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Success Stories

Evaluating Cost Center Productivity

IMPROVING a cost center's productivity depends upon the nurse manager's understanding of how to maximize output from a limited amount of input. To effectively measure input against output, Esmond (1990), asks: How does the actual labor, supply, and other costs, compare to expected costs for the volume and quality of procedures provided? Successful management of an ambulatory care center requires the ability to categorize, compare, trend, and analyze key budget indicators. Mainframe systems provide the required elements but lack the flexibility needed to compare and contrast different data combinations. A computerized spreadsheet template was applied to Lotus®, a commercial software package, using the operational and manpower reports to monitor ambulatory care departments.

Background information for this article is available in the full-text version of this article.

While nursing is moving from the overall cost of operation to the cost per unit of service, using data from operational and manpower reports remains a valuable tool for decision making. Data elements, found in financial reports, can usually fit into the following categories of most ambulatory care facilities (see Table 1).

Once the monthly totals are entered, manually or imported by query, the remaining summary of monthly and year-to-date productivity indicators, described in the next section, are automatically calculated using the spreadsheet's formulas.

The productivity summary is described in detail.

The monthly productivity summary consists of 12 spreadsheets reflecting the fiscal year, that build on each month's financial totals. A month-to-month and year-to-year comparison is also part of the spreadsheet. However, because of space limitation, only the December spreadsheet will be discussed (see Figure 1).

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The number of visits/patient encounters or procedures/treatments (volume) define the key volume indicators or workload units for each cost center. In a clinic environment, the number of treatments, tests, supplies, and the average time taken during each encounter are all included in the volume of patients seen. In contrast, a diagnostic department generally uses a procedure or treatment to measure the workload unit.

Total man hours paid (TTL MNHRS) is the sum of the nonproductive man hours paid (NONPROD MNHRS) and productive man hours paid (PROD MNHRS). The majority of resources required for the delivery of services (total man hours [TTL MNHRS]) are directly related to the department's volumes.

Total man hours per volume (MNHR/volume) consists of the TTL MNHR divided by the cost center's procedures or visits (volume). This measurement can monitor the amount of manpower needed for the volumes. For example, if utilization of MNHRS/volume consistently averaged 3.83 in 1 year, then 3.73 in the next, this would indicate an increase in productivity.

The total full-time employees (TTL FTEs) category is the number of work hours a full-time employee is scheduled a month and can be used in different ways. For example, an FTE can be used to fill one full-time 40-hour week or two part-time positions. FTEs are calculated in the spreadsheet by dividing the TTL MNHRS by the number of working hours each month (accrual value).

The accrual value (see Figure 2) changes depending on the number of days in a month. For example, the number of days in January is 31, so the number of working hours for one FTE is equal to 177, while April has 30 days, making the accrual value 171 hours for each FTE. During a leap year the accrual changes further because February has 29 days resulting in a value of 168. During a regular year the value for February's 28-day month is 160. Therefore, in years with 365 days, one FTE is equal to 2,083 paid hours, while in a leap year with 366 days, one FTE is equal to 2,091 paid hours. It also follows that a 0.5 FTE is equal to 1,041.5 paid hours in a year with 365 days and 1,045.5 paid hours during a leap year.

The cost center's volume/FTE is sensitive to how changes in volumes relate to the number of TTL FTEs. For example, if the cost center's volume increases without a corresponding increase in the number of TTL FTEs, then more procedures or visits are performed with less manpower.

NONPROD MNHRS is an overall monitor of labor costs charged to the cost center. This category

Table 1.
Ambulatory Care Data Categories

Measure	Acronym	Significance
Total visits/procedures	Volume	Department specific services
Total nonproductive man hours paid	NONPROD MNHRS	Vacation, sick time
Total productive man hours paid	PROD MNHRS	Time worked
Total labor expense	LABOR expense	Salary and benefits
Total material and services expense	M/S expense	Supplies and service contracts
Total gross revenue	TTL revenue	Service charges

includes the holiday, vacation, paid sick time, absences, and other benefit hours, such as orientation, education, and conference hours. A benchmark for paid time off varies between 9% and 12% of the employee's total annual hours. Since these are fixed hours per employee, there is no direct relationship to department activity. NONPROD MNHRS are determined by employee benefit packages, and many times increase with length of service.

