

# Physician-Based Active Cost Management of Oncological Therapies Reducing Pharmaceutical Costs by 83.4% in Two Years without Leaving Standard of Care

Volker R. Jacobs<sup>a</sup> Jutta Thoedtman<sup>b</sup> Uta Euler<sup>a</sup> Stefan Paepke<sup>a</sup> Thorsten Fischer<sup>a</sup>  
Nadia Harbeck<sup>a</sup> Marion Kiechle<sup>a</sup>

<sup>a</sup>Frauenklinik,

<sup>b</sup>Klinikumsapotheke, Klinikum rechts der Isar, Technische Universität, München, Germany

## Summary

We report about the 2-year results of a physician-based active cost management model for oncological therapies in a German OB/GYN university clinic. Over 2 years more than 4,000 oncological cycles were prospectively and individually analyzed regarding costs and reimbursement mode. Main aim was reducing costs without lowering cycle number and standard of care. Within two years pharmaceutical costs were reduced by 83.4% or 785,976.- EUR. All causes for a previous financial loss

were identified and eliminated. Debts were paid back and employment of new staff and investments were possible. With this first active cost management model by and for physicians, oncological therapies can be performed cost covering even in a university clinic. Although developed for optimization of cost coverage of oncological therapies in Germany, this model is universally transferable.

## Introduction

Performance of chemo- and other oncological therapies with costs of up to several thousand Euros for a single chemotherapy day is very expensive in any country. Until now, physicians primarily focused on professional medical treatment of cancer patients according to the highest standards of care, mainly without including financial aspects. But unlimited performance of oncological therapies without an adjustment to actual costs and health insurances' reimbursement leads to subsidization of therapies out of the clinic's own budget and can result in a dramatic financial loss for an institution performing chemotherapies.

Although the medical director of any hospital department is often responsible towards the hospital administration for cost efficiency and cost recovery performance of any therapy, limited knowledge of economics and of actual reimbursement rates exists among physicians prescribing chemotherapies. The reason is that economics is not taught at medical schools or during residency in Germany and physicians and medical staff are still focused on the performance of medical care in the

sense of the 'old-fashioned' tender-loving care principle and often reject their responsibility to care about financial aspects of medical treatment as well.

The financial reimbursement of oncological therapies in Germany is very complex, a structure grown over decades and often depending on health politics more than on actual costs. Important factors are limitation of financial resources, yearly contract negotiations about hospital budgets between hospital administration and health insurances and a political demand for control of costs. Therefore, knowledge of adequate reimbursement as well as cost transparency and cost efficiency by physicians is extremely important to improve the financial situation of oncological therapies for any clinic.

The undifferentiated and unlimited performance of cancer therapies in the year 2002 lead to a loss of about 340,000.- € for the oncological unit of the Frauenklinik (OB/GYN) of the Technical University Munich. Two main reasons for this loss were: exceeding the allowed number of treatments (defined by internal hospital budgeting) and the use of an over-proportional number of innovative, expensive but guideline-supported pharmaceuticals. Further factors were highly innovative

(= expensive) treatment concepts at university level and participation in expensive and under-sponsored oncological therapy studies. As a consequence the hospital administration demanded the use of cheaper oncological substances and – as compensation for the financial loss – the layoff of several clinic physicians.

To pay back the debts from 2002 and to be able to maintain the performance of oncological therapies and continue to employ the same number of physicians, a physician-based active cost management model was implemented at the end of 2002 to adjust the cost of chemotherapy to the actual reimbursement. The primary goal was to maintain the standard of care, i.e. not to sacrifice care for a decrease of costs or use of cheaper but less effective pharmaceuticals. As a consequence the model developed defined an individual cost-covering pathway for each single patient depending on a variety of factors.

The cost management model has been described previously [1] and the successful implementation and application of this physician-based active cost management model after one year already showed a remarkable 57.8% reduction of pharmaceutical costs [2]. In the following, the financial results with an even further reduction in costs of cytotoxic pharmaceuticals for our oncological unit and experience after two years with this model are described.

## Patients and Methods

This physician-based active cost management model was successively implemented in our oncological unit starting in December 2002 and used continuously until now for each single patient for every single chemotherapy cycle in over 4,000 oncological cycles. The cancer distribution was about 80% breast cancer, 15% ovarian cancer and 5% other gynecological cancer.

