

# **Activity Based Management in a Hospital Setting: An Exploratory Study**

---

**HBO & Company's  
Amherst Product Group  
1995 Northeast Regional  
Trendstar User's Conference**

**November 15, 1995**

**Anne Farmer  
TriNet Healthcare Consultants, Inc.**

**Michele Sweeney  
The Medical Center of  
Central MA**

# Outline

This session will focus on the results of a preliminary study of the applicability of Activity-Based Costing/Activity-Based Management techniques in a health care environment.

- I. Introduction to The Medical Center of Central Massachusetts and its Cost Accounting initiatives.
- II. Brief overview of ABC/ABM definitions and concepts.
- III. Description of the pilot study of the Chronic Dialysis unit.
- IV. Illustration of adapting the HBOC Trendstar System to accommodate ABC/ABM without creating an entirely new system.

# **Introduction to the Medical Center Of Massachusetts**

## **Part I**

# The Medical Center of Central Massachusetts

## Fiscal Year 1995 Fact Sheet

- Two campuses
  - Variety of Outpatient Satellite Services
- Major Teaching Facility
- Regional Perinatal Center and Transfer Unit for “High Risk” Pregnancies
- 469 Beds, 84 Bassinets
- Gross Revenue 246,770,163
  - Outpatient Revenue 98,814,989
- Discharges 21,423
- Patient Days 96,451
- Average Length of Stay 4.50
- Outpatient Visits 327,449
- # of Employees 3,259
- # of FTE’s 2,454

# Cost Accounting History

- Implementation of the HBOC Trendstar System (Worcester Hahnemann and Worcester Memorial)
  - 1986
- Worcester Memorial Merged with Worcester Hahnemann
  - 1989 (Consolidated Decision Support System)
- Conversion to Single Provider
  - 1994
- Current Trendstar modules include: CCA, RUA, HSL, MCA and Paysim

# Cost Standards: Development/Maintenance

## Cost Standards: Development

- 80/20 Rule (Pareto Principle)
- Studied All Departments
- Focused on Direct Variable Costs
- Evolution of Standards

## Cost Standards: Maintenance

- Study 1/12th of the Departments Per Month
- Addition of New Departments

# Cost Stepdown Model

## Steps

1. General Ledger Expenses
2. Interdepartmental Expense Transfers
3. Offset Other Operating Revenue
4. Assign Physician Expense
5. Apply Fixed/Variable Breakouts to Create Cost Components  
i.e. Direct Fixed Costs, Direct Variable Costs
6. Perform Allocation
7. Develop Cost Data
8. Generate Reports and Audit Results

# Cost Allocation Process

- Started with Medicare 2552 Structure
- Detailed Overhead Structure
- Appropriate Statistics
- Generate Reports and Audit Results

# **Cost Allocation**

## **Examples of Alternative Overhead Statistics**

- Clinical Engineering
- Milk Bank
- Translation Services
- IV Therapy
- Inpatient Phlebotomy

