WHAT DOES CANADA PROFIT FROM THE FOR-PROFIT DEBATE IN HEALTH CARE?

Gillian Currie\textsuperscript{1,2}, Cam Donaldson\textsuperscript{2,3} and Mingshan Lu\textsuperscript{1,2}

1. Departments of Economic, University of Calgary
2. Department of Community Health Sciences, University of Calgary
3. School of Population & Health Sciences and Business School, University of Newcastle upon Tyne

Acknowledgments
Gillian Currie is an Assistant Professor and AHFMR Population Health Investigator in the Departments of Economics and Community Health Sciences at the University of Calgary. Cam Donaldson holds the PPP Foundation Professorship of Health Economics at the University of Newcastle upon Tyne. He is also a Professor in the Department of Community Health Sciences at the University of Calgary, where he is a Canadian Institutes of Health Research Senior Investigator and Alberta Heritage Senior Scholar. Mingshan Lu is an Assistant Professor and AHFMR Population Health Investigator in the Departments of Economics and Community Health Sciences at the University of Calgary. All authors are fellows of the Institute of Health Economics, who funded the work presented in the paper. The views expressed are those of the authors, and not the funders. The authors are extremely grateful to Leigh-Ann Topfer of the Institute of Health Economics for conducting the search of the literature that forms the basis of this paper. The authors also thank Eldon Spackman, Barbara Roberts and Jonathon Huston for excellent research assistance. Finally, the authors would like to thank anonymous referees for valuable comments.

Name and address for correspondence:
Dr Gillian Currie
Department of Economics
University of Calgary
2500 University Drive NW
Calgary, Alberta
T2N 4N1

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Abstract

This paper explores the relevance of the literature on for-profit versus not-for-profit hospital care to the Alberta Government’s Health Care Protection Act and to contracting out of health services more generally. Thirty-four studies were identified and most of these found no difference between for-profit and not-for-profit full-service hospitals with respect to relative costs, quality of care or efficiency - a conclusion that is contrary to more selective reviews of the literature on this topic. Further assessment of the content and context of the literature on for-profit and not-for-profit comparisons, leads us to argue that this ‘evidence’ is irrelevant to Canadian health care and, therefore, the debate on contracting out.
Introduction

In November of 1999, the Alberta Government released its policy statement on the delivery of surgical services [1]. In 2000, the legislation process for this policy, Bill 11, was passed into law as the Health Care Protection Act in the Legislative Assembly in Alberta. Similar legislation exists in the provinces of Saskatchewan and Ontario, and more examples of contracting out of insured services to private providers are coming to light across Canada. In 2002, with a variety of inquiries into the Canadian health care system such as the Mazankowski report in Alberta and the Romanow report federally, the issue of private provision of health care services was once again a topic of debate.

Although its premise is supported by bodies such as the World Health Organisation [2]¹, the Alberta legislation has led to considerable debate in Canada about “privatisation of health care”, the “breakdown of Medicare” and the introduction of a “two-tier health care system”. Part of this debate has included the presentation of evidence, from left- and right-wing think tanks, on the effects of ‘similar’ policies elsewhere [3,4]. The conclusions presented in these reviews are conflicting. We are told, on one hand, that the evidence shows that for-profit care instils incentives which encourage provision of quality care at less cost and, one the other hand, that the evidence shows that for-profits are more costly and do not produce care of as high a quality as public hospitals. The conflicting conclusions arise because each is based on selected evidence. Also, the

¹ The WHO claims that, under "New Universalism,….services may be offered by providers of all types". It should be noted that this policy recommendation also includes universal coverage and no user charges! Universal coverage may be for a limited range of services, with the possibility that the remainder are funded through private "prepayment". Of course, this recommendation leaves a lot unsaid, such as how to define what is covered and what is not.
studies quoted have taken place in contexts different to that in Canada. All of these studies are of for-profit versus not-for-profit provision of care in the U.S..

As part of a larger systematic review of the literature on contracting out of surgical services by health authorities, we identified more papers on for-profit versus not-for-profit care than have been reported on in previous documents debating the issue of contracting out to private providers. The aims of this paper, therefore, are to briefly summarise the main results on relative costs, quality of care and efficiency in the literature comparing for-profit versus not-for-profit hospitals that we identified and to discuss in more depth the relevance of this literature to the Canadian health care context.

In the following section, we briefly describe the methods used in our systematic review and present the main results. We then discuss why it is that much of the literature on for-profit versus not-for-profit care is not relevant to the Canadian context. In the final section some concluding comments are offered.

**Search methods and results**

**Search strategy**

The literature reviewed in this paper was obtained from a number of sources. These included: online bibliographic databases; review of reference lists from a number of recent reports on this subject; references cited in papers obtained for the study; publications referred to us by other researchers working in this area, and, papers identified through Internet searches.
Literature searches were run on a number of biomedical, economics and research databases, including: PubMed; MEDLINE; HealthSTAR; BIOETHICSLINE; The Cochrane Library; EMBASE; CINAHL; ABI/INFORM; EconLit; the databases of the National Health Service Centre for Reviews and Dissemination (DARE, HTA and NHS EED); NTIS (National Technical Information Service); and Dissertation Abstracts.

The databases searched, keywords used, and numbers of publications identified by each search are described in the Appendix. Where possible, searches were restricted to studies published from 1980 to date. Search results were reviewed by one, or both, of two of the authors (GC and CD). Only English language publications were selected for review.

As this literature has been thoroughly reviewed in two well-known studies, one by the U.S. Institute of Medicine and the other by the New York Academy of Medicine [6,7], these sources were used to supplement our search.

*Results on for-profit versus not-for-profit comparisons*

We analyzed the 27 articles comparing for-profit versus not-for-profit hospitals which arose in our search [8-34], supplemented by an additional seven articles [35-41] which our search did not pick up but which were included in the 1999 study of the empirical literature comparing for-profit and not-for-profit hospitals by the New York Academy of Medicine [7]. We have divided up the studies into those that deal with cost, quality and
efficiency (see Table 1). In addition, a brief summary of each article is provided in Table 2 in the Appendix.