Our cost management model contains 4 steps as shown in table 1: Initially a financial as-is analysis of all hospital-specific economy-related aspects of all oncological therapies needed to be performed. This included aspects like cost transparency, cost efficiency and all aspects of inter-hospital information and communication. Central question was: How much does the clinic have to pay for each chemotherapy cycle – with special focus on oncological pharmaceuticals as the major cost factor – and how much is the clinic reimbursed? Expensive oncological pharmaceuticals had to be identified and an analysis of all alternative reimbursement options was performed.

In the second step the pharmaceutical cost for each single cycle were calculated per day based on a standardized patient with 70 kg body weight, 1.8 m<sup>2</sup> body surface and glomerular filtration rate (GFR) of 90 ml/min to give an estimate of costs. This partial cost calculation is sufficient to estimate the cost efficiency of the therapy because the price of oncological pharmaceuticals is the main cost factor. From clinical experience all other costs to perform a single chemotherapy cycle, like physicians' and nurses' care, disposables, use of equipment, documentation, etc. are estimated at a minimum of approx. 150.– € per case and cycle. This does not include any other diagnostics like laboratory, radiology, etc. which should not be performed on the day of chemotherapy to minimize costs for the oncological unit.

The third step is the adjustment of each single cycle to a cost recovery reimbursement mode. The estimated costs from step two are compared with the expected reimbursement by the health insurance, which is different

**Table 1.** Four-step active cost management model

Step	Measure
1	Acquisition of all financially relevant information for performance of oncological therapies (drug cost, reimbursement rate, hospital budget, etc.)
2	Pre-calculation of oncological pharmaceutical cost for each single cycle for a standardized patient to estimate costs in advance
3	Adjustment for cost covering performance either in hospital or at local physicians' office
4	Post-calculation of actual individual costs of oncological pharmaceuticals for financial quality control and elimination of potential mistakes

for treatment in the hospital vs. an oncologist's office. In Germany hospitals normally are reimbursed for ambulatory oncological therapies by a flat all-inclusive rate independent from number or costs of drugs applied. In contrast, oncologists have to charge for the identical therapy performed in their office just a small fee for performance but health insurances pay for the prescribed pharmaceuticals separately and completely. So if the oncological therapy according to our model can be performed cost-covering for the clinic, it will be performed here, if not, the patient is sent to the cooperating local oncologist's practice, mostly previous members of our clinic staff. This assures that the patient will receive the indicated optimal drug and therapy. The optimal standard of oncological therapy never was or is compromised for cost reasons or to reach cost effectiveness for the oncology unit with our model. Standard of care in our university clinic for indication of oncological therapies is defined as effective guideline-based recommendations by St. Gallen consensus for breast cancer and Arbeitsgemeinschaft Gynäkologische Onkologie (AGO) for ovarian cancer.

In the fourth step the actual individual pharmaceutical costs as calculated by the clinical pharmacy are compared once a month with the standardized estimated cost from step two and analyzed for potential mistakes. If errors occur, they can mostly be eliminated. The fourth step also serves as financial quality control for the department.

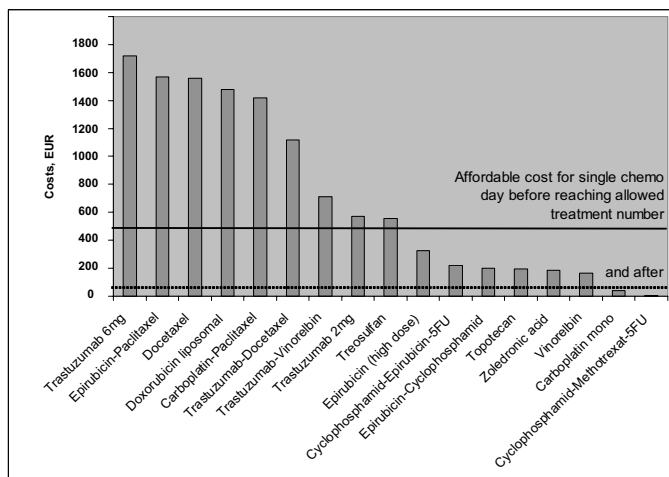
## Results

The initial oncological pharmaceutical cost analysis showed that only pharmaceutical costs of ≤500.– €/cycle were cost-covering at a flat-rate reimbursement of 653.21 € in 2002. This was reduced to only ≤50.– € after passing the allowed number of treatments, when the reimbursement rate was reduced by 85% (to 97.98 €). This means that already 9 out of 17 oncologic regimens used in 2002 (52.9%) were not cost-covering under normal conditions (= within the allowed number to treat) and even 15 out of 17 (88.2%) after passing that number as shown in figure 1.

