# Back to basics: does decentralization improve health system performance? Evidence from Ceará in north-east Brazil

Sarah Atkinson[1] & Dave Haran[2]

**Objective** To examine whether decentralization has improved health system performance in the State of Ceará, north-east Brazil.
**Methods** Ceará is strongly committed to decentralization. A survey across 45 local (*município*) health systems collected data on performance and formal organization, including decentralization, informal management and local political culture. The indicators for informal management and local political culture were based on prior ethnographic research. Data were analysed using analysis of variance, Duncan's post-hoc test and multiple regression.
**Findings** Decentralization was associated with improved performance, but only for 5 of our 22 performance indicators. Moreover, in the multiple regression, decentralization explained the variance in only one performance indicator; indicators for informal management and political culture appeared to be more important influences. However, some indicators for informal management were themselves associated with decentralization but not any of the political culture indicators.
**Conclusion** Good management practices in the study led to decentralized local health systems rather than vice versa. Any apparent association between decentralization and performance seems to be an artefact of the informal management, and the wider political culture in which a local health system is embedded strongly influences the performance of local health systems.

**Keywords** Delivery of health care/organization and administration; Community health services/organization and administration; Quality indicators, Health care; Efficiency, Organizational; Informal sector; Politics; Regression analysis; Brazil (*source: MeSH, NLM*).

**Mots clés** Délivrance soins/organisation et administration; Service public santé/organisation et administration; Indicateurs qualité santé; Efficacité fonctionnement; Secteur informel; Politique; Analyse régression; Brésil (*source: MeSH, INSERM*).

**Palabras clave** Prestación de atención de salud/organización y administración; Servicios de salud comunitaria/organización e administración; Indicadores de calidad de la atención de salud; Eficiencia organizacional; Sector informal; Política; Análisis de regresión; Brasil (*fuente: DeCS, BIREME*).

Arabic

Bulletin of the World Health Organization 2004;82:822-827.

*Voir page 826 le résumé en français. En la página 826 figura un resumen en español.*

## Introduction

Decentralization is widely promoted in health system reform. In many countries of the Southern Hemisphere, this is associated with change in the wider political sphere (*1*). This fits Brazil well. A return to civilian government in the mid-1980s followed more than 20 years of military dictatorship. A new constitution (*2*) promised major restructuring of the health system, including fully devolved management (*3*) combined with local participatory decision-making (*4*). The health system in Brazil is decentralized to the third administrative tier after the federal and state levels: the *município*.

The possible pitfalls of decentralization have been described extensively (*5*–*7*), but few question the benefits if appropriately implemented and it remains a ubiquitous policy measure. Despite this widespread popularity, empirical studies assessing whether the promise of decentralization has been realized are surprisingly rare and mostly depict the variation in the formal structures implemented from the national scale (*8*). Studies at the regional or district scales that can link organizational arrangements, processes of policy implementation and performance indicators are uncommon (*9*). The few that exist use a systems approach linking the system's formal inputs and procedures to desired output: normally the coverage rates of basic preventive services (*10*–*12*). However, organizational research indicates a variety of ways in which organizations can function and can be viewed, with important implications for the variables through which researchers might explore how this affects system performance (*7*, *13*–*15*).

In particular, the informal aspects of systems need to be explicitly incorporated into evaluation studies. This term covers how participants in a system behave within that system in response to incentives from outside that system rather than to incentives consciously built into the system. A second element is how the norms and values of the wider society influence the operations of that system (*16*).

Thinking in terms of formal incentives, let alone informal, has only entered mainstream debates on health systems development in recent years (*9*). Health systems researchers have barely

[1] Health Systems Development Programme, University of Manchester, School of Geography, Mansfield Cooper Building, Oxford Road, University of Manchester, M13 9PL, England; and Escola de Saúde Pública, Fortaleza, Brazil (email: Sarah.Atkinson@man.ac.uk). Correspondence should be sent to this author.

[2] Tropical Health Division, Liverpool School of Tropical Medicine, Liverpool, England.

Ref No. **02-0242**

(*Submitted: 18 September 2002 – Final revised version received: 19 February 2004 – Accepted: 25 February 2004*)

engaged with the influence of the wider cultural context at all. Prescriptions for improving the effectiveness of decentralization repeatedly return to the formal sphere and highlight the need for stronger processes of capacity-building, resource allocation, incentives and procedures for accountability (*10*).

This study builds on a comparative ethnography of three local health systems in north-east Brazil. This demonstrated how local informal factors influence local policy implementation (*17*). These insights are converted, where possible, into quantifiable indicators to explore relationships with the performance of local health systems across an extensive sample. The study aimed to examine whether decentralization improves the performance of local health systems. This was investigated by analysing whether a broad range of indicators for formal organization, informal management and political culture are associated with improved performance of local health systems and, if so, their relationship with decentralization. The study was performed in the State of Ceará, north-east Brazil, which has a strong political commitment to the national reform agenda (*18*).

## Methods

### Study design

The study defined four groups of variables: performance; formal organization; informal management; and local political culture. Table 1 (web version only, available at: http://www.who.int/bulletin) presents the indicators and the data sources.