# Direct and Indirect Report

	FIXED SALARY	VARIABLE SALARY	FIXED NONSL	VARIABLE NONSL	INDIRECT CAPITAL BLDG/FIX	INDRECT CAPITAL MME	PHYS ALLOC	OTHER OPER REVENUE	TOTAL EXPENSE	% OF TOTAL	GROSS REVENUE
202 HEMODIALYSIS-CHRONIC											
NET DIRECT EXPENSES											
111 DIRECT FIXED SALARIES	327,194	0	0	0	0	0	0	0	327,194	17.43%	0
113 DIRECT FIXED SUPPLIES	0	0	7,680	0	0	0	0	0	7,680	0.41%	0
121 DIRECT VARIABLE SALARIES	0	218,129	0	0	0	0	0	0	218,129	11.62%	0
123 DIRECT VARIABLE SUPPLIES	0	0	0	458,638	0	0	0	0	458,638	24.44%	0
TOTAL NET DIRECT EXPENSES	327,194	218,129	7,680	458,638	0	0	0	0	1,011,641	53.91%	0
FRINGE BENEFIT RELATED											
1003 EMP BENEFITS-SALARY	154	52	73,490	0	0	0	0	(1,293)	72,403	3.86%	0
1004 EMP BENEFITS-FTE	0	0	4,109	0	0	0	0	0	4,109	0.22%	0
1005 MEDICAL INSURANCE	0	0	69,797	0	0	0	0	0	69,797	3.72%	0
1009 CAFETERIA	3,121	323	1,117	12	885	89	0	(2,954)	2,593	0.14%	0
TOTAL FRINGE BENEFIT RELATED	3,275	375	148,513	12	885	89	0	(4,247)	148,902	7.93%	0
SPACE & EQUIPMENT RELATED											
1001 DEPRECIATION-BLDG/INTEREST	0	0	0	0	89,818	0	0	(7,082)	82,736	4.41%	0
1002 DEPRECIATION-MAJOR MOVABLE	0	0	0	0	251	18,231	0	0	18,482	0.98%	0
1010 PLATN ENG ADMIN/PLANT OP	35,426	220	26,431	162	8,154	2,050	0	(7,229)	65,214	3.47%	0
1011 POWER PLANT	13,700	274	62,089	220	5,277	1,243	0	(2,036)	80,767	4.30%	0
1012 BIOMEDICAL ENGINEERING	20,139	135	17,406	99	1,491	1,672	0	(775)	40,167	2.14%	0
TOTAL SPACE & EQUIPMENT RELATED	69,265	629	105,926	481	104,991	23,196	0	(17,122)	287,366	15.31%	0
SUPPORT SERVICES RELATED											
1013 HOUSEKEEPING	46,121	4,667	36,498	3,338	2,170	1,451	0	(2,002)	92,243	4.91%	0
1016 LINEN DISTRIBUTION	1,668	1,876	9,575	2,769	707	243	0	(312)	16,526	0.88%	0
1017 PATINET ACCOUNTS	4,298	8,549	6,480	983	940	366	0	(491)	21,125	1.13%	0
1018 PATIENT REGISTRATION	8,661	20,980	11,120	1,142	1,899	1,328	0	(1,059)	44,071	2.35%	0
1035 IN-SERVICE ED/NURSING QA	6,139	1,117	3,095	82	934	430	0	(301)	11,496	0.61%	0
1041 SOCIAL SERVICE	7,799	12,764	7,003	88	980	474	0	(592)	28,516	1.52%	0
1042 MEDICAL RECORDS	105	11	82	23	3	8	0	(6)	226	0.01%	0
1069 CSR-O/H	215	53	191	253	40	31	1	(16)	768	0.04%	0
1070 PHARMACY-O/H	147	32	456	388	5	15	1	(14)	1,030	0.05%	0
TOTAL SUPPORT SERVICES RELATED	75,153	50,049	74,500	9,066	7,678	4,346	2	(4,793)	216,001	11.51%	0
ADMINSTRATIVE & GENERAL RELATED											
1006 ADMINISTRATIVE SERVICES	60,718	4,132	57,891	3,389	5,484	17,173	0	(13,297)	135,490	7.22%	0
1007 EMPLOYEE SERVICES	13,829	69	7,802	56	298	603	0	(2,572)	20,085	1.07%	0
TOTAL ADMIN & GENERAL	74,547	4,201	65,693	3,445	5,782	17,776	0	(15,869)	155,575	8.29%	0
PHYSICIAN RELATED											
1050 HEM/ONC-O/H	243	16	4,272	13	23	68	0	(52)	4,583	0.24%	0
1053 CARDIOLOGY-O/H	97	7	1,705	6	9	28	0	(22)	1,830	0.10%	0
1054 SURGERY-O/H	5,555	137	11,253	50	111	580	0	(236)	17,450	0.93%	0
1055 FAMILY PRACTICE-O/H	224	15	3,935	12	20	63	0	(86)	4,183	0.22%	0
1056 PRIMARY CARE-O/H	320	22	5,640	18	29	92	0	(70)	6,051	0.32%	0
1057 INT MED-O/H	3,228	567	17,013	75	349	956	1,234	(325)	23,097	1.23%	0
TOTAL PHYSICIAN RELATED	9,667	764	43,818	174	541	1,787	1,234	(791)	57,194	3.05%	0
GROSS REVENUE	0	0	0	0	0	0	0	0	0	0.00%	1,712,456
TOTAL 202 HEMODIALYSIS-CHRONIC	559,101	274,147	446,130	471,816	119,877	47,194	1,236	(42,822)	1,876,679	100.00%	1,712,456

# Key Factors for Success

- Look to Improve Our Understanding of What Drives Overhead Costs
- Communicate With Department Managers
- Educate Department Managers
- Automate Wherever Possible
- Audit, Audit, Audit
- Create Good Process Documentation

# **ABC/ABM Definitions and Concepts**

## **Part II**

# Activity- Based Management (ABM)

ABM is a discipline that focuses on the management of activities as the route to continuously improving the value received by patients and the efficiency achieved by providing this value. The primary tools of ABM are:

- Cost Drive Analysis
- Activity Analysis
- Performance Analysis

Activity-based management draws on activity-based costing as a major source of information.

