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# Quality of Care in Investor-Owned vs Not-for-Profit HMOs

David U. Himmelstein, MD

Steffie Woolhandler, MD, MPH

Ida Hellander, MD

Sidney M. Wolfe, MD

**H**EALTH MAINTENANCE ORGANIZATIONS (HMOs) have been both derided and defended. Studies comparing HMOs with fee-for-service care have generally found similar outcomes for the average, healthy enrollee. However most,<sup>1-8</sup> but not all,<sup>9,10</sup> studies have found worse outcomes in managed care for vulnerable groups (ie, the seriously ill, the mentally ill, and the poor). Both patients and physicians are less satisfied with care delivered through HMOs.<sup>11-16</sup>

Most research on quality of care in HMOs has examined nonprofit group- and staff-model plans. Yet other types of HMOs have accounted for most of the recent increase in enrollment. Between 1985 and 1998 the proportion of HMO members enrolled in investor-owned plans increased from 26% to 62%; between 1980 and 1998 the market share of group- and staff-model plans decreased from 81% to 12%.<sup>17,18</sup>

In investor-owned plans, executives' primary fiduciary duty is to shareholders, who are vitally concerned with profits but unlikely to receive their medical care in the plan. However, a major concern is whether the quest for profit compromises the quality of care.

## METHODS

We analyzed data from the National Committee for Quality Assurance's (NCQA's) Quality Compass 1997 including the Health Plan Employer Data

**Context** The proportion of health maintenance organization (HMO) members enrolled in investor-owned plans has increased sharply, yet little is known about the quality of these plans compared with not-for-profit HMOs.

**Objective** To compare quality-of-care measures for investor-owned and not-for-profit HMOs.

**Design, Setting, and Participants** Analysis of the Health Plan Employer Data and Information Set (HEDIS) Version 3.0 from the National Committee for Quality Assurance's Quality Compass 1997, which included 1996 quality-of-care data for 329 HMO plans (248 investor-owned and 81 not-for-profit), representing 56% of the total HMO enrollment in the United States.

**Main Outcome Measures** Rates for 14 HEDIS quality-of-care indicators.

**Results** Compared with not-for-profit HMOs, investor-owned plans had lower rates for all 14 quality-of-care indicators. Among patients discharged from the hospital after myocardial infarction, 59.2% of members in investor-owned HMOs vs 70.6% in not-for-profit plans received a  $\beta$ -blocker ( $P < .001$ ); 35.1% of patients with diabetes mellitus in investor-owned plans vs 47.9% in not-for-profit plans had annual eye examinations ( $P < .001$ ). Investor-owned plans had lower rates than not-for-profit plans of immunization (63.9% vs 72.3%;  $P < .001$ ), mammography (69.4% vs 75.1%;  $P < .001$ ), Papanicolaou tests (69.2% vs 77.1%;  $P < .001$ ), and psychiatric hospitalization (70.5% vs 77.1%;  $P < .001$ ). Quality scores were highest for staff- and group-model HMOs. In multivariate analyses, investor ownership was consistently associated with lower quality after controlling for model type, geographic region, and the method each HMO used to collect data.

**Conclusions** Investor-owned HMOs deliver lower quality of care than not-for-profit plans.

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and Information Set (HEDIS) (version 3.0) and HMO accreditation surveys.<sup>19</sup> The data reflect plan characteristics and performance for 1996.

HEDIS is a set of standardized quality, utilization, financial, and other indicators designed to allow comparisons of managed care plans. A total of 329 HMOs (248 investor-owned and 81 not-for-profit) in 45 states and the District of Columbia provided at least some HEDIS quality, utilization, and financial measures. Forty-one additional plans that provided data to the NCQA declined to allow release of their data.

The NCQA's HEDIS data set includes information on ownership status (investor-owned or not-for-profit),

model type (group, staff, independent practice association, network, mixed, or other), and region (New England, mid Atlantic, south Atlantic, east north Central, west north Central, south Central, Mountain, or Pacific). If data on HMO ownership in 1996 were missing, we consulted InterStudy's HMO Directory,<sup>20</sup> or telephoned the plan. Firms that owned more than 1 HMO submitted

**Author Affiliations:** Department of Medicine, Center for National Health Program Studies, Cambridge Hospital/Harvard Medical School, Cambridge, Mass (Drs Himmelstein and Woolhandler); Physicians for a National Health Program, Chicago, Ill (Dr Hellander); and Public Citizen Health Research Group, Washington, DC (Dr Wolfe).

