HEADCOUNT COST MODELLING FOR A HEALTHCARE PROVIDER

ABOUT THE CLIENT

Client is a U.S.-based healthcare provider that offers **Applied Behavior Analysis (ABA)** therapy and related critical services to autistic children, adolescents, teens, and adults.

SITUATION

- Client had limited visibility into how the high attrition and hiring of their clinicians and technicians was **impacting productivity, revenue and costs**. They also wanted to gauge the impact of their hiring plan on site-wise contribution margin.
- Merilytics partnered with the client to **forecast the future profitability** of each facility for various scenarios of headcount growth based on historical data

VALUE ADDITION

- **Developed an automated model** that uses the current month actuals and historical trends of employee headcount, payroll data, training ramp up information and employee productivity to predict major P&L line items like site contribution margin, revenue and costs for the coming three months
- Further broke down the change in employee headcount into changes in worked hours, scheduled/planned hours, billed hours, cancelled (patient therapy) hours and new employee training hours on a monthly basis, which resulted in **granular visibility into headcount utilization** and its **impact on profitability**
- **Performed a sensitivity analysis** to gauge the impact of various levels of hiring and attrition rate combinations on site contribution margin

IMPACT

- **Forecasting tool aided** the management in making critical decisions regarding hiring trend and headcount growth of the organization
- Granular forecasts enabled the Management to identify the key sources of variances during their **Monthly Operating Reviews**
- The **sensitivity analysis** helped the client to understand the relationship between key growth drivers and P&L items such as costs, revenue and site contribution

METHODOLOGY/ APPROACH
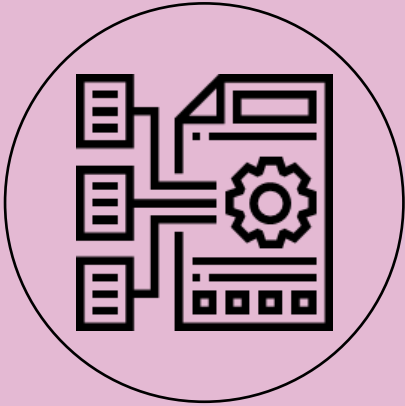
Data Collection

- Collected historical data from various databases (Central Reach, Paycom) which act as inputs to the forecasting model.
- Inputs included key operational metrics such as headcount, hiring, attrition, bookings, cancellations, billings.

Data Manipulation & Enhancement

- Created an automated data manipulation workbook to enhance the quality of data.
- Sliced the data by various dimensions like tenure and region to increase the accuracy of forecast.
- Added features like indexation and scaling to normalize inputs further improving the robustness of the model.

Data Modelling

- Created an automated forecasting model to precisely predict the major P&L line items.
- Added an actuals vs forecast variance analysis to compare monthly forecasts with actuals.
- Developed a sensitivity analysis to understand relationship between retention/attrition and site contribution.

EXHIBIT #1 – FORECASTING TOOL

Tab for one of the regions of service

3 months forecast of major P&L line items such as revenue, cost of service and site contribution

Normalized inputs derived from prior month's actuals and historical data used to forecast

Region 1

		Month 1	Month 2	Month 3	Month 4
Weekdays		21	22	22	22
Holidays		1	0	1	0
Workdays		20	22	21	22
Revenue					
Assessment	Monthly Revenue $0.00		$0	$0	$0
Technician Revenue	Reimb. Rate $59.55		$804,048	$856,634	$909,747
Supervisor Revenue	Reimb. Rate $89.29		$282,417	$286,551	$292,439
Gross Revenue			**$1,086,465**	**$1,143,185**	**$1,202,186**
Bad Debt	% of Gross Rev. 2%		$21,729	$22,864	$24,044
Net Revenue			**$1,064,736**	**$1,120,321**	**$1,178,142**
Cost of Service					
Technician Wages	Wage Rate $21.84		$456,041	$479,745	$503,233
Supervisor Wages	Salary/Month $5,792.56		$237,495	$237,495	$237,495
Total Provider Wages			**$693,536**	**$717,240**	**$740,728**
Patient-Related Expenses per Patient	Monthly $54.39		$16,606	$17,692	$18,789
Total Cost of Service			**$710,142**	**$734,931**	**$759,516**
Gross Profit					
Gross Profit			$354,594	$385,390	$418,625
% Gross Margin			33.3%	34.4%	35.5%
Operating Expense					
Payroll	Monthly $0.00		$0	$0	$0
Other Opex	Monthly $171,611.00		$171,611	$171,611	$171,611
Total Operating Expense			**$171,611**	**$171,611**	**$171,611**
Site Contribution					
Site Contribution			$182,983	$213,779	$247,014
% Contribution Margin			17.2%	19.1%	21.0%