Source: The definitions are adapted from Common Cents and the ABC Performance Break Through by Peter B.B. Turney (Cost Technology, Inc. 1992)

# Activity-Based Costing (ABC)

- ABC is a method of measuring the cost and performance of activities and cost objects.
- ABC assigns costs to activities based on their use of resources, and assigns cost to product based on their use of activities.
- An *activity* is a unit of work performed within an organization which consumes resources.
- A *cost object* is the reason for performing an activity. Cost objects include products, services, projects, contracts, and patients.

# Drivers

## Cost Driver

- A *cost driver* is a factor that changes the performance of an activity and also affects the resources required by the activity (e.g. the acuity of a patient is a determining factor in the effort required by Nursing).

## Activity Driver

- An *activity driver* is a factor used to assign cost from an activity to a cost object based on the frequency and intensity of use (e.g. number of patient days).

## Resource Driver

1. The link between resources and activities. Assigns general ledger costs to activities.

# A Cost Assignment Review

## List Resources

- General Ledger
- Internal/External

## Assign Resources to Activities

- Develop estimates from observation and discussion. These estimates are *resource drivers*.
- The part of each resource assigned to each activity is a *cost element* of that activity.

## Assign the Cost of Activities to Cost Objects

- Use *activity drivers* determines from a study of the activity.

# **Benefits of ABM Approach Focusing on Department Managers**

- Preserve process analysis from TQM efforts.
- Overhead costs are assigned on a “cause-and-effect” basis.
- Increase business awareness and action orientation of department managers.
- Encourage cross-functional teamwork (partnership network).
- Avoid massive top-down system.
- Leverage the investment in the Decision Support System.

# When Does ABC/ABM Make Sense?

- Overhead represents a large part of overall costs.
- Many services are offered which differ in terms of how they use overhead.
- Managers feel uncomfortable with understanding their reports (i.e. either “don’t trust the numbers” or don’t understand the underlying allocation processes).
- Top management wants to improve the quality of cost analysis and introduce a common business language to managers in order to improve efficiency.

# **The Pilot Study**

## **Part III**

# Pilot Study - Step 1

## Identify Activities Performed Within the Department

- Register Patient
- Check-In
- Set Up
- Tending
- Set Down
- Check Out
- Cleaning Station
- Handling Supplies Reuse
- Managing Department
- Educating Staff

# Pilot Study - Step 2

## Identify Resources Required to Support Those Activities

### Internal

- Salaries
- Outside services
- Med/Surg Supplies
- Pharmaceuticals
- Office Supplies
- IV Solutions/Supplies
- Uniforms Purchased
- Service Contracts
- Maintenance/Repair Equipment
- Miscellaneous Supplies

### External

- Clinical Engineering
- Lab Testing
- Information Systems and Data Processing
- Social Services
- Registration
- Purchasing

# Pilot Study - Step 3

## Determine Cost Assignment Method for Each Resource by Interacting with Relevant Department Managers.

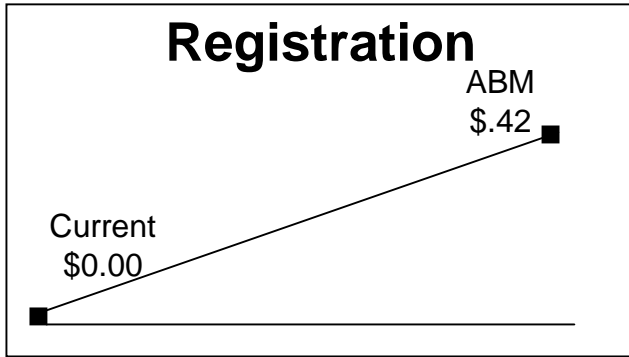
- Six overhead areas targeted (Information Systems, Social Services, Purchasing, Lab Testing, Clinical Engineering, Registration).
- Other Resources (Potential for ABC analysis)
- Sustaining Resources (No clear connection to department).