<table>
<thead>
<tr>
<th>Table 1: Comparison of for-profit versus not-for-profit hospitals</th>
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<tr>
<td><strong>Number of studies</strong></td>
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<tr>
<td><strong>Cost</strong></td>
</tr>
<tr>
<td>Favourable to for-profit</td>
</tr>
<tr>
<td>Unfavourable to for-profit</td>
</tr>
<tr>
<td>No difference/indeterminate results</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

**Cost**

There were 14 studies that investigated cost differences by ownership type [8-21], plus three more [35-37] identified by the New York Academy of Medicine report [7]. Most of these studies used data on a large number of hospitals from across the U.S., or a smaller number of matched hospitals in a more limited geographic area. In all cases an effort was made to control for various other factors which influence costs other than ownership type, such as case-mix, local market conditions, and other hospital specific factors. Most studies found that either there was no difference in hospital costs by ownership, or that for-profit hospitals are more expensive.

However, the result that for-profits are more expensive is difficult to interpret for two main reasons. The first reason relates to the regulatory and competitive environments in
which the studies' hospitals were operating. Most of the studies use data from the time period where hospitals were being paid under cost-based reimbursement, or shortly after the payment mechanism had been switched to the prospective reimbursement. As we explain in more detail below, it is not surprising that, under such a form of reimbursement, for-profits were more costly. Another study showed that, \textit{all else equal}, for-profit hospitals were less costly per admission and per day [16]. However, the study was focussed on the competitiveness of the local hospital market and found that the more competitive the market the more costly the hospital. Thus, ownership was not the main focus of the study and it is not clear that taking the result on ownership out of context of the competitiveness of the local market is meaningful. Another study included in the indeterminate category [37], found no statistically significant differences in for-profit and not-for-profit \textit{chain} hospitals but that not-for-profit \textit{independent} hospitals had lower costs than for-profit \textit{independent} hospitals. This result would complicate the interpretation of studies that considered ownership status, but not chain membership versus independent status.

The second main difficulty in interpreting the results on cost differences is that unobservable quality remains an important issue, despite attempts to control for case-mix and crude attempts to control for quality. Without adequate information on quality, the information on the cost differences can not be meaningfully interpreted. Note also that one study found that not-for-profit hospitals had lower administrative costs [21], but it is unclear that this is a favourable or unfavourable result. For example, higher administrative costs \textit{could} mean better quality of care.
According to Friedman and Shortell [12], who quote heavily from the extensive previous review by the Institute of Medicine [6], literature prior to 1988 suggests that for-profit hospitals are not more cost-efficient and also that prices and markups are generally found to be higher in for-profit hospitals. The 1999 update to the Institute of Medicine report, by the New York Academy of Medicine [7], states that “studies continue to show that markups and costs to purchasers are higher in for-profits than in nonprofit hospitals.” The findings of a 1997 study are “strikingly similar” to earlier studies, namely that the “relative edge in profits in for-profit over not-for-profit hospitals is still due to higher revenues per adjusted admission rather than to more efficient cost management, even though the reimbursement scheme has significantly changed over the years” [18]. As we will argue below, however, there is nothing unusual in this, and it does not necessarily allow any conclusion regarding relative efficiency in either the U.S. or Canadian contexts.

Efficiency

We identified nine studies that dealt with the relative efficiency of not-for-profit versus for-profit hospitals [26-34]. The methodology used in these papers is called cost frontier analysis or data envelopment analysis. A hospital is considered technically efficient if it operates on the ‘best practice frontier’, which is derived via mathematical programming techniques from the hospitals in the sample. A hospital closer to the frontier is more technically efficient than one farther away; that is, it produces the same output at lesser
cost. These studies then examine the extent to which ownership type affects whether the hospital is more likely to be technically efficient.

The most common result of these studies is that no differences in efficiency were detected between for-profit and not-for-profit hospitals (See Table 1). This was the case for five of the studies reviewed [26,27,31-33]. Two studies found that for-profit hospitals are more efficient [28,34]. One of these found that not-for-profits performed worse in terms of "cost, technical and scale" efficiency than for-profit hospitals [38]. However, the authors carefully point out that self-selection is a likely explanation for this result. That is, for-profit hospitals self-select to operate in areas where they are more likely to get a good return on their investment whereas not-for-profit firms choose to operate in less favourable locations pursuing a goal of providing access to care. Thus, this paper might be more properly classified as indeterminate. The other paper was for nuclear medicine services only rather than the whole hospital so it is less comprehensive [34].

Two studies found that not-for-profits were more efficient [29,30]. However, one provides a caveat stating that for-profits may compete by offering higher quality services in which case low efficiency might actually be capturing higher quality. Their result still holds when controlling for some measures of quality, however the concern about unobservable quality differences remains [29].
Quality

There were seven studies that dealt with quality differences between for-profit and not-for-profit firms [8-10,22-25], plus four others [38-41] referenced in the New York Academy of Medicine’s 1999 report [7]. Some used mortality as the measure of quality [9,10, 22-25,38,40], others used a combination of different measures such as ‘scope of services’, accreditations and certifications, education programs offered [8]. Still others used procedure specific measurers like number of adverse events following surgery or ADL (activities of daily living) function improvement following discharge [9,39] or number of vaginal births following cesarean section [41].

That there are so few studies of this very important topic is in part attributable to the difficulties in measuring ‘quality’ in hospital settings. The empirical evidence on quality differences is difficult to interpret because only limited measures of quality were used. Seven of the studies were not able to make a clear conclusion, often because they used several measures of quality in the same study and the implications depended upon which measure was considered [8,9,22] or no difference was detected in the measure considered [10,23,25,39]. The four other studies showed a slight quality difference in favour of not-for-profit hospitals [24,38,39,41]. However, two of them looked at quality in a very limited procedural context [39,41]. Mortality differences can be difficult to interpret, since, as shown in the Kuhn study, the result depends upon the time frame under consideration [22]. The McClellan and Staiger study [24] finds that, on average, for-profit hospitals have higher mortality among elderly patients with heart disease, and that the difference has grown over the 1984-1994 time period. However, they point out that
the differences are associated with the location of for-profit hospitals rather than ownership type per se and that the small average difference in mortality mask enormous variability within ownership types. Overall, they conclude that factors aside from ownership status may be main determinants of quality of care in hospitals [24]. More work needs to be done on this issue, especially given that one of the prime concerns in interpreting the empirical evidence on costs is the extent to which quality differences confound the interpretation any differences found.

