

University of Groningen

Economics

Wijk, Paul van der

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

1999

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Wijk, P. V. D. (1999). *Economics: charon of medicine?*. s.n.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Chapter 6 Economic evaluation of alternative ways for delivering nursing home care

Summary

In Europe and in the Netherlands the number of elderly people is rapidly increasing. This has considerable consequences for health care costs: enormous increases in costs can be expected. As a result of the call for cost containment the question of proper resource allocation in the care for the elderly people has gained importance, that is: the question whether the dependent or disabled person is cared for at the appropriate level and receives an appropriate amount of services. This study assesses the financial consequences of different kinds of nursing home care. Using a static group comparison with matched groups, costs of different care delivery patterns are analysed, including providing a tailor-made package of home care services, additional individual or group care in a residential home, and conventional nursing home care. Depending on the group of clients, government savings of 38% to 53% were found for home care alternatives, even for this considerably disabled population. Even if informal care was included and valued against professional prices, the costs of deinstitutionalised modes of care were at least 17% lower than those of institutionalised ones.

The present chapter is partly based on the following paper:
Wijk, P. van der; Wolffensperger, E.W.; Heuvel, W.J.A.(submitted).
Economic evaluation of alternative ways for delivering nursing home.

6.1 Introduction

Between 1980 and 1994 the percentage of elderly in the Dutch population increased from 11.5% to 13.1%. The total number of elderly people in the Netherlands is 2.1 million on a total population of 15.4 million (CBS 1995). In 1994 the expenditure on health care was nearly 58 billion guilders, which is 8.4% of the Gross Domestic Product (GDP), a high percentage compared to that of other European countries. In Europe only France (9.1%), Sweden (8.8%) and Germany (8.5%) spend a higher proportion of their GDP on health care. Worldwide, the United States heads the list, with health care expenditures of 13.4% as a percentage of its GDP (Thorslund and Parker 1995). In all Western countries the percentage of elderly inhabitants will continue to grow during the next decades. As a result of a rising life expectancy and a decreasing natural growth of the population the percentage of elderly people in the Netherlands will have doubled over the next fifty years (Ministry of Health 1992). In the rest of Europe similar developments are expected. In the United States this development will be somewhat less pronounced. Nevertheless, in 2030 almost 1 out of 5 people will be 65 years or older (Baker and Bice 1995). There will be a strong increase of the elder elderly. These demographic developments will have crucial consequences for the need for medical care and health care costs. If one assumes that health status and care utilisation remain constant for all age groups and no major innovation in the field will occur, rises in health care costs of 8% to 22% can be expected in the Netherlands (Thorslund and Parker 1995). However, the needs of the elderly can be met with various strategies to make more effective and more efficient use of resources. In the Netherlands, several strategies have been proposed to combat the increase of health care costs: limiting the basic package of insured health services, budgeting the medical specialists, imposing a stringent policy on medications, promoting competition between insurers, and expanding the options for replacing expensive care by cheaper care modes. Regarding care for the elderly, during the last decade these measures have led the government to shift resources from institutional care to domiciliary care and home care services. The goal of this substitution process was to shift flows of patients from intramural to extramural facilities and as such make more efficient use of resources. The evidence of the financial consequences of substitution is equivocal. According to Greene et al. (1995) a significant reduction in nursing home use can be achieved without

increasing total community expenditures by more effective use of these community services. Wimo et al. (1993) concluded that day care could play an important role in reducing expenditure by preventing institutional care. However, other studies do not yield positive results. Weinberger et al. (1993), for example, claim higher costs for elderly people living at home. O'Shea and Blackwell (1993) find that community services are only cheaper as long as the costs of informal care are not quantified and valued. Kane (1995) concludes that a series of controlled demonstration projects has shown that, under current pricing strategies and service models, home care is more expensive than nursing home care for people with substantial disabilities unless they receive the bulk of the care from unpaid relatives.

