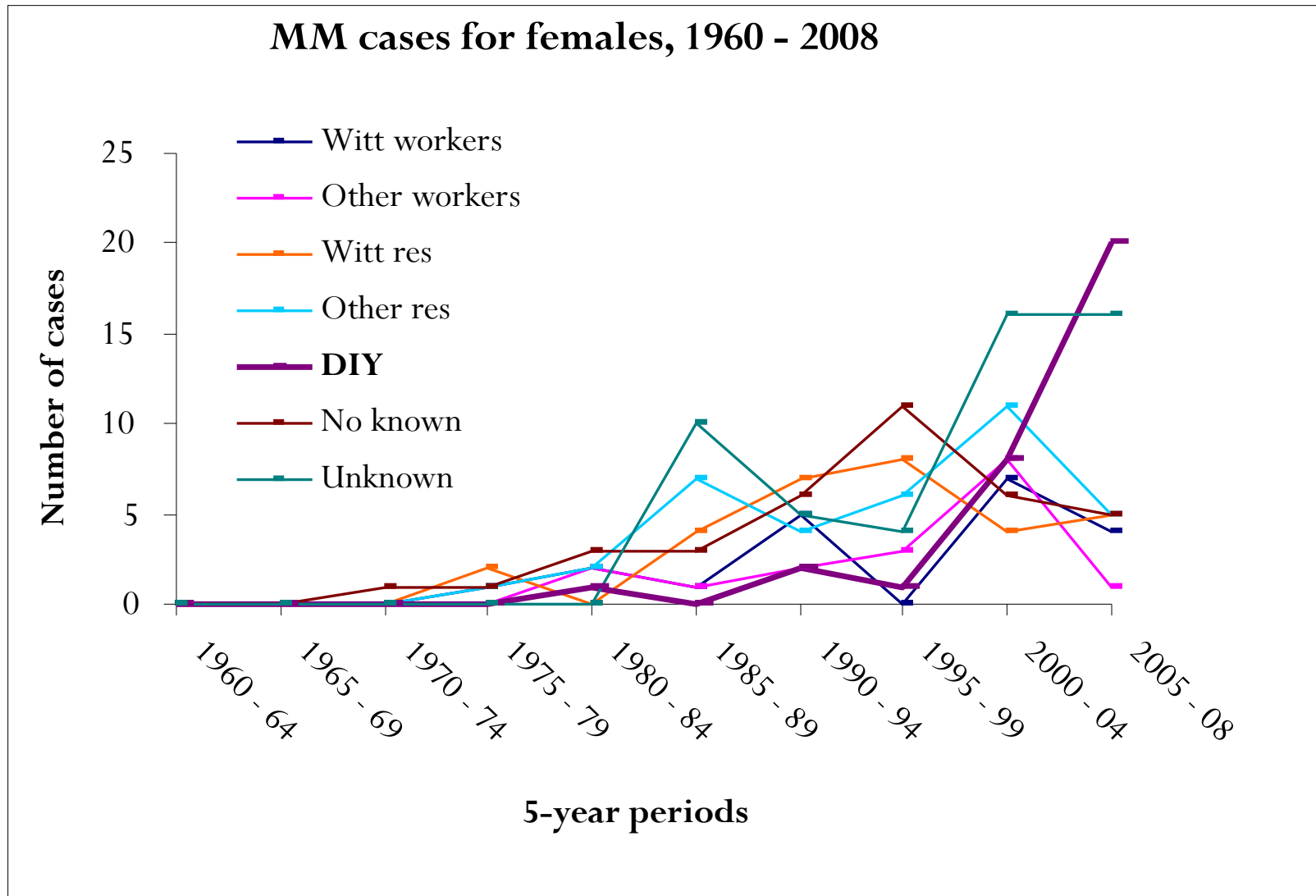
In the period 2005 – 08 DIY 2nd most common exposure category

Males



In the period 2005 – 08 DIY cases account for ~8.5% of total

Females



In the period 2005 – 08 DIY cases account for ~36% of total

Does mesothelioma risk decline after 40 years since first exposure? A pooled analysis

- Mesothelioma risk increases proportionally to 3rd or 4th power of time since first exposed to asbestos
- No clear understanding of long term risk of mesothelioma
- Few cohort studies have long term follow up
- Suggestion pleural mesothelioma risk may decline after 40 years since first exposure
- Clearance of fibres from the lung
- Susceptibility

