

Attempting to Reduce Hospital Costs by Strengthening Primary Care Institutions

The Dutch Health Care Demonstration Project in the New Town of Almere

The assumption that reinforcement and integration of primary health care should result in fewer hospital admissions and lower overall costs has been made on both sides of the Atlantic. However, projects focusing on the cost-effectiveness of home- and community-based care in the United States,¹ case management experiments in the United Kingdom,^{2,3} and examples of integrated health care planning in Sweden⁴ do not provide us with clear answers. A Dutch answer, initiated by the Ministry of Welfare, Health, and Cultural Affairs, may come from a health care experiment in one of the Netherlands' new towns: Almere. Preliminary results from this field experiment suggest that application of the Almere model may be linked to lower hospital utilization and limit some health care expenditures.

The Health Care System in Almere

The history of this new Dutch town starts in 1978, when the first 100 families moved to Almere. Among the first inhabitants were a teacher, a preacher, and one family physician. Seventeen years later, population has grown to approximately 90 000, and population is expected to grow to 150 000 by the year 2000.⁵ Most of the people living in Almere migrated from Amsterdam, which is 24 to 92 km away.

With reference to the factors that influence health and health care behavior, people in Almere differ from the average Dutch population. Most inhabitants have an urban background. Compared with the Dutch population at large, in Almere the age categories of 0 to 10 years and 25 to 45 years and females are overrepresented. People who are at least age 45 years, and older than age 65 years in particular, are underrepresented. Unemployment rates in Almere are relatively low. The middle class and the lower part of the upper social class are overrepresented. These social class differences between Almere and the country as a whole remain constant after adjustment for age and sex differences between the two populations.

Almere provided tabula rasa conditions for a new health care system, incorporating prevalent ideas on health care from the late 1970s and early 1980s. Key issues in those days were regionalization and structuralization. Integrating health care planning on different structural levels was designed to reduce costs and improve the quality of care. Based on these principles, the structure of health care in Almere differs from the existing structure in the rest of the Netherlands.⁶

The Dutch health care system strictly separates basic, primary, and hospital care. Within primary care, the general practitioner (GP) is the gatekeeper for medical specialists. Insurance companies pay for hospital care or specialist treatment only if a patient is referred by a GP. A majority of all GPs work in solo practices, on a private basis. They are paid per capita for patients insured by health insurance funds and on a fee-for-service system for patients with private insurance. Other health care workers in primary care have their own organizations or are self-employed professionals. Almost all specialists in general hospitals work on a private basis. The Dutch system is financed by two social insurance plans, one based on the Health Insurance Act and the other one based on the Exceptional Medical Expenses Act.⁷

Disadvantages of the existing health system include (1) uncontrolled growth of costs, (2) lack of cohesion within primary health care, and (3) unequal access to and distribution of health care facilities. The Dutch Health Care Demonstration Project in Almere was designed to overcome these problems and to address the ideas formulated during the 1978 WHO-UNICEF meeting on Primary Health Care in Alma-Ata, Kazakhstan.⁸ To date primary care in Almere has been decentralized in 16 health centers, each with an intended service area of 6000 to 8000 inhabitants and geographically dispersed through the city. All primary care workers are salaried professionals. All health centers have additional diagnostic facilities, such as instruments for audiometry and electrocardiograms. General practitioners and most other primary care workers (physiotherapists, district nurses, home helpers, social workers, midwives, pharmacists, and dentists) and the managerial staff are employed by one organization: the Almere Foundation for Primary Care.⁹

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A hospital was opened in March 1991. Before that date no such facility was available in Almere, except a small outpatient clinic. The clinical capacity of the new hospital has been limited to 180 beds, which is low compared with the size of the population. The hospital in Almere has additional facilities for short-term hospital admissions, outpatient care, and outpatient surgery. Other facilities in Almere include a combined rest/nursing home with 100 beds and small-scale residential centers for the mentally and physically handicapped. A nursing home to supplement the ambulatory services for the elderly and a multifunctional unit for psychiatric patients are under construction. Networks of health care workers have been set up to coordinate the services for specific groups of patients (eg, psychiatric patients, physically handicapped people, and mentally handicapped children).