PROD MNHRS consists of the total number of hours employees have worked during the month, including salary, raises, bonuses, overtime, temporary staff replacements, and shift differentials. This category is directly affected by fluctuations in cost-center volume and acuity. For example, more nursing or support personnel hours may be needed on high-volume days, while fewer hours should be used on low-volume days.

Productive man hours per volume (PROD MNHR/VOLUME) consist of the PROD MNHR divided by the total number of procedures or visits.

Total productive FTEs (TTL PROD FTE) reflect the actual hours worked by all staff and are directly related to the PROD MNHRS. If, for example, part-time staff extend their hours to cover for the vacancy created by full-time staff vacation, holiday, or sick time, the TTL PROD FTEs will remain constant, while the TTL FTEs will increase. Because these indicators help to determine the actual dollars spent on manpower, departments can use their baseline measures to evaluate the need for corrective action such as department redesign and changes in policy.

The volume/PROD FTE is the total volume divided by the TTL PROD FTEs. These categories are sensitive to changes in the productivity measures used in defining departmental standards, targeting goals, and ultimately measuring resource use. It is important to note that these categories are not affected by even dramatic variations in NONPROD MNHRS.

The labor expense consists of dollars associated with the payment for NONPROD MNHRS and PROD

MNHRS. According to Berman, Weeks, and Kukla (1990), "direct labor, consists of all the labor costs (salaries and fringe benefits) for the department's employees" (p. 650). The labor expense can add up to two-thirds of a department's operating budget, depending upon what services are provided.

M/S expense generally consists of direct expenses, patient and office supplies, leases, equipment repair, contracted services, travel, and training. The cost center's volumes drive about 90% of the direct fixed and variable costs. Due to changes in volumes, equipment performance, equipment rentals, and inflationary factors, M/S expense can vary greatly. The remaining 10% is used for physician contracts and other miscellaneous costs.

Total gross revenue (TTL revenue) consists of billed charges generated for patient care, rather than actual dollars received. Billed charges do not reflect total reimbursement for services because of variances in patient payer mix (Medicare, Medicaid, private insurance, contracts, HMO) and bad debt losses. Reimbursement can often be delayed up to 6 or more months and cover less than 50% of the billed charges. Therefore, TTL revenue is easier and more timely to obtain. Tracking TTL revenue is valuable for analyzing new services, programs, and department redesign.

Total direct expenses (TTL expense) are the sum total of the labor expense plus the M/S expense. TTL expense includes actual resources used such as materials, services, and salary. The TTL expense does not include the fixed costs, such as rent and utilities.

The labor cost/volume, M/S cost/volume (TTL cost/volume), and revenue/volume categories are especially helpful in trending and summarizing the past months' productivity using the spreadsheet's software graph application.

An illustration of several of the budget summary indicators from the same department would be to compare procedures, such as an EKG to cardiac catheterization. Even with a high volume procedure like an EKG, the labor expense, M/S expense, and