# Selected Examples

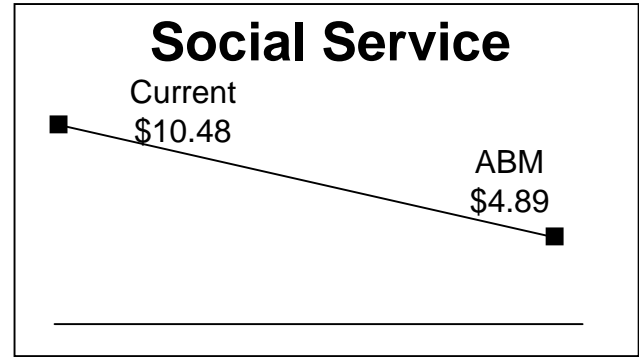
## Costs Assigned to Chronic Dialysis Based on Activity Drivers

	OVERHEAD TOTAL HOSPITAL	ACTIVITY DRIVERS	TOTAL HOSPITAL VOLUME	DEPT. VOLUME	DRIVER FORMULA
CLINICAL ENGINEERING	\$91,840	#FTE'S	7	1	$91,840 * (1/7) = \$13,120$
LAB TESTING	\$2.21 reimb/treatment	# of treatments	---	3,461	$\$2.21 * 3,461 = \$7,649$
SOCIAL SERVICES	\$221,769	# FTE's	20.3	1.5	$221,769 * (1.5/20.3) = \$16,386$
INFO SYSTEMS & DP	\$394,290	# of trans.	480,520	781	$394,290 * (781/480,520) = \$641$
PURCHASING	\$70,555	# of purch. req's	5,412	46	$70,555 * (46/5,412) = \$599$
REGISTRATION	\$50/hour	# of patients	---	3,461	$\$50/60 * (.5 * 3,461) = \$1,442$

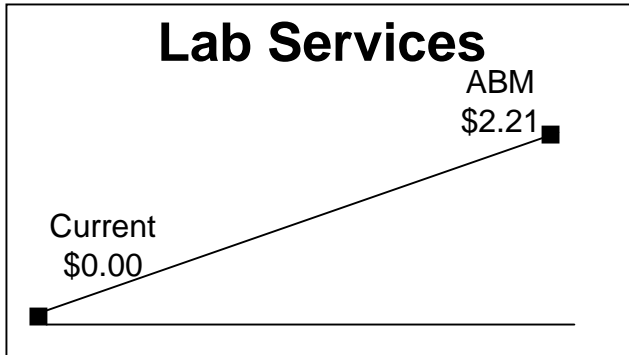
# Cost Comparisons of the Six Indirect Cost Areas Studied



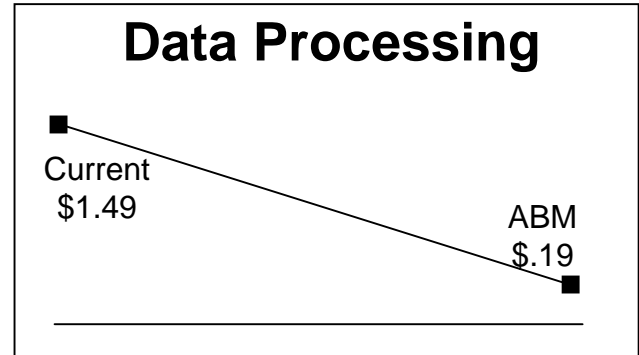
CHANGE = \$0.42 / Rx



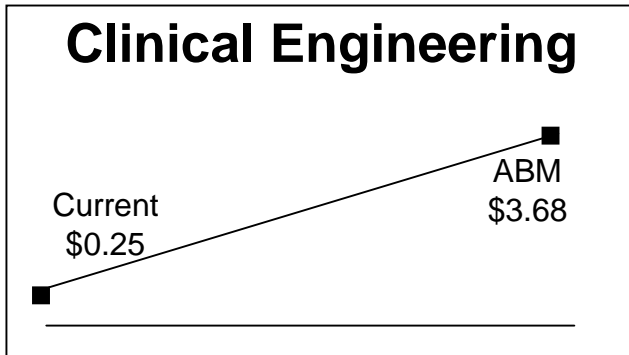
CHANGE = (\$5.60) / Rx



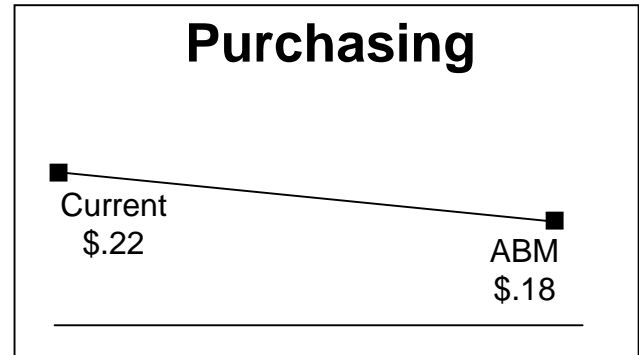
CHANGE = \$2.21 / Rx



CHANGE = (\$1.30) / Rx



CHANGE = \$3.43 / Rx



CHANGE = (\$0.04) / Rx

# Sustaining Resources and Other Resources Detailed Listing

## Sustaining Resources

DEPARTMENT	\$ AMOUNT
Medical Education	3,386
Medical Staff Development	563
Cardiology/Overhead	546
Hematology Overhead	477
Surgery Overhead	916
Primary Care Overhead	1,838
Internal Medicine Overhead	5,371
Interns & Residents	<u>4,500</u>
Total	17,597

