

# Engaging the Informatics Student with Real-Life Data Analytics for Quality Improvement



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## INTRODUCTION

Improving quality healthcare delivery based upon data analysis of performance measurements is an important role for informatics nurses and one that is difficult to teach using traditional methods. Typically, practice experiences or scholarly projects provide the best learning opportunities for the informatics student to decipher how to manage data, interpret results, and implement quality improvement initiatives in nursing practice.

What if the student's learning experiences could be enriched by using live data from organizations as they complete course work? To fully engage students in meaningful learning experiences, Doctor of Nursing Practice (DNP) faculty have embraced a database using real-life, blinded data from healthcare organizations. The database uses de-identified live data from regionally distributed acute care facilities of various sizes created from diversified healthcare organizations.



## COURSE OBJECTIVES

- View data from 40 hospitals in select geographical regions of the United States.
- Utilize knowledge discovery methods or data mining techniques to identify patterns and trends.
- Classify the data based on select quality initiatives or specific diagnosis classifications such as ICD-10 codes.
- Critique the data to detect outliers based on locations and timeframes (seasonality).
- Utilize the data to make predictions and problem solve prospectively.
- Compile material into infographic formats for presentation to diverse, multidisciplinary audiences.

## DATABASE SCREENSHOTS

Net Patient Revenue	Medicare VBP Perform Score	Outpatient Market Share	Estimated IT Capital Budget	Falls and Trauma Rate
\$22,470,668,759	33.8	42.2%	\$272,429,415	0.407
Net Operating Profit Margin	HCAHPS Summary Star Rating	Inpatient Market Share	Open Payments in Research	Falls and Trauma Percentile
0.8%	3 ★	43.5%	\$116,062,079	47

  

Hospital List				
Hospital ID	State	Total Discharges	Total Staffed Beds	
205	AZ	7,201	227	
207	AZ	21,277	479	
430	CA	55,693	879	
651	CO	12,890	183	
845	FL	56,824	1,485	
892	FL	12,115	182	
1073	HI	1,789	33	
1095	ID	9,519	237	
1637	KY	10,666	148	
1862	ME	20,691	313	
1984	MA	7,746	115	
2076	MI	10,310	197	
2152	MN	22,808	398	
2272	MS	22,235	430	
2357	MO	1,696	35	
2442	MO	50,217	1,225	

## COURSE ASSIGNMENTS

The innovative assignments and discussion forums allow the informatics student to assimilate meaningful learning experiences supporting quality improvement and decision making. These experiences are invaluable for the student's education and future professional practice.

- Multiple quality indicators such as Catheter Associated Urinary Tract Infection Rates (CAUTI), Central Line Associated Blood Stream Infections (CLABSI), Falls/Trauma, and Hospital Readmission Rates are available for student evaluation. Additionally, cases of Clostridium difficile (C. diff) and Methicillin-resistant Staphylococcus aureus (MRSA) along with pneumonia, heart failure and COPD cases are accessible. Students can capture the data over a specified time frame, perform statistical analyses, identify quality improvement opportunities, and develop clinical pathways.
- Students can explore Information Technology (IT) budgets of a particular facility with relevant information such as number of beds, total operating budget, revenue, and income margins. Budgets are methodically analyzed; data is evaluated and compared with similar facilities to identify areas of improvement.
- Students can review Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores which survey patient's perceptions of the hospital experience and evaluate the scores related to quality initiatives. Students can identify measures to improve quality outcomes. They can propose technology initiatives to engage the patient and improve satisfaction.
- Students can discuss confidentiality, identify strategies for protection of personal health information, and utilize IT management tools to support a safe process of care with detailed information.