All health care institutions in Almere operate under the umbrella of the Almere Health Care Corporation. This organization coordinates the policy discussions about the future direction of services and provides a platform for communication between the different tiers of care. The corporation also encourages new strategies and projects (eg, home care projects, 24-hour care, multidisciplinary protocols for specific groups of patients, such as diabetic or cancer patients, and case management projects to improve the transition of patients between hospital and primary care institutions and within the different institutions). The corporation draws up its own annual budget proposal, which includes a complete overview of all the costs made by the associated organizations during the previous 3 years, plus an estimate of the expected costs for the current and coming years. A final decision about the budget is reached in negotiations between the Almere Health Care Corporation and health care funding agencies, such as health insurance funds, private insurance companies, and local and central governments. Inhabitants of Almere are represented in the administrative boards of the health care organizations, including the health centers. Although there are scale differences, the structure of the health care facilities in Almere resembles the structure of US health maintenance organizations.

Evaluation Studies of the Almere Project

To determine if the Almere experiment has been successful in reaching its goals, evaluation studies are being conducted, covering different areas of the health care system. In 1987 and 1988, cross-sectional data were gathered as part of the Dutch National Survey of General Practice.^{10,11} In this study, a nonproportional, stratified sample of GPs, randomly chosen from all 5826 GPs established in the Netherlands in 1987, kept records of all patient contacts during a 8-month period, completed an age/sex log for all registered patients, and answered a written questionnaire. In addition, a random sample of patients from each participating GP was asked to complete a health interview. Sample size in the Netherlands was set at 100 patients per GP, while in Almere, for budgetary reasons, the number of interviews was restricted to approximately 60 patients per GP. In total, 180 GPs participated in this study, with 19 GPs (out of a total of 32) practicing in Almere. The total number of health interviews was 14 203, with 1189 interviews conducted in Almere.¹² Using the data collected from GPs, morbidity reports, and interventions within the health centers, general practices in Almere were compared with the situation in the average Dutch general practice. On

Table 1.—Population-Based Morbidity Rates Based on Patient Reports in Health Interviews in Almere and the Netherlands Conducted in 1987 and 1988, per 1000 Inhabitants

Morbidity, No.	Almere*	The Netherlands
Physical and psychosocial problems during the last 14 d	829†	762
≥6 physical/psychosocial problems during the last 14 d	329†	246
Chronic diseases	508	495
≥3 chronic diseases	120†	105
Physical limitations/disabilities	364	359
≥3 physical limitations/disabilities	147	142
Psychological complaints	800†	536
≥3 psychological complaints	250†	216
Psychiatric symptoms	491†	414
≥5 psychiatric symptoms	148	131
Define health as good or very good	818†	854

*These rates were age and sex adjusted.

†P<.05.

‡P<.01.

the basis of the patient health interviews, morbidity reports, and the use of the different health care facilities by the population, Almere was compared with the situation in the rest of the Netherlands.

Apart from the cross-sectional data, information for Almere, as well as for the rest of the Netherlands, was available on the number of hospital admissions, the number of occupied beds, the length of stay in hospital, and mortality rates during a 7-year period. The information about the utilization of hospital services was based on census data, which is provided by all hospitals in the Netherlands and published on a yearly basis.¹³ Mortality rates were based on population data published by the Netherlands Central Bureau of Statistics.¹⁴ Because of sociodemographic differences between Almere and the Netherlands (such as population differences in age and sex distributions) that might influence the amount of care provided in Almere, all figures presented in this article were age and sex adjusted except the mortality rates, which were only adjusted for age differences.

Results of the Evaluation Studies

Typically, the use of primary health care services and the number of admissions to a hospital are influenced by population morbidity rates. If there are clear differences in the morbidity patterns between Almere and the rest of the Netherlands, we must take these differences into account when interpreting the results of the study in general practice and the hospital admission rates.