**The 'red herring' of for-profit and not-for-profit comparisons**

Why might we question the relevance of much of the above literature to the health care debate in Canada? As an initial point, it should be emphasized that this literature is about full service hospitals and this is a different issue from the type of involvement of private providers that is currently being considered in the Canadian context. To illustrate, some of the above studies have shown for-profit U.S. hospitals to be more costly than not-for-profit hospitals, other things being equal. This was probably the most quoted result in the debate over Bill 11 in Alberta. However, the U.S. context is different. The main objective of for-profit hospitals, of course, is to make profits. This is partly achieved by selling services, the characteristics of which are not necessarily fully accounted for in empirical studies. In a market-orientated environment, such hospitals cannot be criticised for selling a service for which consumers are willing to pay. This is like criticising Rolls Royce or BMW as being inefficient because they sell expensive cars. The fact that many for-profits show higher margins of surplus than not-for-profits would seem to indicate that they are, in some sense, more efficient, even if more costly.
In Alberta, the legislation allows for a public body (regional health authorities) to purchase care from private providers of surgical services. The effect of this may be quite different to the experience of for-profit versus not-for-profit hospitals in the U.S.. A recent review of mortality rates in for-profit versus not-for-profit hospitals did not address this issue [42].

It is also the case that the lessons from this body of literature are limited based on practical issues as well as relevance. Empirical studies attempting to detect differences by ownership type are plagued with difficulties in ensuring comparability of financial data, and in accounting adequately for case-mix, diversity of services offered, degree of competition, regulatory factors and quality.

This leads to three important contextual issues to keep in mind when considering the literature from the U.S.. One is that not-for-profit hospitals have traditionally played an important role in providing access to 'uncompensated care' for those who are uninsured. For-profits are beginning to expand into this area, by offering unused bed capacity at reduced prices. Much of the literature involves comparisons of for-profits and not-for-profits in terms of offering such uncompensated care [7], an issue not relevant to the Canadian context. It is therefore difficult to separate the issue of financing from the provision of health care in examining the U.S. hospital literature. Secondly, many of these studies use data from prior to 1984, when Medicare was using a cost-based reimbursement scheme rather than the prospective payment scheme they have used since.
This was the time of the so-called ‘medical arms race’ when hospitals had no incentive to control costs, as all 'reasonable expenses' were reimbursed. Competition was based on quality, amenities and availability of technology. A rational response by market-oriented for-profit hospitals in such an environment would be to earn higher profits by charging more rather than costing less. Their success in doing this is reflected in the empirical evidence; for-profit hospitals were more costly, but they also had higher profits. These results would be expected, given the context, and they do not really inform us about the likely consequences of contracting out.

Finally, it should be noted that the main focus of the U.S. hospital literature is on whether hospital competition is socially beneficial or wasteful. As a result, the degree of competition is often a key variable in these studies while the comparison of not-for-profit hospitals versus for-profit hospitals is a byproduct.

For example, it has been found that not-for-profit hospitals also engage in behaviour such as cream-skimming the more profitable of the indigent patients, and are no more altruistic than for-profit hospitals [43]. Related work has observed that compared to other not-for-profit hospitals, U.S. not-for-profit hospitals in areas with many for-profit competitors are significantly more responsive to financial incentives [44]. Other recent studies have shown that as HMO penetration in the hospital's market increases, not-for-profit hospitals compensate top executives more according to profitability [45] and that not-for-profit hospitals operating in heavily for-profit markets had very similar rates of "upcoding" Medicare reimbursements as their for-profit competitors [46]. Unlike the argument that
competition will lead to not-for-profit hospitals forcing for-profit hospitals to keep quality high, Cutler and Horwitz pointed out that not-for-profit hospitals are forced by for-profit competitors to adopt payment-maximizing behavior [47]. Frank and Salkever found considerable diversification of U.S. not-for-profit hospitals into profit-generating areas, and that "beyond adding to the general financial health of hospitals, returns from profit-making activities do not seem to be targeted specifically to increased supply of social goods" (p.210) [48]. Schlesinger et al. (1997) found that under limited competition, U.S. not-for-profit psychiatric hospitals provide greater access than for-profit providers in terms of uncompensated care [49]. However, such behavior tends to converge as competitive pressures increase. Indeed, after summarizing related empirical evidences, Sloan, in 2002, concluded that the behavior of for-profit and not-for-profit providers is "far more alike than different" (p.1168)[50].

In summary, access to services, market structure and competition, and payment regimes are crucial contextual factors when interpreting results from the U.S. literature. However, given that the Canadian issues relate to contracting out of publicly funded services to private providers, the relevance of these results to Canada is limited and can distract from meaningful debate about the merits of the type of private provision under consideration in the Canadian context.

Conclusions
One major lesson drawn from the empirical literature comparing for-profit versus not-for-profit hospitals in the U.S. is that this literature is of limited applicability. In short, the
empirical results from comparisons of for-profits and not-for-profits are particular to the regulatory and competitive environment within which the hospitals are operating:

“A growing number of researchers are including various measures of the competitive and regulatory environments in their studies, because it is becoming increasingly apparent that the behaviour of both for-profits and nonprofits – in absolute and comparative terms – is affected by the interaction of ownership form with other factors.”[7]

The issue of relevance aside, the for-profit versus not-for-profit literature is also far from conclusive in terms of suggesting that one ownership form is superior. Overall, the literature contains a few studies which favour for-profit hospitals, some which favour not-for-profits and a majority of studies which suggest that there is no significant difference. This highlights the importance of systematic, rather than selective, reviews of the literature, especially for such a politically charged issue.

