

*Flex Monitoring Team Briefing Paper No. 7*

# **Financial Indicators for Critical Access Hospitals**

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**Flex  
Monitoring  
Team** | University of Minnesota  
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**The Flex Monitoring Team** is a consortium of the Rural Health Research Centers located at the Universities of Minnesota, North Carolina at Chapel Hill, and Southern Maine. Under contract with the federal Office of Rural Health Policy (PHS Grant No. U27RH01080), the Flex Monitoring Team is cooperatively conducting a performance monitoring project for the Medicare Rural Hospital Flexibility Program (Flex Program). The monitoring project is assessing the impact of the Flex Program on rural hospitals and communities and the role of states in achieving overall program objectives, including improving access to and the quality of health care services; improving the financial performance of Critical Access Hospitals; and engaging rural communities in health care system development.

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## EXECUTIVE SUMMARY

The purpose of this project was to develop and disseminate comparative financial indicators specifically for Critical Access Hospitals (CAHs) using Medicare Cost Report (Healthcare Report Information System) data. A Technical Advisory Group of individuals with extensive experience in rural hospital finance and operations provided advice to a research team from the University of North Carolina at Chapel Hill. A literature review identified 114 financial ratios that have proven useful for assessing financial condition. Twenty indicators deemed appropriate for assessment of CAH financial condition were chosen. In September 2004, the CEOs of 853 CAHs were mailed a *CAH Financial Indicators Report*© (the *Report*) that included values specifically for their CAH and national median values. State-level reports were sent to State Flex Coordinators.

Results showed that over the six years since 1998, CAHs generally became more profitable and increased utilization of beds. However, while on average CAHs with long-term care became more liquid and reduced their use of debt over time, those without long-term care became less liquid and increased their use of debt. In the most recent year for which we have data (2003), CAHs without long-term care generally were more profitable, were more liquid, had less debt, and had higher utilization of beds in comparison to CAHs with long-term care.

An evaluation form queried respondents regarding the overall usefulness of the *Report* and of individual indicators. Among 180 respondents, 82 percent rated the report as either very useful or useful. Net days revenue in accounts receivable, FTEs per adjusted occupied bed, and total margin were rated most useful by the greatest number of respondents. Every indicator in the *Report* was rated most useful by a substantial number of respondents and least useful by only a few respondents.

The *CAH Financial Indicators Report*© represents a genuine collaboration between a university-based research team and practitioners with experience and expertise in the financial management of CAHs. Together, both parties worked to produce financial indicators that CAH boards and management can use to improve the financial management of their organizations.

The *Report* has several limitations, including use of historical data that may not be predictive of future results, variations in CAH service mix may influence indicator values, no consensus about good performance, and data quality concerns. For example, some hospitals reported zero total patient charges, negative patient deductions, negative current assets, and zero age of plant. From a theoretical standpoint, these numbers were highly unlikely or impossible and reaffirmed a research objective held by the research team since the beginning of the project – to improve the quality of data included in Medicare Cost Reports.

Despite the described limitations, the consensus of the TAG, coupled with feedback from administrators, support the *Report* as a reasonable and appropriate mechanism for portraying the financial performance of CAHs. In the summer of 2005, administrators will receive a 2005 *CAH Financial Indicators Report*© with data specific for their CAH, and an evaluation form. State Flex coordinators will receive a Report for each CAH in their state. In addition to the content included in the 2004 report, there will be more discussion of results, state medians over time, additional data displays, and median data for four peer groups: CAHs with and without long-term care (as before), total revenue greater than and less than \$10 million, government and non-government ownership, and with and without a provider based rural health clinic. The addition of another year of cost report data will provide a longer comparison period and will also result in post-conversion data for a larger number of hospitals.

## **INTRODUCTION**

Financial statement analysis is important to boards, managers, payers, lenders, and others who make judgments about the financial health of organizations. One widely accepted method of assessing financial statements is ratio analysis, which uses data from the balance sheet and income statement to produce values that have easily interpreted financial meaning. Most hospitals, health systems and other healthcare organizations routinely evaluate their financial condition by calculating various ratios and comparing the values to those for previous periods, looking for differences that could indicate a meaningful change in financial condition. Many healthcare organizations also compare their own ratio values to those for similar organizations, looking for differences that could indicate weaknesses or opportunities for improvement.

Comparisons with other organizations are only as useful as the degree to which the organizations are similar. Contrasting the financial position of a Critical Access Hospital (CAH) with that of a major teaching hospital is not informative because the two hospitals have vastly different missions. Therefore, one key element in financial statement analysis is the collection of financial data for similar hospitals. Such data for hospitals are available from commercial suppliers (e.g., Moody's, Standard & Poor's, Solucient, Data Advantage Corporation, Ingenix, and FITCH), and industry trade groups (example.g., the American Hospital Association and the Healthcare Financial Management Association). Each of these data suppliers produces comparative data, but there are minor and sometimes major differences among them due to different samples of hospitals used to calculate the ratios and different definitions and accounts included in the ratio numerators and denominators. If a hospital compares its ratios either to those for a group that includes dissimilar hospitals or to those that do not use the same definitions, erroneous interpretations and conclusions could result.

For CAHs, differences between groups of hospitals are particularly important. Much of the comparative data for all hospitals is grouped by size and type of facility, with CAHs typically included in a category such as “less than 50 beds”. Within such a category there would be substantial hospital variation in revenues, volumes, fixed costs, ownership, patient mix, technology, system affiliation, long-term care service, and other factors. Perhaps most important, the category of “less than 50 beds” would include both hospitals that have Medicare Prospective Payment System reimbursement and CAHs that have cost-based reimbursement. The heterogeneity of hospitals used to produce comparative data for small hospitals makes comparisons difficult and limits the usefulness and relevance of the data for CAH decision-making.

The authors are not aware of any routinely-produced, national comparative data for CAHs only. However, there are some initiatives underway that have produced comparative data for CAHs in specific regions. The Rural Health Resource Center and Stroudwater Associates are working with small hospitals in the Mississippi Delta Region, providing technical expertise and information and producing business tools to improve hospital performance. The Montana CAH Quality Improvement Network initiated a benchmarking project and has generated facility specific “dashboard reports”, beginning in July 2001. The Colorado Health and Hospital Association produces a DATABANK monthly report that CAHs can use to compare their performance with a peer group average.

In 2002, the Medicare Rural Hospital Flexibility Performance Monitoring Project (Flex Monitoring Project) was funded under a cooperative agreement with the federal Office of Rural Health Policy. The Rural Health Research Centers at the Universities of Minnesota, North Carolina, and Southern Maine are collaborating on a multi-year assessment of the impact of the

Flex Program on rural hospitals and communities. A critical objective of the Flex Monitoring Project is the development and dissemination of comparative financial indicators designed specifically for CAHs.

The purpose of this paper is to describe the development of a set of financial indicators (also referred to as ratios) displayed in the *CAH Financial Indicators Report*© (the *Report*), that was produced and disseminated to 853 CAHs in the summer of 2004. The indicators described in this paper are designed to specifically measure financial principles relevant to CAHs. CAHs face a set of challenges different from non-CAH hospitals, so the development of financial indicators specific to their environment is critical in performance assessment. Because these hospitals tend to have a higher risk of financial insolvency, assessing their financial performance is key to ensuring their long term financial survival.