EXHIBIT #2 - ACTUAL VS FORECAST (AVF) VARIANCE ANALYSIS

ILLUSTRATIVE

Comparison of forecasted key metrics to actuals fetched from MOR for all regions

Comparison of forecasted key metrics to actuals fetched from MOR for one region of service

AvF Variance Analysis

	All Regions						Region 1					
	June			**July**			**June**			**July**		
	COG Model	MOR	Delta	COG Model	MOR	Delta	COG Model	MOR	Delta	COG Model	MOR	Delta
Technician Headcount	912	983	71	941	983	42	250	219	(31)	261	219	(42)
Technician Reimbursement	$60.21	$60.27	$0.06	$60.29	$61.03	$0.74	$59.55	$59.55	$0.00	$59.55	$60.98	$1.43
Technician Revenue	$3,188,719	$3,980,569	$791,850	$3,136,905	$3,675,544	$538,640	$842,336	$968,167	$125,832	$856,634	$891,242	$34,608
Technician Billed Hours	52,957	66,044	13,087	52,030	60,228	8,198	14,145	16,258	2,113	14,385	14,616	231
Billed Hours per Technician	58	67	9	55	61	6	57	74	18	55	67	12
Supervisor Headcount	198	198	0	198	198	0	41	41	0	41	41	0
Supervisor Reimbursement	$93.60	$93.16	($0.44)	$93.60	$93.16	($0.44)	$89.29	$89.29	$0.00	$89.29	$92.74	$3.45
Supervisor Revenue	$1,321,330	$1,579,951	$258,621	$1,279,729	$1,478,449	$198,721	$295,866	$347,696	$51,830	$286,551	$325,239	$38,688
Supervisor Billed Hours	14,116	16,852	2,736	13,672	15,372	1,700	3,314	3,894	580	3,209	3,507	298
Billed Hours per Supervisor	71	85	14	69	78	9	81	95	14	78	86	7
Tech/Supervisor Ratio	3.8x	3.9x	0.2x	3.8x	3.9x	0.1x	4.3x	4.2x	-0.1x	4.5x	4.2x	-0.3x
Technician Productivity	68%	65%	-2%	68%	66%	-2%	65%	61%	-4%	66%	60%	-6%
Supervisor Productivity	41%	56%	15%	41%	56%	15%	46%	62%	16%	47%	62%	15%
Gross Revenue	$4,510,048	$5,560,520	$1,050,472	$4,416,633	$5,153,994	$737,360	$1,138,202	$1,315,863	$177,662	$1,143,185	$1,216,481	$73,296
Net Revenue	**$4,419,847**	**$5,449,309**	**$1,029,462**	**$4,328,301**	**$5,050,914**	**$722,613**	**$1,115,437**	**$1,289,546**	**$174,109**	**$1,120,321**	**$1,192,152**	**$71,830**
Technician Wages	$1,813,961	$2,477,180	$663,219	$1,866,386	$1,765,983	($100,403)	$477,757	$614,629	$136,871	$502,590	$425,853	($76,737)
Technician Worked Hours	78,414	101,175	22,761	76,970	91,884	14,914	21,871	26,652	4,782	21,962	$24,403	2,442
Technician Wage Rate (Fully	$23.13	$24.48	$1.35	$24.25	$19.22	($5.03)	$21.84	$23.06	$1.22	$22.88	$17	($5.43)
Supervisor Wages	$1,376,903	$1,522,977	$146,074	$1,376,903	$1,040,073	($336,830)	$248,804	$287,628	$38,823	$248,804	$188,285	($60,519)
Supervisor Salary	$6,954	$7,692	$738	$6,954	$5,253	($1,701)	$6,068	$7,015	$947	$6,068	$4,592	($1,476)
Total COS	$3,243,700	$4,054,912	$811,212	$3,297,956	$2,859,775	($438,181)	$743,958	$918,954	$174,996	$769,928	$629,029	($140,898)
Gross Profit	**$1,176,147**	**$1,394,397**	**$218,250**	**$1,030,345**	**$2,191,139**	**$1,160,794**	**$371,480**	**$370,592**	**($888)**	**$350,393**	**$563,122**	**$212,729**
% Margin	27%	26%		24%	43%		33%	29%		31%	47%	
Opex	$791,975	$774,974	($17,001)	$791,975	$794,974	$2,999	$171,611	$177,331	$5,720	$171,611	$177,331	$5,720
Site Contribution	**$384,172**	**$619,423**	**$235,251**	**$238,370**	**$1,396,165**	**$1,157,795**	**$199,869**	**$193,260**	**($6,608)**	**$178,782**	**$385,791**	**$207,009**
% Margin	9%	11%		6%	28%		18%	15%		16%	32%	

