OP29. Institutional structure, financing mechanisms and heterogeneity in health care supply: Experience from 1078 breast cancer patients in a French region

Tonnaire G[1,2], Paraponaris A[1,2], Chanut C[1], Sambuc R[1]
[1]INSERM 379, Epidémiologie et Sciences Sociales Appliquées à l'Innovation Médicale, Marseille, France; [2]GREQAM, Marseille, France

Background: Heterogeneity in health care supply usually goes hand in hand with great variance in medical costs. In the past, heterogeneity has been documented through differences in patients' health and socioeconomic characteristics or practice-style effects. This study is aimed at pointing out how discrepancies in the health care supply may be explained by differences in institutional structures and financing mechanisms.
Methods: The study is based upon an investigation by the health insurance fund into 1078 female breast cancer patients from a South-Eastern French region (Provence Alpes-Côte d'Azur) who asked for the exemption of patient's contribution towards cost of medical treatment in the first half of 1994 and who have been followed up to the end of the treatment. The follow up began with the screening and stopped at the end of the primitive treatment. The treatment was made by one or more of the following sequences : surgery, chemotherapy, radiotherapy and hormonotherapy.
Results: 945 patients over 1033 who received surgery have had a lymphadenectomy. The number of removed nodes is significantly not greater than 6 for more than 15% of the 322 patients operated in private hospitals versus less than 8% in public hospitals and less than 4% in Cancer Institutes (p-value=0.00003). The general agreement is that the number must be greater than 7. Among the 939 patients who received radiotherapy, X photons have been used in 4 cases over 10. In those cases, there has been a great propension in private structures for using high energies, greater than 10 Mv (p-value=0.003) whereas the general agreement is about 6 Mv. Chemotherapy has been used for 381 patients and most often included anthracyclins, the choice of which heavily depends on the type of structure (p-value<0.00001): cheaper but more chemiotoxic drugs are used in public structures and Cancer Institutes, and more expensive ones with less adverse reactions in private structures. Moreover, when private structures use those latter drugs, dose-intensities are significantly less than the recommended ones.
Discussion: The explanation of different practices by different financing schemes coming from institutional discrepancies is obviously supported by econometric and statistic results. The coexistence in the French health care supply of a public sector with a prospective payment system-like financing regime and a private sector where costs are retrospectively reimbursed according to an official quotation fundamentally involves different choices of therapeutic policies. The objective-functions are clearly not the same : maximising health output subject to budget constraint for public sector and Cancer Institutes, maximising the financial output subject to standard constraints of health output in the private sector. In other words, there is a larger place for claims for quality of life in private hospitals than in public ones because of differences in institutional structure and related financing mechanisms.

Paraponaris A, DARCEME, Institut Paoli-Calmettes, 232 boulevard de Sainte-Marguerite, 13273 Marseille Cedex 9, France, E-mail: alain@ehess.cnrs-mrs.fr

OP30. Cost-effectiveness of faecal occult blood screening for colorectal cancer: results of the Nottingham trial

Whynes DK[1], Walker AR[2], Neilson AR[3]
[1]University of Nottingham, Nottingham, UK; [2]Greater Glasgow Health Board, Glasgow, UK; [3]University of Dundee, Dundee, UK.

Background: Colorectal cancer is a major cause of mortality in all European countries, although the early detection of the disease is known to improve survival. The development of faecal occult blood (FOB) testing and endoscopic investigation techniques has made mass population screening for such cancers a practical possibility. Since 1981, a randomised controlled trial of FOB testing has been conducted on a population of 150.000 persons in Nottingham, UK. Since 1986, an economic evaluation has been conducted in parallel, using evidence from the clinical trial.
Methods: (i) patient-specific costing of the FOB screening process, including programme administration and diagnostic investigation; (ii) patient-specific costing of post-diagnosis treatment (surgery) and follow-up; (iii) survival estimates from the clinical trial; (iv) quality of life estimates obtained from pre- and post-treatment questionnaires. A semi-Markov mathematical model of the entire screening process, based upon the disease progression observed in the trial, has been developed to obtain cost-effectiveness estimates (cost per QALY gained) for the trial protocol. This model has facilitated estimates for simulated screening scenarios employing alternate assumptions, e.g. different compliance rates and screening frequencies.
Results: Many of the earlier results of the evaluation have already been published. For example, the cost per cancer detected using the Nottingham protocol in a general setting would be approximately £3,000 (1991 prices), and variations on this protocol (using higher cost but more sensitive tests) appear to be less cost-effective. Screening permits the early detection and excision of pre-malignant lesions and effectively contributes to a long term reduction in cancer incidence. Such a strategy thus offers a sizeable discount on the costs of a cancer screening programme. Screening is found to offer little prospect of economy in surgical treatment costs, owing to the discovery that earlier stage disease is no less costly to treat than late-stage disease. When all these individual results are combined in the mathematical model, the incremental cost per QALY estimates show that screening according to the Nottingham protocol is of similar cost-effectiveness to UK breast cancer screening in the short term (i.e. over the duration of the trial). However, over the longer term (i.e. over subjects' expected lifetimes), the estimates for colorectal cancer appear superior. In general, the screening of females appears to be more cost-effective than for males, owing to the former's greater post-intervention life expectancy. The results overall appear relatively insensitive to changing assumptions about subject compliance.
Discussion: The evidence from the Nottingham evaluation suggests that FOB screening for colorectal cancer following the Nottingham protocol is cost-effective relative to many other currently-employed treatments, under most plausible assumptions about compliance and screening other parameters. However, other screening modalities are currently under evaluation, e.g. one-off endoscopic screening, which may prove even more cost-effective.