**Corresponding Author and Reprints:** David U. Himmelstein, MD, 1493 Cambridge St, Cambridge, MA 02139.

**Table 1.** Characteristics of Health Plans Analyzed and of All US Health Maintenance Organizations\*

|   | Plans Providing NCQA Quality and Administrative Data | All US Health Maintenance Organizations <sup>23</sup> |
|---|--|---|
| Total US health maintenance organization enrollment | 56   | 100   |
| Ownership   |  |   |
| For-profit  | 75.4   | 68.4  |
| Nonprofit   | 24.6   | 25.9  |
| Unknown   | ...  | 5.8   |
| Model type  |  |   |
| Independent practice association                    | 36.8   | 51.1  |
| Network   | 6.7  | 9.5   |
| Group   | 7.3  | 5.5   |
| Staff   | 1.8  | 3.1   |
| Mixed   | 45.9   | 29.7  |
| Other or unknown                                    | 1.5  | 1.2   |
| Location†   |  |   |
| New England   | 8.2  | 6.3   |
| Mid Atlantic  | 17.6   | 12.3  |
| South Atlantic                                      | 23.1   | 19.6  |
| East north Central                                  | 17.3   | 19.0  |
| West north Central                                  | 7.9  | 7.8   |
| South Central                                       | 15.8   | 15.0  |
| Mountain  | 8.5  | 9.9   |
| Pacific   | 9.1  | 9.9   |

\*All values are percentages. The total number of plans in the United States was 781 with 329 providing National Committee for Quality Assurance (NCQA) quality and administrative data. Ellipses indicate data not available.  
 †Several plans operate in more than 1 region.

**Table 2.** Quality-of-Care Indicators: Investor-Owned vs Not-for-Profit Health Maintenance Organizations for 1996

|   | Investor-Owned Rate, % (No. of Plans Submitting Data) | Not-for-Profit Rate, % (No. of Plans Submitting Data) | P Value |
|---|---|---|---------|
| Immunization completion rate for 2-year-olds  |   |   |         |
| Diphtheria pertussis tetanus (4 doses)  | 76.5 (212)  | 82.8 (68)   | <.001   |
| Oral poliovirus (3 doses)   | 83.0 (212)  | 87.4 (68)   | <.002   |
| Mumps measles rubella (1 dose)  | 86.1 (212)  | 90.7 (67)   | <.001   |
| Haemophilus influenzae type B (3 doses)   | 82.4 (212)  | 89.2 (68)   | <.001   |
| Hepatitis B (3 doses)   | 78.8 (208)  | 83.0 (65)   | <.02    |
| All of the above  | 63.9 (207)  | 72.3 (68)   | <.001   |
| Immunization completion rate for 13-year-olds*  | 51.9 (169)  | 59.1 (63)   | <.02    |
| Mammography rate within 2 y for women aged 52-69 y  | 69.4 (229)  | 75.1 (80)   | <.001   |
| Papanicolaou test rate within 3 y for women aged 21-64 y  | 69.2 (230)  | 77.1 (75)   | <.001   |
| First trimester prenatal care rate  | 83.1 (223)  | 88.5 (70)   | <.001   |
| Women receiving postpartum checkup within 42 d of delivery  | 56.9 (192)  | 59.6 (69)   | .25     |
| β-Blocker prescription filled for patients discharged after a myocardial infarction with no evidence of contraindication† | 59.2 (98)   | 70.6 (49)   | <.001   |
| Patients with diabetes who are receiving insulin or oral hypoglycemic agent and who had an eye examination in past year   | 35.1 (224)  | 47.9 (80)   | <.001   |
| Rate of outpatient follow-up within 30 d for patients older than 6 y hospitalized with mental disorder                    | 70.5 (154)  | 77.1 (58)   | <.001   |

\*Includes mumps measles rubella, hepatitis B, tetanus diphtheria, and varicella if not immune.  
 †Contraindication defined as *International Classification of Diseases, 9th Revision* diagnosis of insulin-dependent diabetes mellitus, asthma, heart block greater than first degree, sinus bradycardia, congestive heart failure, left ventricular dysfunction, or chronic obstructive pulmonary disease.

separate data for each plan or line of business (eg, Kaiser Foundation Health Plan Inc operated 13 distinct plans that each reported HEDIS data). Our unit of analysis was the individual plan.

