

Portuguese health care costs related to asbestos exposure: a cost-of-illness study on mesothelioma hospital admission in the period 2000-2015

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BACKGROUND

Portugal has a temperate climate and low industrialization levels existing in the period after World War II, when asbestos materials were used worldwide, has contributed to the generalized belief of low usage of those materials.

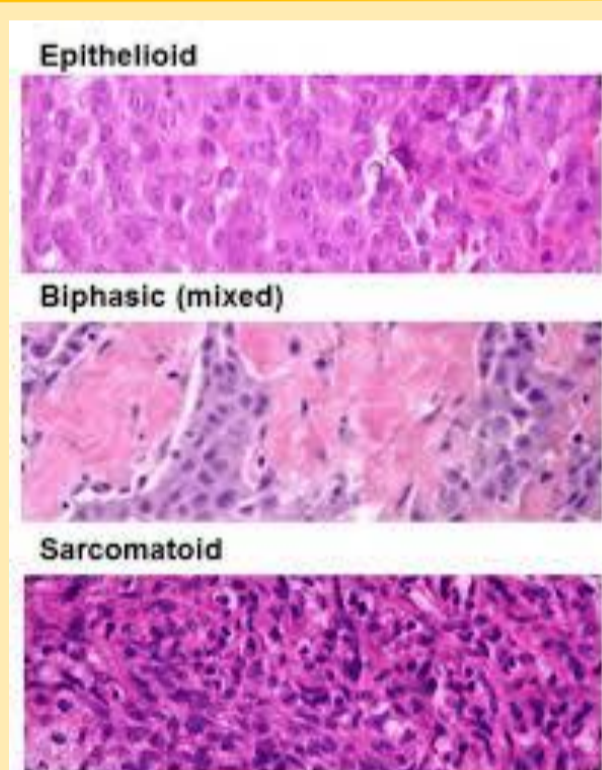
- Such supposition lacks confirmation;
- There is no specific registry of asbestos-related diseases, workers asbestos exposure or asbestos industrial use;
- Mesotheliomas are rare neoplasms strongly related to asbestos exposure so they can be used to understand the possible dimension of past exposure to asbestos;
- It was estimated that professional diseases under notification was up to 90% for asbestos-related diseases, mainly mesotheliomas.

MESOTHELIOMAS

These neoplasms develop mainly from the mesothelial cells overlying pleurae, peritoneum, pericardium and tunica vaginalis emerging usually after a latency period of 30-40 years after the first exposition. Periods of short latency have been described(2). They can also develop as a later consequence of radiotherapy (3), Simian virus (SV) 40 has also been implicated as a cause(4) and the asbestos fibers passage of the placenta is documented (5).



Pleural location, both parietal and visceral, accounts for 60-70% of all cases, followed by peritoneal with 20-30% and 10% in the pericardium. Very few cases have been reported to occur in the ovary and tunica vaginalis (testis)(6).



Histological types have several variants: diffuse epithelioid mesothelioma (the most common, 50-60% of all mesotheliomas), sarcomatoid mesothelioma and biphasic mesothelioma.

- The diagnosis at an early stage is an uncommon feature due to the deep location of the lesions and the lack of specific symptoms.

- Therapeutic approach for the treatment of mesothelioma should cover the following areas: control of serosae effusions, treatment with chemotherapy or surgery, radiotherapy in the intervention sites and palliative care.
- The prognosis is poor (7).

COST-OF-ILLNESS

Cost-of-illness (COI) studies are descriptive analyses assessing the economic burden of health problems on the population overall (8) used frequently to translate impacts on health in monetary values and therefore influence policies development and application.

There are four major methodological approaches for performing COI studies in relation with total and incremental perspectives. The Sum of All Medical (SAM), used in this study, is a total cost approach based on the healthcare expenditure for those diagnosed with the disease (9).

Diagnosis Related Groups (DRG) is a classification system of acute hospital admissions clinically consistent and similar for resource consumption developed in the US (Yale University) in the 70th years of XX century. This system is applied in all NHS Portuguese hospitals for funding operationalization (10).

OBJECTIVE

To estimate the number of mesotheliomas the hospital costs with admissions caused by benign or malignant mesothelioma of any location or histological classification.

METHODS

All admission records with DCI-9 morphology classification code 905xx registered between 2000 and 2015 were extracted from the DRG national database.

After inconsistencies and misspecification coding detection, individual cases were anonymously identified from admission records using sex, birth date and regional address code. This process was independently conducted by two researchers. DRG schedules based on Activity-Based Costing (ABC) were applied to all admission records and patient costs were estimated (11) by aggregating ABC. Patient's characterization by sex, age, residence region along with a resumed analyzes of mesothelioma distribution and overall costs evolution was performed.