## Other Resources

DEPARTMENT	\$ AMOUNT
Depreciation Bldg. Int.	621
Depreciation MME	4,519
Employee Benefits	28,167
Employee Benefits FTE	19,029
Employee Services	1,920
Dietary	30
Housekeeping	13,119
Admin Services	48,030
	(Less Purch. and I.S.)
Telecommunications	2,379
Sewing	5,623
Nurse Admin.	19,240
CSR Overhead	607
Pharmacy Overhead	10,054
Research	<u>2,902</u>
Total	156,240

# Pilot Study - Step 4

## Trace Each Resource to Activities

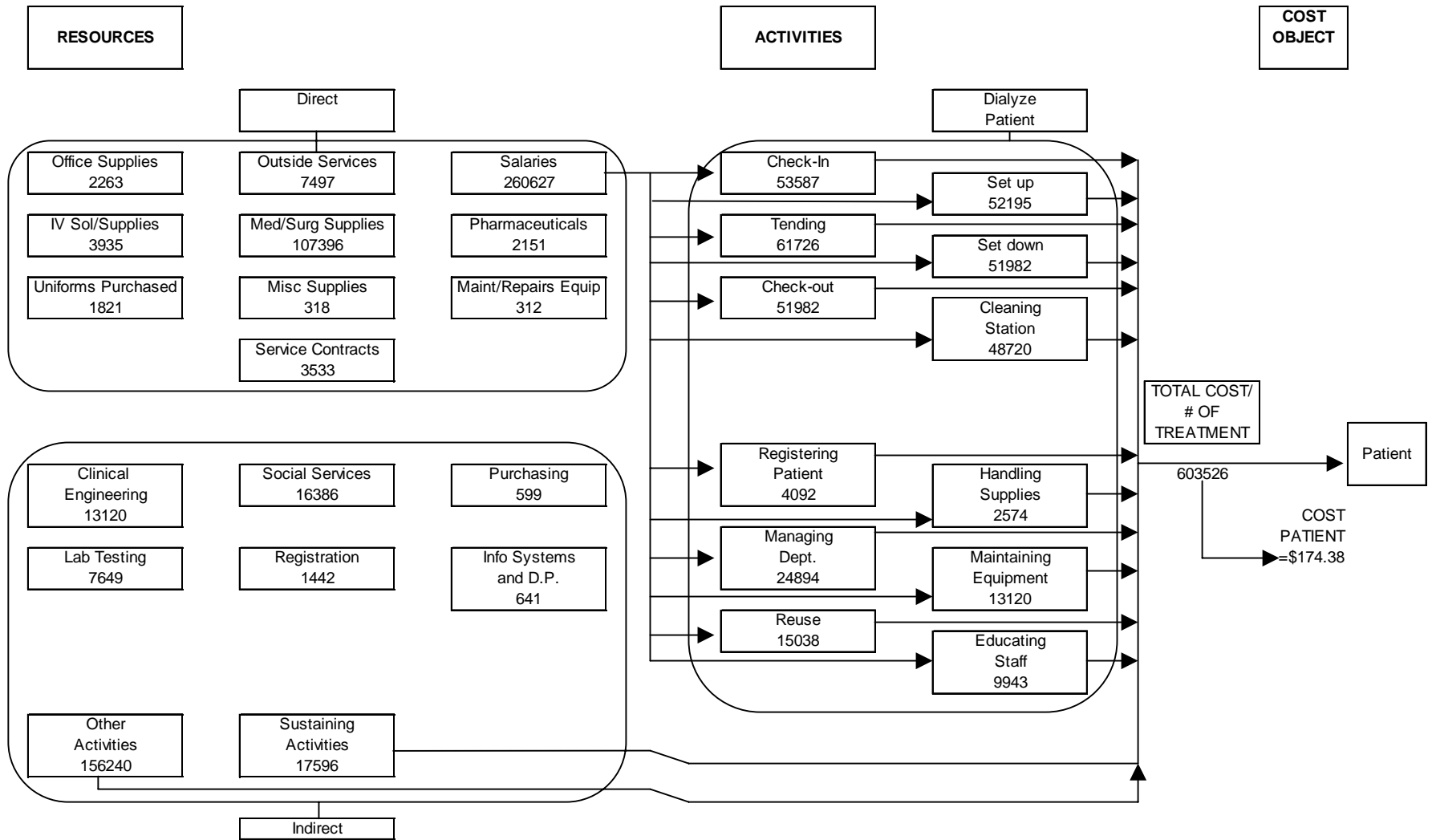
### Direct

- The Dialysis manager developed estimated percentages.