#### *Performance*

Performance variables describe health outcomes (clinical outcome and population satisfaction) and health system outputs (service productivity and coverage and population utilization and accessibility). Many of these data are available from routine information systems; primary data are collected on the population's perspectives on the care provided and their clinical outcomes, utilization and accessibility. Population perspectives on the care provided were accessed from two angles: 15 questions about the aspects of care of a specific ill-health episode (called quality here) and five questions about the same aspects of health services in general (called satisfaction here). Aspects were defined from prior ethnographic research, and the question responses were scored on a five-point Likert scale. Composite scores were constructed across the questions (Cronbach's alpha > 0.8). Four indicators were built from these composite scores: the mean scores for quality and for satisfaction and the percentage of the population in each *município* scoring above the 75th percentile of the total sample on quality and on satisfaction.

#### *Formal organization*

Indicators of formal organization describe inputs (physical and human), the stage of decentralization (none, partial or full) and the capacity to process resources (here indicated by the percentage of the planned budget actually spent). These data are mostly available through the routine information system. The quality of human resource inputs was assessed through a series of simple questions, based on Brazilian guidelines, about good practice in health care related to antenatal care, respiratory infections among children, high blood pressure and treatment regimens.

#### *Informal management*

Informed by the previous ethnographic studies (*17*), the aspects of informal management included were characteristics of health staff in relation to the local health system (continuity of local employment and morale), the management style of the secretary of health (behaviour of good management practice (*18*)) and the extent of engagement with the population (population awareness of community-based activities and the local municipal health council).

#### *Political culture*

Our ethnographic study found that rural and urban districts differed greatly. This spatial distinction is very recognizable to populations, managers and policy-makers although it captures a broad range of factors. Three socioeconomic indicators (education and two measures of housing quality) aimed to separate these effects from the spatial indicator. Latin American society is traditionally based on vertical relations of clientelism (*19*). Although often covert, we tried to capture its influence at two scales. First, the political affiliation of a *município* to the state government may facilitate access to state resources for additional programmes and activities. Secondly, the local exercise of patronage may be acceptable, presenting an obstacle to local demands for change. Following the model of a large survey in the United Kingdom (*20*), five questions assessed the acceptability to health staff of grey areas of practice by either themselves or local politicians. Three of these explicitly explored the acceptability of politicians using the health system for political gain through clientelism. The other two explored the acceptability of practices involving material gain for health staff. Finally, the commitment of key management figures to the district is captured by whether the prefect practises his or her original profession locally and by whether the *município* secretary of health was born locally.

### Secondary data

The State Secretariat of Health for Ceará (SESA) has data for each *município* health system on the productivity of the health facilities and on financial budgets and expenditure. These data were made available either directly from the appropriate SESA departments or through a district-level database (*21*). Data are available for all *municípios*.

### Questionnaires

The primary data were collected through three questionnaires in each *município*:

- to the *município* secretariat of health, including general data on the *município*;
- to health staff at each of three health facilities visited; the number of staff sampled at each facility depended in part on the staff size of the health facility, but a limit of five per facility was set so that the maximum number was 15;
- to women sampled from two neighbourhoods, a total of 100 per *município*.

The questionnaires were piloted and modified to ensure that the questionnaire was both comprehensible to interviewees and of reasonable duration, resulting in 100% response to the community-based questionnaire. Health staff and the *município* secretariat of health filled in the questionnaire themselves, resulting in lower but reasonable response rates. Data from secondary sources were available for all *municípios*.

### Sampling

The primary data were collected from 45 *municípios*. The 45 study sites were intentionally selected to represent stages of

decentralization, urban and rural districts and geographical spread across Ceará.

### *Health centres*

In each district three health centres were visited, selected by these criteria:

- one facility in the *município* centre, preferably a hospital for outpatients or, if none existed, a health centre;
- one facility in a neighbourhood that was not the *município* centre nor near it and that was not close to major roads, preferably a health centre;
- one facility in a remote neighbourhood relatively underserved by public services in general, preferably a health post.

### *Community*

In each *município* a sample of 100 women was interviewed, sampled by these criteria:

- 50 women from neighbourhoods relatively near health facilities;
- 50 women from neighbourhoods far from any health facility in either this or neighbouring *municípios*;
- the neighbourhoods selected should represent those considered to be poorest.

In addition, in rural *municípios* women were not sampled from the district centre, and in urban *municípios* women were not sampled from any rural areas of the *município*. Finally, field workers were to exclude the houses of affluent people in any neighbourhood visited, but otherwise to sample women on an ad hoc availability basis.

The primary data were collected between October and December 1997.

## Analysis

The data were entered into the Statistical Package for the Social Sciences (version 10.0). Three stages of analysis are presented: decentralization against performance indicators; regression of performance indicators against formal organization (including decentralization), informal management and political culture; and decentralization against significant variables emerging from the regression analysis. The relationships between decentralization and performance indicators were explored using one-way analysis of variance, with decentralization entered as a three category variable. Regression analysis was performed with the regression procedure, employing the stepwise method of entering variables. Associations between decentralization and significant variables from the regression analyses were identified using one-way analysis of variance and Duncan's post-hoc test for significant differences between the three levels of decentralization (*22–24*).