**Figure 1.
Monthly Productivity Summary**

1996 MONTHLY PRODUCTIVITY SUMMARY
DEPARTMENT:
DEPARTMENT #:
DATE: DECEMBER

MONTH		1996		1995		1996		YTD	
1995	1996	1996	1996	1995	1996	1996	1996	1996	1996
ACTUAL	BUDGET	ACTUAL	VAR. ACT.	ACTUAL	VAR. ACT.	BUDGET	ACTUAL	ACTUAL	VAR. ACT.
0	0	0	+FE11-FC11	@SUM(EW11+FC11)	+FE11-FD11	@SUM(EX11+FD11)	@SUM(EY11+FE11)	+FK11-FI11	+FK11-FJ11
0	0	0	+FE13-FC13	@SUM(EW13+FC13)	+FE13-FD13	@SUM(EX13+FD13)	@SUM(EY13+FE13)	+FK13-FI13	+FK13-FJ13
+FC13/FC11	+FD13/FD11	+FE13/FE11	+FE15-FC15	+F13/FI11	+FE15-FD15	+F13/FJ11	+FK13/FK11	+FK15-FI15	+FK15-FJ15
+FC13/V12	+FD13/V12	+FE13/V12	+FE17-FC17	+F13/EZ1	+FE17-FD17	+F13/EZ1	+FK13/EZ1	+FK17-FI17	+FK17-FJ17
+FC11/FC17	+FD11/FD17	+FE11/FE17	+FE19-FC19	+F11/FI17	+FE19-FD19	+F11/FJ17	+FK11/FK17	+FK19-FI19	+FK19-FJ19
0	0	0	+FE21-FC21	@SUM(EW21+FC21)	+FE21-FD21	@SUM(EX21+FD21)	@SUM(EY21+FE21)	+FK21-FI21	+FK21-FJ21
0	0	0	+FE23-FC23	@SUM(EW23+FC23)	+FE23-FD23	@SUM(EX23+FD23)	@SUM(EY23+FE23)	+FK23-FI23	+FK23-FJ23
+FC23/FC11	+FD23/FD11	+FE23/FE11	+FE25-FC25	+F123/FI11	+FE25-FD25	+F123/FJ11	+FK23/FK11	+FK25-FI25	+FK25-FJ25
+FC23/V12	+FD23/V12	+FE23/V12	+FE27-FC27	+F123/EZ1	+FE27-FD27	+F123/EZ1	+FK23/EZ1	+FK27-FI27	+FK27-FJ27
+FC11/FC27	+FD11/FD27	+FE11/FE27	+FE29-FC29	+F111/FI27	+FE29-FD29	+F111/FJ27	+FK11/FK27	+FK29-FI29	+FK29-FJ29
0	0	0	+FE31-FC31	@SUM(EW31+FC31)	+FE31-FD31	@SUM(EX31+FD31)	@SUM(EY31+FE31)	+FK31-FI31	+FK31-FJ31
0	0	0	+FE33-FC33	@SUM(EW33+FC33)	+FE33-FD33	@SUM(EX33+FD33)	@SUM(EY33+FE33)	+FK33-FI33	+FK33-FJ33
0	0	0	+FE35-FC35	@SUM(EW35+FC35)	+FE35-FD35	@SUM(EX35+FD35)	@SUM(EY35+FE35)	+FK35-FI35	+FK35-FJ35
+FC31/FC33	+FD31/FD33	+FE31/FE33	+FE37-FC37	+F131/FI33	+FE37-FD37	+F131/FJ33	+FK31/FK33	+FK37-FI37	+FK37-FJ37
+FC31/FC11	+FD31/FD11	+FE31/FE11	+FE39-FC39	+F131/FI11	+FE39-FD39	+F131/FJ11	+FK31/FK11	+FK39-FI39	+FK39-FJ39
+FC33/FC11	+FD33/FD11	+FE33/FE11	+FE41-FC41	+F133/FI11	+FE41-FD41	+F133/FJ11	+FK33/FK11	+FK41-FI41	+FK41-FJ41
+FC35/FC11	+FD35/FD11	+FE35/FE11	+FE43-FC43	+F135/FI11	+FE43-FD43	+F135/FJ11	+FK35/FK11	+FK43-FI43	+FK43-FJ43
+FC37/FC11	+FD37/FD11	+FE37/FE11	+FE45-FC45	+F137/FI11	+FE45-FD45	+F137/FJ11	+FK37/FK11	+FK45-FI45	+FK45-FJ45
+FC35-FC37	+FD35-FD37	+FE35-FE37	+FE47-FC47	+F135-FI37	+FE47-FD47	+F135-FJ37	+FK35-FK37	+FK47-FI47	+FK47-FJ47