### Indirect

- “Other Resources” and “Sustaining Resources” were assigned directly to patients.
- The six targeted areas were assigned based on rough estimates (e.g. evenly or 100% to one activity).

# Departmental ABM Model: Chronic Dialysis Department



# Chronic Dialysis Department-Proposed Service Line Model Based on ABC Analysis

	<u>Total</u>	<u>\$ Per Rx</u>	<u>%</u>
REVENUE	\$ 435,350	\$ 125.78	100%
DIRECT COSTS BY ACTIVITY			
Patient Check In	\$ 53,587	\$ 15.48	12%
Patient Set Up	52,195	15.08	12%
Patient Tending	61,726	17.83	14%
Patient Set Down	51,982	15.02	12%
Patient Check Out	51,982	15.02	12%
Registering Patient	4,092	1.18	1%
Cleaning Station	48,720	14.08	11%
Handling Supplies	2,574	0.74	1%
Reuse	15,038	4.34	3%
Managing Department	24,894	7.19	6%
Educating Staff	9,943	2.87	2%
Direct Costs per GL which could not be located	13,120	3.79	3%
Total Direct Costs by Activity	\$ 389,853	\$ 112.40	90%
DIRECT MARGIN	\$ 45,497.00	\$ 13.14	10%
COSTS OF PARTNERSHIP NETWORK			
Registering	\$ 1,442.00	\$ 0.42	0%
Lab Testing	7,649	2.21	2%
Maintaining Equipment	13,120	3.79	3%
Providing Social Services	16,386	4.73	4%
Computing	641	0.19	0%
Purchasing	599	0.17	0%
Costs of Depts not yet analyzed but which may be subject to Activity Driver Analysis	156,240	45.14	36%
Total Partnership Network Costs	\$ 196,077.00	\$ 56.65	45%
CONTRIBUTION TO SUSTAINING ACTIVITIES	\$(150,580.00)	\$ (43.51)	-35%
COSTS OF SUSTAINING ACTIVITIES	\$ 17,597.00	\$ 5.08	4%
NET PROFIT/(LOSS)	\$(168,177.00)	\$ (48.59)	-39%

# Pilot Study - Step 5

## Assign Costs Generated by all Activities Among the Different “Cost Objects” (e.g. Dialysis Treatment)

### Dialysis Department

- Only one “cost object”.

### Other Departments

- Standards would be developed at an activity level.

# **HBOC Trendstar**

## **Part IV**

# Adapting Trendstar for ABC/ABM

## Variations from Traditional Costing Models

- Creating alternative stepdown structures and statistics.
- Identifying “cost drivers” for indirect costs.
- Looking at costs by activities as well as resources.

# Goals in Integrating ABC/ABM Into Trendstar

- Integrate with other DSS/Cost Accounting applications.
  - Patient/Product Costing
  - Flexible Budgeting
  - Contracting
- Enable phasing- by department.
- Ensure consistency.
- Consider time required to maintain.
- Limit complexity and detail.

# Integration Into Trendstar: Issues

## Stepdown Model

- Statistic chosen for an overhead department by an “ABC” department should also be used for all other departments supported by that area.

## Cost Drivers and Indirect Costs

- Identification at the charge code level (i.e. intermediate product) may not always be feasible.
- Must reduce costs to be allocated.

## Costs By Activity

- Must adapt DSS data structures for this layer of detail.

# Trendstar Implementation Steps

1. Break out G/L costs by activity using %'s or \$ amounts.
2. Set up alternative stepdown structure.
3. Input alternative statistics, and perform cost allocation.
4. Assign indirect costs to activities.
5. Build cost profiles by activity as well as cost item.
6. Identify which indirect costs should be linked to “cost drivers” at the procedure level, and set up within profile.