Based on patient report, population-based morbidity rates were higher in Almere than in the rest of the Netherlands (Table 1). In Almere, fewer people defined their overall health condition as good or very good. Also, the number of people who reported acute complaints, psychological complaints, and psychiatric symptoms were significantly higher in Almere than elsewhere in the Netherlands.

More detailed information is available on the morbidity presented in general practice, with all reasons for physician-patient contacts classified according to the *International Classification of Primary Care*.¹⁵ After standardization for age and sex differences, incidence and prevalence rates of diseases and health problems in Almere were generally higher than in the rest of the Netherlands, especially for women. The

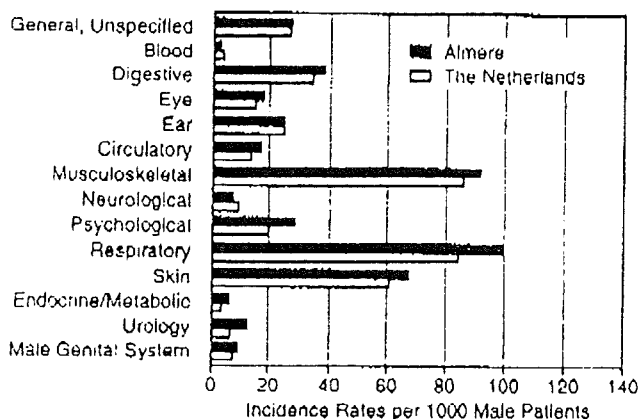


Fig 1.—Three-month incidence rates of disease and health problems presented in general practice in 1987 and 1988 per *International Classification of Primary Care* chapter for men in Almere and the Netherlands, with the figures for Almere adjusted for age differences.

largest differences for female patients were found in the *International Classification of Primary Care* chapters: musculoskeletal, psychological, respiratory, and skin. For men, differences in morbidity rates between Almere and the Netherlands were smaller. Three-month incidence rates for Almere and the Netherlands in general practice are presented in Figs 1 and 2.

The higher morbidity rate in Almere may be a result of a higher use of health care services in Almere (Table 2). However, this conclusion is limited to the use of primary health care services, such as the number of contacts with general practice, the percentage of people receiving physiotherapy, and contacts with social workers and dieticians. There were no significant differences in the number of contacts with medical specialists, the number of contacts with mental health care providers, admissions to hospitals, and the use of prescribed medicines.

The GP is not only the person people most frequently see but also the person one must contact before being referred to a medical specialist or for hospital admission. A policy requiring substitution of care (eg, a shift from hospital care to primary care) and limiting expenditures on health care services cannot be realized without the help of GPs. General practitioners in the Almere project had lower referral rates to medical specialists and lower prescription rates but higher rates of diagnostic activities and interventions and higher rates of referral to primary care workers (social workers, district nurses, home helpers, midwives, and dieticians) (Table 3). Because all figures in Table 3 are presented per 1000 visits, differences that are due to the fact that physicians in Almere saw more of their patients during a 3-month period were removed from the analysis.

Examples of diagnostic activities that are normally done within general practice include physical examination (eg, blood pressure, ear, nose, and throat, eyes, and heart), blood examination (eg, hemoglobin level, erythrocyte sedimentation rate, and glucose level), and urine examination (eg, sediment, nitrite value, glucose level, and pregnancy tests). Diagnostic activities that are normally conducted outside practice in a specialized diagnostic center include blood chemistry tests (eg, glucose level, liver function, electrolytes, fat spectrum,

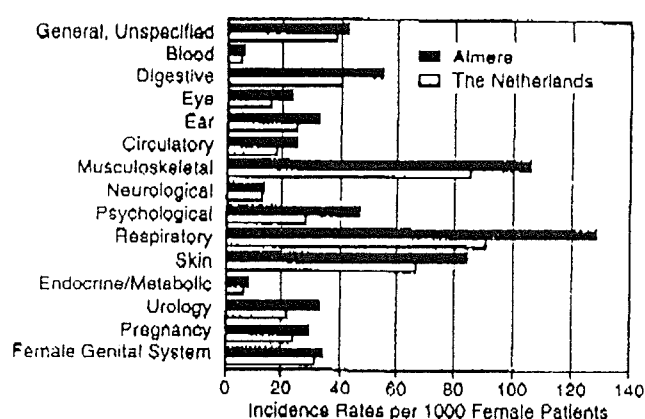


Fig 2.—Three-month incidence rates of disease and health problems presented in general practice in 1987 and 1988 per *International Classification of Primary Care* chapter for women in Almere and the Netherlands, with the figures for Almere adjusted for age differences.