Many HMO firms failed to supply the NCQA with accurate data on total enrollment, Medicaid or Medicare enrollment, patient demographics, or plan age (in some cases the HMO apparently reported data for the entire firm rather than for individual plans or lines of business). Hence, we could not reliably analyze these variables.

We examined all 14 quality-of-care variables included under the NCQA's rubric "Effectiveness of Care" for which data were available. For instances in which data included implausible rates (eg, an immunization rate of 0%), we recoded the value as missing. The NCQA requires HMOs to follow a detailed guide defining each measure and specifying standards for data submission.<sup>21</sup> Plans may collect data to calculate their rates from administrative records (administrative method), or supplement administrative data with chart reviews (hybrid method). The hybrid method, used by more than 90% of plans, usually results in higher reported rates.

For each quality indicator, the administrative method requires that the plan identify the target population: patients continuously enrolled in the HMO for an appropriate period (eg, 1 year for Papanicolaou tests and immunizations, 2 years for mammograms, or 7 days after hospital discharge for β-blocker usage after myocardial infarction) and for whom the particular intervention is clinically appropriate (eg, women aged 52-69 years for mammography). For most indicators, patients whose coverage was interrupted for up to 45 days per year are also included. The HMO then searches administrative records (eg, payment and pharmacy files) for evidence that the intervention occurred. If no evidence of the intervention is found, the HMO may choose to search for exclusions (eg, a history of bilateral mastectomy would exclude the need for mammography). The reported rate is the number of patients receiving

the intervention divided by the number eligible and without exclusions.

For the hybrid method, the plan chooses a sample of eligible patients from among the target population identified as in the administrative method. For most measures, a minimum sample size of 411 patients (after all exclusions) is required. For plans that have previously documented high rates for a particular intervention, somewhat smaller sample sizes are allowed (because for any given sample size the SE of the percentage becomes smaller when rates rise above 50%). For instance, the hybrid method requires a minimum sample size of 313 for a plan that had previously documented a Papanicolaou test rate of 75%. As in the administrative method, the plan initially searches administrative records for evidence that the intervention occurred or that the patient should be excluded from the measure. If administrative records do not give evidence of the intervention or of an exclusion, the plan reviews patient charts for such evidence and calculates a rate using the administrative method.

We also examined total costs per member per month and the medical loss

ratio, defined as total medical and hospital expenses divided by total revenues from premiums, fee-for-service, Medicare, and Medicaid.

We used *t* tests to evaluate differences in univariate comparisons of rates. We performed multiple linear regressions to analyze the association of ownership status with quality indicators after control for region (8 categories), the method used by the plan to collect data (administrative or hybrid), and HMO model type (6 categories). All analyses used SAS software.<sup>22</sup>

### RESULTS

TABLE 1 compares the characteristics of the 329 plans we analyzed with those of all HMOs in the United States. Compared with plans in the NCQA sample, nonparticipating plans were smaller, newer, more likely to be group or mixed model, and to be located in the east north Central region.<sup>23</sup> Similar proportions of investor-owned and not-for-profit plans submitted quality-of-care data.<sup>23</sup>

In univariate comparisons, investor-owned plans had lower rates for all 14 quality indicators (TABLE 2). The larg-

est differences were in the 2 measurements of the quality of care for patients with serious medical illnesses. Among patients discharged from the hospital after a myocardial infarction (with no concurrent diagnosis contraindicating  $\beta$ -blocker therapy), on average 59.2% of patients in investor-owned HMOs compared with 70.6% of patients in not-for-profit plans filled a prescription for a  $\beta$ -blocker ( $P < .001$ ). Among patients with diabetes receiving insulin or oral hypoglycemic agents, on average 35.1% of those in investor-owned plans vs 47.9% in not-for-profit plans had received an eye examination within the past year ( $P < .001$ ).