In the Netherlands approximately 52,000 people live in nursing homes. Another 128,000 live in residential homes (Ministry of Wealth 1994). The combined costs of these institutions are 10,000,000,000 billion guilders in 1994, almost one-fifth of the total health care budget. The above mentioned demographic changes stress the need for the development of alternatives of nursing home care. There is some evidence that approximately 40% of the elderly in intramural institutions could be helped in other (deinstitutionalised) ways (Coolen and Duipmans 1988; Te Velde et al. 1992; Committee on the modernisation of the care for the elderly 1994). On a macroeconomic level this substitution could reduce the growth of costs of care for the elderly that can be expected as a consequence of demographic developments. For society as a whole cost savings are to be expected. For certain groups (as in a study of Weinberger: people with progressive dementia) home care facilities will probably be more expensive. In this article a study is made of the financial consequences for two alternatives of care delivery to Dutch elderly people living in nursing homes. All clients included in the study had an indication for a nursing home. Although this made the population between the different settings appear to be comparable, further research on this aspect was done, because different client characteristics may lead to a diverging professional care dependency (and as a result of that in varying costs). Therefore, it was necessary to compare costs for people in different settings but with similar needs.

All people who had an indication for a nursing home admission in the region of south-east Groningen (in the Northern part of the Netherlands)

were included in this study. A broad package of services was supplied to assist elderly living at home or in a residential home. As a consequence of this tailor-made service, people were able to continue living in their own homes or in the residential home and did not have to move to a nursing home, which would have been the case without the programme. Four groups of clients were identified:

- 1- People who lived on their own and received additional home care to be able to continue living in their own house.
Care was assigned after consultation of home care organisations, the general practitioner and the nursing home. The nursing home had the leading role in the care administration process and served as an advisory board for home care organisations. Home care was delivered by district nurses and domiciliary care.
- 2a- People who lived in residential homes and received individual care.
Elderly people in residential homes often need additional care for a short period of time. Usually, they have severe medical problems as decubitus, incontinence, etc., that make it necessary that extra attention is paid to these clients. Part of this care does not belong to the regular activities of residential homes. In the programme nursing homes delivered this short term care on an individual basis within the residential home, in order to prevent that moving the client to a nursing home could be prevented.
- 2b- People in residential homes who received group care.
For one group of elderly clients, their present home was a residential home. To prevent their moving to a nursing home, group care was provided to a group of cognitively impaired elderly. Due to all kinds of additional group activities during the day they were able to stay in the residential home.
- 3- A control group for comparing the above-mentioned care settings; regular nursing home residents.

The hypothesis underlying this project was: more efficient use of health care resources can be stimulated through the use of alternative ways of delivering nursing home care. Research questions of the economic evaluation were:

- A- Is it possible to establish cost savings from a societal perspective when supplying different modes of nursing home care in other

settings?

- B. How do costs differ between different settings for clients who are similar in terms of care intensity?

6.2 Material and methods

Population and scales

All clients in this study were assessed for admission to a nursing home. These people, who were assessed independently and were sufficiently disabled to be admitted into nursing homes, were cared for in other settings. They received services that offered a full range of personal care, nursing services, housekeeping, etc., in their own homes or in a residential home. A total of 165 clients was included in the study. Of these clients 16 were institutionalised in nursing homes, 14 lived in a residential home and received additional individual care, 15 clients lived in a residential home and received additional group care and 120 were living at home and had access to home care facilities. All kinds of data concerning personal characteristics of clients were registered using a registration form that contained information about IADL-functioning, cognitive impairment, relational and psychosocial problems. The IADL-scale measures problems with activities in daily life and instrumental activities in daily life and the Cognitive Impairment Scale measures orientation to time and locality, memory and spatial capacity (Cognitive Impairment Scale). A combined score for the Activities of Daily Life and the Instrumental Activities of Daily Life gives an index for the care dependency in daily life. This IADL-scale runs from 0-28 and can be categorised as an interval scale (as proved by using a Mokken procedure (Zijlstra et al. 1991; Kempen et al. 1995). The degree of dementia was measured by the CIS-score. The scale runs from 0-15 and also has interval characteristics (Zijlstra et al. 1991).