Although we argue that it generates little insight for the debate in Canada, one reason the for-profit versus not-for-profit literature is referenced is that there is no published evidence on the specific question of health authorities contracting out surgical services to private providers. The lack of this specific evidence might suggest that a process should be put in place whereby governments explicitly consider proposals for contracting out rather than for it to develop piecemeal and without explicit criteria against which to judge proposals. It is such a process that Alberta’s Health Care Protection Act, formerly known as Bill 11, has put in place. It may be sensible, however, to apply the same process to contracting out in all areas of health care, not just surgical services. Given the lack of
directly relevant evidence in the literature, it will be of interest to learn from the experience of Alberta’s Health Regions.
References


Appendix 1

Database Search Strategies
At the beginning of the project a number of searches were run on PubMed using the “see related articles” feature to search for citations related to key papers. These searches were run using the following references. The numbers in parentheses indicate the numbers of references identified by each search.


**MEDLINE and HealthSTAR**

The same search strategy was run on both MEDLINE and HealthSTAR, using the Internet Grateful Med search engine.

The HealthSTAR search excluded MEDLINE references and was extended back to 1975. (552 references)

The MEDLINE search was restricted to the period 1980 to 2000. (996 references)

hospital-physician joint ventures OR hospitals, private OR hospitals, proprietary OR surgicenters OR ambulatory care facilities OR health facilities, proprietary [Subject]

AND

organization & administration [Subject]

AND
privatization OR ownership

**BIOETHICSLINE (Internet Grateful Med)**

No date limits were applied (the literature covered by this database extends back to 1973). The keywords used are shown below. (106 references)

hospital-physician joint ventures OR hospitals, private OR hospitals, proprietary OR surgicenters OR ambulatory care facilities OR health facilities, proprietary [Subject]

AND

privatization OR ownership [Subject]

**EMBASE (Ovid)**

Our access to this database does not extend beyond 1988, thus, in this case, the search was restricted to studies published from 1988 to date. The keywords used are shown below. (91 references)

exp hospital/ OR exp non profit hospital/ OR exp private hospital/

AND

Profit OR privatisation OR privatization OR ownership OR investor [Title words]

**CINAHL (Ovid)**

The CINAHL search covered the time period 1982 to November, 1999 and used the keywords shown below. (154 references)

exp *organizations, for profit/ OR exp *organizations, nonprofit/ OR exp *private sector/ OR “privatization”.mp.

AND

hospitals OR surgery OR surgical OR services OR hospital costs OR costs OR cost-benefit OR quality OR efficiency OR waiting lists OR satisfaction [Title, Subject Heading, Abstract, Instrumentation]

**EconLit (WebSPIRS SilverPlatter)**

The EconLit search covered the period 1980 to 2000 using the terms shown below. (183 references)

profit or nonprofit or private or privatisation or privatization [Title words]
AND

hospital* OR clinic* OR surgery OR surgical OR health OR medical [Title words]

**Dissertation Abstracts (ProQuest Digital Dissertations)**

No date limits were applied to the search on this database. (131 references)

private OR privatization OR privatisation OR for profit [Title words]

AND

hospitals OR hospital OR health [Title words]

**ABI / Inform and NTIS (DialogWeb)**

These databases were searched simultaneously, along with MEDLINE and HealthSTAR. Only “unique” items from ABI / Inform and NTIS databases were retained in the search results. The search was restricted to the time period 1980 – to date. (145 references)

private OR privatization OR privatisation OR for profit OR nonprofit OR non profit [Title words]

AND

hospitals OR hospital OR surgery OR surgical OR healthcare OR health care OR health service [Title words]

**The Cochrane Library**

A search was also run on The Cochrane Library, using the following terms (with no date restriction):

profit OR private OR privatisation OR privatization

As expected with such a broad search strategy, this retrieved numerous references in various component databases of The Cochrane Library, however, none appeared pertinent to this review.

**NHS Centre for Reviews and Dissemination (CRD) Databases**

- **Database of Reviews of Effectiveness (DARE)**
- **NHS Economic Evaluation Database (NHS EED)**
- **Health Technology Assessment (HTA)**
The three CRD databases above were searched simultaneously using the following terms, without date restriction. (12 references)

private OR privatisation OR privatization OR nonprofit OR profit [Title words]

Internet Searches

A number of searches were run on specific web sites and using two Internet search engines. The individual web sites searched included:

- University of Birmingham, Health Services Management Centre (http://www.bham.ac.uk/HSMC)
- Australian Private Hospitals Association Limited (http://apha.org.au)
- National Bureau of Economic Research (NBER) (http://www.nber.org)
- U.S. Agency for Health Care Policy and Research (http://www.ahcpr.gov)
- RAND (http://www.rand.org)
- National Research Register (http://www.doh.gov.uk/research/nrr.htm)

Internet search engines were also used as follows:

Copernic

Search terms: private hospitals (all words) (86 documents); hospital privatization (all words) (74 documents); waiting lists (all words on The Web – Canada) (44 documents)

Northern Light

Search terms: “private hospitals” or “privatization of hospitals” (restricted to English language documents, from 1980 to date) (42 items)
Appendix 2