RESULTS

A total of 1059 hospital admissions were registered in the national DRG database in the period 2000-2015 with the CID - 9 code 905xx.

After inconsistencies and misclassifications detection, a final sample of 1004 records was obtained. 640 patients with benign and malignant mesothelioma of any location were identified. The number of cases by year of first hospital admission is shown in figure 1.

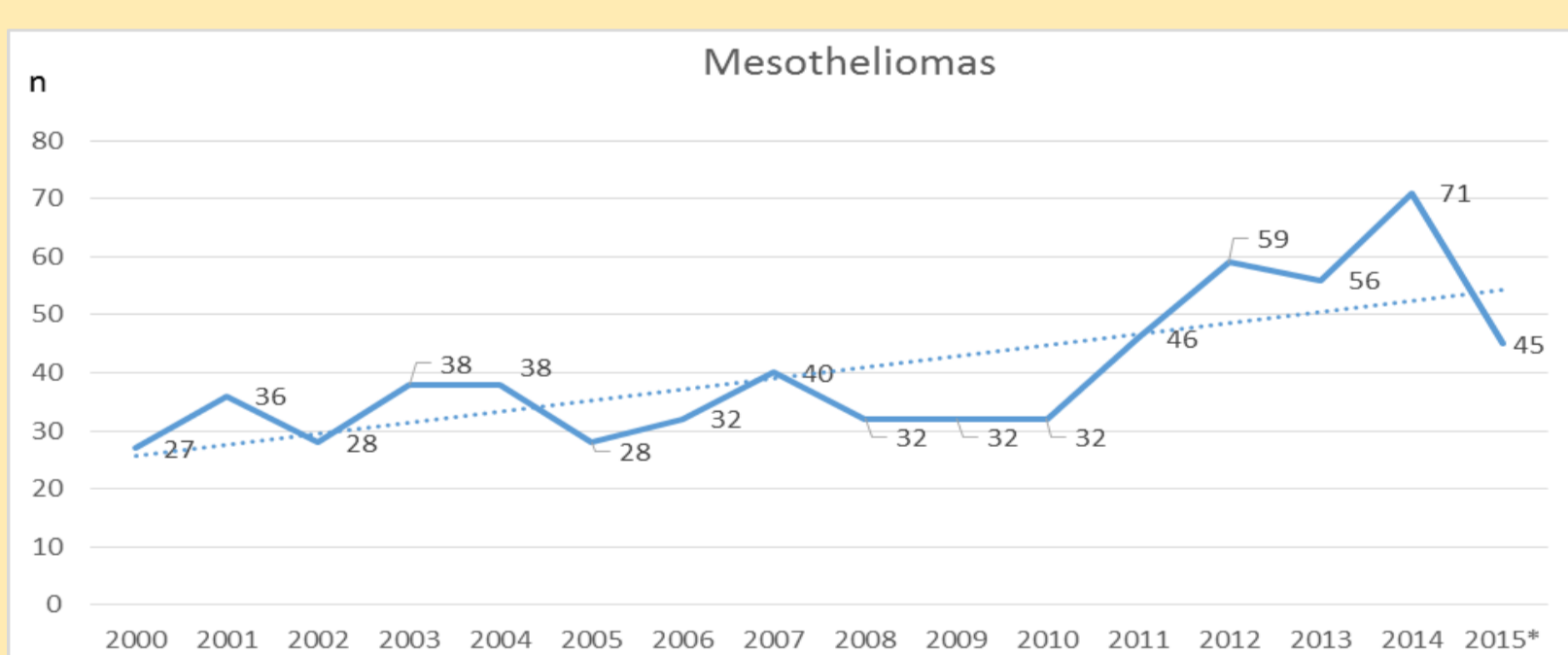


Figure 1 - Number of patients with benign and malignant mesothelioma per year identified from hospital admissions.
*provisional data; spotted line: linear trend.

94% (n=604) of the cases had personal address located at Lisbon and Tagus Valley Region, Center Region and North Region, mainly Lisbon, Oporto and Braga districts with 54% (n=346) of all cases

Mesotheliomas were more frequent among man (n=439; 69%) but the admission of new cases by year has no statistical difference from woman. Frequencies are shown in figure 2.