Costs

The cost analysis focuses on the costs directly linked to care (personnel, medicaments, etc.). Costs within institutions were all-in, so hotel costs (housing, maintenance, energy, etc.) and overhead were included. All cost components in institutional care were accounted for based on annual reports of the institutions. A standard spread sheet was composed and all costs were included in one of five different categories in the same way. These categories were: housing, care personnel, medical costs, food and other costs. The costs of care personnel were accounted to the individual based on a time registration procedure (see Section *care intensity* below).

For people living at home a comparable set of data was created using a questionnaire in which nature, frequency, intensity and duration about costs of housing, food (for example meals-on-wheels), energy and medical consumption of the individuals living at home were gathered. In the sensitivity analysis alternative calculations of valuing this individual costs are presented.

Informal costs are measured and assessed using the shadow price method (Gold 1996; Busschbach et al. 1998). This means informal care time is measured using the time a professional carer needs for a specific activity. This time period is valued against the fee that this professional carer gets when delivering the service himself.

The level of costs is from the year 1994 and the costs are expressed as Dutch guilders (US \$ = 2.0 Dfl). Costs related to production losses were not included, because production losses in this elderly population will be negligible (none of them was working anymore).

Care intensity

To adjust for possible differences in patient characteristics between settings, similar patient groups were created within each setting using individual data on IADL-functions and degree of cognitive impairment (CIS). Patients in residential homes receiving individual somatic care and people in nursing homes do have significantly more IADL-problems ($\alpha = 0,05$). The other groups do not differ statistically (see table 1).

Table 1 Average IADL-score and CIS-score per client group per setting (including standard deviation).

	Severely physically handicapped				Severely physically and severely mentally handicapped			
	IADL		CIS		IADL		CIS	
	μ	σ	μ	σ	μ	σ	μ	σ
Home care (n=112)	21,5	2,7	1,0	1,6				
RH individual somatic care (n=14)	23,3	3,2	1,0	1,4				
Scheffé-test	N.S.		N.S.					
Home care (n=8)					22,4	2,8	10,4	1,6
RH psychogeriatric group care (n=15)					21,8	4,4	9,3	3,1
Nursing home (n=20)					23,2	4,2	11,1	1,3
Scheffé-test					N.S.		N.S.	

Furthermore, it follows from the table that only a very small group of people who have cognitive problems stays at home. All of these clients had a partner who played an important role in the care giving process. From these data it follows, that two groups of patients can be compared in this research group: people with severe IADL-complaints (living at home or having individual somatic care at a residential home; group 1 and group 2a) and people with severe IADL-complaints and severe cognitive problems (living in a nursing home or in a residential home getting psychogeriatric group care; a small part of group 1, group 2b and group 3).

The care intensity of the individual is quantified by a time registration procedure. For every client care intensity was established by interviews with care givers. Validity was enhanced through an observational study in which care givers were followed for several days. For the home care alternatives the amount of care was given in hours per week. This was divided by seven and used as a proxy for care intensity per day. The rationale behind this was that patients who get home care twice a week will be able to function independently during the whole week. Informal care was measured on that same basis. The amount of time used was identified by asking about the personal efforts in certain activities, liking cooking, cleaning or other physically household chores. Social visits were not included. The valuation of this informal mode of care is a special problem Smith and Wright, 1994. In this study the shadow price method is used. The rationale behind this is the premise that if informal care was not available, another professional would be needed to provide the necessary input. Most of these activities are on the lowest speciality level, this means: no specific nursing skills are needed, and thus they are valued against the hourly fee of a home help at the lowest expert level (Dfl. 27 per hour). However, specific nursing skills are valued much higher (Dfl. 38,- per hour. In an institutional setting very little active support is given by informal carers.

Data analysis

The statistical package SPSS was used for analyses of the results. To make the results more comprehensive mean values are used in the tables. Differences in IADL- and CIS-scores were tested by means of the Scheffé-test with a significance level of 0,05. This test makes it possible to

make a multiple comparison between different settings. For all cost data a 95%-confidence-interval was calculated based on the standard error of the mean.