Methods

Six Occupational Cohorts

- Wittenoom miners and millers, Australia
- Eternit asbestos cement factory workers, Italy
- Stagna, Cittadella and Vicenza railway car construction and renovation workers, Italy
- Amosite factory workers – Italy

Two Environmentally exposed cohorts

- Wittenoom residents
- Eternit wives

Data manipulation

- Renamed/coded variables so data could fit together
- Combined all cohorts
- Data split into
 - One year increments of age
 - Five year increments of calendar period
 - One year increments of time since first exposure
- Pleural/peritoneal cases matched with controls on age and calendar period
- Each case matched to a maximum of 150 controls
- Separate datasets for peritoneal and pleural mesothelioma

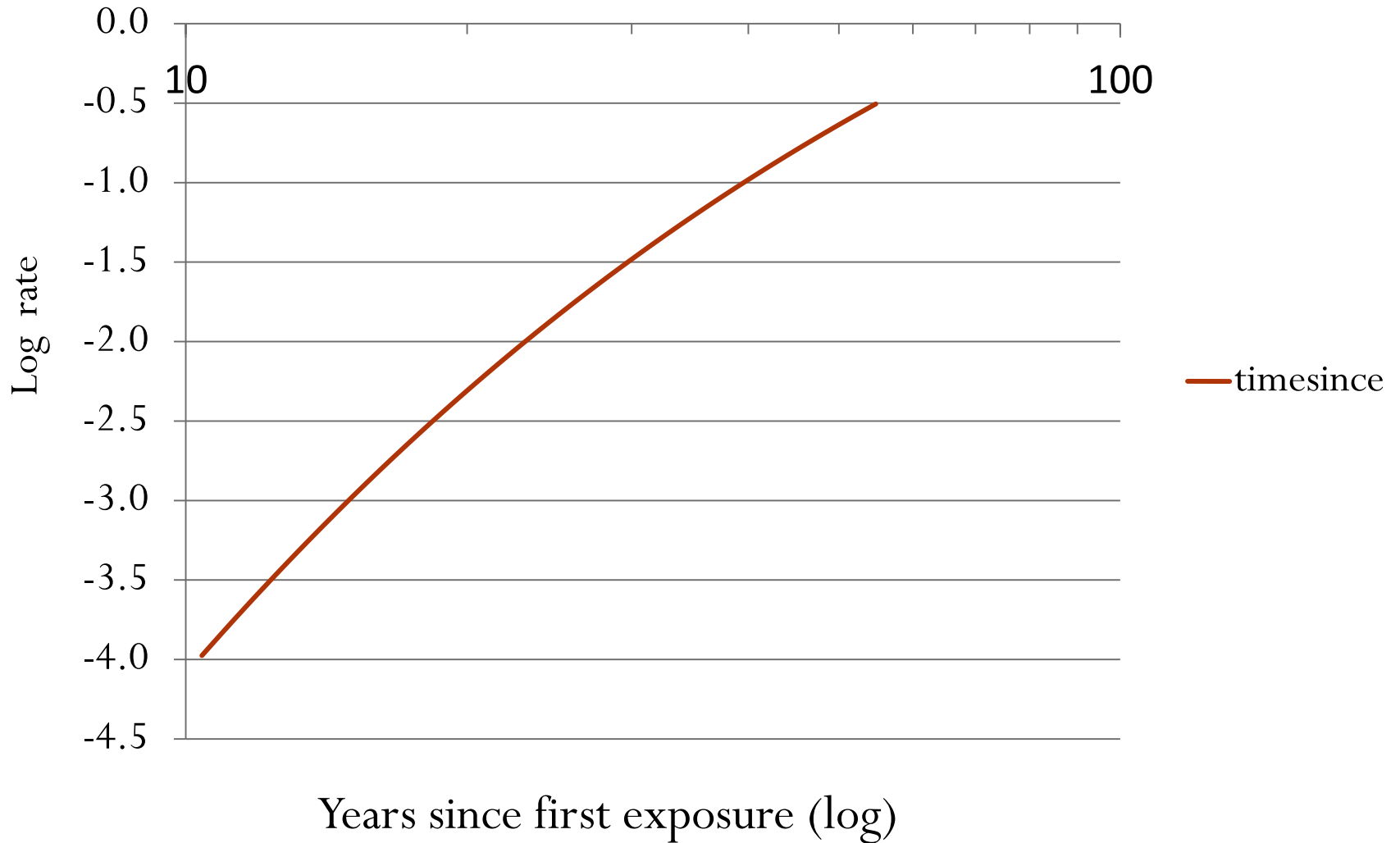
Results - Description of cohorts

Cohort	N 16,279 (m) 5,769 (f)	Definition	Period of operation	Type of asbestos
Wittenoom Workers	6,489 (m) 421 (f)	Crocidolite mine and mill workers	1937-1966	Crocidolite
Wittenoom Residents	2,206 (m) 2,615 (f)	Lived in Wittenoom for more than one month	1937-1992	Crocidolite
Eternit Workers (Casale Monferrato)	2,657 (m) 777 (f)	Asbestos cement factory workers	1907-1986	Mixed – includes amphibole
Eternit Wives	1,779 (f)	Wives of eternit factory workers	1921-1986	Mixed – includes amphibole
Amosite factory (Molina di Ledro)	248 (m) 161 (f)	Amosite factory workers	1919-1978	Amosite
Stagna	1,847 (m) 6 (f)	Railway car construction and renovation workers	1956-1982	Mixed – includes amphibole
Cittadella	1,125 (m) 10 (f)	Railway car construction and renovation workers	1956-1989	Mixed – includes amphibole
Vicenza	1,706 (m)	Railway car construction and renovation workers	1956-1988	Mixed – includes amphibole

