OP9. The cost of radiotherapy at an Ontario regional cancer centre

Earle C, Coyle D, Smith A, Agboola O, Evans WK
Ottawa Regional Cancer Centre, University of Ottawa, Canada

Background: Economic analyses of cancer therapy often require estimates of the cost of radiation. A comprehensive cost analysis, done by Wodinsky et. al. at an Ontario regional cancer centre in 1984, found the average cost of a fraction of radiation to be $123. Inflated by the Consumer Price Index (CPI) to today's dollars, this figure becomes $176. Practice has changed considerably since then with financial restrictions requiring operational efficiencies while new treatment techniques have been introduced. Therefore, we did this analysis to obtain an updated cost estimate of radiation therapy for use in Canadian economic studies.
Methods: The perspective is that of government as payer in a universal health care system. All costs are in 1996 Canadian dollars. Our centre is an ambulatory treatment and research facility located on 2 campuses, each associated with a tertiary care teaching hospital. Both campuses house 3 high-energy treatment machines, 1 cobalt machine and one treatment simulator. Direct costs of the radiation oncology program include the salaries and benefits of oncologists, nurses, secretaries, and physicists, as well as supplies and equipment, including depreciation. We used step-down allocation of overhead to distribute the costs of housekeeping, maintenance, utilities, health records, transcription, and laboratory services to the radiation program. Overhead from departments such as administration and finance was allocated by the same method. The most recent Ontario Schedule of Benefits provided physician fees. We allocated costs to the different machines and programs based on proportion of treatment time.
Results: There were 2,941 patients given 45,209 fractions of radiation at our institution in 1995/96. Breast cancer was the most common indication, accounting for 33% of treatments. This was followed by prostate cancer (18%), gynecologic malignancies (12%), and lung cancer (8%). The average cost of each fraction was $130. Single field fractions cost $100/fraction, two fields cost $114/fraction, three fields cost $143/fraction, and four field treatments cost $159/fraction. The average cost per minute of treatment was $8.36.
Discussion: With more complete costing and CPI adjustment, significant efficiencies appear to have been realized in the last 12 years. While there were methodological differences between the evaluations, the difference also likely reflects improved efficiency in the radiation delivery system, with machines operated at higher volume by fewer employees. This data will facilitate the assessment of cost-effectiveness of both alternative radiation regimens and techniques for improving the efficiency of current practice.

Earle C, Ottawa Regional Cancer Centre, University of Ottawa, 501 Smyth Road, Ottawa K1H 8L6, Canada

OP10. Integrating patients' preferences in therapeutic decisions in cancer: Development of a decision board

Ferdjaoui N[1,3], Carrere MO[1], Bremond A[1,2], Charavel M[3], Fervers B[1], Grattadour AC[2], Voog E[2], Philip T[1,2]
[1]GRESAC, ESA 5047 CNRS, Lyon France; [2]Centre Léon Bérard, Lyon, France, [3]Université Lyon2, Lyon, France

Background: Many clinical decisions in oncology are based on a choice between the toxicity of the treatment (i.e. the **patient's quality of life**) and potential survival (i.e. the **quantity of life**). In order to make such a **choice**, two components are needed: knowledge of the risks and benefits of each option (**cognitive component**) and patients' preferences concerning the potential outcome (**preferential component**).
Physicians often have a "paternalistic" attitude to their patients and make choices from their point of view. Recently, social evolution, particularly in North America, and ethical considerations brought about changes in behaviour, moving from a paternalistic model to a *shared-decision model.*
Methods: At the Centre Léon Bérard Regional Cancer Centre in Lyon, a multidisciplinary working group comprising oncologists, economists and psychologists is developing a decision board.
We have chosen the therapeutic situation of post-menopausal women with node-positive breast cancer (N<8) and positive hormonal receptors (R≥10), after surgery. In this situation, the choice to be made is both simple and complex. Women have the choice, between a better chance of relapse-free survival with chemotherapy and a better quality of life without chemotherapy. On the basis of a systematic review of the literature and the experience of the physicians and psychologist, we identified several stages in the development of a decision board.
First stage: Development of a user guide; **Second stage:** Material development of the decision board; **Third stage:** Testing the clarity of language and presentation of choices; **Fourth stage:** Testing the quality of the psychometrics with regard to validity and reliability and **Fifth stage:** Testing the general acceptability of the instrument.
Results and discussion: We have completed the first stage, writing the user's guide, which contains all of the information given by doctors to patients. It describes the main differences between the two treatments, including the results of relapse and the side-effects of chemotherapy. The second and third stages are being implemented. The comments of doctors and nurses at our Center, indicate that the shared decision model is very different from the way therapeutic decisions are now made (the paternalistic model). The main aim of the subsequent stages will be to evaluate the feasibility and acceptability of this kind of help in decision making, for both patients and physicians.