6.3 Results

Care intensity

Table 2 shows the results of the time registration procedure for the clients in all settings. Most people at home get help from the home care organisation as well as from the district nursing home service. The total amount of hours is multiplied by the gross salary of care personnel.

Table 2 Care intensity of the different population groups in individual care minutes per day

Type of care	client group	Mean time	Standarddev.	N
Home care	severe IADL	60	59	112
	severe IADL and CIS	62	46	8
Home nursing service	severe IADL	7	31	112
	severe IADL and CIS	11	14	8
Informal care	severe IADL	55	52	112
	severe IADL and CIS	72	55	8
Residential home Individual somatic	severe IADL	155	34	14
	severe IADL and CIS	-	-	-
Psychogeriatric	severe IADL	-	-	-
	severe IADL and CIS	174	39	15
Nursing home	severe IADL	-	-	-
	severe IADL and CIS	152	41	16

People in nursing homes tend to get less care minutes than people in residential homes with additional care. However, the costs will not be lower, because of the higher level of expertise of personnel in the nursing homes. Apart from the individual care intensity for each client care personnel in institutional settings is involved in all kinds care of activities on a group-level. These activities are divided equally across clients.

In table 3 the total amount of informal care per activity group is shown for all patient groups. Total time of care givers is given in the first column, in

the second column an estimation is given of the time professional care givers would have needed for provision of these activities. These last figures are used to find the costs of informal care in the next section.

Table 3 Mean time of informal care per activity, and total time necessary by professionals to provide those same activities (standard deviation between brackets).

Type of care	client group	Mean time		N
		informal caregivers	professional	
ADL-activities	severe IADL	99 (48)	32 (18)	112
	severe IADL and CIS	109 (32)	38 (27)	8
HDL-activities service	severe IADL	31 (20)	10 (10)	101
	severe IADL and CIS	36 (12)	12 (6)	6
Nursing activities	severe IADL	13 (4)	4 (2)	110
	severe IADL and CIS	15 (6)	4 (3)	7
Social activities	severe IADL	21 (15)	9 (7)	99
	severe IADL and CIS	38 (30)	14 (11)	8
Total	severe IADL	148	55	112
	severe IADL and CIS		198 72	8

Costs per setting for comparative client groups

With all the information accumulated so far, the cost per unit of production, the individual medical and non-medical costs, patient characteristics and accompanying care intensity, a calculation of costs per individual for each treatment modality is possible. These final cost estimates are presented in table 4 and table 5. Table 4 gives a comparison for people with severe IADL-problems. In this group considerable efficiency gains can be established by supplying home care to a group of elderly, even if they have severe IADL-problems. Gains mount up to more than fifty guilders a day if we look at government expenditure (when informal care is excluded), which is a 38% saving. However, if informal care is taken into account according to, savings in the main analysis decrease to 17%.

Table 4 Costs of nursing home care for people with severe IADL-problems, Dutch guilders per day.

IADL-index	Home care incl.	Residential home
	district nursing severe N=112	with individual care severe N=14
Care personnel		82
-Home care	38	
-Home nursing	13	
-Informal care	30	
(Para)medic personnel	1	2
Housing	13	28
Food	10	12
Other	18	25
Total	123	149
95%-confidence interval	111-135	128-170

Table 5 shows the results for people with severe IADL-problems and severe cognitive problems. Note that this group is very rare in home care situations. However, it is possible to help them at home at a lower price than in the other institutions. Residential homes where special attention is given to those kinds of elderly seem a cheap substitute too. Savings for the government mount up from 36% (when informal care is included) to 53% (informal care excluded). Societal cost decreases with 27%, considering residential group help compared to nursing home care respectively.