# Results

## Decentralization and performance

Table 2 presents the mean values for the performance indicators that proved to significantly differ across the three categories of decentralization by analysis of variance. For three of these five indicators, the difference with decentralization was in the direction aimed for by health reform. Coverage of preventive care (antenatal care and vaccination) increased and utilization of hospital-based care decreased. The gains in increased antenatal care coverage and decreased use of a hospital facility progressed from not decentralized to partly and then fully decentralized *municípios*. Vaccination coverage was significantly higher in fully decentralized *municípios* than the others. The percentage change in productivity for basic clinical services was ambivalent in relation to the reform agenda. *Municípios* not decentralized or partly decentralized showed rapid rates of increased productivity compared with a very low percentage change in those fully decentralized. Those not fully decentralized may have been building their capacity for productivity, whereas those fully decentralized were already working near capacity and consolidating service provision rather than expanding. However, the productivity of basic clinical services was not higher in fully decentralized *municípios* than in other *municípios*. On the contrary, the partly decentralized *municípios* had the highest productivity rates, whereas nondecentralized and fully decentralized *municípios* performed similarly. The gain in performance with decentralization was neither progressive nor maintained between the partial stage and the full stage.

Table 2. **Decentralization and performance**

| Performance indicator | Not decentralized | Partly decentralized | Fully decentralized |
|---|---|---|---|
| *Outcome – user assessment* | | | |
| Quality, mean rating (1 = high, 5 = low) | 2.42 | 2.37 | 2.30 |
| Satisfaction, mean rating (1 = high, 5 = low) | 2.79 | 2.77 | 2.56 |
| % rating quality as high | 15.6 | 21.3 | 28.1 |
| % rating satisfaction as high | 21.9 | 24.4 | 34.4 |
| % rating the performance of the community health worker as high | 24.0 | 30.6 | 33.2 |
| *Output – preventive care* | | | |
| % of pregnant women attending antenatal care | 69.5 | *78.6*[a] | *83.3* |
| % of infants younger than 11 months vaccinated | 74.8 | 75.2 | *85.0* |
| *Output – clinical care* | | | |
| Productivity per 1000 population for basic clinical services | 0.65 | *1.08* | 0.48 |
| % change in productivity of basic clinical services, 1996–97 | 129.4 | 137.5 | *41.0* |
| *Utilization and access* | | | |
| % attending hospital | 76.2 | *53.4* | *43.2* |

[a] Figures in italics were significant at the $P \leq 0.05$ level in Duncan's post-hoc test for significant differences.

These results indicate that decentralization leads to gains in performance in all categories except clinical outcome. However, these gains in local health system performance with decentralization seem rather limited and erratic in expression. Are other factors influencing or mediating these associations?

## Performance, formal organization, informal management and political culture

We used regression analysis to explore the relative contribution of the variables for formal inputs (including decentralization), informal management and political culture to each performance indicator (Table 3: web version only, available at http://www.who.int/bulletin).

Twenty-two indicators of performance were tested with 15 indicators of formal organization, 15 indicators of informal management and 14 indicators of political culture. A few independent variables explained a high proportion of the variance for most performance indicators. Seven or fewer independent variables predicted more than 75% of the variance for 12 performance indicators: mean quality; percentage rating satisfaction as high; percentage rating the performance of the community health worker as high; percentage of infants with low birth weight; perinatal mortality rate; infant mortality rate; percentage of children younger than two years old growing well; productivity of basic clinical services, percentage of children younger than two years old weighed; percentage attending any health facility; percentage attending a health facility in this *município*; and percentage who had a problem requiring care.

Surprisingly, given the complexity of health outcomes, the significant variables in the multiple regression explained more than 90% of variance for all the *município*-scale health outcome indicators except for the percentage of users reporting that they got better after their consultation. For a further five indicators, more than 65% of the variance was predicted by the independent variables: percentage who report getting better after consultation; productivity of advanced clinical services; percentage change in productivity of both basic and of advanced clinical services; and percentage attending a hospital.

Only in five cases did the regression explain variance of 40% or less: mean satisfaction; percentage rating quality as high; percentage attending antenatal care; percentage of infants younger than 11 months old vaccinated; and percentage attending the nearest health facility. In all these cases, the analysis produces a model involving only one independent variable or, for the percentage attending antenatal care, no model at all.

Across the performance indicators for which the regression variables explained more than 65% of their variance, a mix of formal inputs, informal management and political culture provided the explanatory variables. This result reinforces the findings from organizational studies in general and from previous qualitative studies of local health systems in north-east Brazil in particular that aspects of the formal organization are only one influence on organizational performance. Here, the aspects of organizational reality captured by the indicators of informal management and political culture consistently emerge as important influences on all measures of performance. Decentralization was an important contributing variable for only one performance indicator (percentage rating satisfaction as high). This implies that, although decentralization is associated with some indicators of better performance of local health systems, it is not a major explanatory factor of the variation in performance between local health systems compared with other indicators of formal inputs, informal management and political culture.

## Decentralization and significant regression variables

The independent variables that emerged as significant in the regression analysis were examined for association with decentralization. Table 4 presents those proving significant (Duncan's post-hoc test) (*23*). Decentralization was significantly associated with two indicators of formal organization: poorer management of financing for basic and advanced clinical services in fully decentralized *municípios*. However, this probably reflects how financial records are kept. Once fully decentralized, a local health system no longer has to return productivity bulletins to the state secretariat of health for monthly payments to be released; expenditure can be more flexible. Thus, an association between poorer management of financing and full decentralization is largely a mutual relationship rather than one of influence.