EXHIBIT #3 - SENSITIVITY ANALYSIS

Sensitivity of site contribution in terms of $ value and as a share of net revenue to attrition and hiring one and three months forward

Sensitivities
Actuals as of Month 1

Hiring vs. Attrition: One Month Forward

Month 2 Site Contribution ($000s)

		Average	Annualized Technician Attrition				
			85%	95%	105%	115%	125%
	Feb	*Average*	7%	8%	9%	10%	10%
	100%	238	7%	8%	9%	10%	10%
Techincians Hired in February	80	80	787	768	749	730	711
	100	100	766	747	728	710	691
	120	120	744	726	708	690	672
	140	140	723	705	687	670	652
	160	160	701	684	667	650	633
	180	180	680	663	646	630	613
	200	200	658	642	626	609	594

Month 2 Site Contribution ($000s)

			Technician Attrition per Month				
			85%	95%	105%	115%	125%
	Feb	*Average*	7%	8%	9%	10%	10%
	100%	6%	7%	8%	9%	10%	10%
Techincians Hired in February	80	80	15%	15%	15%	15%	14%
	100	100	15%	15%	14%	14%	14%
	120	120	14%	14%	14%	14%	13%
	140	140	14%	14%	14%	13%	13%
	160	160	14%	13%	13%	13%	13%
	180	180	13%	13%	13%	13%	12%
	200	200	13%	13%	12%	12%	12%

Hiring vs. Attrition: Three Months Forward

Month 3 Site Contribution ($000s)

			Annualized Technician Attrition				
			85%	95%	105%	115%	125%
	Weekly	*Monthly*	7%	8%	9%	10%	10%
Techincians Hired in February	20	80	956	915	875	836	798
	25	100	918	879	839	801	764
	30	120	881	842	804	766	729
	35	140	843	805	768	731	695
	40	160	806	768	732	696	661
	45	180	768	732	696	661	626
	50	200	731	695	660	626	592

Month 3 Site Contribution Margin %

			Annualized Technician Attrition				
			85%	95%	105%	115%	125%
			7%	8%	9%	10%	10%
Techincians Hired in February	20	80	18%	18%	17%	17%	16%
	25	100	18%	17%	17%	16%	16%
	30	120	17%	16%	16%	15%	15%
	35	140	16%	16%	15%	15%	14%
	40	160	15%	15%	14%	14%	13%
	45	180	15%	14%	14%	13%	13%
	50	200	14%	13%	13%	12%	12%