## **PROCESS**

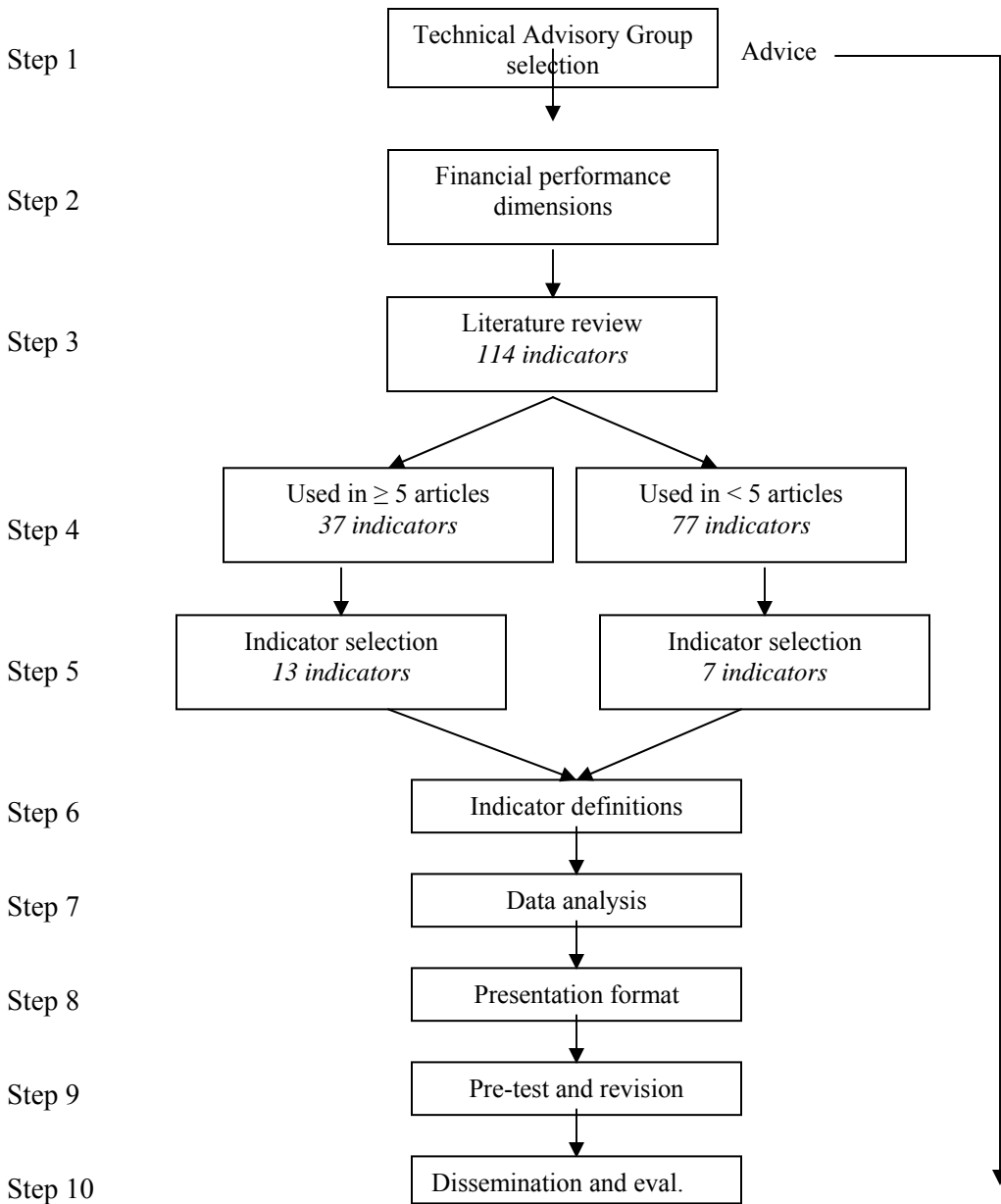
The process used to develop and produce the *CAH Financial Indicators Report*© is depicted in Figure 1. In the sections that follow, each step is described.

### ***Step 1: Selection of the technical advisory group***

From the outset of the project, the academic team sought to ground the research in practical financial management. To this end, a Technical Advisory Group (TAG) was selected to provide practical advice on the selection and use of financial indicators for CAHs. To select members for the TAG, a variety of industry and opinion leaders were canvassed for names of individuals who are knowledgeable about CAH financial and operational issues, data, and reporting practices. Four individuals with a valuable mix of expertise and geographic

perspective agreed to serve on the TAG: Dave Berk (Rural Health Financial Services, Anacortes, Washington), Brandon Durbin, CPA (Durbin & Company, LLP, Lubbock, Texas), Roger Thompson, CPA, FHFMA (Seim, Johnson, Sestak & Quist, LLP, Omaha, Nebraska), and Gregory Wolf (Stroudwater Associates, Portland, Maine).

**Figure 1: Method for Developing *CAH Financial Indicators Report*©**





Throughout the entire research process, the TAG provided practical advice on numerous methodological issues, including: sources of information about CAH financial performance and condition; timeliness, accuracy, completeness, and relevance of data; potential indicators of CAH financial performance and condition; selection of financial indicators to be produced using secondary data; precise definitions of selected indicators, including account codes; reliability of Medicare Cost Report accounts; face validity of data analyses; interpretation of results and data limitations; and methods of dissemination and evaluation.

### ***Step 2: Identification of dimensions of financial performance***

Establishing dimensions of financial performance provided an overarching structure for identification of relevant financial indicators. Different financial indicators measure different dimensions of financial performance, such as profitability and liquidity, and all of this information is needed to make an informed judgment about the financial health of an organization. For example, profitability indicators may indicate an organization is earning a profit, but liquidity indicators may show it is having difficulty paying its bills and capital structure indicators may show a large increase in debt.

To select financial performance dimensions, the five top-selling textbooks on healthcare financial management were reviewed. The intent was to select performance dimensions that would be familiar to graduates of health administration programs and others who had received formal training in ratio analysis. Not surprisingly, there was substantial overlap and it was relatively straightforward to establish five preliminary dimensions of financial performance: profitability, liquidity, capital structure, activity, and other.

### ***Step 3: Review of the literature***

The third step was to identify the financial ratios that had been found to be or deemed to be important measures of hospital financial performance. A non-systematic literature review was undertaken to identify the financial ratios included in articles in peer-reviewed journals, industry publications, and articles in practitioner journals.

To identify ratios in peer-reviewed articles, searches of Medline and other academic databases using keywords such as “hospital”, “financial performance”, and “ratio analysis” were undertaken. Articles published prior to 1990 were excluded from the searches in order to ensure that only the most recent studies were included. This exclusion was important because of the many changes in healthcare since 1990 and the likely lower relevance of articles prior to these changes. Ratios were selected from the articles if results showed that they were statistically significant in explaining a dimension of hospital financial performance, such as profitability or financial distress. To identify ratios in industry publications, the websites of various commercial suppliers and industry organizations were reviewed. Finally, to identify ratios in practitioner journal articles, searches of various databases including these journals using the keywords above were undertaken. Due to the lack of statistical analysis in these articles, judgment of the project staff was used in selection of ratios.

In total, 114 ratios were identified in the peer-reviewed journals, industry publications, and articles in practitioner journals. The bibliography lists all of the articles and publications in which the 114 indicators were found.

***Step 4: Identification of frequently used indicators***

Among the 114 ratios found to be or deemed to be important indicators of hospital financial performance, some were used in many articles and some were used in only one article. Identification of the most frequently used indicators was considered to be a logical way of reducing the opportunity set of indicators from 114 to a more manageable number.

All publications and the ratios used in them were recorded and coded in a database. The database was then queried to count the articles that found a particular indicator to be important. An indicator was defined as frequently used if it appeared in five or more articles and infrequently used if it appeared in four or fewer articles. On this basis, 37 indicators were identified as frequently used, and 77 identified as infrequently used.

To assess the extent to which the 37 frequently used indicators identified in the literature review measured different dimensions of financial performance, each ratio was assigned to one of the five dimensions listed in Step 2. Table 1 shows the five dimensions of financial performance, the ratios included under each dimension, a definition of each ratio, and the frequency of the indicator in the articles identified in the literature review.