Decentralization was significantly associated with five indicators of informal management. Four times more people have heard of the Family Health Programme in fully and partly decentralized *municípios* than in those not decentralized. Fully decentralized *municípios* have more people who have been asked for their opinions by a member of the local health council

Table 4. **Decentralization and the significant regression variables against performance: significant relationships**[a]

| Variables | Not decentralized | Partly decentralized | Fully decentralized |
|---|---|---|---|
| **Formal organization** | | | |
| *Financial management capacity:* | | | |
| for basic services (0 = good, 8 = poor) | 3.92 | 3.71 | *6.68* |
| for advanced services | 4.15 | 3.93 | *7.22* |
| **Informal management** | | | |
| *Management style* | | | |
| *Município* secretary of health has unreliable office hours[b] | 1.95 | 2.04 | *1.41* |
| *Município* secretariat holds meetings with staff | 0.55 | 0.61 | *0.82* |
| *Population awareness of community health activities* | | | |
| % who had heard of Family Health Programme | 5.3 | *19.9* | *21.1* |
| *Population awareness of participatory spaces* | | | |
| % who knew a member of the local health council | 3.1 | 3.1 | *6.8* |
| % who had a local health council member ask for their opinions | 0.5 | 1.2 | *3.4* |

[a] Duncan's post-hoc test for significant differences, $P \leq 0.05$; figures in italics indicate the stages at which significance operates.
[b] % of staff who reported these occurrences.

(CMS) and twice as many people who know a member of the CMS as other *municípios*. Fully decentralized *municípios* also have more staff reporting that the *município* secretary of health keeps reliable office hours and holds meetings between health facility staff and the *município* secretariat of health.

These findings imply that decentralization was associated with improvement in informal management. However, this was not, in turn, always positively associated with improved performance. This is specifically true with respect to greater awareness of participatory spaces: a higher percentage of the population knowing a member of the CMS was associated with fewer children under two years old being weighed or growing well, and a higher percentage of the population having a member of the CMS ask for their opinions was associated with higher perinatal mortality rates. The creation of participatory spaces is a major component of Brazil's health reform agenda, as in many countries. Although associations do not necessarily indicate influence, these results imply ambivalence in the relationship between desirable management practice in the health system reform agenda and performance.

Finally, decentralization was not associated with political culture, whereas many of the indicators of political culture were significantly associated with performance.

## Discussion and conclusions

A common-sense interpretation of the association between decentralization and informal management is that good management practices lead to *municípios* achieving a more advanced stage of decentralization rather than decentralization leading to better local informal management. Decentralization shows no association with local political culture, whereas political culture substantially influences local health system performance.

A complex interplay between formal inputs, informal management and political culture influences variation in the performance of local health systems. Trying to quantify complex social relations is an inherently reductionist exercise that can provoke more criticism and disagreement than consensus. Nevertheless, exploring the complex world of health systems across a more extensive sample is useful.

Does decentralization improve health system performance? No, not per se. Importantly, decentralization was never associated with worse performance; any association with better performance appeared to be mediated by aspects of informal management. Other formal inputs played a part in improving health system performance, but this was consistently moderated by informal management and political culture. Even where informal management practices were desirable, this did not ensure a positive impact on performance, as everything is mediated through the political and social context embedding the local health system. Decentralization per se is not associated with and does not influence this. Thus, formal inputs are insufficient to improve the performance of local health systems. Health system researchers and planners need to discuss tackling management culture and the relationship of the local health system to the local political culture. Our research demonstrates the value of further detailed local analysis of influences on health system performance, the potential and limitations of formal inputs to improve health system performance and the need for policy initiatives to identify different kinds of complementary inputs for the varying contexts of local health systems. ■

### Acknowledgements

The research was funded by a grant from the United Kingdom DFID. Staff from the ESP, Fortaleza, Brazil organized the data collection and provided logistical support, information and hospitality during the research.

**Conflicts of interest:** none declared.

## Résumé

### Revenir à l'essentiel : la décentralisation améliore-t-elle l'efficacité des systèmes de santé ? L'expérience de l'Etat de Ceará dans le nord-est du Brésil

**Objectif** Examiner si la décentralisation a amélioré l'efficacité des systèmes de santé dans l'Etat de Ceará, dans le nord-est du Brésil. **Méthodes** L'Etat de Ceará est fortement impliqué dans la décentralisation. Une enquête sur 45 systèmes de santé locaux (décentralisés au niveau du *município*) a permis de réunir des informations sur l'organisation officielle des systèmes et sur leur efficacité, notamment en ce qui concerne la décentralisation, la gestion informelle et la culture politique locale. Pour ces deux derniers éléments, les indicateurs étaient basés sur les résultats d'une étude ethnographique préalable. L'analyse des données a été effectuée par analyse de la variance, test post-hoc de Duncan et analyse par régression multiple.
**Résultats** La décentralisation était associée à une amélioration de l'efficacité des systèmes de santé, mais seulement pour 5 de nos 22 indicateurs de performance. De plus, dans l'analyse par régression multiple, la décentralisation n'expliquait la variance que pour un seul indicateur ; les indicateurs de gestion informelle et de culture politique ont paru exercer une influence plus importante. Cependant, certains indicateurs de gestion informelle étaient eux-mêmes associés à la décentralisation, mais aucun des indicateurs de culture politique. **Conclusion** Les bonnes pratiques de gestion observées dans l'étude ont conduit à décentraliser les systèmes de santé et non l'inverse. Toute association apparente entre la décentralisation et l'efficacité des systèmes semble un artefact de la gestion informelle, et la culture politique plus large dans laquelle s'inscrivent les sytèmes de santé locaux influence fortement leur efficacité.