Ferdjaoui N, ESAC, Centre Léon Bérard, 28 rue Laënnec, 69008 Lyon, France

OP11. Evaluation of relative costs of the cytostatic agents Tomudex® and 5-Fluorouracil plus Leucovorin as treatments for advanced colorectal cancer

Groener MGH[1], van Ineveld BM[1], Byttebier G[2], Rutten FFH[1]
[1]Erasmus University Rotterdam, Institute for Medical Technology Assessment, Rotterdam, The Netherlands; [2]Zeneca NV, Destelbergen, Belgium

Background: The standard chemotherapeutic treatment for patients with advanced colorectal cancer consists of 425 mg/m² 5-Fluorouracil + 20 mg/m² Leucovorin (Mayo-regimen), administered 5 consecutive days and repeated at week 4, 8 and every 5 weeks thereafter. Recently a new cytostatic agent was introduced for the treatment of these patients (Tomudex®, raltitrexed, Zeneca Pharmaceuticals, Macclesfield, UK). Tomudex® is administered as an IV injection at a dose of 3 mg/m² once every 3 weeks. In an international randomised clinical trial (Phase III study, n=439) the clinical efficacy of Tomudex® was compared to that of the Mayo-regimen with 5-FU + LV. The results showed no statistical significant differences in time to progression and survival between the two groups. However, the tolerability profile showed a major advantage for Tomudex®, e.g. a lower incidence of severe leucopenia and severe mucositis. Based on the finding of equal efficacy of the two treatments, a cost-minimisation analysis was performed in order to establish which treatment induces least costs for society, specifically for The Netherlands in daily clinical practice.
Methods: Units of health care resources from the trial were combined with Dutch unit costs. A statistical analysis was performed to determine which of the non-protocol driven resource items from the trial (e.g. intensive care days, ward days, outpatient visits and General Practitioner visits) differed between countries. Where a variation was shown, since there were insufficient patient numbers from The Netherlands, OECD health data were used to adjust the resource figures for The Netherlands. The protocol driven resources (e.g. laboratory tests, CT-scans) were adjusted for The Netherlands on the basis of results from a survey among Dutch oncologists.
Results: Although there is a major difference in drug costs between 5-FU + LV and Tomudex® (about 43%) in favour of the 5-FU + LV treatment, the results showed a minor difference in the average treatment costs per patient per week, amounting to $22,41 in favour of 5-FU + LV

(cost difference of about 11%). The cost component 'day case' days contributes most to the total treatment costs of 5-FU + LV, and the cost component 'drugs and preparation' contributes most to the total treatment costs of Tomudex®.
Discussion: This research was based on the finding of equal efficacy of the two chemotherapy treatments. To determine the optimal treatment for society, Quality of Life must be invoked in economic evaluation. Because of a convenient dosing schedule, Tomudex® patients spend less time at the 'day case' department, travel less often to the hospital and thus are less time away from normal activities than 5-FU + LV patients. 5-FU + LV patients are more likely to suffer from severe mucositis and leucopenia than Tomudex® patients. This may influence patient's Quality of Life and thus warrants for further research, preferably a cost-utility analysis.

Groener MGH, Erasmus University Rotterdam, Institute for Medical Technology Assessment, PO Box 173 8, 3 000 DR Rotterdam, The Netherlands

OP12. Results of an economic evaluation of a RCT of routine follow-up after primary treatment for breast cancer: A comparison of primary care vs specialist care

Grunfeld E[1,2,3], Gray A[4], Mant D[2], Coyle D[3], Yudkin P[2], Fitzpatrick R[2], Vessey MP[2]
[1]Ottawa Regional Cancer Centre, University of Ottawa, Canada; [2]Dept of Public Health and Primary Care University of Oxford, UK; [3]Ottawa Civic Hospital Loeb Medical Research Institute, University of Ottawa, Canada; [4]Health Economics Research Centre at Wolfson College, University of Oxford, UK