Table with summaries for references in literature review
<table>
<thead>
<tr>
<th>Ref #</th>
<th>Author</th>
<th>Setting</th>
<th>Measure</th>
<th>Methods</th>
<th>Results</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Arrington and Haddock (1990)</td>
<td>1982 AHA Annual Survey of Hospitals. 1982 Multihospital System Parent Corporation data set. Federal Register for labour rates.</td>
<td>Cost: average cost/patient day. Quality of care: additive index of accreditations and certificates.</td>
<td>Discriminant analysis.</td>
<td>Hospitals with higher average cost per patient day were found to more likely be for-profit hospitals. Average length of stay was also shorter in for-profits. Accredited hospitals were also more likely to be for-profit, suggesting to the authors for-profit hospitals provide a higher quality of care. Not-for-profits have more employees per bed.</td>
<td>Hospitals offering services considered to be community responsive were more likely to be not-for-profit. Hospitals with higher number of emergency room visits were more likely to be not-for-profit. Higher employee per bed ratio could be interpreted as an indicator of higher quality care.</td>
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<td>9</td>
<td>Sloan et al., (1998) Sample from the National Long-term Care Survey (2674 patients, 65 years or older, admitted for hip fracture, stroke, coronary heart disease, or cognitive heart failure in 1984.) Hospital characteristics were identified using the AHA (1,378 hospitals across the U.S.)</td>
<td>Cost measured as Medicare payments over various time frames post admission. Quality of care: mortality, hospital readmissions, living in the community afterwards, limitation in activities of daily living (ADL) or in instrumental activities of daily living (IADL), cognitive status, and .</td>
<td>OLS for payment analysis. Hazard models for mortality and re-admission. Logit or ordered logit for rest.</td>
<td>No statistically significant difference in Medicare payments between for-profit and non-profit during the first 6 months. Mortality rates, re-admissions to hospital and probability of living in the community not significantly different. Patients from nonprofit hospitals more likely to report an IADL limitation at the next interview, but no difference in ADL or cognitive status.</td>
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<td>10</td>
<td>Sloan et al., (1999) Same as above</td>
<td>As above plus measures of treatment intensity (procedures following coronary heart disease, rehabilitation following stroke or hip fracture).</td>
<td>For payment analysis, put beneficiaries into spending quintiles then used ordered logit analysis. Logistic regression or hazard model for other analyses.</td>
<td>Spending similar for-for-profit versus non-profit hospitals. No differences in intensity of treatment, readmissions or mortality.</td>
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<tr>
<td>11</td>
<td>Becker and Sloan</td>
<td>1979 American</td>
<td>Cost is measured as</td>
<td>Regression analysis</td>
<td>Independent proprietary hospitals</td>
<td>For profit hospitals have a</td>
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<td>Year</td>
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<td>1985</td>
<td>Hospital Association (AHA) surveys: 1. Reimbursement Survey – hospital revenue and prices by payer for 2,231 U.S. community hospitals 2. Annual Survey of Hospitals- costs, outputs and facilities and services.</td>
<td>total hospital cost per adjusted patient day and per adjusted admission. Adjustments express outpatient visits in terms of inpatient day equivalents. Profits measures: the ratio of the hospital’s patient revenue to total cost and total (patient and non-patient) revenue to total cost. With the four cost or profit measures as dependent variables and ownership variables as independent variables. Also repeated regressions with control variables for teaching status, case-mix, source of revenue, hospital size and geographical variables.</td>
<td>are more expensive in terms of cost per adjusted patient day than independent nonprofit but less costly than nonprofit using cost per adjusted admission. Cost differences are negligible once factors other than ownership are held constant. No difference in profitability measures.</td>
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<td>1988</td>
<td>Friedman and Shortell (1988)</td>
<td>300 hospitals in 45 states, 1983-1985. All owned or leased members of three investor-owned and 5 not-for-profit corporations – not a representative sample. Data collected by request to these 8 systems. Cost measured as cost per adjusted admission. Information on diversified health services (i.e. ambulatory surgery centres or geriatric day care). An index of structure/process indicators of quality. Case-mix and facility characteristics. Ordinary least squares regression. Included control variables accounting for quality, case-mix, facility age, scope of services, management, competition, demographics and others.</td>
<td>The independent effect of investor ownership was not significant.</td>
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<td>1981</td>
<td>Levin et al, (1981)</td>
<td>Selected matched pairs of 53 investor owned (IO), and 53 not for profit (NP) hospitals from Florida, Texas, and California. Matching criteria based on size, location, services offered. Data from 1978 Variety of measures: Gross inpatient charges (which is what private insurers would pay), medicare payments, net patient service revenue, inpatient cost components, ancillary department costs, general service costs, markup ratios, net income, and use Hypothesis tests of difference in each measure by for profit and not for profit hospitals.</td>
<td>No significant differences in total patient care cost per day or per admission.</td>
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<td>Year</td>
<td>Authors</td>
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<td>Cost Comparison</td>
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<td>14</td>
<td>Pattison and Katz (1983)</td>
<td>Medicare Cost Reports.</td>
<td>Data provided by the California Health Facilities Commission (CHFC) on urban and suburban hospitals offering services of low to moderate complexity. Fiscal year July 1979 through June 1980</td>
<td>Cost measured in cost per patient day, and cost per admission.</td>
<td>Present descriptive data only, no hypothesis testing since they data base includes entire population of California hospitals.</td>
<td>Cost per patient-day is higher in for profit hospitals. Costs per admission depend on whether the private hospital is a member of a chain or an independent. From lowest to highest: independent for profit, not for profit and then chain profit hospitals. Costs and charges are higher in for-profit hospitals than for not-for-profit hospitals.</td>
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<td>15</td>
<td>Renn et al (1985)</td>
<td>561 U.S. short-term general community hospitals. 1980 AHA data.</td>
<td>All hospitals were Medicare certified, with average length of stay from 3 to 13 days. Federal, state and specialty hospitals were excluded.</td>
<td>Cost measured in three ways: total patient care expenses per adjusted admission, general and administrative costs per adjusted admission, and home office costs per adjusted admission.</td>
<td>OLS multiple regression used to quantify the effect of ownership and system affiliation on each of the dependent performance measures.</td>
<td>No significant differences in total patient care expenses per adjusted admission.</td>
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<td>16</td>
<td>Robinson and Luft (1985)</td>
<td>5013 U.S. community hospitals in 1972 Annual Survey of the AHA. Local area data from Area Resource file. Case-mix data from Commission on Professional and Hospital Activities (CPHA) on a subset of 1084 hospitals.</td>
<td>The measures of cost are average cost per patient and cost per patient day.</td>
<td>OLS of cost measures on ownership variables and controlling for hospital and local area characteristics, and case-mix.</td>
<td>Private hospitals have lower average cost per admission as well as average cost per patient day, compared to non-profit hospitals. The CPHA subset provides similar results both when using the case mix data and when not.</td>
<td>Hospitals in more competitive local markets have higher costs, controlling for case-mix leading authors to speculate that competition leads not to price-competition but to increased technological intensity.</td>
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<td>17</td>
<td>Robinson and Luft (1988)</td>
<td>5490 hospitals in the U.S. from the AHA 1982 and 1986</td>
<td>The measure used is the rate of change in average costs per OLS used to estimate the effect of local market</td>
<td>Non-profit hospitals had the lowest rate of cost inflation.</td>
<td>Hospitals in more competitive local markets experienced significantly higher costs than did</td>
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Annual Survey of Hospitals.
This included 43 “control states”; California as a market oriented sample, and four states representing all-payer rate regulation. Focus was to investigate effectiveness of regulatory and market-oriented cost-control policies on cost inflation.

