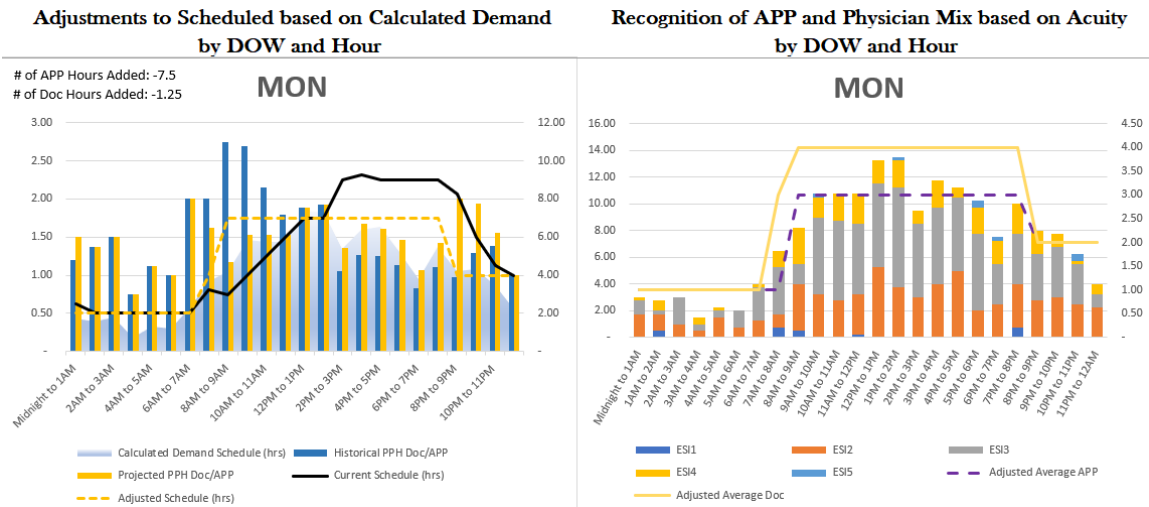# Precision Demand Capacity Management

The COVID Pandemic abruptly ushered in a new normal where long-held and traditional Demand Capacity Management methods were not sufficient. In March 2020 ED volumes dropped by over 40%. While volumes have since increased, greater volatility in both volumes and case mix will remain, requiring a new data driven approach to match capacity more precisely with demand.

Not a Black Box AI Solution – A Solution that Augments Physician Intelligence

We at d2i believe that no solution for demand capacity can entirely replace the judgement physician leadership has based on their local contracts, staff, market, patient mix and more. What is needed and d2i provides
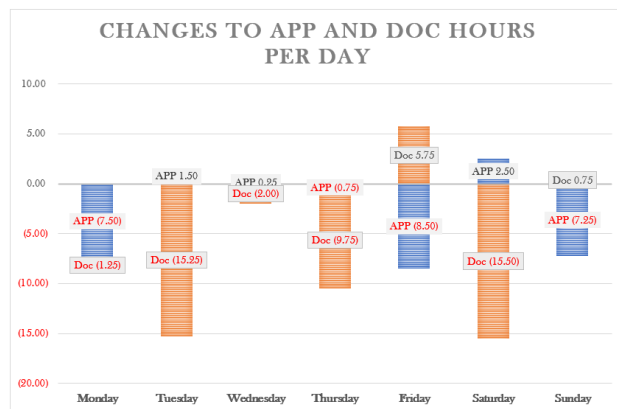
- Immediate access to daily volumes by time of day and all related data
- A purpose-built integrated data set that makes analysis by any factor effortless and instantaneous
- A modeling tool that enables the user to change any factor and quickly see the impact
- Multi-variate forecasting to help you anticipate changes in demand and its impact on Capacity needs

Demand Capacity Needs to be Optimized by Day & Time of Day Based on Arrival Patterns

Adjustments to Scheduled based on Calculated Demand by DOW and Hour

Recognition of APP and Physician Mix based on Acuity by DOW and Hour

Changes Made to Current Schedule to Achieve Targets

	# APP Hours Added	# Doc Hours Added
Monday	(7.50)	(1.25)
Tuesday	1.50	(15.25)
Wednesday	0.25	(2.00)
Thursday	(0.75)	(9.75)
Friday	(8.50)	5.75
Saturday	2.50	(15.50)
Sunday	(7.25)	0.75
Total	(19.75)	(37.25)

Staffing Cost Impact of Scheduling Changes by DOW

	Change in APP Cost	Change in Doc Cost
Monday	($675)	($281)
Tuesday	$135	($3,431)
Wednesday	$23	($450)
Thursday	($68)	($2,194)
Friday	($765)	$1,294
Saturday	$225	($3,488)
Sunday	($653)	$169
Total	($1,778)	($8,381)

CHANGES TO APP AND DOC HOURS PER DAY

Annual Cost impact of Schedule Changes: ($528,255)

Other Factors Need to be Simultaneously Understood and Considered

Getting physician schedules just right is not only critical from a business sustainability and quality of care perspective but adaptation to long held paradigms about physician schedules will need to be considered. For this physician buy-in is critical and only a transparent and trusted data driven approach will work.

