

TEAM ID	PNT2022TMID54193
PROJECT NAME	ANALYTICS FOR HOSPITALS HEALTH- CARE DATA

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Performance Metrics
1) Model Performance Metrics

# HEALTHCARE PERFORMANCE MEASUREMENTS

Spearhead hospital and health system improvements by using standardized data and analytics on a variety of topics

## **what are healthcare performance measurements**

Healthcare performance measurements are aggregated, quantified and analyzed data on a particular healthcare- related activity.

Their purpose is to identify opportunities for reducing costs, improving quality of care and increasing efficiency of care delivery.

They're also used to monitor other initiatives that an institution wants to track- or needs to track- to satisfy regulatory requirements.

These measurement initiatives are typically developed and operated with the active involvement of the physicians and hospital staff whose performance is being measured- as well as government and other third- party agencies- to ensure that the measures are meaningful, and the data are accurate.

**Types of healthcare performance measurements include:**

- 1) Quality and efficiency of patient care
- 2) Cost of healthcare services
- 3) Disparities in performance
- 4) Care outcomes

Level of safety and adherence to governmentally- mandated standards There are many reasons why healthcare performance measurements are important to healthcare institutions and society,

- Good health is more important to people than most other goods or services.
- Governments and individuals spend a lot on healthcare.
- People want to make informed decisions about their healthcare.
- Governments bodies can make better healthcare polices.

### **Using software for healthcare performance measurements,**

In 2009, the US government created a USD 27billion incentive program to encourage healthcare providers to adopt EHRs.

## **Prioritizing healthcare performance measurements- which are more important?**

- 1)Length of stay
- 2)Readmission rates
- 3)Mortality rates
- 4)Hospital incidents
- 5)CMS program performance initiatives
- 6)Average cost per discharge
- 7)operating margin
- 8)Bad debt

### **IBM Watson Health Solutions,**

IBM, through its Watson health solutions, has been a

leader in providing solutions for clinical quality measures and quality reporting for core measures.

It has a track record of accurate, on- time submissions- making it a leader for the CMS Hospital Inpatient Quality Reporting Program (HIQRP) or for accreditation from the joint commission (TJC).

**Table 1: National Performance Comparisons (All Hospitals in Study)**

Table 1: National Performance Comparisons (All Hospitals in Study)						
Domain	Performance Measures	Medians		Benchmark Compared With Peer Group		
		Benchmark Hospitals (Winners)	Peer Hospitals (Nonwinners)	Difference	Percent Difference	Comments
Clinical Outcomes	Inpatient Mortality Index <sup>1</sup>	0.77	0.99	-0.22	-22.3%	Lower mortality
	Complications Index <sup>1</sup>	0.73	0.92	-0.18	-20.1%	Fewer complications
	HAI Index <sup>2</sup>	0.60	0.69	-0.09	-13.1%	Fewer infections
Extended Outcomes	30-Day Mortality Rate <sup>3</sup>	11.6	12.3	-0.7	n/a <sup>7</sup>	Lower 30-day mortality
	30-Day Hosp-Wide Readmission Rate <sup>4</sup>	15.0	15.6	-0.6	n/a <sup>7</sup>	Fewer 30-day readmissions
Operational Efficiency	Average Length of Stay <sup>1</sup>	4.4	4.7	-0.4	-7.7%	Shorter stays
	ED Throughput Measure <sup>5</sup>	111.3	131.0	-19.8	-15.1%	Less time to service
	Inpatient Expense per Discharge <sup>6</sup>	\$6,186	\$7,190	-\$1,004	-14.0%	Lower inpatient cost
	Medicare Spend per Beneficiary <sup>5</sup>	0.96	0.99	-0.03	-3.4%	Lower Episode Cost
Financial Health	Operating Profit Margin <sup>6</sup>	15.8	4.0	11.8	n/a <sup>7</sup>	Higher profitability
Patient Experience	HCAHPS Top Box (%) <sup>5</sup>	77.0	71.0	6.0	n/a <sup>7</sup>	Better patient experience