Table 5 Costs of nursing home care for people with severe IADL-problems and severe cognitive problems (CIS), Dutch guilders per day

IADL-index	Home care incl. district nursing severe + CIS N=8	Residential home with group care severe + CIS N=15	Nursing home severe + CIS N=20
Care personnel		92	77
-Home care	40		
-Home nursing	20		
-Informal care	38		
(Para)medic personnel	1	2	21
Housing	13	28	43
Food	10	12	16
Other	18	25	60
Total	140	159	217
95%-confidence interval	101-169	135-183	192-242

Sensitivity analysis

In this sensitivity analysis the critical components in the calculation are changed by 25% to show what the impact will be on costs and for the comparison between the different care settings. If the maximum amount of all individual costs together is taken into consideration, this will show the absolute minimum of cost savings for extramural care. On the other hand gives the minimum amount of individual costs the maximum saving rate. In table 5 these scenarios are shown, together with a univariate sensitivity analysis for the variables housing and care. Although care has an important impact on total costs, an increase of 25% of all cost factors will not change conclusions about the cheapest options, if nursing home care is considered. The differences between residential care and home care are diminished. Care intensity has to be doubled in the home care situation before other alternatives will become cheaper.

In the main analysis care intensity of informal carers mirrors the time necessary for that same activity by professionals. When an informal carer takes 30 minutes to make a bed, while a professional carer uses only 10 minutes, this last figure is used in the cost calculations. If however, the full 30 minutes are included in the analysis the price per day of the home care alternative approximately raises with Dfl 50,- to Dfl. 95,- per day for elderly people with severe IADL-problems and elderly people with severe IADL-problems and severe CIS-problems respectively.

Table 6: Sensitivity analyses for both client groups in all settings, in guilders per day

	Home care incl. district nursing	Individual care in residential home		
Severe IADL				
Main analysis	93	149		
Costs of housing + 25%	98			
Care intensity +25%	106			
Informal care valued as regular home help	127			
All of the above	149			
	Home care incl. district nursing	Residential home with somatic care	Nursing home	
Severe IADL + CIS				
Main analysis	102	159	217	
Costs of housing + 25%	106			
Care intensity +25%	117			
Informal care valued as regular home help	161			
All of the above	190			

6.4 Discussion

The purpose of this study was to perform an economic evaluation of care for a group of elderly with severe impairments, either cognitive or functional. The results on sub-group-level show that home care is cheaper for people with many problems in activities of daily living. For people with a severe degree of dementia, additional care in a residential facility is much cheaper than admission in a nursing home. For this group home care cannot necessarily be seen as a more cost-effective method of care arrangement, because the assistance of informal carers is a necessary condition for organising the care delivery process. If, and only if, there are informal carers, then home care can be seen as more cost-effective alternative.

This presented method for economic evaluation has several advantages above the traditional cost comparisons. Cost analyses in this study were conducted on an individual level. This means that a large range of cost components was included, consisting of housing costs, adaptations to accommodations, food, personal care, medical care, etc. Even in the institutional settings costs of care was calculated based on an individual time registration procedure. The comparison between institutional settings and home care is, therefore, not based on average costs like in most studies so far. That (traditional) approach does not pay any attention to differences in client characteristics, that do have a major influence on costs. People who are severely demented and who have a lot of physical problems will need more professional attention, no matter which setting they are in. Summarised: individual costing is necessary to find out if there are any threshold values at which home care will be more expensive than institutional care. The type of methodology used in this article is promising for economic evaluation in the care sector. Based on this method it will be possible to construct cost functions for an institution as a whole based on individual data. Based on client characteristics it will even be possible to predict future costs of a new admitted person.

Nevertheless, there are some shortcomings. First, the study does not have a longitudinal character. The economic evaluation started as a piggy-back study, long after the project had started. It was not possible to assess costs and effects prospectively. Secondly, there is no random design. This is compensated through a matched control group. However, the questions remains whether the client characteristics used in this study (IADL and CIS) to predict care intensity the only significant ones. Several other

factors may have to be included. Thirdly, the costs of informal are crucial. These can be a significant cost factor in home care facilities. There is, however, much discussion how to value this type of care (Smith and Wright 1994; Gold et al. 1996; Busschbach et al. 1998). The most common assessment was conducted in this study. Last, in this study quality of care and quality of life assessments were not included. This was not the focus of the research study. Furthermore, measurement of quality of life in dementia patients will be very difficult (Wimo et al. 1993).