Investor-owned plans also had lower rates of all routine preventive services that we evaluated (Table 2). The rate of completion of immunizations for 2-year-olds averaged 63.9% in investor-owned HMOs vs 72.3% in not-for-profit plans ( $P < .001$ ); the proportion of women aged 52 to 69 years who had undergone mammography within the past 2 years averaged 69.4% in investor-owned plans and 75.1% in not-for-profit plans ( $P < .001$ ). Staff- and group-model HMOs had higher scores on virtually all quality-of-care in-

**Table 3.** Quality-of-Care Indicators by Health Maintenance Organization Model Type for 1996\*

|  | Rate, % (No. of Plans Submitting Data) |           |            |           |            |          |
|--|--|-----------|------------|-----------|------------|----------|
|  | Staff                                  | Group     | IPA        | Network   | Mixed      | Other    |
| Immunization completion rate for 2-year-olds   |  |           |            |           |            |          |
| Diphtheria pertussis tetanus (4 doses)   | 93.0 (6)                               | 84.3 (23) | 77.5 (103) | 75.7 (19) | 77.2 (124) | 72.4 (5) |
| Oral poliovirus 3 doses  | 95.3 (6)                               | 89.6 (23) | 83.4 (103) | 80.9 (19) | 83.8 (124) | 77.2 (5) |
| Mumps measles rubella (1 dose)   | 96.0 (6)                               | 89.6 (23) | 87.6 (103) | 84.2 (19) | 86.6 (124) | 85.0 (4) |
| <i>Haemophilus influenzae</i> type B (3 doses)   | 95.3 (6)                               | 87.3 (23) | 84.8 (103) | 82.7 (19) | 82.6 (124) | 80.8 (5) |
| Hepatitis B (3 doses)  | 86.3 (6)                               | 87.2 (23) | 79.7 (103) | 77.9 (16) | 78.8 (120) | 71.2 (5) |
| All of the above   | 81.0 (6)                               | 75.7 (23) | 65.0 (104) | 64.8 (19) | 64.7 (118) | 58.2 (5) |
| Immunization completion rate for 13-year-olds†   | 84.0 (4)                               | 66.5 (22) | 50.8 (82)  | 43.4 (17) | 54.7 (104) | 39.0 (3) |
| Mammography rate within 2 y for women aged 52-69 y   | 82.7 (6)                               | 76.5 (23) | 69.3 (117) | 71.3 (21) | 70.9 (137) | 65.8 (5) |
| Papanicolaou test rate within 3 y for women aged 21-64 y   | 83.7 (6)                               | 76.8 (24) | 70.4 (109) | 72.0 (22) | 70.2 (139) | 66.6 (5) |
| First trimester prenatal care rate   | 93.5 (6)                               | 90.0 (24) | 83.7 (102) | 82.7 (20) | 83.6 (136) | 86.6 (5) |
| Women receiving postpartum checkup within 42 d of delivery   | 67.1 (5)                               | 60.5 (24) | 57.9 (104) | 60.6 (18) | 55.6 (106) | 60.4 (4) |
| $\beta$ -Blocker prescription filled for patients discharged after a myocardial infarction with no evidence of contraindication‡ | 71.1 (2)                               | 75.2 (19) | 62.4 (49)  | 53.5 (12) | 61.6 (63)  | 55.1 (2) |
| Patients with diabetes who are receiving insulin or oral hypoglycemic agent and who had an eye examination in past year          | 62.8 (6)                               | 53.5 (24) | 33.4 (115) | 39.9 (21) | 39.2 (133) | 24.4 (5) |
| Rate of outpatient follow-up within 30 d for patients older than 6 y hospitalized with mental disorder                           | 83.2 (3)                               | 78.8 (21) | 72.1 (81)  | 68.2 (11) | 71.2 (93)  | 73.3 (3) |

\*Percentages are rates. IPA indicates independent practice association.  $P < .01$  for differences between group- and staff-model plans and all other models except for receiving postpartum checkup within 42 days of delivery ( $P = .12$ ).

†Includes mumps measles rubella, hepatitis B, tetanus diphtheria, and varicella if not immune.

‡Contraindication defined as *International Classification of Diseases, 9th Revision* diagnosis of insulin-dependent diabetes mellitus, asthma, heart block greater than first degree, sinus bradycardia, congestive heart failure, left ventricular dysfunction, or chronic obstructive pulmonary disease.