## Resumen

### Replanteamiento de una cuestión básica: ¿mejora la descentralización el desempeño de los sistemas de salud? Evidencia procedente de Ceará, en el noreste del Brasil

**Objetivo** Determinar si la descentralización ha mejorado el desempeño de los sistemas de salud en el Estado de Ceará, en el noreste del Brasil. **Métodos** Ceará ha apostado firmemente por la descentralización. Mediante una encuesta realizada en 45 sistemas locales (*município*) de salud se recogieron datos sobre el desempeño y la organización

formal, en particular sobre la descentralización, la gestión informal y la cultura política local. Los indicadores de la gestión informal y la cultura política local se basaron en investigaciones etnográficas anteriores. Los datos fueron sometidos a análisis de varianza, prueba de Duncan post hoc y análisis de regresión múltiple.
**Resultados** La descentralización se asoció a un mejor desempeño, pero sólo en 5 de nuestros 22 indicadores de desempeño. Además, en la regresión múltiple, la descentralización explicó la varianza de sólo un indicador del desempeño; los indicadores sobre la gestión informal y la cultura política parecían tener una influencia más importante. Sin embargo, algunos de los indicadores relativos a la gestión informal estaban asociados a la descentralización, lo que no ocurría con ninguno de los indicadores sobre la cultura política.
**Conclusión** En el contexto de este estudio, las buenas prácticas de gestión condujeron a unos sistemas locales de salud descentralizados, en lugar de a la inversa. Cualquier relación aparente entre descentralización y desempeño parece ser un artefacto de la gestión informal, y el marco general de cultura política en el que se inscriben los sistemas locales de salud influye muy marcadamente en el desempeño de esos sistemas.

Arabic

## References

1. *Decentralization and health systems change: a framework for analysis.* Geneva: World Health Organization; 1995. WHO document WHO/SHS/NHP/95.2.
2. *Constituição da república federativa do Brasil: de 5 outubro de 1988 (3a edição) [Constitution of the Federal Republic of Brazil: 5 October 1988. 3rd ed.].* São Paulo: Editora Atlas; 1988. In Portuguese.
3. Rondinelli D. Implementing decentralization programmes in Asia: a comparative analysis. *Public Administration and Development* 1983;3:181-207.
4. de Carvalho GI, Santos L. *Sistema Único de Saúde: comentários à Lei Orgânica da Saúde (Leis 8.080/90 and 8.142/90) [Single health system: commentaries on the Health Act – Laws 8.090/90 and 8.142/90].* São Paulo: Editora Hucitec; 1992. In Portuguese.
5. Collins C. Decentralization. In: Janovsky K, editor. *Health policy and systems development.* Geneva: World Health Organization; 1995. WHO document WHO/SHS/NHP/96.1. p. 161-78.
6. Collins C, Green A. Decentralization and primary health care: some negative implications in developing countries. *International Journal of Health Services* 1994;24:459-75.
7. Atkinson S. Restructuring health care: tracking the decentralization debate. *Progress in Human Geography* 1995;19:486-503.
8. Mills A, Vaughan JP, Smith DL, Tabibzadeh I. *Health systems decentralization: concepts, issues and country experiences.* Geneva: World Health Organization; 1990.
9. Savedoff WD. Social services viewed through new lenses. In: Savedoff WD, editor. *Organization matters: agency problems in health and education in Latin America.* Baltimore: Johns Hopkins University Press; 1998. p. 3-35.
10. Thomason JA, Newbrander WC, Kolehmainen-Aitken RL, editors. *Decentralization in a developing country: the experience of Papua New Guinea and its health service.* Canberra: National Centre for Development Studies, the Australian University; 1991 (Pacific Research Monograph 25).
11. Barnabas G-A. *Local government, equity and primary health care in Ethiopia* [dissertation]. London: University of London, London School of Hygiene and Tropical Medicine; 1997.
12. Gonzalez-Block M, Layva R, Zapata O, Loewe R, Alagón J. Health service decentralization in Mexico: formulation, implementation and results of policy. *Health Policy and Planning* 1989;4:301-15.
13. Shafritz JM, Ott JS. *Classics of organization theory.* 3rd ed. Wadsworth: Belmont; 1992.
14. Abrahamsson B. *The logic of organizations.* Newbury Park, CA: Sage; 1993.
15. McKevitt D, Lawton A. *Public sector management: theory, critique and practice.* Newbury Park, CA: Sage; 1994.
16. North DC. *Understanding the process of economic change.* London: Institute of Economic Affairs; 1999.
17. Atkinson S, Medeiros RLR, Oliveira PHL, Almeida RDD. Going down to the local: incorporating social organisation and political culture into assessments of decentralised health care. *Social Science and Medicine* 2000;51:619-36.
18. Tendler J. *Good governance in the tropics.* Baltimore: Johns Hopkins University Press; 1997.
19. Eisenstadt SN, Roniger L. *Patrons, clients and friends.* Cambridge: Cambridge University Press; 1984.
20. Sheaff R, West M Marketization, managers and moral strain: chairmen, directors and public service ethos in the National Health Service. *Public Administration* 1997;75:189-206.
21. IPLANCE. *Ranking dos municípios [Ranking of the municípios].* Fortaleza: Fundação Instituto do Planejamento do Ceará; 1997. In Portuguese.
22. Kinnear PR, Gray CD. *SPSS for Windows made simple.* 3rd ed. Hove: Psychology Press; 1999.
23. SPSS. *User's guide SPSS Base 8.0 for Windows.* Chicago: SPSS Inc.; 1988.
24. Sokal RR, Rohlf FJ. *Biometry.* 2nd ed. New York: W.H. Freeman; 1981.