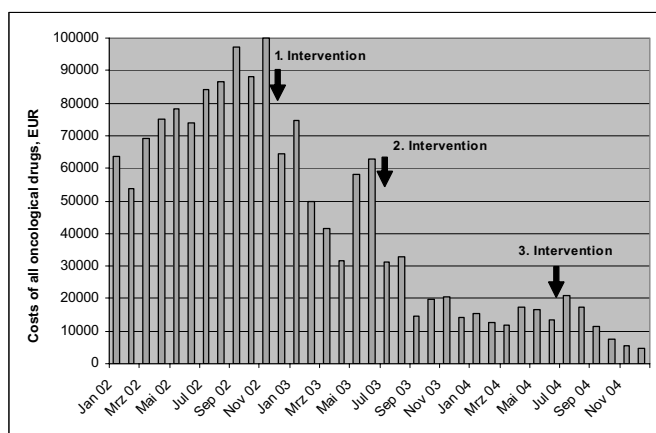
Starting in December 2002 the previously described physician-based active cost management model was successively implemented over several months, adjusted to any changes and refined. The financial results are shown in table 2. The overall cost reduction for all oncological pharmaceuticals was 83.4% within two years or absolute 778,339.– €. The reduction for pharmaceuticals without bisphosphonates showed an even higher reduction with 88.2% or absolute 785,976.– €. The re-

**Table 2.** Decrease of oncological pharmaceutical cost (without antiemetics, supportive drugs etc.) from 2002 to 2004, subdivided into chemotherapy drugs and bisphosphonates

Year	Chemotherapy drugs, €	Yearly reduction, %	Bisphosphonates, €	All Oncological drugs, €	Yearly reduction, %
2002	891,309.–		41,982.–	933,291.–	
2003	368,101.–	58.7	82,831.–	450,932.–	51.7
2004	105,333.–	71.4	49,619.–	154,952.–	65.6
$\Sigma$ Reduction	785,976.–	88.2		778,339.–	83.4



**Fig. 1.** Comparison of pharmaceutical costs (in 2002) for a single oncological treatment day for a standardized patient (BW 70 kg, BS 1.8 m<sup>2</sup>, GFR 90 ml/min) vs. cost recovery for oncological pharmaceuticals before and after reaching the allowed number of chemotherapy treatments.



**Fig. 2.** Development of monthly pharmaceutical costs for oncological therapies (CTX and bisphosphonates) for Frauenklinik from January 2002 – December 2004 with dates of 3 interventions marked.

duction of pharmaceutical costs was neither caused by sacrificing the oncologic standard of care, e.g. substitution of expensive drugs through cheaper ones, nor by a reduction in number of oncological therapy cycles performed. It was reached by identification of previously too expensive and therefore not cost-covering therapy regimens and adjustment

to a cost-covering reimbursement strategy. The number of cycles per year stayed on a similar level still exceeding the number of previous years before 2002 by far. The cycles exceeding the allowed number of treatments according to hospital internal budgeting are now mainly performed on the basis of reimbursement of pharmaceutical prescriptions.