Table 2.—Use of Health Care Services in Almere and the Netherlands Based on Patient Reports in Health Interviews Conducted in 1987 and 1988, per 1000 Inhabitants

Health Care Services, No.	Almere*	The Netherlands
Contact with		
General practitioner in the last 2 mo	441†	372
Physiotherapist in the last year	160†	133
Social worker in the last year	37‡	25
Dentist in the last year	695	683
Dietician in the last year	46†	21
Medical specialist in the last 2 mo	171	163
Mental health care services in the last year	35	35
Admission to a hospital in the last year	78	80
Use of prescribed medicines during the last 14 d	300	304
Use of nonprescribed medicines during the last 14 d	279†	239

*These rates were age and sex adjusted.

† $P < .01$.

‡ $P < .05$.

and kidney function), hematology and serology, roentgenogram, and other activities, such as urine or fecal cultures, cytology, echoscopy, and endoscopy. Therapeutic services within general practice include counseling, giving information about the complaint or disease and treatment, health education, and providing medication without prescription. Other treatments include injections, wound care, minor surgery, and vaccinations.

After standardization for age and sex differences, the number of contacts with GPs per 1000 listed patients was about 9% higher in Almere than in the rest of the Netherlands. Looking at the interventions per 1000 contacts, we saw in Almere more (time-consuming) therapeutic interventions and diagnostic activities than in the Netherlands. General practitioners in Almere had lower figures for cost-generating interventions, such as the number of prescriptions and referrals to medical specialists than did GPs in the Netherlands. The lower prescription rate per 1000 patient contacts in Almere, combined with more contacts per 1000 patients, was responsible for the conclusion in Table 2 that there were no differences in the use of prescribed medicines as reported by patients during the health interviews in Almere and the Netherlands. Differences in the number of interventions per

Table 3.—Interventions in General Practice in Almere and the Netherlands During a 3-Month Period in 1987 and 1988, per 1000 Patient Contacts

Interventions, No.	Almere*	The Netherlands
Diagnostic activities		
Within practice	596	563
Outside practice	72	57
Treatment in general practice		
Therapeutic interventions	635	508
Minor surgery	89	63
Medicines prescribed	582	642
Referral to		
Medical specialist	55	61
Mental health care services	3	2
Physiotherapy	22	24
Other primary care services	15	7

* These rates were age and sex adjusted.

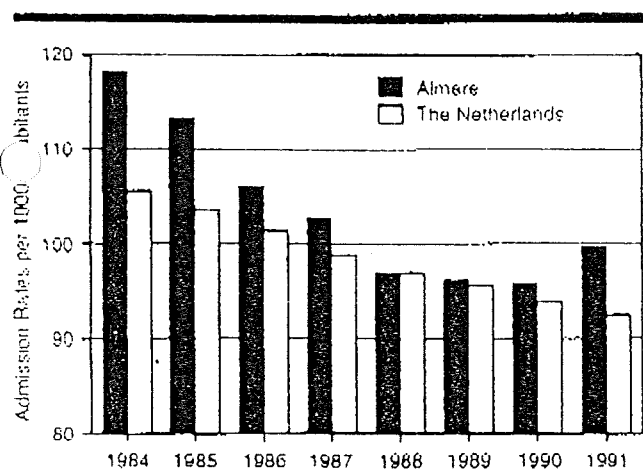


Fig 3.—Hospital admission rates for Almere and the Netherlands per 1000 inhabitants between 1984 and 1991, with the figures for the Netherlands adjusted for age and sex differences.