**Table 1. 37 Most Frequently Used Indicators from Literature Review**

<b>Dimension and Indicator</b>	<b>Definition</b>	<b>Frequency</b>
<b>Profitability</b>		
Operating margin	$(\text{Total operating revenue} - \text{operating expenses}) / \text{Total operating revenue}$	33
Total margin	$\text{Excess of revenues over expenses} / \text{Total revenue}$	23
Return on assets	$\text{Net income} / \text{Total assets}$	22
Return on equity	$\text{Excess of revenue over expenses} / \text{Fund balance}$	9
Non-operating revenue	$\text{Non-operating revenue} / \text{Operating revenue}$	7
Return on investment	$(\text{Revenues and gains in excess of expenses and losses} + \text{depreciation} + \text{interest}) / \text{Price-level adjusted total assets}$	6
<b>Liquidity</b>		
Current ratio	$\text{Current assets} / \text{Current liabilities}$	19
Days revenue in net accounts receivable	$\text{Net patient account receivables} / (\text{Net patient service revenue} / 365)$	11
Days cash on hand	$(\text{Cash} + \text{marketable securities} + \text{unrestricted investments}) / [(\text{Total expenses} - \text{depreciation}) / 365]$	9
Average payment period	$[\text{Current Liabilities} / (\text{Operating Expenses} - \text{Depreciation})] / 365$	7
Replacement viability	$(\text{Restricted plant fund balance} + \text{unrestricted investments}) / \text{Price-level adjusted accumulated depreciation}$	5
Acid test ratio	$(\text{Cash} + \text{marketable securities}) / \text{Current liabilities}$	4
Quick ratio	$(\text{Total current assets} - \text{inventory}) / \text{Total current liabilities}$	4
<b>Capital Structure</b>		
Equity financing	$\text{Fund balance} / \text{Total assets}$	11
Total debt/total assets	$\text{Total liabilities} / \text{Total assets}$	9
Debt service coverage	$(\text{Revenue over expenses} + \text{depreciation} + \text{interest}) / (\text{Current portion of long-term debt} + \text{interest expense})$	9
Cash flow to total debt	$(\text{Net Income} + \text{depreciation expense}) / \text{Total liabilities}$	9
Long-term debt to capitalization	$\text{Long-term debt} / (\text{Long-term debt} + \text{equity})$	7
Long-term debt to equity	$\text{Long-term liabilities} / \text{Fund balance}$	7
Long-term debt to total assets	$\text{Long-term debt} / \text{Total assets}$	6
Fixed asset financing	$\text{Long-term liabilities} / \text{Net fixed assets}$	6
<b>Activity</b>		
Total asset turnover	$\text{Total operating revenue} / \text{Total assets}$	13
Fixed asset turnover	$\text{Total operating revenue} / \text{Net fixed assets}$	8
Current asset turnover	$\text{Total operating revenue} / \text{Current assets}$	6
<b>Other</b>		
Occupancy rate	$\text{Average daily census} / \text{Number of staffed beds}$	24
Inpatient payer mix	$\text{Number of Medicare or Medicaid patients} / \text{Total number of patients}$	22
Medicare case-mix	Medicare Case-Mix Index	20
Average length of stay	$\text{Total number of inpatient days} / \text{Total number of admissions}$	20
Expense per discharge	$(\text{Total operating expenses} + \text{other expenses}) / \text{Adjusted discharge}$	19
Average age of plant	$\text{Accumulated depreciation} / \text{Annual depreciation expense}$	14
Outpatient mix	$\text{Total outpatient (inpatient equivalent) days} / \text{Total patient days}$	10
Herfindahl index	$\text{Squared sum of (acute care patient days for hospital} / \text{Total acute-care patient days in the county)}$	10
Revenue per discharge	$(\text{Net patient revenue} + \text{nonpatient revenue}) / \text{Adjusted discharge}$	9
FTEs per bed	$\text{Total FTEs} / \text{Occupied beds}$	9
Market share	$\text{Patient revenue (discharges)} / \text{Total county patient revenue (discharges)}$	8
HMO penetration	Percent of revenue from managed care patients	8
FTEs per adjusted day	$(\text{FTE} / \text{Adjusted average daily census}) / (\text{Medicare case-mix index})$	5

### *Step 5: Selection of the indicators*

The research team and the Technical Advisory Group (TAG) met in Chicago in February 2004. Prior to the meeting, the TAG was provided with an information package that included TAG member biographies, overview of the project, TAG terms of reference, project work plan, the five performance dimensions, literature review, list and definitions of the 37 frequently used indicators, a form for evaluating the 37 indicators, and a form for defining the account codes from Medicare Cost Reports needed to calculate each ratio.

The TAG was asked to evaluate each of the 37 frequently used indicators using three criteria: feasibility (whether the indicator can be accurately calculated from Medicare cost report data), importance (whether the indicator is an important measure of the financial management of CAHs), and usefulness (whether the indicator is useful to CAH administrators). After preliminary discussion, 6 indicators were dropped from the 37 because they were considered not applicable to CAHs. For the remaining 31 indicators, each was evaluated on each criterion, using a scale from one to four, with four being very feasible, important, and useful and one represented as very unfeasible, unimportant and not useful. Table 2 shows the TAG's evaluation of 31 of the 37 most frequently used indicators.

**Table 2. Evaluation of 31 of the 37 Most Frequently Used Indicators by Technical Advisory Group**

<b>Performance Dimension and Indicator</b>	<b>Feasibility</b>	<b>Importance</b>	<b>Usefulness</b>	<b>Total</b>	<b>Overall Ranking</b>
<b>Profitability</b>					
Operating margin	4	4	4	12	1
Total margin	4	3	3	10	2
Cash flow margin	4	3.5	2.5	10	2
Return on equity	4	3	2.5	9.5	4
Return on assets	4	2	1	7	5
<b>Liquidity</b>					
Days cash on hand	4	4	4	12	1
Days revenue in net accounts Receivable	3.5	4	4	11.5	2
Current ratio	4	3	2	9	3
Average payment period	4	1	2	7	4
<b>Capital Structure</b>					
Long-term debt to capitalization	4	4	4	12	1
Debt service coverage	2	4	4	10	2
Equity financing	4	2	2	8	3
Total debt/total assets	4	1	1	6	4
Cash flow to total debt	4	1	1	6	4
<b>Activity</b>					
Fixed asset turnover	4	3	2	9	1
Total asset turnover	4	2	1	7	2
Current asset turnover	4	1	1	6	3
<b>Other</b>					
Outpatient mix	4	4	3	11	1
Average daily census	4	4	3	11	1
Patient deductions	4	3.5	3	10.5	3
Average age of plant	4	3	3	10	4
FTEs per adjusted occupied bed	4	3	3	10	4
Medicare inpatient revenue / Medicare patient days	4	3	3	10	4
Outpatient payer mix	4	3	3	10	4
Medicare outpatient cost to charge ratio	4	3	3	10	4
Inpatient payer mix	4	3	3	10	4
Medicare case-mix	1	4	3	8	10
Average length of stay	4	2	2	8	10
Expense per discharge	4	2	2	8	10
Salaries, wages, and benefits as a percent of expenses	3	2	2	7	13
Occupancy rate	4	1	1	6	14
<b>Scale</b>					
1. Very unfeasible, unimportant or not useful					
2. Somewhat unfeasible, unimportant or not useful					
3. Somewhat feasible, important, or useful					
4. Very feasible, important, or useful					

After extensive debate and consideration, the TAG decided to retain 13 of the 37 most frequently used indicators. However, the TAG believed that the 13 did not capture some important attributes of CAH financial management. At this point of the indicator selection process, the research value and importance of the professional experience and expertise of the TAG members was particularly evident. Their knowledge of the operating reality of CAHs - low volumes, the impact of swing beds, and effects of payer mix, for example - led to consideration of indicators that were included among the 77 less frequently used indicators that had been eliminated by the research team. From these indicators, seven were selected that the TAG was confident would be feasible, important and useful to CAH managers and boards. In the end, the TAG selected 20 indicators that included 13 of the 37 most frequently used indicators and seven of the 77 less frequently used indicators, although the precise definitions of seven indicators were slightly modified to be more relevant for CAHs.

The final 20 indicators forced revisiting the five original performance dimensions of profitability, liquidity, capital structure, activity, and other. Among the final 20 indicators, there were traditional measures of profitability, liquidity and capital structure, so these performance dimensions were retained. However, the activity and other performance dimensions were dropped and three new ones created: revenue, cost, and utilization. The final performance dimensions were defined as follows:

- **Profitability** indicators measure the ability of an organization to generate the financial return required to replace assets, meet increases in service demands, and compensate investors (in the case of a for-profit organization).
- **Liquidity** indicators measure the ability of an organization to meet its cash obligations in a timely manner.