The implementation and the results of introduction of an economical model into the physicians' daily work, which is so far primarily focused on patient treatment and clinical care requires time. This model and the necessity for cost awareness among physicians and medical staff had to be communicated repeatedly and several interventions were necessary as can be seen from figure 2. The initial intervention (first intervention, fig. 2) in December 2002 and implementation of this active cost management model led to a decrease of monthly costs of more than 50%. But without continuous cost control and repeated teaching the new knowledge expires over time and an increase of cost was seen before the second intervention (fig. 2). So after the second intervention in July 2003 the costs were again remarkably reduced by again more than 50% of the new monthly cost level. The slower but repeated reduction of monthly costs even after the third intervention in July 2004 confirmed that cost management cannot be solved with a single implementation of a cost management model but requires a continuous and permanent learning process to reach cost control which is confirmed by improvement of financial long-term results. After more than 2 years now a stable plateau of monthly pharmaceutical costs of on average 7,506.75 € for the last 4 months from 11/2004–02/2005 was reached, representing the maximum of savings with this active cost management model. As a result of the clinic's successful chemotherapy cost management, the hospital administration granted an increase in allowed number of cycles from 943 to 1206 (+27.8%).

During the last two years of application of this model, a number of related problems were identified and eliminated: all oncological therapies have to be proven to be cost covering in advance to be performed in our clinic, subsidizing of oncological therapies was eliminated, sterile oncological drugs are reused according to hygienic standards in case a patient did not keep an appointment, efforts are increased to assign the right admission and reimbursement category (ambulatory, semi-in-patient, in-patient), expensive oncological therapies are not prescribed to inpatients if not indicated, different substances are applied sequentially over several days if simultaneous applica-

tion is not cost-covering, counting and invoice mistakes, e.g. by the clinical pharmacy or accounting department of the hospital, are eliminated, participation in not cost-covering oncological trials is cancelled or negotiated, costs of any diagnostic and therapy application for foreign patients are recovered, and potential resources (clinical pharmacy, prescription value, private prescriptions etc.) are identified and used.

## Discussion

In Germany only one paper within the last years focused on calculating the actual cost for gynecologic cancer chemotherapies. Based on costs in 1999 the actual cost for a single chemotherapy cycle for breast cancer was calculated at 1,002.38 € and for ovarian cancer even higher with 1,802.08 € [3]. From this background it is obvious that an actual flat rate all-inclusive reimbursement of only 653.21 € per single cycle in 2002 (and similar amounts in 2003 and 2004) at our oncological out-patient unit could never be cost-covering. Although by German social law (Sozialgesetzbuch, SGB V) §12 and §70 every physician in Germany is obliged to perform any medical care cost-effectively [4] the law does not guarantee that the physician is paid even for his own expenses at all. To avoid financial bankruptcy through obvious under-reimbursement by health insurances it is up to the physician performing cancer therapy to take financial aspects into account. Although it was already shown that economics of medicine directly influence the practice of oncology and the direct relationship between financial considerations and clinical care [5], it should be an ethical landmark not to reduce and thereby sacrifice the standard of care, of giving the adequate substance. Standard of care in our definition is that the patient has the undoubted right to receive the most adequate therapy even at expensive costs, representing the current maximum care level. However, to receive the adequate oncological care the patient cannot insist on having a maximum of convenience at the same time as well. So as long as certain expensive oncological therapies are under-financed and not cost efficient for the performance in our oncology unit, the patient has to respect that the therapy might be given at a local oncologist's office or consecutively in several sessions. This might cause some inconvenience for the patient but at current reimbursement rates it is essential and indispensable.

In times of politically intended increasingly limited resources available for health care, physicians and especially oncologists performing expensive therapies have to adjust to these changes. The physicians' responsibility to adequately document and code diagnosis and therapy of patients is of growing importance for the allocation of financial resources to pay for this service. If the physician is refusing this new duty of financial responsibility and is indicating and performing medical care without adjusting – at least on average – the cost for diagnosis and therapy to the actual amount paid by the insurances

in a socialized health care system, his/her work will finally result in a financial loss for his/her employer and/or hospital, which may result in his/her own unemployment. The continuous subsidization of under-reimbursed medical treatments from the clinics' own budget often can only be financially compensated through a reduction of medical staff resulting in increase of unpaid overtime and more on-call duties or a decrease of other budgets e.g. for investment into new therapies and equipment. Therefore it is in any physicians' own interest to use financial resources wisely, not exceeding the limits. Although physicians in general dislike the idea of increasing new administrative duties and taking care of financial aspects, they as patients' advocates are the primary choice to solve these problems.