**Table 2: Major Teaching Hospital Performance Comparisons**

Table 2: Major Teaching Hospital Performance Comparisons						
Domain	Performance Measures	Medians		Benchmark Compared With Peer Group		
		Benchmark Hospitals (Winners)	Peer Hospitals (Nonwinners)	Difference	Percent Difference	Comments
Clinical Outcomes	Inpatient Mortality Index <sup>1</sup>	0.91	1.00	-0.09	-9.2%	Lower mortality
	Complications Index <sup>1</sup>	0.94	0.97	-0.03	-2.9%	Fewer complications
	HAI Index <sup>2</sup>	0.64	0.82	-0.19	-22.9%	Fewer infections
Extended Outcomes	30-Day Mortality Rate <sup>3</sup>	11.5	12.0	-0.5	n/a <sup>7</sup>	Lower 30-day mortality
	30-Day Hosp-Wide Readmission Rate <sup>4</sup>	15.1	16.2	-1.1	n/a <sup>7</sup>	Fewer 30-day readmissions
Operational Efficiency	Average Length of Stay <sup>1</sup>	4.4	5.0	-0.6	-11.5%	Shorter stays
	ED Throughput Measure <sup>5</sup>	161.0	205.0	-44.0	-21.5%	Less time to service
	Inpatient Expense per Discharge <sup>6</sup>	\$6,420	\$8,456	-\$2,036	-24.1%	Lower inpatient cost
	Medicare Spend per Beneficiary <sup>5</sup>	0.97	1.01	-0.04	-3.5%	Lower Episode Cost
Financial Health	Operating Profit Margin <sup>6</sup>	11.7	3.8	7.9	n/a <sup>7</sup>	Higher profitability
Patient Experience	HCAHPS Top Box (%) <sup>5</sup>	77.0	71.0	6.0	n/a <sup>7</sup>	Better patient experience



**Table 4: Large Community Hospital Performance Comparisons**

Table 4: Large Community Hospital Performance Comparisons						
Domain	Performance Measures	Medians		Benchmark Compared With Peer Group		
		Benchmark Hospitals (Winners)	Peer Hospitals (Nonwinners)	Difference	Percent Difference	Comments
Clinical Outcomes	Inpatient Mortality Index <sup>1</sup>	0.79	1.02	-0.23	-22.1%	Lower mortality
	Complications Index <sup>1</sup>	0.86	0.99	-0.13	-13.0%	Fewer complications
	HAI Index <sup>2</sup>	0.57	0.68	-0.10	-15.2%	Fewer infections
Extended Outcomes	30-Day Mortality Rate <sup>3</sup>	11.6	12.4	-0.8	n/a <sup>7</sup>	Lower 30-day mortality
	30-Day Hosp-Wide Readmission Rate <sup>4</sup>	15.2	15.5	-0.3	n/a <sup>7</sup>	Fewer 30-day readmissions
Operational Efficiency	Average Length of Stay <sup>1</sup>	4.7	5.0	-0.3	-6.0%	Shorter stays
	ED Throughput Measure <sup>5</sup>	122.5	148.3	-25.8	-17.4%	Less time to service
	Inpatient Expense per Discharge <sup>6</sup>	\$6,373	\$6,786	-\$412	-6.1%	Lower inpatient cost
	Medicare Spend per Beneficiary <sup>5</sup>	1.00	1.01	-0.01	-1.1%	Lower Episode Cost
Financial Health	Operating Profit Margin <sup>6</sup>	15.0	6.6	8.4	n/a <sup>7</sup>	Higher profitability
Patient Experience	HCAHPS Top Box (%) <sup>5</sup>	79.0	70.0	9.0	n/a <sup>7</sup>	Better patient experience

**Table 5: Medium Community Hospital Performance Comparisons**

Table 5: Medium Community Hospital Performance Comparisons						
Domain	Performance Measures	Medians		Benchmark Compared With Peer Group		
		Benchmark Hospitals (Winners)	Peer Hospitals (Nonwinners)	Difference	Percent Difference	Comments
Clinical Outcomes	Inpatient Mortality Index <sup>1</sup>	0.74	0.98	-0.23	-23.8%	Lower mortality
	Complications Index <sup>1</sup>	0.77	0.98	-0.21	-21.5%	Fewer complications
	HAI Index <sup>2</sup>	0.54	0.61	-0.07	-11.5%	Fewer infections
Extended Outcomes	30-Day Mortality Rate <sup>3</sup>	11.4	12.3	-0.8	n/a <sup>7</sup>	Lower 30-day mortality
	30-Day Hosp-Wide Readmission Rate <sup>4</sup>	14.8	15.6	-0.8	n/a <sup>7</sup>	Fewer 30-day readmissions
Operational Efficiency	Average Length of Stay <sup>1</sup>	4.4	4.9	-0.5	-9.9%	Shorter stays
	ED Throughput Measure <sup>5</sup>	103.8	131.3	-27.5	-21.0%	Less time to service
	Inpatient Expense per Discharge <sup>6</sup>	\$5,896	\$6,869	-\$973	-14.2%	Lower inpatient cost
	Medicare Spend per Beneficiary <sup>3</sup>	0.95	0.99	-0.05	-4.6%	Lower Episode Cost
Financial Health	Operating Profit Margin <sup>6</sup>	14.8	4.7	10.1	n/a <sup>7</sup>	Higher profitability
Patient Experience	HCAHPS Top Box (%) <sup>5</sup>	76.5	70.0	6.5	n/a <sup>7</sup>	Better patient experience