All short-term, acute care, medical/surgical, for-profit and not-for-profit hospitals in Virginia are included (total 83 hospitals, 70 not for profit and 13 for profit).
Used five cost measures:
1. Total cost per admission (total operating expenses divided by casemix adjusted admissions).
2. Total cost less taxes per admission which is total operating expenses minus taxes paid all divided by the casemix adjusted admissions.
3. Labor cost divided by casemix adjusted admissions.
4. Non Labor costs divided by the casemix adjusted admissions.
5. Capital costs per casemix adjusted admission
Analysis of variance looked at the extent of the differences between the two groups on cost measures.
A multivariate regression model was also run for each performance indicator, including controls for profits, revenues, efficiency and productivity and community support provided. Contextual variables were size, location, system affiliation and payer mix.
All cost indicators except for labor are significantly higher for for-profit than for not-for-profit hospitals.

19 Sloan and Vraciu (1983) 1980 Financial data from Florida State Hospital cost containment board for net operating funds, defined as operating revenues (net of
Regression analysis investigating effect on cost measure of independent variables
Net-operating funds per adjusted patient day are higher in the investor-owned for-profit hospitals than in not-for-profit hospitals.

hospitals in less competitive markets. This effect became less pronounced in 1986 than in 1982.
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<td>20</td>
<td>Watt <em>et al</em> (1986)</td>
<td>80 matched pairs of general hospitals from eight states. 1978 and 1980 AHA data used for matching. Financial data from Medicare cost reports. Used Medicare case mix indices.</td>
<td>Cost measures: total cost per admission with and without controlling for case mix, total cost per day with and without case mix adjustment. Also, general service cost, in total and broken into the following areas: Administration, depreciation, plant operation and other overhead were used.</td>
<td>Hypothesis testing of differences in means of various measures of performance.</td>
<td>No significant differences in case-mix adjusted cost per case. Administrative overhead costs higher in for-profits. Total case-mix adjusted charges are higher in for-profit hospitals. For-profits hospitals are more profitable.</td>
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<td>21</td>
<td>Woolhandler and Himmelstein (1997)</td>
<td>Medicare cost reports on almost all U.S. hospitals 1990 and 1994, and Medicare Minimum Data set for information on hospital ownership, hospital type, number of beds, revenues, and income.</td>
<td>Cost data from medicare cost reports classified into administrative, clinical, mixed or other. Costs in the mixed admin and clinical category were allocated assuming proportion of costs in mixed category attributable to admin was same as share of overall costs attributable to admin. Tested sensitivity to method by assuming none of these costs attributable to admin. Inpatient costs at</td>
<td>Linear multivariate analysis to look at effect of hospital ownership on administrative costs, controlling for hospital type, census region, hospital size, and proportion of revenues derived from outpatient services.</td>
<td>In 1994, Administrative costs accounted for 34% of total costs in for profit hospitals, 24.5% in private not for profit, and 23% in public hospitals. For profit hospitals had higher adjusted costs per discharge than did public hospitals due mainly to higher administrative costs.</td>
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<td>22</td>
<td>Kuhn et al, (1994)</td>
<td>3,782 general medical surgical acute care U.S. hospitals. Mortality rates from HCFA. Hospital characteristics from the AHA’s 1988 annual survey of hospitals.</td>
<td>Quality measure: modification of the risk-adjusted mortality rate computed by the HCFA. Examined relationship between hospital type and both short- and long-term mortality rates using analysis of covariance, weighting each hospital for the number of Medicare patients at the hospital. Independent variables were hospital type alone or hospital type and community size. Additional covariates related to the hospital’s risk of mortality were predicted hospital mortality rate, proportion of patients reimbursed by Medicaid and proportion of patients with an emergency department visit.</td>
<td>Results depend on which mortality measure is considered. For-profit hospitals had the lowest post-30-day mortality rate, but had a higher 30-day mortality rate than not-for-profits. Authors argue that the 30-day mortality rate should depend on quality of care more strongly than the post 30-day mortality which would be more dependent on patient risk.</td>
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<td>23</td>
<td>Keeler et al (1992)</td>
<td>14,008 elderly patients with one of five diseases (congestive heart failure, acute myocardial infarction, pneumonia, stroke or hip fracture).</td>
<td>Mortality rate (adjusted for sickness at admission). Explicit clinical criteria and implicit review of medical records. The unadjusted association between hospital characteristics and measures of quality were tested by F tests.</td>
<td>Nonprofit and for-profit hospitals provide similar quality.</td>
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Patients were randomly selected from 297 hospitals in 5 states in two time periods (1981-82 and 1985-86). This information was used to determine how quality of care varies by hospital characteristics. Hospital average values for measures were obtained by averaging patients within a disease and by averaging the five disease measures.