**Table 4.** Multivariate Analysis\* of Association of Investor Ownership With Quality-of-Care Indicators for 1996

|   | Parameter Estimate for Investor Ownership† | P Value |
|---|--|---------|
| Immunization completion rate for 2-year-olds  |  |         |
| Diphtheria pertussis tetanus (4 doses)  | -5.0 (-8.4 to -1.5)                        | .005    |
| Oral polio virus (3 doses)  | -4.3 (-7.4 to -1.2)                        | .007    |
| Mumps measles rubella (1 dose)  | -4.3 (-6.6 to -2.0)                        | <.001   |
| <i>Haemophilus influenzae</i> type B (3 doses)  | -6.2 (-9.1 to -3.3)                        | <.001   |
| Hepatitis B (3 doses)   | -3.3 (-6.9 to 0.3)                         | .07     |
| All of the above  | -5.2 (-9.2 to -1.2)                        | .01     |
| Immunization completion rate for 13-year-olds‡  | -4.5 (-10.3 to 1.2)                        | .12     |
| Mammography rate within 2 y for women aged 52-69 y  | -4.8 (-6.9 to -2.7)                        | <.001   |
| Papanicolaou smear rate within 3 y for women aged 21-64 y   | -6.6 (-9.4 to -3.7)                        | <.001   |
| First trimester prenatal care rate  | -4.5 (-8.0 to -1.0)                        | .01     |
| Women receiving postpartum checkup within 42 d of delivery  | -4.8 (-10.4 to 0.9)                        | .10     |
| β-Blocker prescription filled for patients discharged after a myocardial infarction with no evidence of contraindication§ | -6.5 (-13.2 to 0.1)                        | .06     |
| Patients with diabetes who are receiving insulin or oral hypoglycemic agent and who had an eye examination in past year   | -9.7 (-13.0 to -6.3)                       | <.001   |
| Rate of outpatient follow-up within 30 d for patients older than 6 y hospitalized with mental disorder                    | -5.6 (-10.2 to -0.9)                       | .02     |

\*Analysis controlled for health maintenance organization model type, data reporting method, and geographic region.  
 †Negative value indicates that investor-ownership predicts lower score. Values are expressed as change in rate associated with for-profit ownership (95% confidence interval).  
 ‡Includes mumps measles rubella, hepatitis B, tetanus diphtheria, and varicella if not immune.  
 §Contraindication defined as *International Classification of Diseases, 9th Revision* diagnosis of insulin-dependent diabetes mellitus, asthma, heart block greater than first degree, sinus bradycardia, congestive heart failure, left ventricular dysfunction, or chronic obstructive pulmonary disease.

dicators (TABLE 3). Plans in New England scored better than plans in other regions for most indicators (data not shown).

In multivariate analyses controlling for model type, method of data collection, and region, investor ownership was consistently associated with poorer quality (TABLE 4). For instance, investor ownership was associated with decreases in rates of mammography of 4.8 percentage points and of eye examinations for patients with diabetes of 9.7 percentage points. As expected, plans that used the hybrid method for data collection tended to report higher rates (eg, 1.4% higher for mammography). Staff- and group-model types, as well as a location in New England, continued to predict higher quality for most quality indicators.

Total cost per member, per month averaged \$128.00 in investor-owned plans vs \$127.50 in not-for-profit plans ( $P = .88$ ). The medical loss ratio (percentage of revenues spent on medical and hospital services) averaged 80.6% in investor-owned HMOs vs 86.9% in not-for-profit plans ( $P = .05$ ). Hence, spending on profit and administrative overhead

was about 48% higher in investor-owned plans (19.4% vs 13.1% for not-for-profit plans).

**COMMENT**

Investor-owned HMOs now dominate the managed care market.<sup>24,25</sup> However, our study suggests that these plans are associated with reduced quality of care. Although total costs are similar in investor-owned and not-for-profit plans, the latter spend more on patient care. Group- and staff-model plans that offer better quality are also being eclipsed. The medical market is not rewarding quality and efficiency.