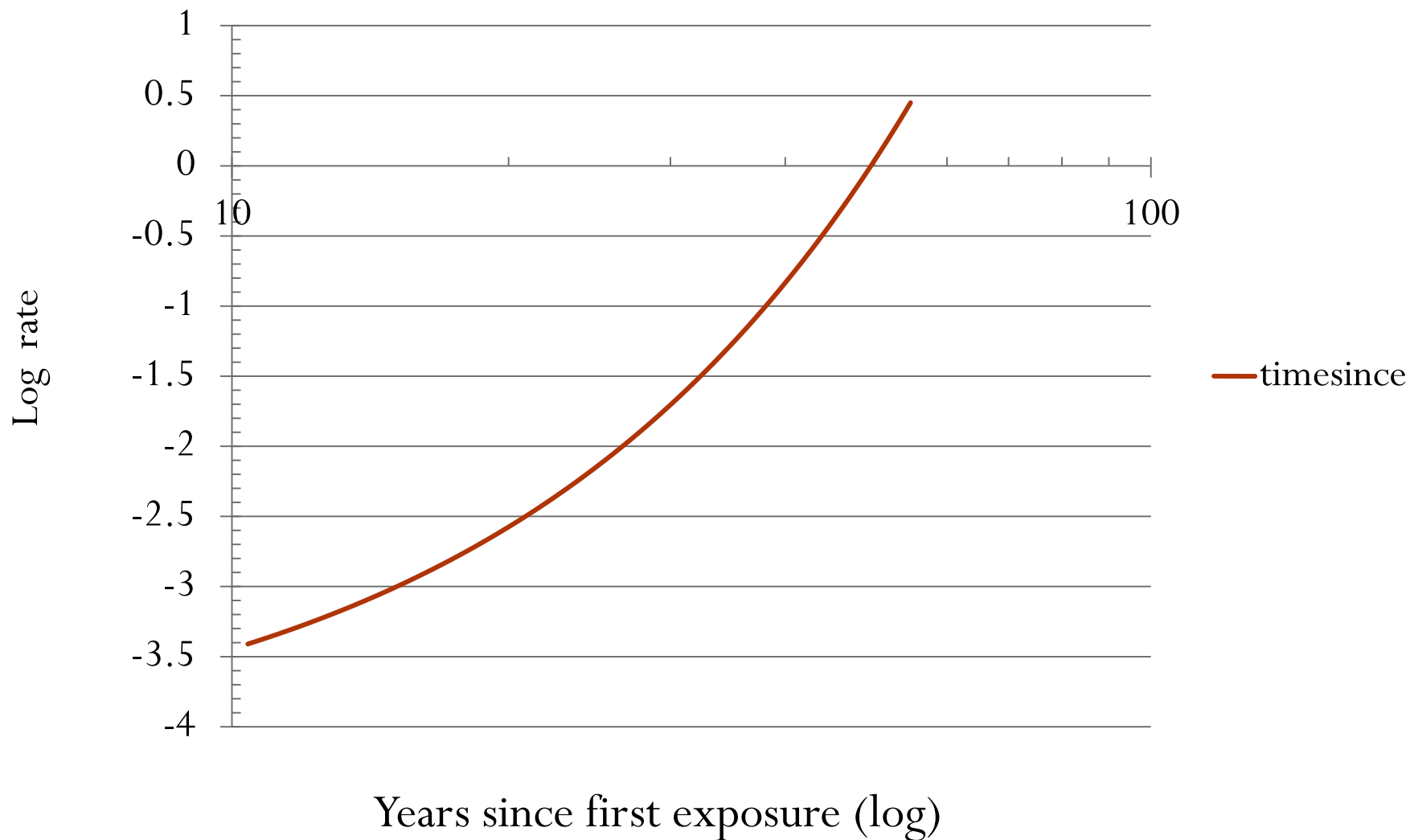
Mesotheliomas

Cohort	Pleural N=494 (m) N=155 (f) N=649	Peritoneal N=112 (m) N=30 (f) N=142	Median time since first exposure (pleural mm) Years (IQR)
Wittenoom Workers	276 (m) 14 (f)	49 (m)	35.6 (28.9 -41.7)
Wittenoom Residents	47 (m) 43 (f)	5 (m) 1 (f)	41.2 (35.9 – 45.7)
Eternit Workers	123 (m) 54 (f)	49 (m) 24 (f)	40.6 (32.7 – 48.5)
Eternit Wives	36 (f)	3 (f)	42.2 (35.8 – 47.8)
Amosite factory	3 (m) 7 (f)	1(m) 2 (f)	47 .2 (40.3 – 56.3)
Stagna	33 (m) 1 (f)	3 (m)	42.5 (33.1 – 50.2)
Cittadella	4 (m)	1 (m)	39.4 (31.0 – 46.1)
Vicenza	8 (m)	4 (m)	43.4 (34.8 – 46.2)

Rate of pleural mesothelioma and time since first exposure, 648 cases each matched with 150 controls



Rate of peritoneal mesothelioma and time since first exposure, 149 cases each matched with 150 controls