1000 patient contacts were not related to differences in morbidity patterns between Almere and the Netherlands. The analyses of the cross-sectional population data and the differences in general practices point to fewer referrals to medical specialists and hospital admissions in Almere compared with the rest of the Netherlands. These findings are supported by trend figures for some indicators of clinical hospital utilization.

Data concerning hospital utilization are currently available for the period between 1984 and 1991. The 1990 data for Almere were based on estimates, because not all the necessary information to calculate the total amount of hospital admissions was available. Reliable figures are not available for Almere before 1984. Data for 1992 and further have not yet been analyzed. Accordingly, these trends mainly cover the period in which the population of Almere had to use hospital facilities in neighboring regions, including Amsterdam. To assess the effect of this factor, we analyzed two indicators of clinical hospital utilization: the number of hospital admissions per 1000 inhabitants and the number of occupied hospital beds per 100 000 inhabitants (Fig 3).

Between 1984—1 year after the official start of the Almere experiment—and 1990, the number of hospital admissions per 1000 inhabitants gradually decreased in Almere as well

as in the Netherlands. However, the decline in Almere was more pronounced than in the rest of the Netherlands. In Almere, the number of hospital admissions per 100 000 inhabitants in 1990 was 80% of the admission rate in 1984. The corresponding figure for the Netherlands during the same period—after adjustment for differences between the two populations in age and sex distributions—was 89%. At the beginning of the health care experiment in Almere, the hospital admission rate for the population of the town was about 12% higher than the adjusted admission rate in the Netherlands. In 1990, the difference between Almere and the Netherlands was much smaller and less than 1%. In 1991, however, which is the year that the hospital in Almere was opened, there was a 4% increase in the number of hospital admissions.

Looking at the differences in 1989 between Almere and the Netherlands by the medical specialities with 5% or more of the total number of admissions, lower admission rates in Almere were found for surgery (-9%), ear, nose, and throat specialists (-25%), and neurology (-6%). For internal medicine (+10%), pediatrics (+34%), orthopedics (+13%), and cardiology (+25%), we found higher admission rates in Almere, while for gynecology the differences between the actual number of admissions and the expected number were small. In 1991, lower admission rates were found for ear, nose, and throat specialists (-28%) and higher admission rates for internal medicine (+28%), cardiology (+59%), orthopedics (+17%), and pediatrics (+29%). For surgery, gynecology, and neurology, the differences between the actual number of admissions and the expected number were small.

The number of hospital admissions in 1988 differs from the number of admissions to a hospital presented in Table 2. Possible explanations include differences in measurement instruments (eg, patient reports with the possibility of memory bias vs census data) and the possibility that people were admitted to a hospital more than once a year. Both factors may result in lower hospital admission rates based on health interview data.

The total number of occupied beds per 100 000 inhabitants in Almere and the Netherlands between 1984 and 1990 also showed a trend downward. This variable was calculated by multiplying the total number of hospital admissions by the length of stay in hospital divided by number of days in a year. This downward trend was more pronounced in Almere than in the rest of the Netherlands (Fig 4). In 1984, the number of occupied hospital beds in Almere exceeded the number expected on the basis of the figures for the Netherlands as a whole by almost 13%. But the number of hospital beds occupied by the population of Almere decreased from 325.6 in 1984 to 234.4 in 1990, while for the rest of the Dutch population—after adjustment for age and sex differences—the number of hospital beds occupied decreased from 288.8 in 1984 to 238.5 in 1990. Between 1988 and 1990 the actual number of occupied beds per 100 000 inhabitants in Almere was lower than what could be expected on the basis of the age and sex distribution for the rest of the Netherlands. In 1991, however, there was an increase in the number of occupied beds per 100 000 inhabitants of Almere from 234.4 to 250.3.