Whynes DK, Department of Economics, University of Nottingham, Nottingham NG7 2RD, UK

OP31. The cost of breast cancer: Implications for screening

Wolstenholme J[1], Whynes D[2]
[1]Trent Institute for Health Services Research, University of Nottingham, UK, [2]Department of Economics, University of Nottingham, UK

Background: The effectiveness of breast cancer screening is now well-established although questions regarding cost-effectiveness remain. One unresolved issue is whether screening can offer the prospect of economies in treatment costs as a result of detection of the disease at earlier stages of development.
Methods: A detailed cost audit was conducted using the medical notes of 137 patients diagnosed with breast cancer in the Trent region of the UK in 1991 and followed for four years. From individual patient records we developed stage-specific algorithms of diagnostic and therapeutic cost-entailing events. These resource use algorithms were combined with unit cost estimates to obtain the mean costs of diagnosis, treatment and follow-up by stage at diagnosis over the four year period.
It is important to appreciate that for some patients, these four year costs will represent an underestimate of the total treatment costs arising from the condition. For those surviving, certain therapies will continue into the fifth year and beyond. These additional costs were modelled using stage specific survival rates and the four year resource-use data.

The resource-use costs were then incorporated into a comparison of the costs and outcomes of the current screening programme in the Trent region with that of a hypothetical scenario; one which assumes that screening had not been introduced and that cancers had been detected by other methods.

Results and Discussion: Audited at four years, stage IV cancers emerge as being more expensive to treat than those at earlier stages (stage IV; £6590 (£5064), stage I; £3569 (£2555), stage II; £3996 (£2004), stage III; £3917 (£3132) although this difference fails to achieve significance when expected lifetime costs are considered (stage IV; £6590, stage I;. £4652). The inclusion of the treatment cost estimates in the model of the screening programme in the Trent region indicates that screening may actually increase expected treatment costs, although only by a marginal amount (0.3 per cent). Thus although screening entails an improvement in the stage distribution at diagnosis, the expected benefits of reducing the numbers of late-stage patients who consume relatively large amounts of expensive palliation resources are counter-balanced by an increased proportion of early-stage patients consuming more surgical, radiotherapy and follow-up resources. However, the model also suggests that the cost-effectiveness ratio of breast cancer screening in the UK might actually be better than had originally been thought. Translated into 1991 values, the basic cost per life-year estimate from the Forrest Report becomes £4,500. Employing a Forrest-type cost-effectiveness methodology with the Trent data, we have obtained a base-line figure some 22 per cent lower; £3522.

Wolstenholme J, Trent Institute For Health Services Research, Room B39, Medical School, QMC, Nottingham NG7 2UH, UK

OP32. The cost of cervical cancer: Implications for screening

Wolstenholme J[1], Whynes D[2]
[1]Trent Institute for Health Services Research, University of Nottingham, UK; [2]Department of Economics, University of Nottingham, UK

Background: Cancer of the cervix is the tenth most common female cancer accounting for 2.9% of all new registrations in the Trent region of the UK. The lifetime risk of developing the disease is approximately 1 in 125[1]. In contrast with breast cancer screening which detects early invasive cancers, the screening programme for cervical cancer targets pre-invasive cancers. This ability to detect pre-invasive cancer combined with the increased efficiency of the screening programme since the late 1980's has led to a reduction in the incidence of invasive and an increase in the incidence of pre-invasive carcinoma of the cervix. What this effect has had on the resource-use and cost of diagnosis, treatment and follow up of carcinoma of the cervix is still unknown.