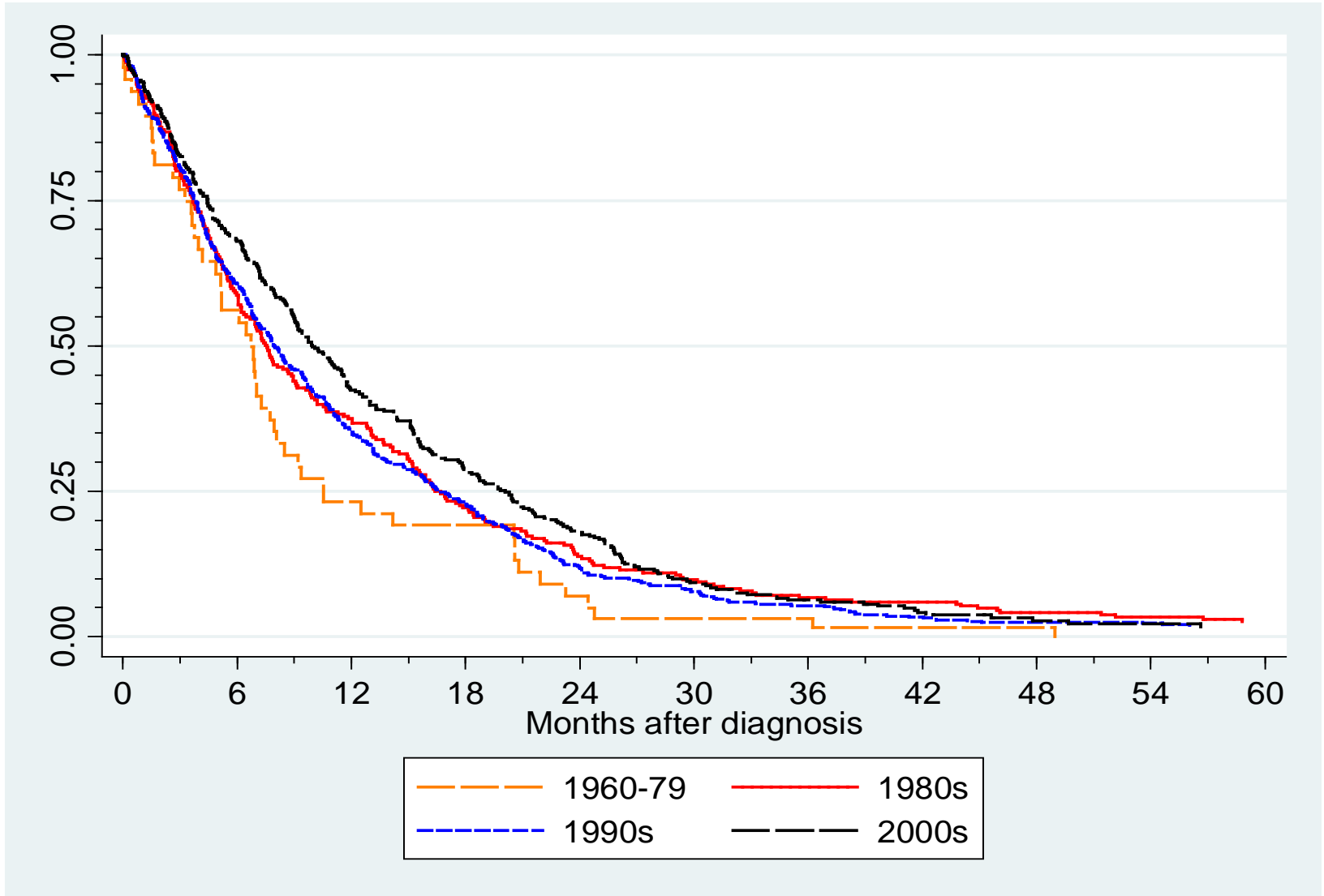
Mesothelioma treatment and survival

- Attracts increasing medical interventions and escalating health