# Example: Assign Direct Costs to Activities (HSL Allocation Table)

COST COMPONENT DEFINITIONS:

Direct Component Number	Direct Component Title	Component Type	Indirect Component Number	Indirect Component Title
1	PATIENT CHECK-IN	VARIABLE	1	PATIENT CHECK-IN
2	PATIENT SETUP	VARIABLE	2	PATIENT SETUP
3	PATIENT TENDING	VARIABLE	3	PATIENT TENDING
4	PATIENT SETDOWN	VARIABLE	4	PATIENT SETDOWN
5	PATIENT CHECKOUT	VARIABLE	5	PATIENT CHECKOUT
6	CLEANING STATION	VARIABLE	6	CLEANING STATION
10	HANDLING SUPPLIES	FIXED	10	HANDLING SUPPLIES
11	REUSE	FIXED	11	REUSE
12	MANAGING DEPARTMENT	FIXED	12	MANAGING DEPARTMENT
13	EDUCATING STAFF	FIXED	13	EDUCATING STAFF
14	MAINTAINING EQUIPMENT	FIXED	14	MAINTAINING EQUIPMENT
15	OTHER DIRECT FIXED COSTS	FIXED	15	OTHER DIRECT FIXED COSTS

# Example: Assign Direct Costs to Activities (HSL Allocation Table)

EXTRACTION RULES:

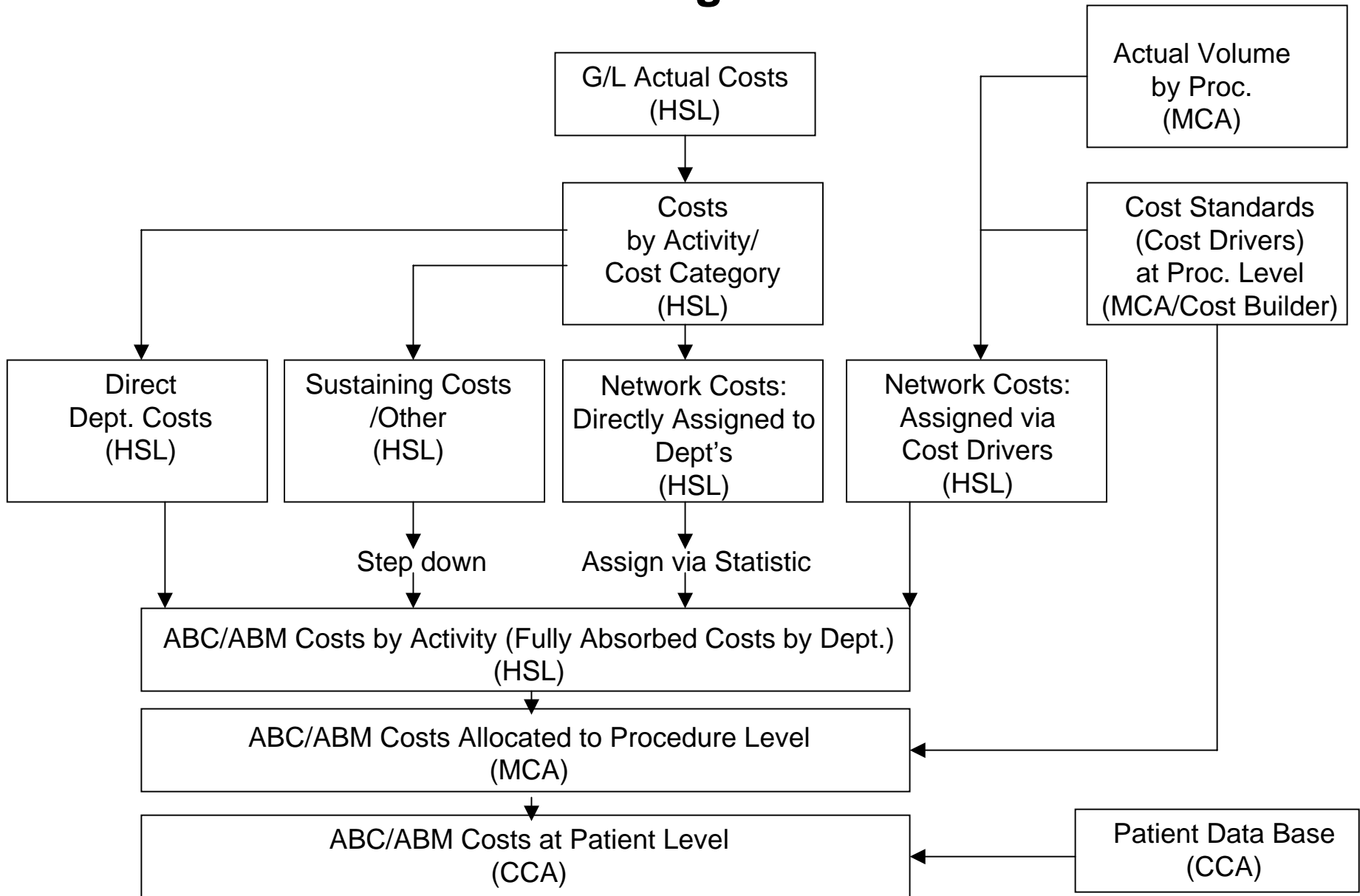
Title/Type	Cost Center	Data Type	Account	Cls Q	Adj. Amount	Fixed Amount	Variable Component	Fixed Component
DIALYSIS: PATIENT CHECK-IN (CLERK)	202	E	1131	ALL	50%	0%	1	1
DIALYSIS: PAT CHECKOUT (CLERK)	202	E	1131	ALL	505	0%	5	5
DIALYSIS: PATIENT SETUP (RN/LPN)	202	E	2613 2705	ALL	20%	0%	2	2
DIALYSIS: PAT TENDING (RN/LPN)	202	E	2613 2705	ALL	60%	0%	3	3
DIALYSIS: PAT SETDOWN (RN/LPN)	202	E	2613 2705	ALL	20%	0%	4	4
DIALYSIS: MANAGING DEPARTMENT (NURSE MGR)	202	E	2707	ALL	85%	0%	12	12
DIALYSIS: MAINTAIN EQUIP (REPAIRS/SVC CONTRACTS)	202	E	7196	ALL	100%	0%	14	14
DIALYSIS: HANDLING SUPPLIES (PURCHASING DEPT)	202	E	1081	ALL	100%	0%	10	10
DIALYSIS: MAINTAIN EQUIPMENT (BIOMED ENGIENERING)	202	E	1012	ALL	100%	0%	14	14
DIALYSIS: PATIENT TENDING (SOCIAL SERVICES)	202	E	1041	ALL	100%	0%	3	3
DIALYSIS: CLEANING (HOUSEKEEPING DEPT)	202	E	1013	ALL	100%	0%	6	6
DIALYSIS: OTHER INDIRECT (NO ASSIGNED TO AN ACTIVITY)	202	E	001-1011 1014-1040 1042-1079 1080 1082-1999	ALL	100%	0%	25	25