- **Capital structure** indicators measure the extent to which an organization uses debt and equity financing.
- **Revenue** indicators measure the amount and mix of different sources of revenue.
- **Cost** indicators measure the amount and mix of different types of costs.
- **Utilization** indicators measure the extent to which fixed assets (beds) are fully occupied.

The 20 indicators are fairly evenly distributed across the six performance dimensions, with the exception of the dimension entitled “revenue” in which there are relatively more indicators assigned.

***Step 6: Definition of indicators using the Medicare Cost Report accounts***

The production of actual indicator values requires detailed financial data for each CAH. The TAG considered the feasibility and desirability of various sources of financial data, including the American Hospital Association database and the Medicare Cost Reports from the Healthcare Cost Report Information System (HCRIS). After brief deliberation, Medicare Cost Reports were selected as the data source because they are the only national data that use standard definitions, have sufficient detail, and will eventually include data for all CAHs. Although lack of timeliness and data quality concerns were identified, the advantages were deemed to outweigh the drawbacks.

Each indicator was then defined using the Medicare Cost Report accounts, which proved to be a complex and time-consuming activity. Carefully thinking about the precise definition of each indicator, and the appropriate accounts to include in the numerator and denominator was simple for some indicators, such as the current ratio, and very complicated for others, such as the



FTEs per adjusted occupied bed. Table 3 shows the six performance dimensions, 20 indicators, definitions, and Medicare Cost Report accounts used in the *Report*.

**Table 3. CAH Financial Indicators Report©: Performance Dimensions, Indicators, Definitions, and Medicare Cost Report Accounts\***

<b>Performance Dimension and Indicator</b>	<b>Definition</b>	<b>Medicare Cost Report Accounts</b>
<b>Profitability</b>		
Total margin	Net income/Total revenues	Worksheet G-3, Line 31/Worksheet G-3, Line 3 + 25
Cash flow margin	((Net income - (contributions, investments and appropriations)) + depreciation + interest) / (Net patient revenue + other income - (contributions, investments, and appropriations))	((Worksheet G-3, Line 31 - (Worksheet G-3, Lines 6,7, 23)) + Worksheet A, Lines 1, 2, 3, 4, Column 3 + Worksheet A, Line 88, Column 3)/(Worksheet G-3, Line 3 + Worksheet G-3, Line 25 - (Worksheet G-3, Lines 6, 7, 23))
Return on equity	Net income / Fund balance	Worksheet G-3, Line 31/(Worksheet G, Line 51, Columns 1, 2, 3, 4)
<b>Liquidity</b>		
Current ratio	Current assets / Current liabilities	(Worksheet G, Line 11, Columns 1, 2, 3, 4)/ (Worksheet G, Line 36, Columns 1, 2, 3, 4)
Days cash on hand	(Cash + marketable securities + unrestricted investments) / [(Total expenses-depreciation)/Days in period]	(Worksheet G, Lines 1, 2, 22, Columns 1, 2, 3, 4)/ [(Worksheet A, Line 101, Column 3) - Worksheet A, Lines 1, 2, 3, 4, Column 3)/Days in Period]
Net days revenue in accounts receivable	(Net patient accounts receivable) / (Net patient service revenue / Days in period)	(Worksheet G, Line 4 - “absolute value”6, Column1)/((Worksheet G-3, Line 3)/Days in period)
<b>Capital Structure</b>		
Equity financing	Fund balance / Total assets	(Worksheet G, Line 51, Columns 1, 2, 3, 4)/ (Worksheet G, Line 27, Columns 1, 2, 3, 4)
Debt service coverage*	(Net Income + depreciation + interest) / (Current portion of long-term debt + interest expense)	(Worksheet G-3, Line 31 + Worksheet A, Lines 1, 2, 3, 4, Column 3 + Worksheet A, Line 88, Column 3)/(Worksheet G, Line 31, Columns 1, 2, 3, 4 + Worksheet 8, Line 88, Column 3)
Long-term debt to capitalization	Long-term debt / (Long-term debt + fund balance)	(Worksheet G, Lines 42+31, Columns 1, 2, 3, 4)/(Worksheet G, Lines 42+31, Columns 1, 2, 3, 4 + Worksheet G, Line 51, Columns 1, 2, 3, 4)
<b>Revenue</b>		
Outpatient revenues to total revenues	Total outpatient revenue / Total patient revenue	Worksheet G-2, Line 25, Column 2/Worksheet G-2, Line 25, Column 3
Patient deductions	(Contractual allowances + discounts) / Gross total patient revenue	Worksheet G-3, Line 2/Worksheet G-3, Line 1
Medicare inpatient payer mix	Medicare inpatient days / (Total inpatient days - Nursery bed days - SNF swing bed days)	Worksheet S-3, Part I, Line 12, Column 4/(Worksheet S-3, Part I Line 12 - Line 11 - Line 4, Column 6)
Medicare outpatient payer mix	Outpatient Medicare charges / Total outpatient charges	(Worksheet D, Part V, Title XVII, Hospital Line 104, Columns 2, 3, 4, 5, 5.01, 5.02)/(Worksheet C, Part I, Line 101, Column 7)

Medicare outpatient cost to charge	Outpatient Medicare costs / Outpatient Medicare charges	(Worksheet D, Part V, Title XVII, Hospital, Line 104, Columns 6, 7, 8, 9, 9.01, 9.02)/(Worksheet D, Part V, Title XVII, Hospital, Line 104, Columns 2, 3, 4, 5, 5.01, 5.02)
Medicare revenue per day	Medicare revenue / (Medicare days – NF swing bed days)	(Worksheet E-3, Part II, Line 4)/(Worksheet S-3, Part I, Line 12, Column 4 - Worksheet S-3, Part I, Line 3 Column 4)
<b>Cost</b>		
Salaries to total expenses	Salary expense / Total expenses	Worksheet A, Line 101, Column 1/(Worksheet A, Line 101, Column 3)
Average age of plant*	Accumulated depreciation / Annual depreciation expense	(Worksheet G, Lines 12.01, 13.01, 14.01, 15.01, 16.01, 17.01, 18.01, 19.01, Columns 1, 2, 3, 4)/Worksheet A, Lines 1, 2, 3, 4, Column 3
FTEs per adjusted occupied bed	(Number of FTEs / [(Inpatient days - NF swing days - nursery days) * (total patient revenues / (Total inpatient revenue - NF revenue - other LTC revenue))] / Days in period]	(Worksheet S-3, Part I, Line 25, Column 10)/[(Worksheet S-3, Part I, Line 12, Column 6 - Line 4 - Line 11)*(Worksheet G-2, Part I, Line 25, Column 3)/(Worksheet G-2, Part I, Line 7, Column 1 - Worksheet G-2, Part I, Line 8, Column 1))/Days in period]
<b>Utilization</b>		
Average daily census swing-SNF beds	Inpatient swing bed SNF days / Days in period	Worksheet S-3, Part I, Line 3, Column 6/Days in period
Average daily census acute beds	Inpatient acute care bed days / Days in period	Worksheet S-3, Part I, Line 12 - (Lines 3 + 4 + 11), Column 6/Days in period

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### **Step 7: Analysis of data**

The research team developed a computer program that produces, organizes, and analyses the indicator values for individual CAHs using data from Medicare Cost Reports. Descriptive statistics, histograms and scatterplots were used to verify programming accuracy. After eliminating probable programming errors, results showed that there were some obvious data quality problems, such as hospitals reporting zero total patient charges, negative patient deductions, negative current assets, and zero age of plant. From a theoretical standpoint, these numbers were highly unlikely or impossible and reaffirmed a research objective held by the research team since the beginning of the project – to encourage improved data quality in Medicare Cost Reports.