THE MONTHLY PRODUCTIVITY SUMMARY

**Figure 2.
Accrual Values**

Month	Year
177	January
160	February
177	March
171	April
177	May
171	June
177	July
177	August
171	September
177	October
171	November
177	December

TTL cost/volume will be low because the EKG is a noninvasive diagnostic test with a quick turnaround time. In comparison, for cardiac catheterization, volume indicators will be relatively lower than the EKG procedure, while the TTL cost/volume will be significantly higher due to the procedure time, specialized skill levels, equipment, and supplies. These categories can also be used to monitor the effects of procedural price increases and general wage increases.

Direct net revenue is the TTL revenue minus the TTL expenses. After the cost center's direct expenses have been covered, the direct net revenue is the cost center's net profit (or loss) contribution to the hospital's overall financial performance.

Case Study: Trending an Endoscopy Department's Productivity

Our facility's endoscopy department underwent a work redesign process resulting from both internal and external forces. Since the changes between 1995 and 1996 were pivotal years, this time period is used to illustrate how the monthly productivity summary works. During 1995, endoscopy experienced an increase in volume by 1,634 from the past year (see Figure 3). This exceptional growth in volume was primarily due to the merger of two hospital systems. However, changes in national health care policies were used to forecast a decrease in the number of procedures, as well as reimbursement for services. Using this information, the budgeted volume for 1996 was predicted at 7,375 with no growth anticipated.

The next step was to determine the department's number of FTEs. In 1995, the endoscopy staff included 1 manager, 1 secretary, 4 registered nurses, and 7.1 licensed practical nurses, with the addition of NON-PROD MNHRS and overtime, TTL FTEs equaled 14.87 (15). Because there was no predicted increase in volumes and with the department redesign in

progress, the 1996 budgeted TTL FTEs were decreased slightly to 14.58. However, year end TTL FTEs for 1996 were 15.48 or +0.9, over budget. The increase in actual over budget resulted from issues such as staffing two campuses, long-term sick time, and monitoring standards for conscious sedation.

The 1996 budgeted NONPROD MNHRS were predicted at 3,745; however, by December that actual total climbed to 4,462 (+717). This increase in unbudgeted PROD and NONPROD MNHRS was again due to the same three issues listed above. In addition to increasing TTL FTEs (also discussed above), this impact was found in the TTL PROD FTEs category resulting in a variance of +0.32 (97.6% PROD MNHRS within a range of 95% to 105%). The trend continued as a relational negative variance of 19 in the volume/FTE from a budgeted 506 to an actual 487, and 4.29 MNHR/volume with a variance of +.16 over budget. But, in spite of the increased NONPROD MNHR, the PROD MNHR/volume remained relatively stable at an actual of 3.70 (+0.01). It is important to note that the PROD MNHRS are directly related to the volume, supporting the assumption that for every procedure there is a required number of staff.

The PROD MNHR/VOLUME is an excellent measure of the actual work performed. For 1996 the variance of +0.01 indicated a high level of productivity (99.7%). The volume/PROD FTE is also a good indicator of productivity. In 1996 the budgeted amount was 566, and the actual of 565, resulted in a variance of -1.

The labor expense, M/S expense, and TTL revenue originate from our facilities' mainframe print-out. The TTL expense consists of the sum of the department's labor expense and M/S expense. By 1996 year end, the actual M/S expense remained on target with the exception of a few accounts. However, an increase in procedure volumes caused a relational increase in the expenses for equipment repair and general operations of +\$8,404 (budget \$53.89/procedure, actual \$53.82/procedure, with an increase variance in the direct net revenue of \$61,592).

The labor cost/volume showed an increase between a budgeted \$72 and an actual cost of \$77, with a variance of +\$5 primarily due to long-term sick time. The M/S cost/volume demonstrated an increase in actual expenses from 1995 to 1996 by +\$3. The result was an increase in the actual 95/96 TTL cost/volume of \$13.99 in the overall cost of procedures, while the TTL revenue/volume showed a \$28 increase (+\$8) for 1996. Results of the spreadsheet can be graphed for additional visualization of progress.