**Table 6: Small Community Hospital Comparisons**

Table 6: Small Community Hospital Comparisons						
Domain	Performance Measures	Medians		Benchmark Compared With Peer Group		
		Benchmark Hospitals (Winners)	Peer Hospitals (Nonwinners)	Difference	Percent Difference	Comments
Clinical Outcomes	Inpatient Mortality Index <sup>1</sup>	0.51	1.00	-0.49	-49.2%	Lower mortality
	Complications Index <sup>1</sup>	0.58	0.90	-0.32	-35.1%	Fewer complications
	HAI Index <sup>2</sup>	n/a	n/a	n/a	n/a	n/a
Extended Outcomes	30-Day Mortality Rate <sup>3</sup>	11.6	12.4	-0.8	n/a <sup>7</sup>	Lower 30-day mortality
	30-Day Hosp-Wide Readmission Rate <sup>4</sup>	14.7	15.4	-0.7	n/a <sup>7</sup>	Fewer 30-day readmissions
Operational Efficiency	Average Length of Stay <sup>1</sup>	4.3	4.9	-0.6	-13.0%	Shorter stays
	ED Throughput Measure <sup>5</sup>	93.8	100.5	-6.8	-6.7%	Less time to service
	Inpatient Expense per Discharge <sup>6</sup>	\$6,344	\$7,577	-\$1,233	-16.3%	Lower inpatient cost
	Medicare Spend per Beneficiary <sup>5</sup>	0.90	0.96	-0.06	-6.1%	Lower Episode Cost
Financial Health	Operating Profit Margin <sup>6</sup>	17.2	1.7	15.5	n/a <sup>7</sup>	Higher profitability
Patient Experience	HCAHPS Top Box (%) <sup>5</sup>	76.5	73.0	3.5	n/a <sup>7</sup>	Better patient experience



Figure 1 State-level Performance Comparisons, 2021 Study

● Quintile 1 - Best   ● Quintile 2   ● Quintile 3   ● Quintile 4   ● Quintile 5

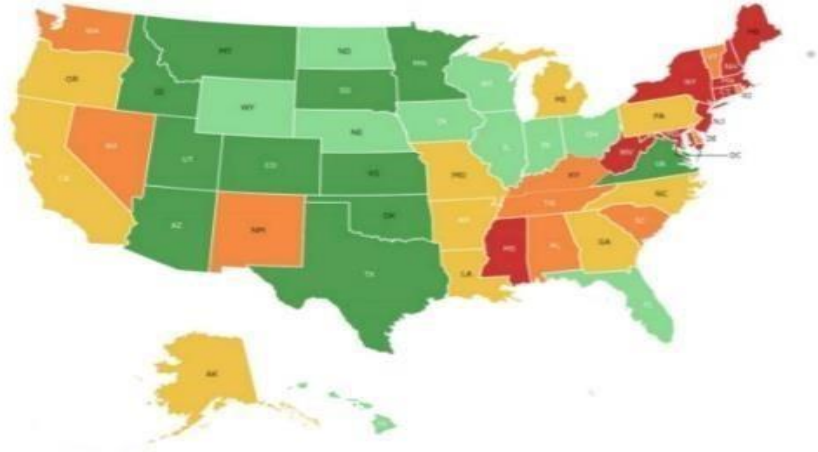


Figure 2 State-level Performance Comparisons, 2020 Study



Table 7. 100 Top Hospitals Two-year State-level Performance Comparisons

Northeast		Midwest		South		West	
Current Study	Previous Study	Current Study	Previous Study	Current Study	Previous Study	Current Study	Previous Study
CT	CT	IL	IL	AL	AL	AK	AK
ME	ME	IN	IN	AR	AR	AZ	AZ
MA	MA	IA	IA	DE	DE	CA	CA
NH	NH	KS	KS	DC	DC	CO	CO
NJ	NJ	MI	MI	FL	FL	HI	HI
NY	NY	MN	MN	GA	GA	ID	ID
PA	PA	MO	MO	KY	KY	MT	MT
RI	RI	NE	NE	LA	LA	NV	NV
VT	VT	ND	ND	MD	MD	NM	NM
		OH	OH	MS	MS	OR	OR
		SD	SD	NC	NC	UT	UT
		WI	WI	OK	OK	WA	WA
				SC	SC	WY	WY
				TN	TN		
				TX	TX		
				VA	VA		
				WV	WV		

## **Model Performance Metrics,**

Most model- performance measures are based on the comparison of the models predictions with the (known) values of the dependent variable in a dataset.

## **Performance Metrics In Healthcare,**

A healthcare key performance indicator (KPI) or metric is a well- defined performance measure that is used to observe, analyse, optimize, and transform a health process to increase satisfaction for both patients and healthcare providers alike.