Complexity of Case Mix

We are experiencing disruptive changes in case mix due to telehealth, health plan design, and consumer behavior. Understanding the impact of these changes is essential to optimize demand capacity.

Admitted % / Average ESI

TimeofDay	Admitted %							Average ESI						
	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN
Midnight to 1AM	26%	12%	24%	17%	21%	25%	28%	2.97	3.04	2.90	2.75	2.97	2.92	2.94
1AM to 2AM	21%	24%	13%	27%	12%	12%	20%	2.74	2.88	3.00	2.87	2.92	3.00	2.85
2AM to 3AM	26%	33%	23%	15%	28%	14%	16%	2.96	2.73	2.95	2.75	2.72	2.90	2.89
3AM to 4AM	50%	24%	13%	14%	22%	23%	50%	3.00	3.05	3.06	3.19	2.91	3.00	2.95
4AM to 5AM	33%	17%	15%	13%	35%	28%	7%	2.73	3.00	2.54	3.19	2.76	3.06	3.33
5AM to 6AM	7%	33%	44%	45%	36%	31%	43%	2.86	2.87	2.83	2.70	2.95	2.77	2.93
6AM to 7AM	24%	33%	15%	28%	16%	29%	23%	2.93	2.73	2.96	2.97	2.77	2.81	3.31

Productivity of Physicians and APPs

Estimating capacity is both a function of provider hours and productivity to understand and project the number of patients physicians and APPs can effectively treat per hour. In the heat map below the Green boxes are capacity meets demand within + or - 5%, Yellow + or – 5 - 10% and Red + or - > 10%

| TimeofDay | Comparison to Baseline | | | | | | | | | | | | | |
| | Apr.2021 | | | | | | | % Delta | | | | | | |
	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN
Midnight to 1AM	1.35	0.81	1.16	1.13	1.21	1.29	1.68	-2%	30%	-4%	26%	33%	-6%	-1%
1AM to 2AM	1.19	1.04	1.00	1.15	1.14	1.18	1.43	24%	12%	19%	38%	33%	-12%	16%
2AM to 3AM	1.44	0.94	1.29	1.00	1.78	1.31	1.36	-11%	42%	0%	75%	49%	1%	-8%
3AM to 4AM	0.88	1.31	0.94	1.05	1.35	0.87	1.43	23%	5%	10%	59%	7%	20%	18%
4AM to 5AM	0.94	0.75	0.76	0.80	1.00	1.20	1.07	-2%	-18%	-2%	34%	56%	2%	-2%
5AM to 6AM	0.88	0.94	1.06	1.00	1.29	0.87	1.00	-7%	12%	16%	60%	26%	14%	-7%

Revenues, Costs and Operating Margins

Account	Jan.2021	Feb.2021	Mar.2021	Qtr 1.2021	Apr.2021	May.2021	Qtr 2.2021	2021
Calcuated Revenue	8,563,000	7,661,000	8,981,000	25,205,000	8,966,000	9,305,000	18,271,000	43,476,000
Doctor Cost	1,845,000	1,607,000	1,879,500	5,331,500	1,834,500	1,896,500	3,731,000	9,062,500
APP Cost	730,400	957,900	1,099,800	2,788,100	1,053,000	1,088,400	2,141,400	4,929,500
Total Cost	2,575,400	2,564,900	2,979,300	8,119,600	2,887,500	2,984,900	5,872,400	13,992,000
Margin	5,987,600	5,096,100	6,001,700	17,085,400	6,078,500	6,320,100	12,398,600	29,484,000
Number of APP Hours	3,652	3,193	3,666	10,511	3,510	3,628	7,138	17,649
Number of Doctor Hours	3,690	3,214	3,759	10,663	3,669	3,793	7,462	18,125
Number of Encounters	8,563	7,661	8,981	25,205	8,966	9,305	18,271	43,476

About d2i

Drawing from experience working with 1000s of physician leaders, d2i offers data analytics solutions to help healthcare organizations identify and implement opportunities for improvement. Founded in 2010, d2i provides data analytics applications that integrate diverse data sets for Emergency Medicine, Hospital Medicine, RCM, CMS Quality Programs, Benchmarking, AI/ML and Research. D2i SaaS solutions are cloud based and used across over 300 hospitals throughout the United States.

www.d2ihc.com