Our findings are consistent with the scant previous reports on the influence of investor ownership on HMO quality. An analysis of 1994 data from 76 HMOs found that investor-owned plans provided less preventive care.<sup>26</sup> Comparisons of HMO quality published in popular magazines have reached similar conclusions.<sup>27,28</sup> Investor-owned Medicare HMOs have higher disenrollment rates<sup>29</sup> and lose more beneficiary appeals than not-for-profit plans.<sup>30</sup> Physi-

cians in Minneapolis rated care at a staff-model plan better than at 2 network model HMOs.<sup>31</sup> A Centers for Disease Control and Prevention analysis of 4 preventive services, using HEDIS data that excluded Medicaid and Medicare recipients, found regional patterns similar to those we report.<sup>32</sup>

Moreover, the differences we observed in this study appear to be clinically significant. For instance, if all 23.7 million American women between ages 50 and 69 years were enrolled in investor-owned, rather than not-for-profit plans, an estimated 5925 additional breast cancer deaths would be expected (based on our finding of a 4.8% difference in screening rates, and previous estimates that biennial screening in this age group would result in 52 fewer breast cancer deaths by age 80 years per 10 000 women screened).<sup>33</sup> Similarly, since β-blockers reduce death rates in myocardial infarction survivors by 23%,<sup>34</sup> their underuse in investor-owned plans suggests that many such patients may die needlessly.

However, the HEDIS quality indicators we analyzed have serious shortcomings.<sup>35</sup> No indicators appraise the outcomes of care. Most focus on relatively inexpensive preventive services and exclude patients who are not continuously enrolled. Few HEDIS measurements address care for seriously ill or chronically ill patients who are financially unattractive to HMOs and at risk for underservice. Medicare HMOs apparently encourage sick patients to disenroll<sup>36</sup> and selectively recruit and enroll healthy individuals.<sup>37-39</sup> Hence, our finding that the 2 quality indicators relevant to patients with serious medical illnesses showed the sharpest differences is particularly disturbing. Moreover, plans may narrowly focus quality improvement efforts on the few services that HEDIS assesses, causing an upward drift of HEDIS scores that may not accurately reflect global quality trends. For instance, HMO administrators may push clinicians to increase mammography rates, but deny them the time needed to perform optimal clinical breast examinations, patient educa-

tion, or other clinical activities that HEDIS does not measure. Hence, the usefulness of HEDIS quality indicators as surrogate measures of the global quality of care may deteriorate over time.

Despite these limitations, the data we analyzed are the best available currently. They encompass plans that account for more than half of the HMO enrollment in the United States. The data were collected and reported in standard formats and have been found accurate in federal audits.<sup>40</sup> Unfortunately, even fewer data may be available in the future. In 1997 (the data that we analyzed, which reflects 1996 figures but was submitted in 1997) only 41 plans that submitted information to the NCQA declined to allow release of their data; in 1998, 155 plans refused data release.

Inaccurate reporting could explain our findings only if not-for-profit plans

consistently inflated their quality measures while investor-owned HMOs did not. We cannot rule out the possibility that systematic differences in market characteristics, patients, physicians, HMO data systems, or other unmeasured confounders could influence our results.

Our findings are worrisome in light of previous research comparing the quality of care in HMO and fee-for-service settings. Most such comparisons examined care in not-for-profit group- and staff-model HMOs, which we found to have higher quality scores than the average plan. Moreover, the best of this research was carried out before market pressures forced non-profit HMOs to increase financial incentives and productivity pressures for physicians, abandon community rating, and implement other measures that

mimic investor-owned plans.<sup>24,25</sup> In these nonprofit, group- and staff-model HMOs of an earlier era, the average healthy patient received similar or slightly more preventive care, but vulnerable patients fared poorly<sup>1,2,4,7</sup> (eg, the risk of dying for sick, poor patients was increased by 21%).<sup>1</sup>

Our findings suggest that the decade-old experiment with market medicine is a failure. The drive for profit is compromising the quality of care, the number of uninsured persons is increasing, those with insurance are increasingly dissatisfied, bureaucracy is proliferating, and costs are again rapidly escalating. We believe national health insurance deserves a second look.<sup>41,42</sup>

**Disclaimer:** Data analyzed in this study were from NCQA's Quality Compass and are published with the permission of the NCQA. The views expressed are those of the authors and not of NCQA.

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