The direct net revenue is a bottom line measure of the department's overall productivity, excluding overhead costs. Endoscopy was able to exceed their goals by achieving an increase (actual 95/96 of 197 procedures) in the direct net revenue from a 1995

**Figure 3.
Monthly Productivity Summary**

1996 MONTHLY PRODUCTIVITY SUMMARY
DEPARTMENT: ENDOSCOPY
DEPARTMENT #:
DATE: DECEMBER

	MONTH		95A/96A VAR. ACT.	96A/96B VARIANT	1995 ACTUAL	1996 BUDGET	1996 ACTUAL	1996 BUDGET	Y T D	
	1995 ACTUAL	1996 ACTUAL							1996 ACTUAL	95A/96B VARIANT
	588	630	13	(29)	7,344	7,375	7,541	197	166	
	2,169	2,621	734	282	30,978	30,491	32,366	1,388	1,875	
	3.69	4.16	1.14	0.67	4.22	4.13	4.29	0.07	0.16	
	12	15	4	2	15	15	15	1	1	
	48	43	37	(6)	494	506	487	(7)	(19)	
	358	342	580	238	4,803	3,745	4,462	(341)	717	
	2,043	2,279	2,323	44	26,969	27,244	27,906	937	662	
	3.47	3.62	3.87	0.25	3.67	3.69	3.70	0.03	0.01	
	12	13	13	2	13	13	13	0.40	0.32	
	51	49	46	(5)	567	566	565	(2)	(1)	
	\$39,597	\$45,315	\$52,319	\$7,004	\$488,929	\$534,556	\$581,921	\$92,992	\$47,365	
	\$9,443	\$33,408	\$33,466	58.00	372,702.00	397,483.00	405,887.00	33,185.00	8,404.00	
	\$217,760	\$239,496	\$228,399	-11,097.00	2,532,532.00	2,692,196.00	2,809,557.00	277,025.00	117,961.00	
	58809.00	78,723.00	85,785.00	7,062.00	861,631.00	932,039.00	987,808.00	126,177.00	55,769.00	
	\$67	\$72	\$87	\$15	\$67	\$72	\$77	\$11	\$5	
	\$16	\$53	\$56	\$3	\$51	\$54	\$54	\$3	(\$0.07)	
	\$370	\$380	\$380	(\$0.12)	\$345	\$365	\$373	\$28	\$8	
	\$100	\$125	\$143	\$18	\$117	\$126	\$131	\$13.99	\$4.61	
	158951.00	160,773.00	142,614.00	-18,159.00	1,670,901.00	1,760,157.00	1,821,749.00	150,848.00	61,592.00	