care costs as novel treatments are tried
- What is the evidence for success in a total population?

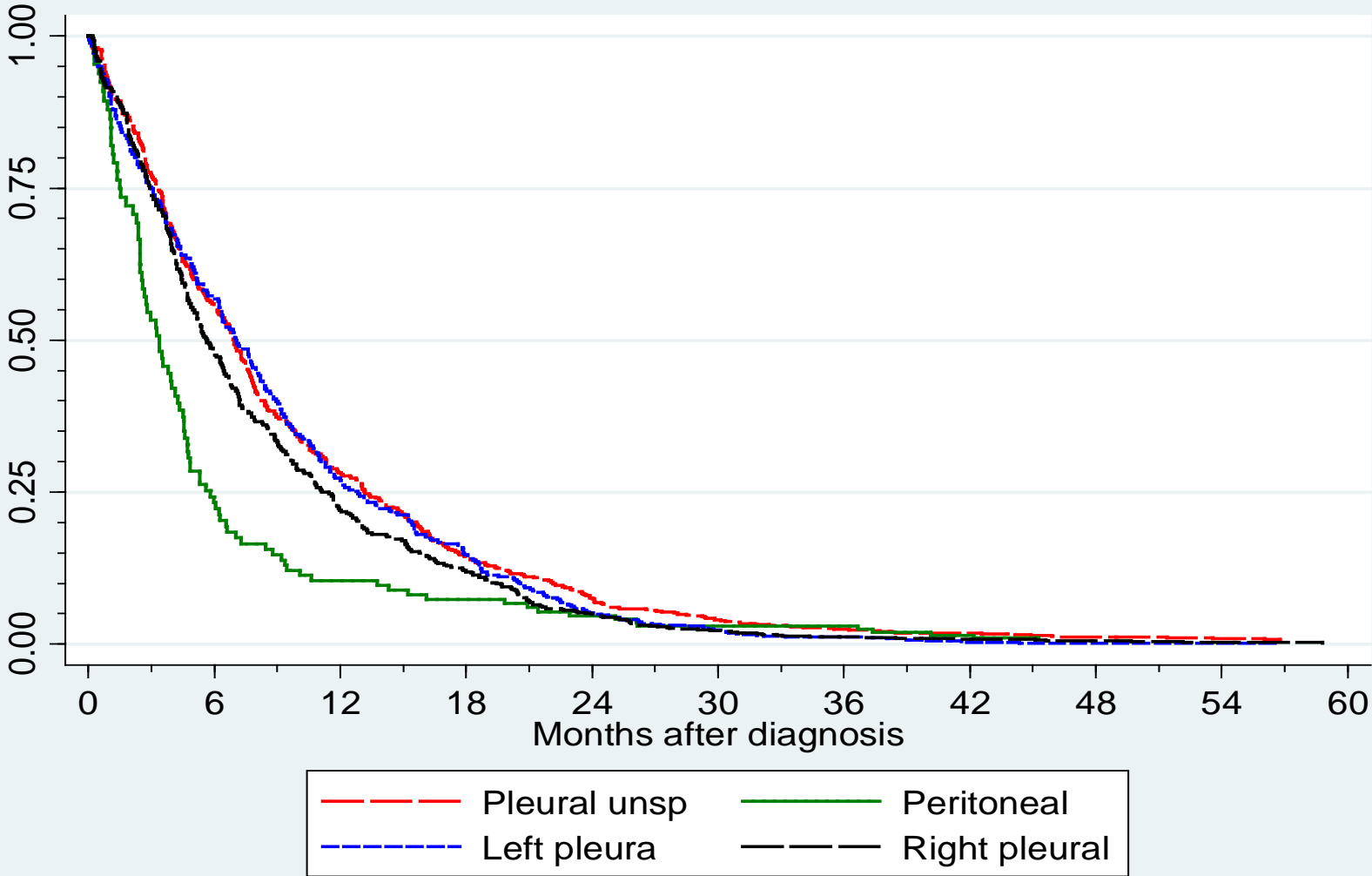
Since;