It was decided not to report an indicator value for a hospital when potential data errors were identified and instead report a potential error. In this way, it was hoped that the CAH administrator would be made aware of the potential data problem and would initiate corrective action so that the error would not appear in future reports. Data quality problems and other data issues encountered during the data analysis required development of data exclusion criteria, circumstances under which the indicator value was not reported for a hospital nor included in calculation of a state's median (Table 4). These criteria include:

- 1) *No cost report*: Some hospitals have no cost report for a given year, thus no indicators can be computed.
- 2) *Invalid data*: A financial account entry that is theoretically impossible, such as negative accumulated depreciation. Problems with division by zero were also classified in this section. For example, if total revenues are zero then total margin is not defined.
- 3) *Short fiscal year*: Only cost reports with at least 360 days of reporting were considered.
- 4) *Outliers*: Calculated ratios that were very unusual, such as total margins greater than 100 percent, were not reported.
- 5) *Pre-Conversion*: Pre-conversion data for three ratios (Medicare outpatient payer mix, Medicare outpatient cost to charge, and Medicare revenue per day) were suppressed because PPS revenue is not comparable to cost-based revenue.

**Table 4. CAH Financial Indicators Report©: Data Quality / Exclusion Criteria**

<b>Performance Dimension and Indicator</b>	<b>Data Quality / Exclusion Criteria</b>
<b>Profitability</b>	
Total margin	Hospitals with total revenues of zero were excluded from calculation of medians.
Cash flow margin	There may be variations in non-cash items included in net income. Hospitals whose net patient revenue, other income, and contributions, investments and appropriations sum to zero were excluded from the calculation of medians.
Return on equity	The real equity of a hospital may not be reflected in its fund balance if it is part of a larger system. Hospitals with a fund balance of \$1 or less were excluded from the calculation of medians.
<b>Liquidity</b>	
Current ratio	There may be variations in the classification of investments as either current or long-term. Hospitals with negative current assets or negative current liabilities were excluded from the calculation of medians.
Days cash on hand	Hospitals with negative days cash on hand were excluded from the calculation of medians, as were those with total expenses of zero. It is possible that worksheet G, columns 1-4, line 22 could include donor restricted, trustee restricted or board designated investments.
Net days revenue in accounts receivable	Hospitals with negative net days revenue in accounts receivable and those with net patient service revenue of zero were excluded from the calculation of medians.
<b>Capital structure</b>	
Equity financing	The real equity of a hospital may not be reflected in its fund balance if it is part of a larger system. Hospitals with a fund balance of \$1 or less were excluded from the calculation of medians.
Debt service coverage	Hospitals with no current portion of long-term debt and no interest expense were excluded from the calculation of medians.
Long-term debt to capitalization	Other long-term liabilities may include some items that do not relate to debt, such as deferred compensation. The real equity of a hospital may not be reflected in its fund balance if it is part of a larger system. Hospitals with a fund balance of \$1 or less were excluded from the calculation of medians.
<b>Revenue</b>	
Outpatient revenues to total revenues	Hospitals with zero total patient charges were excluded from the calculation of medians.
Patient deductions	Hospitals with zero total patient charges were excluded from the calculation of medians, as were those with patient deductions of zero or less.
Medicare inpatient payer mix	Hospitals with zero total inpatient days were excluded from the calculation of medians.
Medicare outpatient payer mix	Hospitals with zero total outpatient charges were excluded from the calculation of medians. Pre-conversion data was suppressed because PPS revenue may not be comparable to cost-based revenue as disclosed on the Medicare cost reports.
Medicare outpatient cost to charge	Hospitals in states with rate regulation may have higher values than those hospitals in non-rate regulated states. Hospitals with Medicare outpatient charges of zero were excluded from the calculation of medians. Pre-conversion data was suppressed because PPS revenue may not be comparable to cost-based revenue as disclosed on the Medicare cost reports.
Medicare revenue per day	Hospitals where all Medicare days were SNF swing bed days were excluded from the calculation of medians. Pre-conversion data was suppressed because PPS revenue may not be comparable to cost-based revenue as disclosed on the Medicare cost reports.
<b>Cost</b>	
Salaries to total expenses	Hospitals with zero total expenses were excluded from the calculation of medians.
Average age of plant	Hospitals with average age of plant of zero or less and those with depreciation

	expense of zero were excluded from the calculation of medians.
FTEs per adjusted occupied bed	Hospitals with total inpatient revenues of zero were excluded from the calculation of medians.
<b>Utilization</b>	
Average daily census swing- SNF beds	Hospitals that were not licensed to maintain swing beds were excluded from the calculation of the medians.
Average daily census acute beds	There were no exclusion criteria for this indicator.

Throughout the data analysis, the TAG was extensively consulted. Several teleconference calls were held to discuss the validity of the indicator definitions, outliers, and data quality problems. After resolution of these problems, the TAG reviewed the data analysis, including tabular and graphical presentation of values for each indicator. From their knowledge of the operating reality of CAHs, the TAG hypothesized that indicator values for CAHs with long-term care may differ from those for CAHs without long-term care and subsequent testing of this hypothesis confirmed this difference. Therefore, two peer groups of CAHs were created and national median values were produced for CAHs with and without long-term care.

***Step 8: Selection of presentation format***

After all of the data problems were addressed and indicator values had been produced, the research team turned to presentation of the data. Several presentation principles were established: the name of the CAH should appear on the cover page to inform the reader that the report includes results specifically for their hospital; the report overview should be in the form of an executive summary; details about the method should be kept to a minimum and located in an appendix; all of the information about an indicator should be on one page so readers would not have to search for information; indicators should be defined in both words and Medicare Cost Report accounts; results over time should be simply displayed in a graph with no more than three

lines and in a table; no data should appear in the graph that do not also appear in the table, and vice versa; an interpretation of the indicator and a brief summary of results over time and for CAHs with and without long-term care should be provided; and data quality and exclusion criteria should be explicitly stated to assist the reader in assessing robustness of the data. Alternative presentation formats were considered and a draft of the Report was produced.

***Step 9: Pilot testing***

Two pilot tests were conducted to ensure the accuracy of our calculations. First, each member of the TAG selected some of their own CAH clients that represented a cross-section of CAHs. We compared our calculated financial indicators with those independently calculated by the TAG member. Second, two CAH Chief Financial Officers with high levels of expertise were selected to preview the draft *CAH Financial Indicators Report*©. These individuals provided valuable feedback about the presentation and user-friendliness of the data and suggestions for future reports. No significant problems with the indicators were identified. Suggested changes in presentation were made and the final version of the Report was produced.

As an additional check on the accuracy of the calculations, we created a spreadsheet-based calculator that individual hospital administrators could use. This spreadsheet calculates the financial indicators based on values for specific Medicare Cost Report account codes entered by the user. Thus, the indicator values we produced by the statistical packages could be compared with values obtained using the independently created spreadsheet program. The values for roughly 20 randomly chosen CAHs were reconciled and it was concluded that the calculations were consistent and accurate.

## **DISSEMINATION AND RESULTS**

In September 2004, the Chief Executive Officers (CEOs) of 853 CAHs were mailed a package with three documents – a letter from the project directors explaining the study, the *CAH Financial Indicators Report*© that included indicator values specifically for their CAH (although 293 had no valid data as a CAH), and an evaluation form. Each State Flex Coordinator also received a packet that contained a letter explaining the project, a Report specifically for their state that included median values for their state and for CAHs with and without long-term care in the U.S., and an evaluation form. Because we did not want to identify individual CAH performance in this first round of reports, state-level data were not sent to coordinators in any states with less than five CAHs in our cost report data. This resulted in nine coordinators receiving reports with national medians for CAHs with and without long-term care, but without their state medians.