Mortality rates in Almere can be compared with other new cities, with Amsterdam, and with the country as a whole (Table 4). Adjusted for age differences, the trends in mortality showed no systematic differences between Almere, other new cities (eg, Purmerend and Zoetermeer), and the

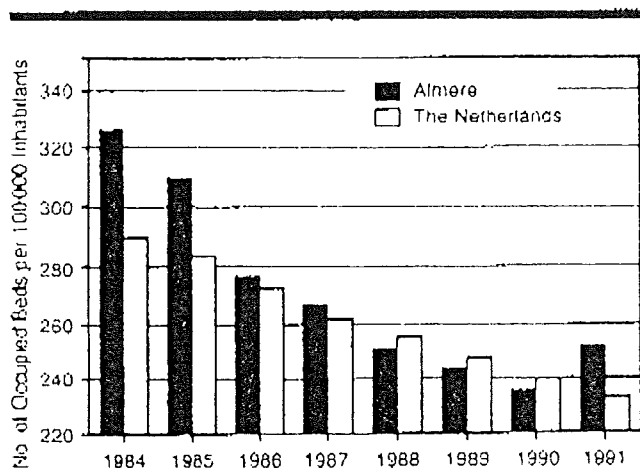


Fig 4.—Number of occupied beds (ie, the total amount of hospital admissions multiplied by the length of stay in hospital and divided by the number of days in a year) for Almere and the Netherlands, per 100 000 inhabitants between 1984 and 1991, with the figures for the Netherlands adjusted for age and sex differences.

Table 4.—Mortality Rates Between 1984 and 1991 in Almere, Two Other New Cities (Purmerend and Zoetermeer), Amsterdam, and the Netherlands, Adjusted for Age Differences, per 100 000 Inhabitants

	Year							
	1984	1985	1986	1987	1988	1989	1990	1991
Almere*	785	835	785	720	805	940	910	845
Purmerend*	910	935	840	905	905	890	945	905
Zoetermeer*	820	875	835	865	890	870	860	800
Amsterdam*	840	870	900	875	920	945	940	940
The Netherlands	830	860	860	830	840	870	880	880

*These mortality rates were age adjusted.

Netherlands as a whole. However, mortality in Amsterdam was higher than in the rest of the Netherlands.

Comment

The results of both the cross-sectional studies as well as the trends in hospital utilization indicate that the Almere experiment was successful with respect to some cost-generating factors. Despite higher population morbidity rates, hospital admission rates and the number of occupied hospital beds gradually decreased from 1984 through 1990. These downward trends were stronger in Almere than in the Netherlands, resulting in hospital admission rates that were almost equal and a lower number of occupied hospital beds in Almere. All differences were age and sex adjusted. In 1991, however, there was an increase in the number of hospital admissions and the number of occupied hospital beds. Mortality rates in Almere between 1984 and 1991 were not significantly higher than mortality rates in the rest of the Netherlands for those years. In addition, the work performed in general practice was also in line with the ideas formulated at the start of the Almere experiment.¹⁶ Lower referral rates to medical specialists and lower prescription rates were indicators of a lower-cost type of care.

Our conclusion that morbidity rates in Almere were higher than in the Netherlands cannot easily be explained by the health of the population or the organization of primary care services in Almere. If it was simply a question of a better

organized primary care services, one would expect that in Almere more people were seeing GPs in the absence of differences in population morbidity rates. However, this was clearly not the case. Therefore, a more realistic conclusion is that the differences in morbidity rates were a result of a population in Almere that was not as healthy as in the rest of the Netherlands. A possible explanation for these differences in population morbidity rates might be that Almere was a typical new town with a population that recently migrated and had to build up new social networks. People that have recently moved to a new house or a new town usually show higher morbidity rates.¹⁷ This conclusion is supported by the fact that differences in population morbidity rates were higher for women than for men and more pronounced for problems and complaints that had a strong psychological component. However, if morbidity differences were due to the new population aspect of Almere, the relatively high morbidity should decrease over time. Unfortunately, longitudinal data on population morbidity or morbidity in general practice were not available. When we used the opening dates of the health centers as a proxy for the number of years people were living in Almere, there was no significant relationship between the morbidity level and number of years people were living in Almere. Morbidity did not seem to decrease over time.