Figure 4.
Yearly Productivity Summary

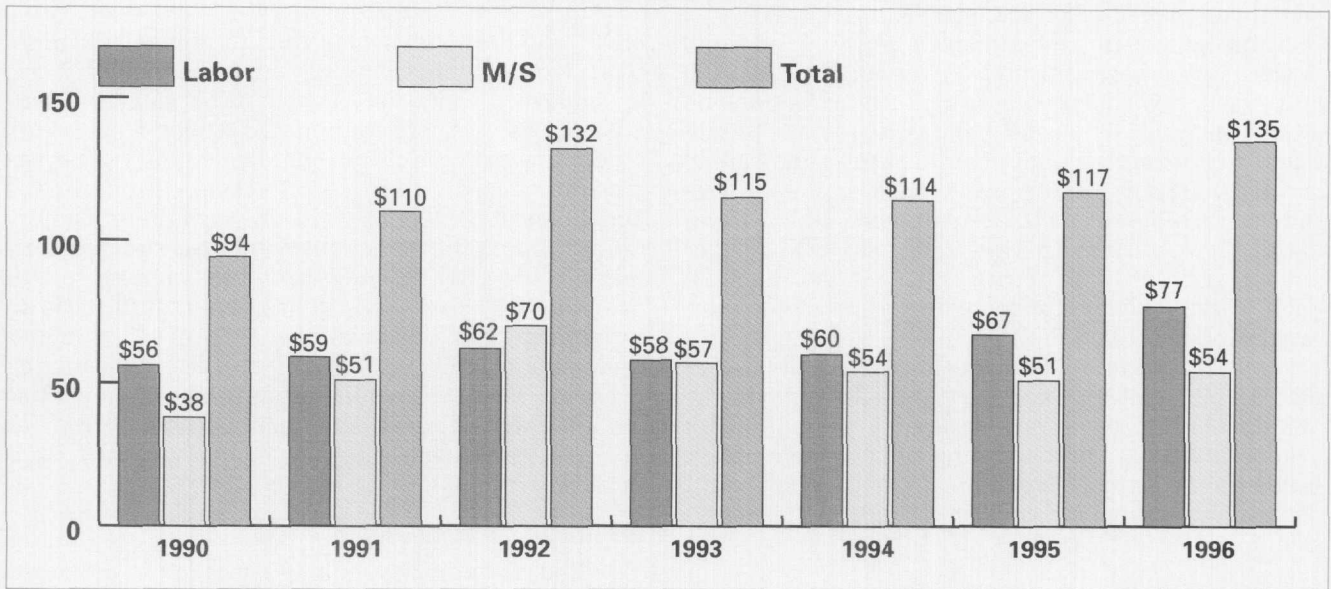
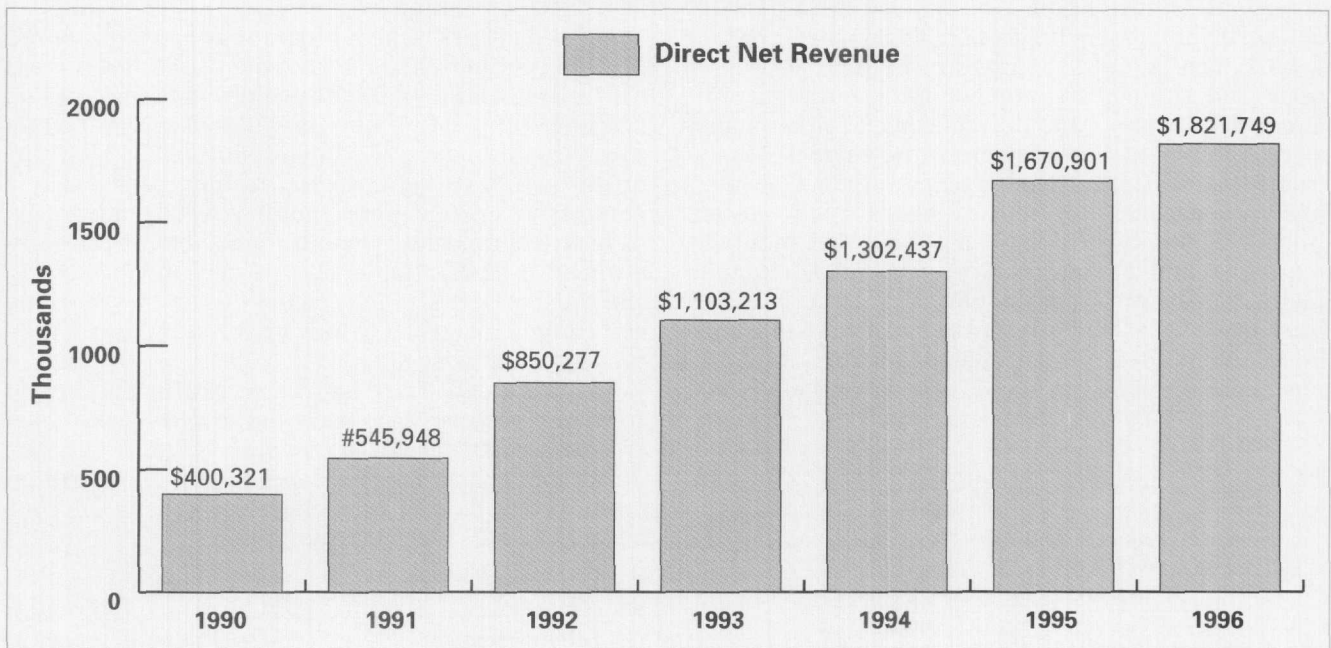