Figure 2 shows an example of one indicator display – total margin. The display for each indicator includes the following sections:

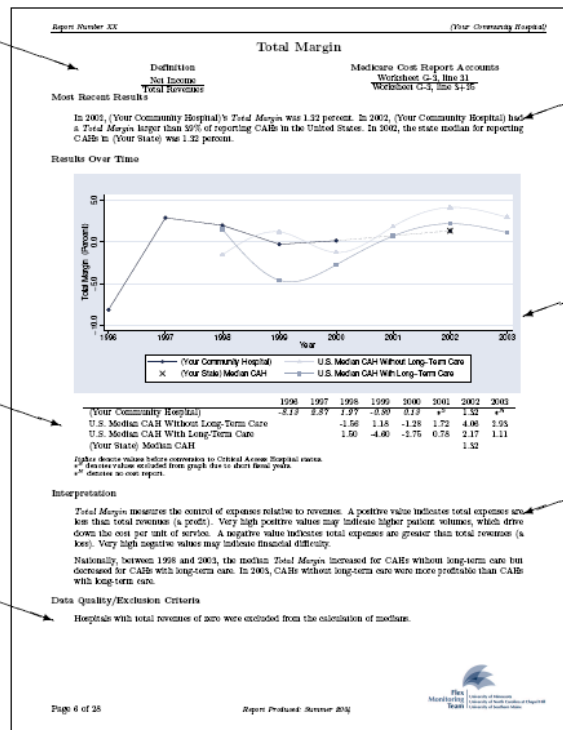
- **Definitions.** Formulae for the indicator in both conceptual and Medicare Cost Report formats.
- **Most Recent Results.** A snapshot comparing the CAH value (for reports to individual CAHs) or state median (for reports to Flex Coordinators) to national data in the most recent year.
- **Results Over Time.** A graphical and tabular comparison of the CAH value or state median to national data between 1998 and 2003. National medians for CAHs with and without long-term care are reported separately. The most recent state median is presented only if valid

data for five or more CAHs were available. Missing indicator values are coded and an explanation provided beneath the table.

- Interpretation. A description of the indicator and an overview of national trends over the past few years.
- Data Quality / Exclusion Criteria. Identification of potential data quality problems and a description of the rules that were used to decide whether an indicator is presented.

**Figure 2: Example indicator display**

Definitions: Formulae for the indicator in both conceptual and Medicare Cost Report format.



Most Recent Results: A snapshot comparing the CAH to national and state data in the most recent year.

Values are compared to national medians for hospitals with long-term care and without long-term care. The most recent state median is also presented if five or more values are valid.

Results Over Time: A graphical and tabular comparison of the CAH to national trends over the past few years.

Interpretation: A description of the indicator and an overview of national trends.

Data Quality/Exclusion Criteria: A description of the rules that were used to define whether a ratio is presented.

The 1998-2003 national median values for each indicator included in the *CAH Financial Indicators Report*© are shown in Table 5.



**Table 5: CAH Financial Indicators Report©: Indicator Medians, 1998-2003**

<b>Performance Dimension and Indicator</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>
<b>Profitability</b>						
Total margin	.15	-.81	-2.37	.95	3.16	2.33
Cash flow margin	-1.63	-3.10	-1.79	2.55	5.06	3.12
Return on equity	1.46	-.78	-3.94	3.28	7.15	5.72
<b>Liquidity</b>						
Current ratio	1.78	1.95	1.56	2.03	2.05	1.90
Days cash on hand	29.66	45.95	22.15	34.40	45.22	41.74
Net days revenue in accounts receivable	69.96	63.96	62.67	62.18	61.60	59.31
<b>Capital structure</b>						
Equity financing	65.05	63.03	63.45	61.89	63.86	62.99
Debt service coverage	1.31	.36	1.16	2.35	3.02	2.77
Long-term debt to capitalization	16.60	17.27	12.06	21.04	20.67	20.65
<b>Revenue</b>						
Outpatient revenue to total revenue	.72	.70	.65	.60	.57	.57
Patient deductions	16.85	17.38	18.55	20.12	22.28	23.40
Medicare Inpatient payer mix	87.38	86.21	83.79	80.82	78.71	78.86
Medicare outpatient payer mix	34.90	38.14	40.60	40.00	38.57	37.38
Medicare outpatient cost to charge	48.34	47.87	54.01	58.60	60.22	60.35
Medicare revenue per day	1427.80	1448.51	1428.20	1333.89	1247.62	1283.98
<b>Cost</b>						
Salaries to total expenses	52.31	50.70	49.28	47.67	45.90	45.65
Average age of plant	14.99	15.50	12.43	12.29	11.64	12.32
FTEs per adjusted occupied bed	6.76	7.94	7.38	6.63	6.20	6.17
<b>Utilization</b>						
Average daily census swing-SNF beds	1.12	1.04	1.02	1.18	1.35	1.51
Average daily census acute beds	1.05	1.15	1.62	2.19	2.81	2.87
Number of reporting CAHs	31	62	211	424	633	260

*CAH Financial Indicator Calculator, ©2005, The University of North Carolina at Chapel Hill, for use in the public domain.*

In forming a dissemination strategy, the research team decided to directly confront two weaknesses of the Medicare Cost Report data – lack of timeliness and data quality problems. An Excel® spreadsheet called the *CAH Financial Indicator Calculator*© was created. This easy-to-use spreadsheet calculates all of the indicator values included in the Report. Every Medicare Cost Report account that is used in the calculation of indicators is listed in the order in which they appear in the Cost Report. When a value for each account is entered in the designated cell, the spreadsheet automatically calculates the associated indicator values. No creation of formulae

is required, just simple entry of data already reported in the Medicare Cost Reports. This can be done for any CAH for any year that data are available, including data that are more recent than those included in the hospital-specific Report distributed to CAH administrators in Summer 2004.

It is hoped that the *CAH Financial Indicator Calculator*© at least partially addresses weaknesses of the Medicare Cost Report data in two ways. First, it helps to identify data quality problems, particularly for CAHs with missing values for many indicators in their Report. The spreadsheet allows the CAH administrators to explore the reasons for the missing data and provides an independent check on the calculations performed by the research team. Second, it allows administrators to calculate more timely indicator values when data are available to them but are not yet part of the publicly available Medicare Cost Report data files. Because there is often a substantial delay between the closing of the fiscal year and inclusion of data in the publicly released Medicare cost reports, the data accessible to the research team were not as timely as the data to which individual administrators have access.

In the letter sent to the CEOs in Summer 2004, the *CAH Financial Indicator Calculator*© was described. Instructions on how to obtain a copy of the spreadsheet, as well as an electronic file of the Report for their hospital, were provided. As of March 1, 2005, 56 requests for the CAH Financial Indicator Calculator and 53 requests for the electronic files of specific reports had been received.

## **EVALUATION**

Included in the information package sent to the CEOs of CAHs and the State Flex Coordinators in Summer 2004 was an evaluation form that asked recipients to provide feedback

about the overall usefulness of the *CAH Financial Indicators Report*®, to rank the usefulness of each individual indicator, to suggest any needed changes to the indicator formulae, to suggest any indicators not included in the proposed set of 20, and to identify possible peer groups. Recipients were asked to return the evaluation form by mail or fax.

As of March 1, 2005, 180 evaluations were returned. Table 6 shows the distribution of responses to the question “Overall, how do you rate the usefulness of the *CAH Financial Indicators Report*?” Eighty-two percent of respondents rated the report as either very useful or useful. Most of the respondents who evaluated the report as somewhat useful or not useful stated that their the report had not included any indicator values for their CAH (because the research team did not yet have post-conversion Medicare Cost Report data), the data in the report were not current, or that the indicator values were not valid for their facility (because their assets were held by a parent organization, for example).

**Table 6. Overall, how do you rate the usefulness of the *CAH Financial Indicators Report*?**

<b>Response</b>	<b>Number</b>	<b>Percentage</b>
Very useful	107	59%
Useful	41	23%
Somewhat useful	22	12%
Not very useful	4	2%
Not useful	6	3%
Total	180	100%

The responses to the questions “Which indicators are most useful? Which indicators are least useful?” are summarized in Table 7. Net days revenue in accounts receivable, FTEs per adjusted occupied bed, and total margin were rated most useful by the greatest number of respondents. Perhaps the most interesting result was that every indicator in the Report was rated

most useful by a substantial number of respondents and least useful by only a few respondents.

Most respondents considered most of the indicators to be useful.