Table 1. **Indicators used in the survey of local health systems**

| | |
|---|---|
| **Indicators of performance**[a] | |
| **Outputs** | **Data sources** |
| *Productivity of services* | Routine productivity data provided by the State Secretariat of Health to the Outpatient Information System of the Brazilian Unified Health System (SIA/SUS) (*21*) |
| Productivity of clinical care coverage (basic and advanced) | |
| Change in the productivity of clinical care coverage (basic and advanced) from 1995 to 1996 | |
| Productivity of preventive care coverage (antenatal care, infants younger than 11 months old vaccinated, children younger than two years old weighed) | |
| *Utilization and accessibility for the population (women)*[b] | Community-based survey, data collected October–December 1997 in 45 districts, $n = 100$ women in each |
| % attending any health facility | |
| % attending a hospital | |
| % attending a health facility in their own district | |
| % attending the nearest health centre | |
| % having a problem requiring care at a health facility | |
| **Outcome**[c] | |
| *Clinical outcome* | State Secretariat of Health, Ceará, printout of 1996 community health worker data |
| Low birth weight, children younger than two years old growing well, perinatal and infant mortality rate | |
| % reporting they got better after consulting the health services | |
| *Community evaluation* | Community-based survey, data collected October–December 1997 in 45 districts, $n = 100$ women in each |
| *Population (women) rating of satisfaction and quality of services*[d] *(based on five-point Likert scales):*[e] | |
| % rating high satisfaction with care; % rating high quality on specific questions of provision; mean score on satisfaction questions; mean score on specific questions on quality of provision; and % rating the performance of community health workers as high | |
| **Indicators of formal organization** | |
| **Management structure** | |
| *Stage of decentralization (none, partial, full)* | Escola de Saúde Pública, Fortaleza, Ceará records |
| Two categories are used for analysis: not decentralized versus decentralized: not decentralized and basic decentralization versus full decentralization | |
| **Resource inputs** | |
| Health facilities per 1000 population | IPLANCE (*21*) |
| Beds per 1000 population | |
| Public facilities per 1000 population | District secretariat of health survey, data collected October–December 1997 |
| Private facilities per 1000 population | |
| Public staff per 1000 population | |
| Private staff per 1000 population | Health centre survey, data collected October–December 1996 |
| Public–private ratio of facilities | |
| Public–private ratio of staff | |
| Staff knowledge of correct procedures (based on national and state protocols) for: antenatal care, respiratory infections among children, high blood pressure and treatment regimens | |
| **Financial management capacity** | |
| Management of financing (for basic and advanced services) | State Secretariat of Health, Ceará, printout of 1996 budget and expenditure data |
| Capacity scores = % of planned budget spent (for basic and for advanced services) in each district and then categorized by difference from 100%[e] | |
| 90–110%: +1; 80–90% or 110–120%: +2; etc. to 0–30% or ⩾170%: +8 | |
| **Indicators of informal organization of the health system** | |
| **Staff characteristics** (of those interviewed) | |
| Mean time spent working in this district | Health Centre Survey data collected October–December 1996 |
| Mean staff satisfaction score[e] | |
| **District management style** (staff perceptions) | |
| % who think *município* secretary of health keeps reliable office hours[e] | |
| % who have health facility staff meetings | |
| % who have staff meetings with the district secretariat | |
| % of staff who think that secretary of health makes decisions together with others | |
| % staff who think that secretary of health asks for advice from others | |
| % staff who think that secretary of health shares information with others | |
| Who makes the decisions on the local health council according to health facility staff | |

(Table 1, cont.)

| Indicators of performance[a] | |
|---|---|
| **Population awareness of community health activities** | |
| % who know the community health worker | Community-based survey, data collected |
| % who had a community health worker come to their house | October–December 1997 in 45 districts, |
| % who had heard of the Family Health Programme | $n = 100$ women in each |
| **Population awareness of participatory spaces** | |
| % who had heard of the local health council | |
| % who knew a member of the local health council | |
| % who had a member of the local health council ask for their opinions | |
| **Indicators of political culture** | |
| **Geographical** | |
| Zone: urban versus rural | IPLANCE (*21*) |
| **Political affiliation** | |
| Prefect (mayor) is a member of the same party as the state governor | District secretariat of health survey, data collected October–December 1997 |
| **Management's commitment to district** | |
| Whether the prefect was born in the district | District secretariat of health survey, data |
| Whether the prefect exercises his or her profession in the district | collected October–December 1997 |
| Whether the secretary of health was born in the district | |
| Whether the secretary of health lives in the district | |
| **Norms and values of health staff** | |
| *Acceptability to staff of certain practices*[e] | Health centre survey data collected |
| Politicians help clients to gain preferential access to health resources | October–December 1996; secretariat of |
| Community health workers involved in political campaigns | health survey, data collected October– |
| Politicians keep drugs in their homes for distribution | December 1997 |
| Staff refer patients to their own private clinics | |
| Staff get informal material gain from the health services | |
| **Socioeconomic status of the population** | |
| % of women with any education | Community-based survey, data collected |
| % of houses made of mud | October–December 1997 in 45 districts, |
| % of houses with a mud floor | $n = 100$ women in each |

[a] Data availability varies from 48% to 66% for data collected from the *município* secretariat of health.