Background: It is standard practice in most countries to provide long-term routine follow-up after primary treatment for breast cancer in specialist oncology or surgical clinics. We hypothesised that routine follow-up under primary care would be equivalent but less costly than follow-up under specialist care. We conducted an RCT with concurrent economic evaluation to assess the effect of transferring primary responsibility for routine follow-up of women with early stage breast cancer from specialist care to primary care.
Methods: Patients were 296 prevalent cases with early stage breast cancer. They were randomised to continued follow-up in specialist clinics (control arm) or follow-up by their own general practitioner (GP arm). Patients in the GP arm were referred back to specialist care if diagnosed with recurrence or new primary cancer. The outcome measures were delay in diagnosing recurrence' and health-related quality of life (HRQOL). A detailed cost analysis was conducted alongside the RCT. The perspective of the economic evaluation considered costs to the health service (particularly the costs of visits and diagnostic tests) and costs to the patient (direct costs, indirect costs and time taken for a follow-up visit).
Results: Most recurrences (18/26, 69%) presented between routine visits and almost half (7/16, 44%) of the recurrences in the control arm presented first to the primary care physician. There were no differences between groups in clinical or HRQOL outcome measures. Hence, a cost minimisation analysis was conducted. The cost analysis showed clear evidence that primary care based follow-up services were substantially less costly than specialist based follow-up services ($p<0.001$). Patients in the specialist group reported longer travel times, longer waiting times and less time with the doctor ($p<0,001$). Detailed results of the economic evaluation will be presented.
Discussion: Primary care follow-up of the women studied led to lower costs without any increase in time to diagnosis of recurrence or deterioration in health-related quality of life. If these results are replicated in other settings (a trial is currently taking place in Ontario), they suggest women with breast cancer should be offered a choice between specialist and primary care follow-up.

Grunfeld E, Ottawa Regional Cancer Centre, 501 Smyth Road, Ottawa, Canada KIH 8L6, E-mail: egrunfeld@octrf.on.ca

OP13. Economics of the MRC Colorectal Working Party CR06 Trial

Hale J[1], Cohen D[1], Maughan T[2]
[1]University of Glamorgan, Pontypridd, Wales, UK; [2]Velindre NHS Trust, Cardiff, Wales, UK

Background: CR06 is a large nation-wide multi-centre trial being undertaken to compare three alternative chemotherapy treatments for patients with advanced colorectal cancer (de Gramont bolus and infusion, Lokich continuous infusion 5FU, and Tomudex) and to assess the optimum duration of treatment (stop versus continue treatment of patients whose disease has not progressed during the first 12 weeks of chemotherapy). There is, however, a growing awareness that health care resources are scarce and therefore in addition to determining comparative effectiveness in terms of clinical outcomes it is also important to consider at what cost these outcomes are achieved. In line with the main investigation, the health economics component of the trial will also address two issues; the comparative cost-effectiveness of continuing versus stopping chemotherapy after an initial 12 weeks of treatment. This will require data on resource use in addition to all other data being collected for CR06.
Method: The health economic data is being collected from a sub sample of centres taking part in the main trial. We have recruited 5 centres for this part of the study, spread geographically across the UK. Each centre provides all three chemotherapy regimes. Each of the alternative forms of chemotherapy delivery is provided in at least one centre. A total sub sample of approximately 150 patients will be obtained. Detailed data on the NHS costs of treatment are being collected from the five participating centres. This includes measurement and valuation of staff costs (medical, nursing, pharmacy), and costs of drugs and consumables for all regimes. A shorter questionnaire has been sent to all participating centres in the main trial to determine current methods of providing chemotherapy and obtain crude data on associated costs which will allow extrapolation of the detailed data across the whole trial. A research nurse in each of the five centres is monitoring via patient notes the investigations undertaken as well as any additional treatment. Patient borne costs are being collected by means of a weekly patient diary, completed by the patient or a relative. The diary monitors all costs incurred by patients or their families, including the opportunity cost of time taken off work both by the patient and by others to care for the patient. Differential use of general practitioner, district nurse or other health or social service resources between the groups is also being monitored in the diaries. Outcome data will be provided from the whole trial population on survival and quality of life measured on the EORTC QLQ-C30.
Results: From the data collected so far, it appears that the five centres chosen are representative of the sample as a whole, allowing extrapolation of the data.
Discussion: The extent to which detailed costing data can be collected from a sub sample of participating centres and extrapolated across the whole trial population is an interesting issue that requires further exploration.

Hale J, University of Glamorgan Business School, Treforest, Pontypridd, Mid Glam., Wales CF37 1DL, UK

OP14. Diagnostic Imaging in Cancer. The Economics of PET

James M[1], Hunt K[1]
[1]Centre for Health Planning and Management, University of Keele, Keele, Staffordshire, UK.

Background: Positron Emission Tomography (PET) is a diagnostic imaging modality that differs from traditional technologies such as Magnetic Resonance Imaging (MRI) and Computed Axial Tomography (CAT) by evaluating function and biochemical process within the body rather than structural and anatomical indicators of disease. This gives PET the advantage of detecting cancer at an earlier stage and, by not restricting diagnosis to a specific anatomical region, the extent of the cancer throughout the body.