| 24 | McClellan and Staiger (1997) | Data on over 200,000 elderly Medicare beneficiaries who had heart attacks, and over 350,000 hospitalized with ischemic heart disease between 1984 and 94. 3991 hospitals in the USA treated 92% of these patients. AHA data (1985, 1991, 1994) on hospital ownership status. | Quality measures: risk-adjusted mortality and cardiac complications requiring re-hospitalization. Risk adjusted mortality rates for each year, each diagnosis, and each hospital constructed as estimated hospital specific intercepts from a patient level regression that estimates average all cause mortality rates with fully interacted controls for age, gender, race, and rural location. Regression analysis using a special method to filter out estimation error in raw data. | For profit hospitals have higher mortality than do not for profits. Between 1985 and 1994 differences in mortality increased amongst for profit and not for profit hospitals. “Average” differences in mortality across types of hospitals (i.e. for-profit and not-for-profit) account for only a small share of the variation in outcomes across hospitals and masks an enormous variation in quality within the groups. The authors suggest more extensive market-level analysis is needed to provide insights. |

<p>| 25 | Shortell and Hughes (1988) | Medicare data for 214,839 patients with a group of 16 clinical conditions who received care in 981 different hospitals in 45 states between July 1, 1983 and June 30, 1984. | Quality measure: 30-day mortality rates. Hierarchical OLS with natural log transformation of the mortality rate variable. Looked at effect of ownership, competition and regulatory environment with controls for case-mix. Findings for the | There were no significant differences in mortality rates among hospitals of different ownership. There were relationships between mortality and measures of competition (HMO enrollment) and regulatory environment (more regulation and more competitive environments associated with higher mortality rates), and authors suggest quality assurance controls to monitor outcomes needed when designing programs to contain costs and/or promote competition. |</p>
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<th>Bruning and Register (1989)</th>
<th>AHA’s 1985 hospital survey data on 1254 full service U.S. hospitals.</th>
<th>The measure of efficiency is an Index of Technical Efficiency (ITE) constructed using linear programming techniques which measures a hospital’s deviation from the best practice hospital performance in combining inputs to produce outputs (“frontier analysis”).</th>
<th>OLS estimation of the efficiency measure against independent variables on ownership type, hospital size measures, case-mix measures, and regional dummies.</th>
<th>Not-for-profit and for-profit hospitals are equally efficient, controlling for size factors, case mix and regional differences,</th>
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<td>Burgess and Wilson (1995)</td>
<td>All U.S. hospitals from 1985 through 1988. Data sources: various Veteran Affairs (VA) data sources, the Annual Survey of Hospitals by the AHA and Medicare cost reports.</td>
<td>The measures of efficiency used were Malmquist Indices, decomposed into two parts to show changes in efficiency as well as for technical change. The methodology applied was to estimate input and output efficiency for hospitals using distance function estimators.</td>
<td>Looked at changes in productivity over time by ownership type.</td>
<td>From the average input and output distance functions, the following results can be derived. Input Side: For profit hospitals perform closer to the efficient level than not-for-profit hospitals for all years of the sample Output Side: For profit hospitals appear to be more efficient for 1985-1986, but less efficient than private not-for-profit hospitals during those 86-87 and 87-88same final years. Further analysis of the indices of technical and efficiency change show that for profit hospitals showed an overall decrease in efficiency over the time period of the study, whereas not-for profit hospitals showed improvement in efficiency over the time period.</td>
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<td>28</td>
<td>Ferrier and Valdmanis (1996)</td>
<td>360 rural hospitals in the West South Central United States.</td>
<td>The measure of efficiency is a score calculated by the ratio of the untransformed variable and logistic transformation were the same as for the natural logtransformation.</td>
<td>OLS of the measure of efficiency against independent variables: quality Private for profit hospitals are more efficient than not-for-profits. Also, for profit hospitals are found</td>
<td>The authors note, “not all inefficiency is necessarily undesirable. For example, some of the technical inefficiency is</td>
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<td>Koop et al, (1997)</td>
<td>Panel data from 382 non-teaching hospitals over the time period ranging from 1987 to 1991.</td>
<td>The measure of cost efficiency for this study is an efficiency index derived from a stochastic efficiency frontier model in four Bayesian settings. Two are fixed effects models, and the other two are random effects models. Cost function estimated using multiple controls (number of cases, number of inpatient days and number of beds, number of outpatient visits, case mix index, wage index, capital stock, time trend, dummy variables for non profit and for profit hospitals, and a dummy variable representing the staffing intensity, clinical workers to average daily census.</td>
<td>The key finding from this study is that for-profit ownership decreases hospital efficiency in each Bayesian setting. The authors discuss the finding that for-profit hospitals display a lower level of efficiency and conjecture that for-profits compete via quality aspects of health care provision, creating the potential for low efficiency to mask higher quality. However they reject the hypothesis that this quality is provided through clinical personnel.</td>
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<td>Ozcan et al (1992)</td>
<td>1987 AHA annual survey. Data on 3000 acute care general hospitals across the U.S.</td>
<td>Computed technical efficiency scores while controlling for specific markets in which hospitals were located. Scores computed using linear programming to search for optimal combinations of inputs and outputs. Comparisons of efficiency scores across ownership type within region and market size categories using t-tests.</td>
<td>More non-profits were classified as efficient or than for-profits (43% vs 27%). In addition, more for-profits are classified as highly inefficient (35% compared to 22%).</td>
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<td>31</td>
<td>Register and Bruning (1987)</td>
<td>457 full-service U.S. 100-250 bed size hospitals in large urban areas from AHA 1984 survey of hospitals (1983 data). Also, for the matching procedure, data from the Oklahoma Health Planning Commission’s 1981 survey of hospitals was used.</td>
<td>The measure of efficiency used in this study is an index of technical efficiency constructed using linear programming techniques. A matching procedure was used control for case mix heterogeneity to identify the characteristics of hospitals that could serve as proxies of casemix. Regression analysis with the efficiency index as the dependent variable. Independent variables include ownership dummies, the four firm concentration ratio for each SMSA, a hospital size variable and two interaction terms to capture relations between number of beds and the for-profit and government dummy variables.</td>