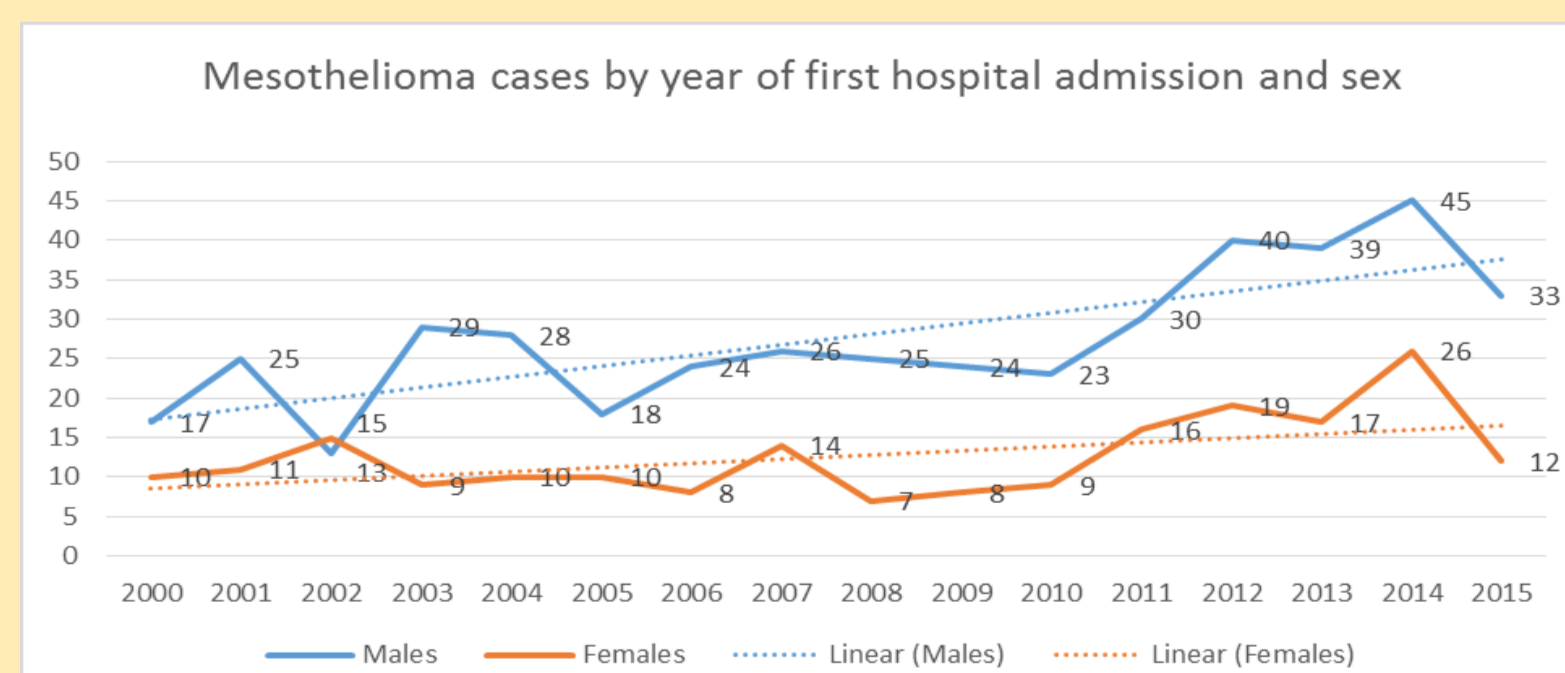


Figure 2 - Number of patients, male and female, with benign and malignant mesothelioma per year identified from hospital admissions.
*provisional data; spotted line: linear trend.

Intra-hospital mortality was about 20% (n=125) and it was slightly higher in men (21%).

ICD-9 Code	Designation	n	Pleura	Peritoneum	Ovary	Testis	No indication	Costs
M905	Mesothelial neoplasms	1	0	0	0	0	1	2 064,64 €
M90500	Mesothelioma, benign	32	10	15	4	0	3	103 847,99 €
M90510	Fibrous mesothelioma, benign	3	2	1	0	0	0	13 709,41 €
M90520	Epithelioid mesothelioma, benign	1	0	1	0	0	0	3 295,80 €
M90530	Mesothelioma, biphasic type, benign	1	1	0	16	0	0	6 947,93 €
M90540	Adenomatoid tumor NOS	46	0	1	0	26	3	73 688,58 €
M90551	Cystic mesothelioma	1	0	1	0	0	0	5 350,11 €
Total benign		85	13	19	20	26	7	208 904,43 €
M90503	Mesothelioma, malignant	450	306	83	5	1	55	2 786 907,60 €
M90513	Fibrous mesothelioma, malignant	9	6	0	0	0	3	71 578,22 €
M90523	Epithelioid mesothelioma, malignant	79	55	14	1	0	9	474 241,90 €
M90533	Mesothelioma, biphasic type, malignant	17	13	1	1	0	2	83 225,62 €
Total malignant		555	380	98	7	1	69	3 415 952,95 €
Total		640	393	117	27	27	76	3 624 857,88 €

In the first admission, there is no statistical difference on age between men and women for malignant mesothelioma however it is higher in man for the benign type. Intra-hospital mortality was about 20% (n=125) and it was slightly higher in men (21%).