'Patient picking' in the sense of mixed calculation for reducing the average cost as the industry does would mean limiting access of patients to care and is neither performable nor ethical. Hospital controllers assume that expensive chemotherapy drugs could easily be exchanged for cheaper substitutes, but that is not possible in today's world of guidelines and consensus statements. So attempts of health insurances and hospital administrations – as experienced within the last two years – to limit the application of expensive pharmaceuticals for all patients cannot be the solution. Finally, it is up to physicians to maintain the oncological standard of therapy with simultaneous adjustment of actual costs to actual reimbursement.

The physician-based active cost management model described above was developed in our institution after experiencing a substantial financial loss and potential consequences in 2002 and offers an acceptable solution to this problem. It is transferable and universally valid for other hospitals and situations. In contrast to most other publications, this model is not an economic evaluation of cancer therapy like cost-efficiency or cost-benefit analysis, etc. but an economic adjustment to the financial resources available.

The overall financial impact of introducing such a cost management model into clinical practice cannot be underestimated. It led to the amortization of the Frauenkliniks' debts of 340,000 € from 2002 in 2003, all physicians requested to be laid off by the hospital administration in 2003 to compensate for the clinic's loss from the previous year received contract extensions. An even higher financial budget surplus was used in 2004 to employ additional physicians to improve working conditions and reduce the number of on-call duties as well as for new investments into clinical infrastructure and patient care. As a side effect after implementation of this cost management model further savings were realized through higher cost awareness among all medical staff, e.g. reduction of unnecessary expensive pharmaceuticals for inpatients, more careful use of expensive resources like radiological and laboratory diagnostics, admission of patients in a cost-covering mode etc. Also important was the improved communication between different hospital departments especially the clinic, clinical pharmacy, administration, and accounting department.



The development of this cost management model initially is time consuming and its implementation into clinical practice requires comprehensive and repetitive teaching for all physicians and medical staff involved. But after implementation the time for routine control and elimination of mistakes is about 5 hours per week. As proven the return of investment outnumbers the costs and efforts within a short period of time. Even a full-time chemotherapy manager could be paid just from the savings. From our experience we encourage colleagues to take financial issues into their hands, for allocation of financial resources and to be able to finance diagnostics and therapy in their clinic in the future.

Limitations of our cost management model are that cost savings for our clinic do not result in cost savings for the entire health system. Potentially, our cost management model might even increase the costs for the entire German health system by far. But higher costs only reflect the non-subsidized (= real) price of any oncological therapy and should not be the problem of our oncological unit. In an unsteady and also illogical reimbursement system, applied financial pressure will always lead to someone finding the holes in the system. Substitution processes and unintended effects often result from this [6]. However, isolated solutions can be very effective for a single clinic, but cannot solve a general health system's cost problem. Further problems are still unsolved and need to be addressed: The newly introduced DRG reimbursement system in Germany in 2004 is again based on a flat-rate reimbursement for oncological therapies, not reflecting the costs for expensive and innovative pharmaceuticals. Off-label-use, which is often used as economical definition by health insurances to exclude payment for expensive therapies (>500.- €) cannot be performed under current conditions and is a sign for rationing

and limiting medical care. But most patients are not aware that this is already happening and health politicians totally deny this fact. Performance of clinical oncological treatment trials in the future is in question if the German social court law requires that sponsors of a clinical trial have to pay for the experimental as well as for the conventional study arm [7]. It is a contradiction that quality of care is defined by a maximum participation rate of therapies in clinical trials but reimbursement of all clinical trials is left with the financial sponsors, mainly pharmaceutical companies. And if just ethics and patients' rights are discussed but human rights and working conditions for physicians are left out of the picture, a solution for honest financing of oncological therapies will also not be possible.

## Conclusion

A physician-based active cost management model was shown to reduce oncological pharmaceutical costs by 83.4% within 2 years in a German university clinic without compromising the oncological standard of care. Now all oncological therapies can be performed cost-covering in our oncological unit and savings can be invested in medical staff and infrastructure. In a changing health market physicians increasingly need economic knowledge for allocation of financial resources for diagnosis and therapy. An active cost control by an obligatory instruction-issuing clinical supervisor is necessary in the oncology unit for a consequent case-by-case management; a close cooperation especially with the clinical pharmacy and awareness of all staff for cost transparency and cost efficiency are preconditions for this successful concept.

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