**Table 7: Which indicators are most useful? Which indicators are least useful?**

<b>Performance Dimension and Indicator</b>	<b>Most Useful (%)</b>	<b>Least Useful (%)</b>
<b>Profitability</b>		
Total margin	95	7
Cash flow margin	94	4
Return on equity	75	12
<b>Liquidity</b>		
Current ratio	81	5
Days cash on hand	89	5
Net days revenue in accounts receivable	99	5
<b>Capital structure</b>		
Equity financing	67	16
Debt service coverage	71	16
Long-term debt to capitalization	69	14
<b>Revenue</b>		
Outpatient revenues to total revenues	80	3
Patient deductions	78	8
Medicare inpatient payer mix	89	8
Medicare outpatient payer mix	83	9
Medicare outpatient cost to charge	79	7
Medicare revenue per day	77	11
<b>Cost</b>		
Salaries to total expenses	89	8
Average age of plant	73	20
FTEs per adjusted occupied bed	96	10
<b>Utilization</b>		
Average daily census - swing/SNF beds	73	12
Average daily census - acute beds	71	8

Many comments about the *CAH Financial Indicators Report*© were provided by respondents. All comments from the evaluations were categorized and their content analyzed in a report that was distributed to the TAG. Many of the suggestions for change will be incorporated in future reports.

## CONCLUSION

The *CAH Financial Indicators Report*© is an attempt to provide CAH administrators with a set of comparative financial indicators designed specifically for these small, Medicare cost-based reimbursed hospitals. The *Report* is a genuine collaboration between a university-based research team and practitioners with experience and expertise in the financial management of CAHs. Together both parties worked to produce financial indicators that CAH boards and management can use to improve the financial management of their organizations.

### *Limitations*

The *CAH Financial Indicators Report*© has several limitations:

- Use of historical data. Indicators values reflect the results of past decisions and may not be predictive of future results.
- Variations in CAH service mix. Among CAHs there is significant variation in the volume and types of services provided, including physician clinics, home health services, wellness centers, and diagnostic and treatment technology. Differences in indicator values across facilities may reflect variation in service mix.
- No consensus about good performance. For many of the indicators in the report, there are no ranges of values that are generally accepted to be “good performance” or “bad performance”.
- Data quality concerns. There are reporting variations and other data quality concerns that affect the validity of the indicators. It is hoped that the dissemination of indicators that use data from Medicare Cost Reports will make administrators aware of data quality problems, which could lead to better data in the future.

### *Next Steps*

The consensus of the TAG, coupled with positive feedback from CAH administrators, gives the research team confidence that the 20 indicators in the *Report* represent a reasonable and appropriate mechanism for portraying the financial performance of CAHs. Therefore, using the same set of indicators, a 2005 *CAH Financial Indicators Report* will be produced in the summer of 2005. In addition to the content included in the 2004 report, there will be more discussion of results, state medians over time, additional data displays, and median data for peer groups that potentially include: CAHs with and without long-term care (as before), groupings by total revenue, government and non-government ownership, and with and without a provider based rural health clinic. CAH CEOs will each receive the 2005 *Report* with data specific to their institution, and State Flex Coordinators will receive *Reports* for each CAH in their state. The addition of another year of cost report data will provide a longer comparison period, and will also result in the availability of post-conversion data for a larger number of facilities.

## REFERENCES

1. American Hospital Association. AHD.com American Hospital Directory, accessed from <http://www.ahd.com>. Indicators; 2004 Jan.
2. Bazzoli G, Andes S. Consequences of hospital financial distress. *Hospital and Health Services Administration*. 1995;40(4):472-95.
3. Bazzoli GJ, Chan B, Shortell SM, D'Aunno T. The financial performance of hospitals belonging to health networks and systems. *Inquiry*. 2000;37(3):234-52.
4. Bazzoli GJ, Cleverley WO. Hospital bankruptcies: an exploration of potential causes and consequences. *Health Care Management Review*. 1994;19(3):41-51.
5. Carpenter CE. Determinants of hospital tax-exempt debt yields: corrections for selection and simultaneous equation bias. *Health Services Research* 27(5) December 1992:695-713.
6. Carpenter CE, McCue MJ, Hossack JB. Association of bond, market, operational, and financial factors with multi-hospital system bond issues. *Journal of Health Care Finance*. 2001;28(2):26-34.
7. Center for Healthcare Industry Performance Studies. CHIPS 2000 Almanac of Hospital Financial and Operating Indicators.
8. Chan B, Feldman R, Manning WG. The effects of group size and group economic factors on collaboration: a study of the financial performance of rural hospitals in consortia. *Health Services Research*. 1999 Apr;34(1 Pt 1):9-31.
9. Chu DK, Zollinger TW, Kelly AS, Saywell RM. An empirical analysis of cash flow, working capital, and the stability of financial ratio groups in the hospital industry. *Journal of Accounting and Public Policy*. 1991;10(1):39-58.
10. Clement JP, D'Aunno TA, Poyzer BM. Hospital corporate restructuring and financial performance. *Medical Care*. 1993 Nov;31(11)(a): 975-988.
11. Clement JP, D'Aunno TA, Poyzer BM. The financial performance of diversified hospital subsidiaries. *Health Services Research*. 1993 Feb;27(6)(b):741-763.
12. Clement JP, McCue MJ, Luke RD, Bramble JD, Rossiter LF, Ozcan YA, Pai CW. Strategic hospital alliances: impact on financial performance. *Health Affairs*. 1997;16(6): 193-203.
13. Cleverley WO. Improving financial performance: a study of 50 hospitals. *Hospital and Health Services Administration*. 1990;35(2):173-87.

14. Cleverley WO, Harvey RK. Does hospital financial performance measure up? *Healthcare Financial Management*. 1992 May;46(5)(a):20-4, 26.
15. Cleverley WO. Financial and operating performance of systems: voluntary versus investor-owned. *Topics in Health Care Financing*. 1992. 18(4):
16. Cleverley WO. Economic value added--a framework for health care executive compensation. *Hospital and Health Services Administration*. 1993;38(2):215-28.
17. Cleverly WO. Understanding your hospital's true financial position and changing it. *Health Care Management Review*. 1995;20(2):62-73.
18. Cleverley WO. The hospital cost index: a new way to assess relative cost-efficiency. *Healthcare Financial Management*. 2002 Jul;56(7):36-42.
19. Data Advantage Corp., Hospital Financial Profile Report, accessed from <http://www.data-advantage.com/products/financial.asp>, on March 1, 2005.
20. Dobson A, Koenig L, Sen N, Ho S, Gilani J. Financial Performance of Academic Health Center Hospitals, 1994-2000. Commonwealth Fund Report 543, September 2002.
21. Ehreht JL. The development and evaluation of hospital performance measures for policy analysis. *Medical Care*. 1994 June; 32(6): 568-87.
22. FITCH, 2004 Median Ratios for Nonprofit Hospitals and Health Care Systems, accessed from <http://www.fitchratings.com/corporate/search/results.cfm>, on March 1, 2005.
23. Franco, SJ. (1999). Implications of the BBA for Rural Hospitals. Working Paper. Bethesda, The Project HOPE Walsh Center for Rural Health Analysis.
24. Gapenski LC. Using MVA and EVA to measure financial performance. *Healthcare Financial Management*. 1996 Mar;50(3):56, 58, 60.
25. Gapenski LC, Vogel WB, Langland-Orban B. The determinants of hospital profitability. *Hospital and Health Services Administration*. 1993;38(1):63-80.
26. Gardiner LR, Oswald SL, Jahera JS Jr. Prediction of hospital failure: a post-PPS analysis. *Hospital and Health Services Administration*. 1996;41(4):441-60.
27. Gautam K, Campbell C, Arrington B. Financial performance of safety-net hospitals in a changing health care environment. *Health Services Management Research*. 1996 Aug; 9(3): 156-71.
28. Gertler, P. J. and D. M. Waldman. Quality-adjusted cost functions and policy evaluation in the nursing home industry. *Journal of Political Economy*. 1992;100(6): 1232-56.