- First clinical trial of gemcitabine and cisplatin showed partial response rates of 30-40% and similar stable disease rates and the demonstration of significantly prolonged survival with pemetrexed and cisplatin more patients are submitting to active treatment regimes.
- Trimodality therapy with radical pleuro-pneumonectomy, radiotherapy and chemotherapy still attracts some people with "early" disease.
- Gene therapy and immunotherapy trials are common in conference proceedings and reports.
- Some highly selected groups show longer survival

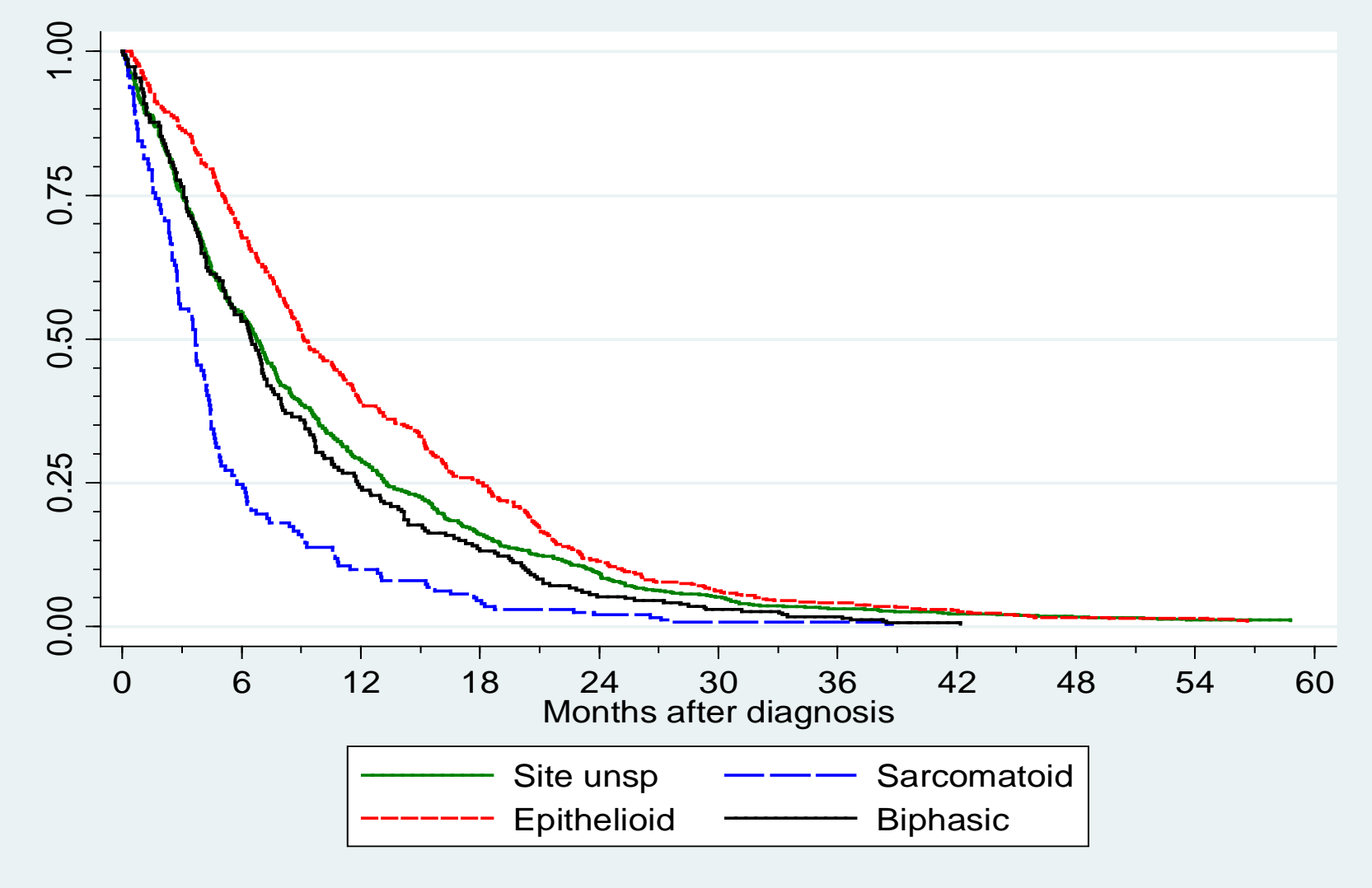
Change in survival over time



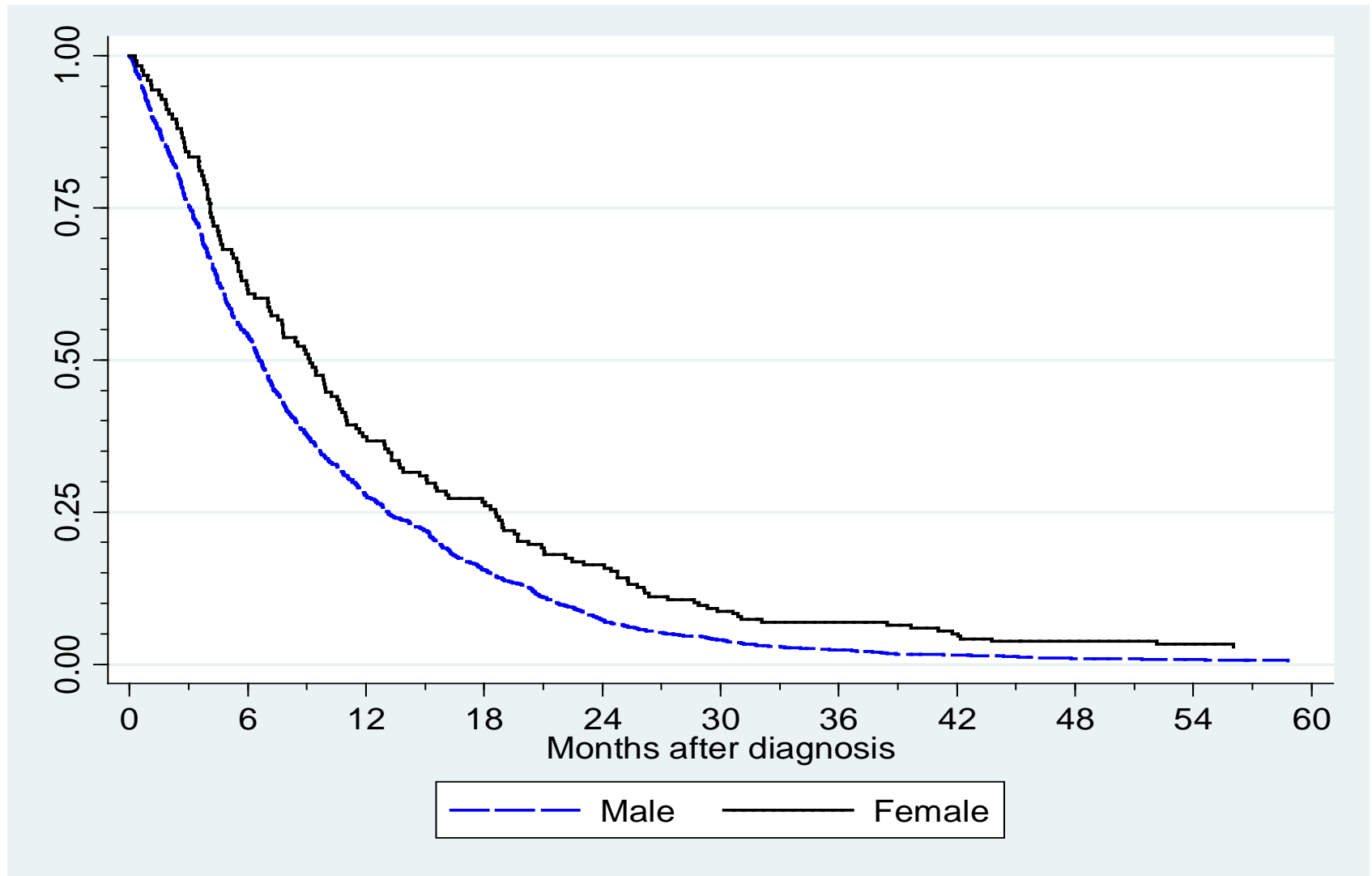
Survival by site of mesothelioma

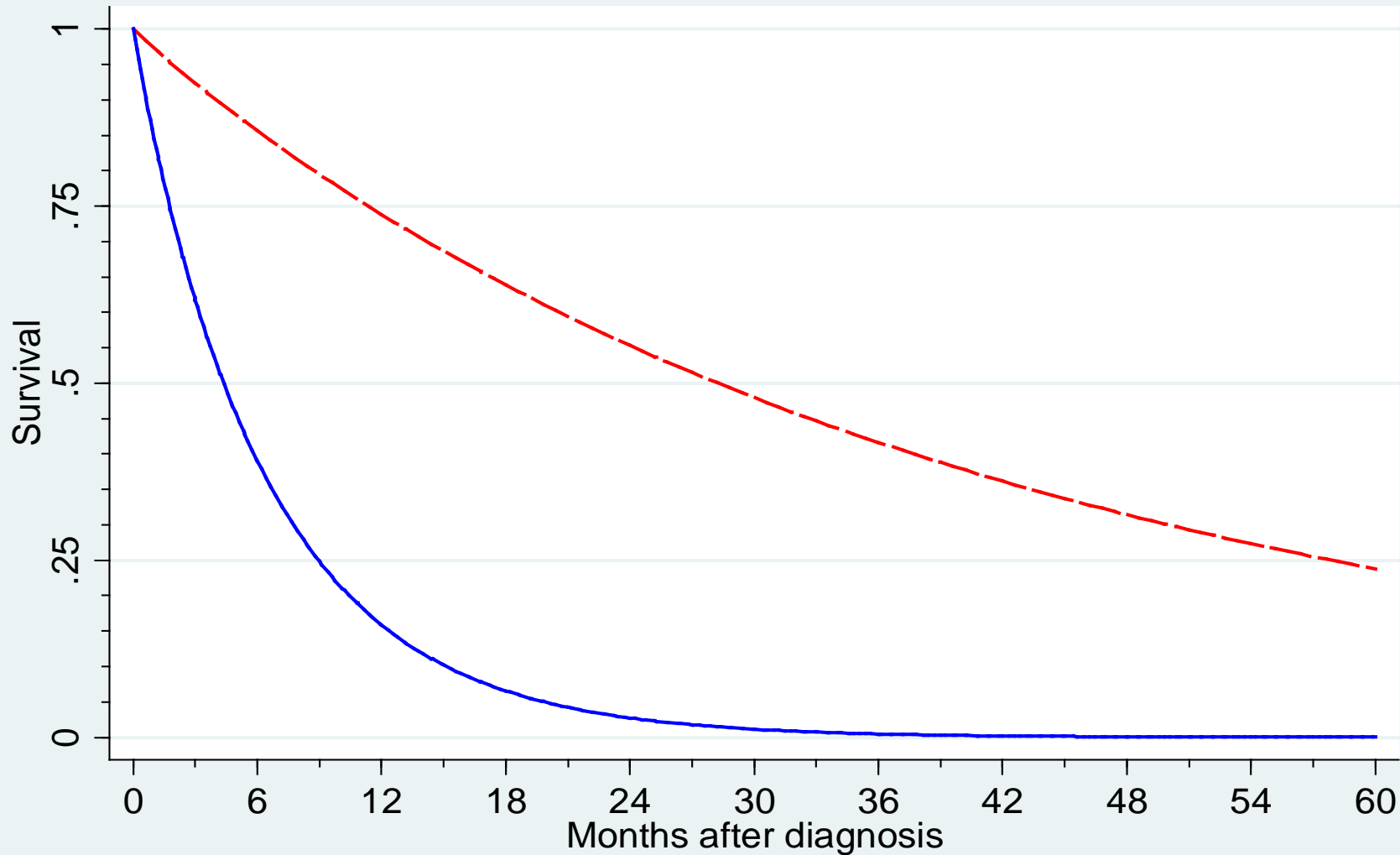


Survival by histology



Improved survival for women





--- 50y f epithelial pleural — 70y m sarcomatous peritoneal

Conclusions

- Despite increasing resources and treatment costs of malignant mesothelioma there have been only modest improvements in survival over the past 40 years.
- Prevention of exposure to asbestos still remains the urgent priority for mesothelioma prevention.
- Prevention includes: (i) banning production manufacture and use; (ii) subsidised and supervised removal and disposal; (iii) protection from known sources of exposure.