[b] In the context of the aims of the health reforms, indicators of utilization are interpreted as being positive if districts have a higher % seeking a health facility for care, seeking one that is not a hospital, seeking one in their own district and seeking the nearest one. Accessibility issues are also indicated by whether seeking health care involves transport costs, payment at the chosen health facility or any problem experienced in being consulted.

[c] The figures collected by the community health workers refer only to those registered by them and not to the whole district population. However, the community health workers operate in the poorer neighbourhoods of the districts, which is where the impact of reforms is of most interest. These figures are by far the most reliable of any available.

[d] Community satisfaction with services is determined from two slightly different angles: questions on aspects of care identified through the qualitative work as being important to users, with specific reference to two stages of the care process — the preconsultation and the consultation processes — referred to here as quality. Questions on aspects of care identified through the qualitative work as important to users, with reference to the process as a whole, are referred to here as satisfaction. The difference is in method, and the language distinction facilitates clarity in analysis rather than representing any conceptual difference.

[e] A lower score indicates better results for: mean quality and mean satisfaction; financial management capacity for basic and for advanced clinical services; staff morale; the *município* secretary of health keeps reliable office hours; and acceptability to staff of certain practices.

Table 3. **Regression of performance indicators on decentralization, informal organization and political culture**

| | Standardized coefficient (β) | *t* | *P*-value |
|---|---|---|---|
| **Outcomes — user assessment** | | | |
| **Dependent variable: mean quality rating (1 = high)** | | | |
| *Variable* | | | |
| *Município* secretary of health lives there | –0.72 | –6.5 | < 0.0001 |
| Settlement type | –0.51 | –4.9 | 0.001 |
| House made of mud | +0.36 | +3.5 | 0.006 |
| *Município* secretary of health shares information | –0.33 | –2.9 | 0.016 |
| $R^2 = 0.901$ | | | |
| **Dependent variable: mean satisfaction rating (1 = high)** | | | |
| *Variable* | | | |
| Management of financing for advanced clinical services | –0.63 | –2.95 | 0.011 |
| $R^2 = 0.401$ | | | |
| **Dependent variable: % rating quality as high** | | | |
| *Variable* | | | |
| *Município* secretary of health lives there | +0.614 | 2.80 | 0.015 |
| $R^2 = 0.377$ | | | |
| **Dependent variable: % rating satisfaction as high** | | | |
| *Variable* | | | |
| Settlement type | +0.760 | 4.95 | <0.0001 |
| Decentralization | +0.490 | 3.28 | 0.007 |
| *Município* secretary of health consults others | +0.366 | 2.39 | 0.036 |
| $R^2 = 0.756$ | | | |
| **Dependent variable: % rating the performance of the community health worker as high** | | | |
| *Variable* | | | |
| Private facilities per 1000 population | –0.838 | –8.42 | <0.0001 |
| Acceptability to staff that politicians store drugs | –0.424 | –4.01 | 0.002 |
| *Município* secretary of health lives there | +0.460 | +4.48 | 0.001 |
| Public facilities per 1000 population | –0.299 | –2.82 | 0.018 |
| $R^2 = 0.909$ | | | |
| **Outcomes — clinical** | | | |
| **Dependent variable: % reporting that they got better after consultation** | | | |
| *Variable* | | | |
| Floor made of mud | +0.597 | 3.41 | 0.005 |
| % who had heard of local health council | –0.394 | –2.25 | 0.044 |
| $R^2 = 0.676$ | | | |
| **Dependent variable: % with low birth weight** | | | |
| *Variable* | | | |
| Public facilities per 1000 population | –0.629 | –13.704 | <0.0001 |
| Ratio of public to private staff | +0.599 | +10.43 | <0.0001 |
| *Município* secretary of health lives there | +0.501 | +13.03 | <0.0001 |
| Public staff per 1000 population | –0.595 | –11.58 | <0.0001 |
| Unreliability of office hours of *município* secretariat of health | +0.346 | +7.83 | <0.0001 |
| Acceptability to staff that community health workers are involved in political campaigns | +0.188 | +4.36 | 0.003 |
| Settlement type | +0.150 | +2.67 | 0.032 |
| $R^2 = 0.991$ | | | |
| **Dependent variable: perinatal mortality rate** | | | |
| *Variable* | | | |
| % who had a member of the local health council ask for their opinions | +0.749 | 7.04 | <0.0001 |
| % who know a community health worker | +0.406 | 4.15 | 0.002 |
| % who had heard of local health council | +0.363 | 3.64 | 0.005 |
| % who know that the Family Health Programme exists | –0.267 | –2.55 | 0.029 |
| $R^2 = 0.910$ | | | |

(Table 3, cont.)