29. Goes JB, Zhan C. The effects of hospital-physician integration strategies on hospital financial performance. *Health Services Research*. 1995 Oct;30(4):507-530.
30. Hadley, J., K. Nair, et al. Hospital closures, financial status, and access to care: A rural and urban analysis, Center for Health Policy Studies; Georgetown University. 1992.
31. Harkey, J. and R. Vraciu. Quality of health care and financial performance: Is there a link?. *Health Care Management Review*. 1992;17(4): 55.
32. HCIA-Sachs. 100 Top Hospitals: Benchmarks for Success. 2000.
33. HospitalBenchmarks.com, 2006 Almanac of Hospital Financial and Operating Indicators, accessed from <http://www.hospitalbenchmarks.com/default.asp>, March 1, 2005.
34. Ingenix, Financial Analysis Service / Strategic Operating Indicator Service, accessed from <http://www.ingenix.com/esg/products.php?pid=314>, on March 1, 2005.
35. Kane NM. Hospital profits, a misleading measure of financial health. *Journal of American Health Policy*. 1991 Jul-Aug;1(1):27-35.
36. Kuhn, E. M., A. J. Hartz, et al. The relationship of hospital characteristics and the results of peer review in six large states. *Medical Care*. 1991;29(10): 1028-1037.
37. Langland-Orban B, Gapenski LC, Vogel WB. Differences in characteristics of hospitals with sustained high and sustained low profitability. *Hospital and Health Services Administration*. 1996;41(3):385-99.
38. Levitt SW. Quality of care and investment in property, plant, and equipment in hospitals. *Health Services Research*. 1994 Feb;28(6):713-727.
39. Li LX, Collier DA. The role of technology and quality on hospital financial performance: An exploratory analysis. *International J Service Industry Management*. 2000;11(3);202-224.
40. Lynch JR, McCue MJ. The effects of for-profit multihospital system ownership on hospital financial and operating performance. *Health Services Management Research*. 1990 Nov;3(3): 182-192.
41. Lynn ML, Wertheim P. Key financial ratios can foretell hospital closures. *Healthcare Financial Management*. 1993 Nov;47(11):66-70.
42. McCue MJ. The use of cash flow to analyze financial distress in California hospitals. *Hospital and Health Services Administration*. 1991;36(2):223-41(a).
43. McCue MJ. Bed size and system influence on financial structure: a time-series and cross-sectional analysis of California hospitals. *Health Services Management Research*. 1991 Nov;4(3):206-215(b).

44. McCue MJ. Association of HMO penetration and other credit quality factors with tax-exempt bond yields. *Inquiry*. 1997;34(3): 217-227.
45. McCue MJ, Renn SC, Pillari GD. Factors affecting credit rating downgrades of hospital revenue bonds. *Inquiry*. 1990;27(3):242-54.
46. McCue MJ, Clement JP. Characteristics of the divested HCA and AMI hospitals. *Medical Care*. 1992 April;30(4): 360-372.
47. McCue MJ, Ozcan YA. Determinants of capital structure. *Hospital & Health Services Administration*. 1992;37(3):333-346.
48. McCue MJ, Clement JP, Hoerger TJ. The association of ownership and system affiliation with the financial performance of inpatient psychiatric hospitals. *Inquiry*. 1993;30(3):306-317.
49. McCue MJ, Clement JP. Assessing the characteristics of hospital bond defaults. *Medical Care*. 1996 Nov;34(11):1121-34.
50. McCue, M. J., N. McCall, et al. Financial performance and participation in Medicaid and Medi-Cal managed care. *Health Care Finance Review*. 2001;23(2): 69-81.
51. McCue MJ, Thompson JM, Dodd-McCue D. Association of market, mission, operational, and financial factors with hospitals' level of cash and security investments. *Inquiry*. 2000-01;37(4):411-22.
52. McCue MJ, Thompson JM. Association of ownership and system affiliation with the financial performance of rehabilitation hospitals. *Health Services Management Research*. 1997 Feb;10(1):13-23.
53. Menke TJ. The effect of chain membership on hospital costs. *Health Services Research*. 1997 June;32(2):177-196.
54. Moody's Investors Service, Not-for-Profit Health Care Medians, accessed from <http://www.moodys.com/cust/default.asp>, on March 1, 2005.
55. Nauenberg E, Brewer CS, Basu K, Bliss MK, Osborne JW. Network structure and hospital financial performance in New York State: 1991-1995. *Medical Care Research and Review*. 1999 Dec;56(4):415-39.
56. Nelson, E., R. Rust, et al. Do patient perceptions of quality relate to hospital financial performance? *Journal of Health Care Mark*. 1992;12(4): 6-13.
57. Oswald S, Gardiner L, Jahera J Jr. Indicators of hospital closure under PPS and Blue Cross/Blue Shield cost-based reimbursements. *Journal of Hospital Marketing*. 1992;6(2):149-82.

58. Ozcan YA, McCue MJ. Development of a financial performance index for hospitals: DEA approach. *Journal of Operational Research Society*. 1996;47(1):18-26.
59. Prince TR. Assessing financial outcomes of not-for-profit community hospitals. *Hospital & Health Services Administration*. 1991;36(3):331-349.
60. Prince TR, Ramanan R. Bond ratings, debt insurance, and hospital operating performance. *Health Care Management Rev*. 1994;19(1):64-73.
61. Rizzo, J.A. Has Medicare been a "bad deal" for rural hospitals? *Journal of Rural Health*. 1991;7(5):599-617.
62. Schoenman, JA, C. M. Cheng, et al. Do hospital-based rural health clinics improve the performance of the parent hospitals? Washington DC, The Project HOPE Walsh Center for Rural Health Analysis. 1999.
63. Sear, AM. Operating characteristics and comparative performance of investor-owned multihospital systems. *Hospital and Health Services Administration*. 1992;37(3): 403-15.
64. Shukla RK, Pestian P, Clement J. A comparative analysis of revenue and cost-management strategies of not-for-profit and for-profit hospitals. *Hospital and Health Services Administration*. 1997;42(1):117-134.
65. Solucient. The Comparative Performance of U.S. Hospitals: 2004 Sourcebook, accessed from [http://solucient.ecnext.com/coms2/page\\_cpush2002\\_description](http://solucient.ecnext.com/coms2/page_cpush2002_description), on March 1, 2005.
66. Tennyson DH, Fottler MD. Does system membership enhance financial performance in hospitals? *Medical Care Research Review*. 2000 Mar;57(1):29-50.
67. Vogel WB, Languard-Orban B, Gapenski LC. Factors influencing high and low profitability among hospitals. *Health Care Management Review*. 1993;18(2):15-26.
68. Watkins AL. Hospital financial ratio classification patterns revisited: Upon considering nonfinancial information. *Journal of Accounting and Public Policy*. 2000;19(1):73-95.
69. Wedig GJ, Hassan M, Morrissey MA. Tax-exempt debt and the capital structure of nonprofit organizations: an application to hospitals. *Journal of Finance*. 1996 Sep;51(4):1247-1283.
70. Wedig GJ, Hassan M, Van Horn RL, Morrissey MA. Hospital affiliation and capital structure: how will capital markets guide health care restructuring? *Journal of Public Budgeting, Accounting and Financial Management*. 1998;10(3):413-440.
71. Williams, D. and J. Pettengill. The role of profitability and community characteristics in hospital closure an urban and rural analysis. Washington DC, Prospective Payment Assessment Commission. 1991.

72. Younis M, Rice J, Barkoulas J. An empirical investigation of hospital profitability in the post-PPS era. *Journal of Health Care Finance*. 2001;28(2):65-73.
73. Zeller TL, Stanko BB, Cleverley WO. A new perspective on hospital financial ratio analysis. *Healthcare Financial Management*. 1997 Nov;51(11):62-66.
74. Zeller TL, Stanko BB, Cleverley WO. A revised classification pattern of hospital financial ratios. *Journal of Accounting and Public Policy*. 1996;15(2):161-181.
75. Zeller TL, Stanko BB. Hospital industry cash flow ratio analysis: a sufficiency and efficiency perspective. *Hospital Cost Management and Accounting*. 1997 Jan;8(10):5-8.