Clearly, there will be a break-even point below which the costs of home care will be more than the costs of nursing home care. Obviously, that break-even point is more likely to be reached if the client has a high level of disability, low cognitive functioning and little family help. The feasibility of substitution depends on the assumption that there are some individuals who require lesser levels of care (in care time or professional expertise) than is provided in the setting they are located in presently. According to this study the financial consequences of substitution will be highly positive and the break-even point will not be met unless there is no informal care available. These results seem highly important for policy makers.

Acknowledgements

This study was part of a larger research programme 'The development of alternatives for nursing home care in south-east Groningen' funded by the Ministry of Public Health, Welfare and Sports of the Netherlands.

References

- Baker, D.I. and Bice, T.W. 1995. The influence of urinary incontinence on publicly financed home care services to low-income elderly people. *The Gerontologist*, **35**, 360-369.
- CBS. 1997. *Statistisch Zakboek*, Staatsuitgeverij, 's-Gravenhage.
- Committee on the Modernisation of Care for the Elderly. 1994. *Ouderenzorg met toekomst*, Rijswijk.
- Coolen, J.A.I. and Duipmans, D. 1988. *Behoeft-ramingen en de planning van verzorgingsplaatsen. Onderzoek \naar vraagvorming, toelating en doorstroming m.b.t. bejaardenoorden*, Enschede.
- Gold M.R.; Siegel J.E.; Russell, L.B.; Weinstein, M.C. 1996. *Cost-Effectiveness in Health and Medicine*, Oxford University Press, New York/ Oxford.
- Greene, V.L., Lovely, M.E. and Ondrich, J.I. 1993. The cost-effectiveness of community services in a frail elderly population. *Gerontologist*, **33**, 177-189.
- Kane, R.A. 1995 Expanding the home care concept: blurring distinctions among home care, institutional care, and other long-term-care services, *The Millbank Quarterly*, **73**, 161-183.
- Kempen, G.I.J.M., Myers, A.M. and Powell L.E. 1995. Hierarchical structure in ADL and IADL: Analytical assumptions and applications for clinicians and researchers, *Journal of Clinical Epidemiology*, **48**, 1299-1305.
- Ministry of Health, Welfare and Sports. 1992. *Financieel Overzicht Zorg*, Rijswijk.
- Ministry of Health, Welfare and Sports. 1995. *Jaar Overzicht Zorg*, Rijswijk.
- O'Shea, E. And Blackwell, J. 1993. The relationship between the cost of community care and the dependency of old people, *Social Science and Medicine*, **37**, 583-590.
- Smith, K. And Wright, K. 1994 Informal care and economic appraisal: a discussion of possible methodological approaches, *Health Economics*, **3**, 137-148.
- Thorslund, M. and Parker, M.G. 1995. Strategies for an ageing population: Expanding the priorities discussion, *Age and Society*, **15**, 199-217.
- Velde, B.P. te, Zijlstra, W.O. and Wolffensperger, E.W. 1992. *Vergelijking van de demonstratieprojecten aan de hand van cliëntregistratiegegevens: Deel II: Resultaten van de cliëntregistratie per project*, Groningen, Styx Publications.
- Weinberger, M.,Gold, D.T., Divine, G.W., Cowper, P.A., Hodgson, L.G., Schreiner, P.J. and George, L.K. 1993. Expenditures in caring for patients with dementia who live at home. *American Journal of Public Health*, **93**, 338-341.
- Wimo, A., Wallin, J.O., Lundgren, K., Rönnbäck, E., Asplund, K., Mattsson, B. and Krakau, I. 1991. Group living, an alternative for dementia patients, A cost analysis, *International Journal of Geriatric Psychiatry*, **6**, p. 21-29.
- Zijlstra, W.O., Wolffensperger, E.W. and Velde B.P. te. 1991. *Registratie van verschuivingen in de zorg voor ouderen*, Groningen, Styx Publications.