Methods: A detailed cost audit was conducted using the medical notes of all patients diagnosed with invasive cervical cancer in the Trent region of the UK in 1990 and followed for a minimum of five years.

From individual patient records we developed stage-specific algorithms of diagnostic and therapeutic cost-entailing events. These resource use algorithms were combined with unit cost estimates to obtain the mean costs of diagnosis, treatment and follow-up by stage at diagnosis over the five year period. To assess the implication on resource use of the increased efficiency of the screening programme during the late 1980's, the average cost per disease episode of pre-invasive carcinoma of the cervix must be estimated. A database of all patients diagnosed since 1990 with pre-invasive cervical cancer at Queens' Medical Centre, Nottingham has been used to elicit the resource use information for costing purposes.

Results and Discussion: Audited at five years, preliminary cost results for invasive carcinoma of the cervix have shown that stage I cancers are significantly cheaper to diagnose, treat and follow-up than stage II, 111 and IV cancers. The average cost per disease episode for stage I cancers is approximately £7,000 (1990 £ sterling) compared with the average cost per disease episode for stage II - IV cancers of approximately £1 1,000.

The average cost of pre-invasive carcinoma of the cervix is yet to be determined, as the research is still ongoing. These results will be presented at the conference in November.

These cost results for pre-invasive and invasive carcinoma of the cervix combined with screening programme information and survival data can also be used to model the cost-effectiveness of cervical cancer screening in the UK.

Wolstenholme J, Trent Institute For Health Services Research, Room B39, Medical School, QMC, Nottingham NG7 2UH, UK

[1]First Report of Trent Cancer Registry 1996/97

OP33. Determining the importance of specific symptoms for the economic evaluation of advanced prostate cancer therapies

Yabroff KR[1], Barofsky I[2], Pearson A[1], Rothman M[3]
[1]MEDTAP International, Bethesda, MD, USA, [2]Johns Hopkins University-Bayview, Baltimore, MD, USA, [3]Janssen Research Foundation, Titusville, NJ, USA

Cost-utility analyses integrate the economic impact of disease and its treatment with patient valuation of health states. Utility assessment in prostate cancer has focused on early stage disease where potential side effects of therapy are impotence or incontinence and potential benefit is improved long-term survival. Little attention has been given to advanced prostate cancer where patients having failed hormonal therapy experience many adverse effects and treatment offers only small improvement in survival. Here qualitative assessment may have a tremendous impact on the economic analysis.

We interviewed 80 advanced prostate cancer patients as part of a cost-utility analysis of alternative therapies. Subjects evaluated between eight and twelve descriptive health states with a visual analog scale as part of a computer-assisted utility assessment package. Three "core" health states provided a contextual description of advanced prostate cancer using average levels of fatigue, physical functioning and emotional state. These states corresponded to an asymptomatic, a less functional, and a rapidly progressing advanced prostate cancer patient.

Subjects also evaluated between four and eight supplemental states, which combined one of the core states with an advanced prostate cancer symptom or side effect of therapy. Subject valuations of symptoms and side effects were assessed using paired t-tests comparing the supplemental state to the appropriate core health state.

The mean value (SE) for the asymptomatic health state was 81.1 (1.27); 60.8 for the less functional health state; and 30.7 (1.76) for the rapidly progressing health state. When evaluated in the context of the asymptomatic health state, subjects indicated that PSA progression, constipation, nausea and vomiting, and diarrhea would result in an additional decrement in their overall well-being ($p<0.05$).

When evaluated with the more symptomatic health state, subjects indicated that constipation, nausea and vomiting, hot flushes, diarrhea, bone pain or cachexia would result in an additional decrement in utility ($p <0.05$). Alopecia, gynecomastia, urinary complications, brittle nails, and skin complications were not judged to have a significant impact on utility in the asymptomatic or the symptomatic health state.

Three symptoms of disease were evaluated with the rapidly progressing health state. Cachexia and constipation were judged to result in an additional decrement in utility ($p<0.05$) while the addition of urinary complications was not significant.

The three core health states resulted in significantly different patient generated values indicating qualitative differences within advanced prostate cancer. Specific symptoms or side effects of treatment were associated with additional decreases in utility. Constipation, nausea and vomiting, diarrhea, cachexia, and bone pain were described as being consistently worse than the core health state in at least two of the three health states. Inclusion of patient-based assessment of health states will lead to a more meaningful economic evaluation of advanced prostate cancer therapy.

Yabroff, KR, MEDTAP International, 7101 Wisconsin Ave, Suite 600, Bethesda, MD 20814, USA