<td>No significant relationship between degree of efficiency and ownership was found.</td>
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<td>Register et al, (1985)</td>
<td>Data from Oklahoma Health Planning Commission’s annual hospital survey on 120 short-term, acute care Oklahoma hospitals in 1978 and 1981.</td>
<td>The authors test four hypotheses on differences between for-profit and not-for-profit hospitals that relate to (1) case-mix, (2) mix of labor inputs (3) production relationship (4) efficiency. Finally this third prediction is extended to indicate that for-profit hospitals should be found to be more efficient than not-for-profit hospitals. The Multivariate Analysis of Variance (MANOVA) Analysis was used to test whether the case-mix and labour skill mix between for-profit and not-for-profit hospitals is the same. A translog production function was estimated with hypothesis testing on whether the coefficients on the inputs interacted with for-profit dummies were significant. If the productive relationship differed</td>
<td>The results of the MANOVAs indicated that the two hospital types treated the same case mix, and employed the same mix of employees. Furthermore, the regression results and specification tests indicates that the two firm types produced under the same productive conditions. Since the two types of hospitals don’t operate under different productive conditions, one type can’t be more efficient, and the fourth hypothesis deemed redundant.</td>
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<td>Wilson and Jadlow (1982)</td>
<td>Data on 922 short-term general hospitals that have nuclear medicine.</td>
<td>The measure of technical efficiency is derived using linear programming methods to estimate a nuclear medicine production frontier (using the Cobb-Douglas specification). A regression is then run using the “efficiency divergence index”, as the dependent variable. The independent variables include a competition index, and ownership type dummy variables.</td>
<td>The results show that, in the production of nuclear medicine services, for-profit hospitals display less divergence from efficient production than other types.</td>
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<td>Cleverly (1992)</td>
<td>Medicare cost reports 1986-1989. Data on for-profit and not-for-profit hospitals that are part of hospital systems and those that are not – 5722 hospitals in total, covering almost all U.S. hospitals.</td>
<td>Cost per discharge in total and broken down into overhead and capital costs. Case mix adjusted. Comparisons of median values of measures of interest.</td>
<td>For-profits system hospitals had higher costs than not-for-profit system hospitals. System affiliated hospitals had higher costs than non-system hospitals. Much of the cost difference is driven by differences in overhead and capital costs. Cost differences could be driven by geographical factors, severity differences or inadequate case-mix adjustment.</td>
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<td>Herzlinger and Krasker (1987)</td>
<td>1977 and 1981 data obtained from 14 major U.S. hospital chains. Of these 6 were for-profit which accounted for 90% of all the</td>
<td>Overall performance was measured by comparing the returns on invested capital to their costs. Returns on invested capital were</td>
<td>Nonprofit hospital chains earn less than for-profits, in part because of their higher operating costs. The authors found that for-profits have 8% lower operating costs, due to economies of scale. For-profit hospital chains do not earn higher returns because they charge higher prices. For-profits are slightly more accessible to patients with no or low health insurance and no difference in accessibility was found for the affluent. For profits make better</td>
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<td>Menke (1997)</td>
<td>Data on 2200 non-federal, general medical/surgical hospitals from AHA’s 1990 Annual Survey.</td>
<td>The cost measure is total costs, including the cost of capital.</td>
<td>Separate cost functions were estimated for chain and independent hospitals. Hybrid translog cost functions included measures of outputs, input prices, and hospital and area characteristics. A two-stage estimation method accounted for the simultaneous determination of costs and chain membership, and for any nonrandom selection of hospitals into chains.</td>
<td>Among independent hospitals, for-profits had the highest costs. There were no statistically significant differences in costs by ownership among chain members.</td>
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<td>Hartz et al (1989)</td>
<td>1986 data from 3100 general medical surgical hospitals across the U.S. for adult patients. HCFA hospital mortality data. Hospital characteristics from AHA’s 1986 annual</td>
<td>Quality measured using an adjusted 30-day mortality rate. This rate takes into account the number of Medicare admissions to the hospital and the expected mortality rate for the hospital</td>
<td>Weighted least-squares regression was used to test associations between hospital characteristics and the adjusted mortality rate, with control variables for other indicators of severity of illness. Higher adjusted mortality rates were associated with private for-profit hospitals than private nonprofit hospitals. Before adjustment for severity of illness, for-profit hospitals did not differ from other hospitals because they treated less severely ill patients.</td>
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<td>Kovner and Gergen (1988)</td>
<td>Survey of hospitals (based on the HCFA logistic analysis).</td>
<td>Measures of quality used were measures of specific adverse events following surgery.</td>
<td>Regression analysis of rates of four adverse events on predictor variables including RN staffing levels, hospital size, ownership types, regional dummies, teaching status, network and HMO affiliation.</td>
<td>Not-for-profit hospitals had lower rates of postoperative pneumonia, pulmonary compromise and urinary tract infection following surgery than for-profits. There was no significant difference in thrombosis.</td>
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<td>Lanska and Kryscio (1998)</td>
<td>Data on mortality following 18,510 carotid endarterectomies performed in 17 U.S. States collected from the Healthcare Cost and Utilization Project were analyzed for the year 1993.</td>
<td>Quality measure is in-hospital mortality following the procedure.</td>
<td>A multivariate logistic regression model of predictors of the log odds of dying including ownership variables.</td>
<td>Hospital ownership was not a significant predictor of mortality following this procedure.</td>
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<td>Stafford (1991)</td>
<td>1986 Data for 461,066 California hospital births of which 45,425 were to women with previous cesarean sections.</td>
<td>Quality is measured as the odds of having a vaginal birth after a cesarean section (VBAC).</td>
<td>Multiple logistic regressions quantified the independent effects of the nonclinical variables and adjusted for the potentially confounding clinical factors.</td>
<td>Hospital ownership had the greatest independent effect on the likelihood of a VBAC, based on this variable’s predictive ability within the regression model. For-profit hospitals had the highest repeat cesarean section rates and therefore the lowest quality of care.</td>
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