Another possibility is that differences in morbidity rates and the utilization of health care services were partly related to social class differences between Almere and the country as a whole. The cross-sectional data from the study in 1987 and 1988 allowed us to calculate morbidity rates and rates for the utilization of health care services adjusted for social class differences between Almere and the country as a whole. After adjustment for social class differences, morbidity rates in Almere dropped considerably as far as it concerned physical problems, chronic diseases, and the number of respondents defining their own health as good or very good. Adjustment for social class differences did not affect the significantly higher rates in Almere for psychological complaints and psychiatric symptoms. The same tendency occurred in the utilization of health care services based on patient reports in health interviews as presented in Table 2. After adjustment for social class differences, figures for Almere tended to decrease. Differences that remained statistically significant ($P < .01$) were the number of contacts with the GP and the dietician, which were higher in Almere. Also higher was the use of nonprescribed medicines ($P < .05$), while the use of prescribed medicines during the last 14 days in Almere was lower ($P < .05$) than in the country as a whole.

Between 1984 and 1990 Almere was able to reduce its initially raised hospital utilization to a level almost equal to the national level. The fact that increased morbidity at the level of the entire population and in general practice was not translated to higher referral rates and hospital admissions suggests that reinforcement and integration in primary care can be successful instruments in bringing down the costs of health care facilities in general.

However, as usual there are two sides of the coin. Integration of basic care, primary care, and hospital care facilities, both at a structural as well as a functional level, is difficult to reach, even under almost optimal conditions as in Almere. First, the vested interests of the individual parties are not easily supplanted by a common interest. Second, reinforcement of primary care services costs additional money. In

Almere, extra personnel, additional equipment and services performed, a managerial staff, and a system of health centers were subsidized by the central government, as well as local and regional authorities. It remains questionable whether or not these costs are balanced by the benefits of the Almere model. Third, inhabitants of Almere have not indicated that they were more satisfied with the prevalent structure of the health care services than the Dutch population at large. Although a large majority of all people were satisfied or highly satisfied, satisfaction scores for the work of the GPs in Almere were somewhat lower than in the rest of the Netherlands, especially when it concerned the accessibility to the GP after office hours.

Ad hoc explanations for these lower scores are (1) a limited choice between different GPs, (2) a tendency toward bureaucratization, with individual GPs feeling less responsible for activities, such as the accessibility of primary care services, and (3) a more critical attitude of the population of Almere due to the high expectations or previous experiences in the city one originates from. Recently, the accessibility of the health care centers after office hours was improved by introducing additional facilities for emergency care.¹⁸

Conclusion

The figures presented in this article do not give any definite answer nor do they prove that the results we found can be interpreted as being caused by the Almere experiment. There are other plausible mechanisms that could have contributed to these results. One might argue that because there was no hospital in Almere before 1991 admission rates and other indicators for the use of hospital care tended to be relatively low. The relatively high hospital admission rate in 1991 supports this explanation. Another possibility is that the reduction in hospital utilization in Almere was due to chance fluctuation, although the downward trends in the hospital admission rates and number of occupied hospital beds were in contradiction to the explanation that the lower figures were just a coincidence. However, both explanations may be addressed as soon as long-term figures about hospital admissions and related data, especially for the years 1992 and after, become available. Other outcome measures for the quality of health care services, such as mortality rates, show very little systematic variation between the different geographical areas in the Netherlands.

At this time, we support continued strengthening of primary health care institutions in Almere to reduce the number of people being referred to hospitals. With reference to the work of the GP, this includes fewer listed patients than the average number in the Netherlands (2000 in Almere vs 2350 in the Netherlands), special training courses and statistical feedback from the Almere Foundation for Primary Care to the GPs about their performances, additional equipment in the health care centers that makes it possible for GPs to do more themselves instead of referring the patients to hospi-

tals, the possibility to attract those GPs who subscribe to the basic philosophy of the Almere experiment, patient participation that provides the option of making improvements to the basic health care structure, and an organizational and structural setting that facilitates professional consultations and better access to a wide range of health care services.

The Almere experiment shows that a primary care-based organizational structure can function. The goals that were set at the start of the experiment in 1983, of treating more people in primary care institutions and limiting the number of hospital admissions, have proved to be realistic and feasible. At the same time, the Almere experiment shows that it might be difficult to combine these goals with the wishes and demands of all patients.

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