| | Standardized coefficient (β) | *t* | *P*-value |
|---|---|---|---|
| **Dependent variable: infant mortality rate** | | | |
| *Variable* | | | |
| Meetings with *município* secretary of health | –0.568 | –5.65 | <0.0001 |
| Staff satisfaction | +0.589 | +5.80 | <0.0001 |
| Prefect practises profession in *município* | +0.411 | +4.04 | 0.002 |
| Public facilities per 1000 population | –0.341 | –3.37 | 0.007 |
| $R^2 = 0.902$ | | | |
| **Dependent variable: % of children younger than two years old growing well** | | | |
| *Variable* | | | |
| Floor made of mud | –1.058 | –11.43 | <0.0001 |
| % who know a member of the local health council | –0.554 | –5.82 | <0.0001 |
| % who know a community health worker | +0.509 | +5.99 | <0.0001 |
| Acceptability to staff that politicians store drugs | +0.727 | +5.78 | <0.0001 |
| Acceptability to staff that community health workers are involved in political campaigns | –0.450 | –3.74 | 0.006 |
| Private facilities per 1000 population | +0.237 | +2.70 | 0.027 |
| $R^2 = 0.951$ | | | |
| **Outputs — preventive care** | | | |
| **Dependent variable: % of infants younger than 11 months old vaccinated** | | | |
| *Variable* | | | |
| Acceptability to staff that politicians store drugs | +0.620 | 2.851 | 0.014 |
| $R^2 = 0.385$ | | | |
| **Dependent variable: % of children younger than two years old weighed** | | | |
| *Variable* | | | |
| Acceptability to staff that politicians store drugs | +0.790 | 19.08 | <0.0001 |
| Staff knowledge of treatment regimens | +0.484 | 8.67 | <0.0001 |
| % who know a member of the local health council | –0.456 | –11.05 | <0.0001 |
| Ratio of public to private facilities | –0.161 | –3.59 | 0.007 |
| Prefect practises profession in the *município* | –0.252 | –5.47 | 0.001 |
| % of women with any education | –0.179 | –2.90 | 0.020 |
| $R^2 = 0.990$ | | | |
| **Outputs — clinical care** | | | |
| **Dependent variable: productivity of basic clinical services per 1000 population** | | | |
| *Variable* | | | |
| Management of financing for basic services | –1.119 | –7.66 | <0.0001 |
| Settlement type | –0.587 | –5.55 | <0.0001 |
| Acceptability to staff of participating in political campaigns | +0.803 | +5.20 | 0.001 |
| % who know that the Family Health Programme exists | +0.312 | +2.92 | 0.017 |
| $R^2 = 0.914$ | | | |
| **Dependent variable: productivity of advanced clinical services per 1000 population** | | | |
| *Variable* | | | |
| Private staff per 1000 population | +0.727 | 4.16 | 0.002 |
| Meetings with *município* secretary of health | +0.427 | 2.45 | 0.032 |
| $R^2 = 0.666$ | | | |
| **Dependent variable: % change in productivity of basic clinical services, 1996–1997** | | | |
| *Variable* | | | |
| Floor made of mud | +0.666 | 4.13 | 0.002 |
| Management of financing for basic clinical services | –0.494 | –3.06 | 0.011 |
| $R^2 = 0.714$ | | | |

(Table 3, cont.)

| | Standardized coefficient (β) | *t* | *P*-value |
|---|---|---|---|
| **Dependent variable: % change in productivity of advanced clinical services, 1996–1997** | | | |
| *Variable* | | | |
| Acceptability to staff of referral to a private clinic | +0.649 | +3.50 | 0.006 |
| % who had heard of the local health council | –0.471 | –2.55 | 0.029 |
| $R^2 = 0.657$ | | | |
| **Utilization and access** | | | |
| **Dependent variable: % attending any health facility** | | | |
| *Variable* | | | |
| Unreliability of the office hours of the *município* secretariat of health | –0.431 | –2.75 | 0.021 |
| Staff satisfaction | –0.900 | –4.80 | 0.001 |
| Public staff per 1000 population | –0.723 | –3.82 | 0.003 |
| Style of decision-making of the *município* secretary of health | –0.457 | –2.48 | 0.032 |
| $R^2 = 0.820$ | | | |
| **Dependent variable: % attending hospital** | | | |
| *Variable* | | | |
| Ratio of public to private facilities | –0.545 | –3.22 | 0.008 |
| % who know that the Family Health Programme exists | –0.447 | –2.64 | 0.023 |
| Floor made of mud | +0.422 | +2.49 | 0.030 |
| $R^2 = 0.685$ | | | |
| **Dependent variable: % who attended facility in this *município*** | | | |
| *Variable* | | | |
| Management of financing for advanced clinical services | 0.850 | 4.98 | <0.0001 |
| House made of mud | 0.494 | 3.47 | 0.005 |
| Average time staff worked in *município* | –0.381 | –2.23 | 0.047 |
| $R^2 = 0.777$ | | | |
| **Dependent variable: % attending nearest facility** | | | |
| *Variable* | | | |
| % who had heard of local health council | 0.603 | 2.73 | 0.017 |
| $R^2 = 0.364$ | | | |
| **Dependent variable: % who had a problem that required health care** | | | |
| *Variable* | | | |
| *Município* secretary of health consults others | +0.650 | 4.15 | 0.002 |
| *Município* secretary of health lives there | –0.580 | –3.79 | 0.003 |
| Whom staff consider makes local health council decisions in reality | –0.407 | –2.59 | 0.025 |
| $R^2 = 0.745$ | | | |