# Procedure Cost Profile

## Chronic Dialysis Treatment

<u>Account Name</u>	<u>Code</u>	<u>Subaccount Name</u>	<u>Code</u>	<u>Resource Name</u>	<u>Code</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Check-In	1	Unit Clerk	1131	Check-in	101	10 min.	0.188	1.88
		Reg. Clerk	1132	Registration Costs	102	.50 min.	0.833	0.42
		M/S Supplies	7076	Med Ctr Kit	13	1 kit	3.850	3.85
								6.15
Set Up	2	LPN/RN	2613	Set up	201	10 min	0.332	3.32
		M/S Supplies	7076	I.V. Adm Set	293085	1 set	0.400	0.40
				Protective Gown	761	1 each	3.007	3.01
								6.73
Tending	3	LPN/RN	2613	Tending	301	100 min.	0.332	33.20
		Lab Costs	7011	Lab Testing	302	1 test	2.210	2.21
		M/S Supplies	7076	.9% NaCl 1000 ml	695010	2 each	0.600	1.20
				4x4 gauze pad-sterile	8010	1 pkg	0.452	0.45
				Acid Concentrate	35010	1.5 gallon	2.500	3.75
				Aldetect	235020	2 each	0.150	0.30
				Artificial Kidney	70097	.40 each	15.500	6.20
							50.31	
Set-down	4	LPN/RN	2613	Set down	401	15 min.	0.332	4.98
Check-out	5	Unit Clerk	1131	CheckOut	501	5 min.	0.188	0.94
Cleaning	6	Aide	2828	Cleaning Station	601	10 min.	0.167	1.67
		M/S Supplies	7076	Cleaning Supplies	602	\$/treatment	5.490	5.49
								7.16
PROCEDURE TOTAL								76.26

# Integrating ABC/ABM Into Trendstar The Costing Process



# Moving Toward ABC/ABM

- Improve detail on stepdown model.
- Explore use of alternative statistics.
- Talk to managers of overhead departments.
- Improve record-keeping and logging (for better statistics).
- Break out costs by activity when studying or restudying a department's procedures.
- Get managers of revenue centers to think about indirect costs (partnership network).

# Conclusions

- It's possible!
- Need to get people “around the table” (communication is the key).
- Information from the study must be used to manage costs (ABM, not just ABC).
- Phase it in gradually vs. hospital-wide.