During the period 2000-2015 a total of 3.6 M€ was spend by the Portuguese NHS on hospital care for mesothelioma patients. Average costs by admission remained stable over time but the total expenditure increased as shown in figure 3.

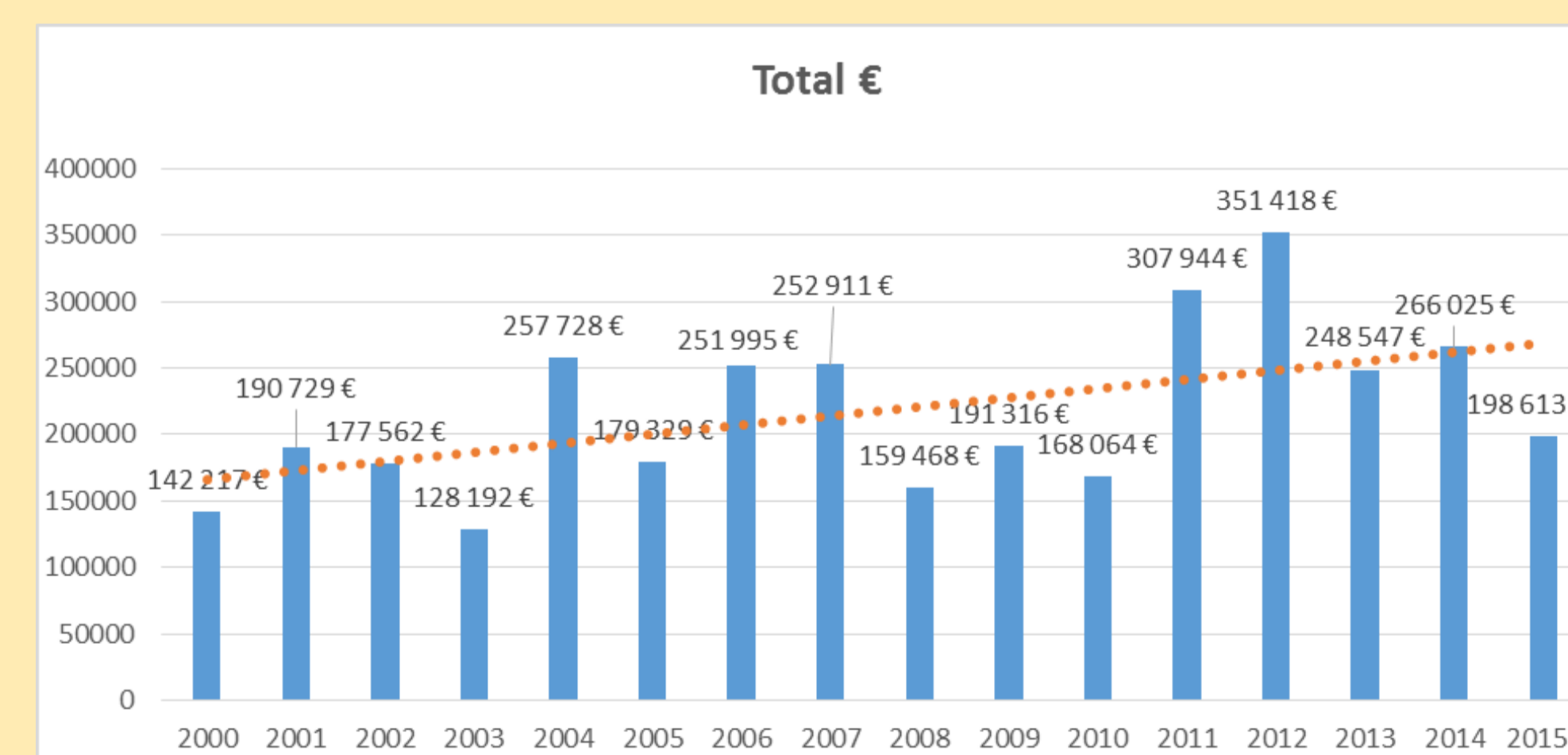


Figure 3 - Expenditure by year with benign and malignant mesothelioma identified from hospital admissions.
*provisional data; spotted line: linear trend.

CONCLUSIONS

The results are consistent with the literature (5) and show an increase in the number of cases of mesothelioma, especially of malignant types. Results are also suggestive that asbestos exposure have been higher than it is believed.

The absence of significant differences in age at first hospitalization between men and women for malignant tumors may indicate that both sexes were exposed to the same factors at the same time, suggesting an higher participation of women in the labor market but a domestic exposition cannot be discarded. These findings needs further investigation in the future.

The value of 3.6 M€ is a relative small amount for the period under study, but is however important because it was improperly supported by the NHS. Consequently, physicians should be aware of the need to notify the compensation system. Moreover, a professional disease recognition may provide further care and support for the patients, allowed by the Portuguese compensation system.