Figure 5.
Yearly Productivity Summary



actual of \$1,670,901 to 1996 actual \$1,821,749, with a favorable variance of +\$150,848, and a 1996 budget to actual variance of +\$61,592 (see Figures 3 & 4).

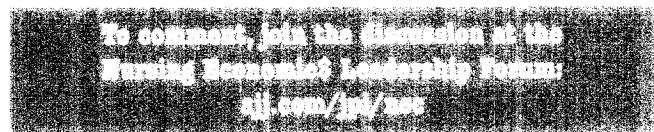
The endoscopy department's positive year-end position was accomplished by detailed monitoring and timely implementation of cost-saving options on a monthly basis. Several examples include established vendor agreements, standing orders for routine supplies, reduced number of vendors, initiating reorganization/redesign of the department, and consolidating services. As the budget indicators have demonstrated, even in a year of many changes and unanticipated costs, with careful balancing between volumes, resources, and inflation, it is possible to have positive year-end results (see Figure 5). However, to determine that the purse strings were not pulled too tight, the quality of services were measured for appointment availability, delays in scheduling, appointment delays in waiting, consumer complaints/compliments, accidents/injuries, and job satisfaction indicators such as sick time and staff turnover.

Summary

The monthly and yearly productivity summaries were developed and applied to a computer spreadsheet to aid the nurse manager in better understanding and communicating budget issues for diverse ambulatory care departments. A computerized spreadsheet using a commercially available personal computer program, such as Lotus®, Quattro Pro®, or Excel®, can be used to more quickly and accurately track and summarize monthly budget reports. The data can be entered into the spreadsheet either manually or imported by query from the financial mainframe system. Contact your agency's finance or information department for information on how to accomplish this. Periodically acuity and resources should be measured and compared with quality monitors to maintain standards. For the past 10 years, our facility has successfully used this tool to make more informed decisions by identifying trouble spots early, and taking corrective action to avoid crisis management. S

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areas, emphasis must now turn to clinical IT initiatives, where savings have proven to be more difficult to achieve. Federal, state, and local mandates will advance the implementation of systems to measure, report and improve clinical outcomes, and the importance of timely and specific information on clinical and financial indicators will only continue. Quality ratings and report cards will become the standard, primary tool used to measure and choose health providers. Payers will increasingly shift risk to providers, and organizations will need to better understand their customers' profiles and buying behavior. They will require accurate and timely information about clinical and financial data as well as business intelligence about customer and key competitive weapons.

Memorable Moments

Other IT priorities ranking near the top of the list include applications to support enterprise-wide scheduling, decision support and data warehousing, as well as systems to support common vocabularies and standardized syntax, which are critical for effective communication and analysis. The movement to wireless technologies and outsourcing IT functions also deserve mention.

The business of health care is being restructured from top to bottom, as is the role of the health care executive. Even the basic mission of treating the sick has now turned to a new model of keeping people well. The ultimate goal of increasing satisfaction and quality while reducing costs will only be realized if progressive organizations continue to take advantage of new technologies. Organizations should carefully evaluate industry trends against their own strategic and business goals and choose their IT priorities accordingly. Choosing to bide your time and wait may prove to be unwise.

Sure enough, there may be no rest for the weary. After you remove your party hat and celebrate your organization's success at the initial Y2K event, put down your champagne flute and dig in. There will be a number of new IT challenges for you to confront head-on as the calendar registers 00.\$

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