CAUTI Observed Cases	CAUTI Patient Days	CAUTI Predicted Cases	CDIFF Observed Cases	CDIFF Patient Days	CDIFF Predicted Cases	CLABSI Observed Cases	CLABSI Patient Days	CLABSI Predicted Cases	COPD Patients Eligible Discharges	COPD Patients Rate	HCAHPS Summary Star Rating	Heart Failure Patients Eligible Discharges	Heart Failure Rate	Hospital ID
1	2730	3,346	6	41253	18,229	1	1	3,640	62	0.201	2	90	0.212	205
9	14112	19,888	43	138191	83,633	22	22	24,613	129	0.196	2	322	0.218	207
40	46553	68,063	99	253758	139,877	31	31	48,552	547	0.194	3	2012	0.199	430
4	5289	4,467	21	49139	31,424	5	5	3,280	69	0.186	3	110	0.218	651
61	50655	76,495	210	374486	262,280	29	29	77,447	287	0.21	2	493	0.267	845
5	6747	5,677	27	54433	34,099	2	2	4,013	347	0.216	3	356	0.23	892
0	861	0.440	2	5537	1,333	0	0	0.433	33	0.186	3	48	0.216	1073
11	11031	10,270	30	47559	34,223	7	7	8,164	204	0.175	3	216	0.172	1095
2	3934	4,044	23	48127	28,157	0	0	4,314	463	0.238	3	382	0.246	1637
37	14923	14,499	45	101218	69,141	16	16	14,234	502	0.205	3	755	0.21	1862
3	5753	4,481	13	31380	20,432	1	1	2,009	270	0.192	3	251	0.239	1984
11	13364	20,364	20	47681	26,998	1	1	11,801	466	0.204	3	461	0.219	2076
5	7717	6,829	42	88870	60,291	2	2	5,969	200	0.201	3	540	0.205	2152
13	20833	22,717	70	102983	76,920	18	18	18,802	776	0.206	4	1081	0.228	2272
0	2718	1,482	0	8570	2,187	0	0	0.715	134	0.198	3	78	0.212	2357
67	53208	83,398	131	292001	190,600	60	60	64,221	334	0.189	4	1136	0.219	2442
11	4015	2,100	11	20230	10,189	0	0	1,329	96	0.187	3	215	0.185	2461
17	27201	42,445	109	174149	162,508	18	18	33,263	472	0.204	2	489	0.19	2610
1	1553	1,071	8	12716	6,745	1	1	0.528	331	0.183	4	229	0.206	2638

  

Hospital ID	ICD10	ICD10 Description	Region	State	Est Total Charges	Est Total Claims	Est Total Payments
205	A419	Other sepsis	Southwest	AZ	Null	Null	Null
205	I214	ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction	Southwest	AZ	Null	Null	Null
205	J189	Pneumonia, unspecified organism	Southwest	AZ	Null	Null	Null
205	J441	Other chronic obstructive pulmonary disease	Southwest	AZ	Null	Null	Null
205	K179	Acute kidney failure	Southwest	AZ	Null	Null	Null
205	N030	Other disorders of urinary system	Southwest	AZ	Null	Null	Null
205	A419	Other sepsis	Southwest	AZ	17,788,976.42	373.93	6,989,325.52
205	I214	ST elevation (STEMI) and non-ST elevation (NSTEMI) myocardial infarction	Southwest	AZ	6,554,484.19	135.41	2,281,459.20
205	J189	Pneumonia, unspecified organism	Southwest	AZ	1,129,610.73	43.99	451,064.99
205	J441	Other chronic obstructive pulmonary disease	Southwest	AZ	1,233,536.71	53.05	483,849.77
205	K179	Acute kidney failure	Southwest	AZ	1,446,851.95	44.64	553,982.60

## ALIGNMENT TO COMPETENCIES

The course assignments and discussion forums utilizing the database can be aligned to nursing informatics education competencies as outlined by various invested agencies and associations.

The Healthcare Information and Management Systems Society (HIMSS) identified basic informatics competencies for entry level nursing practices in the *Technology Informatics Guiding Education Reform (TIGER)* initiative. The initiative included basic computer competency, information literacy competency, and information management competency (HIMSS, 2011).

The Quality and Safety Education for Nursing (QSEN) Institute (n.d.) identifies informatics competencies addressing the nurse's ability to "use information and technology to communicate, manage knowledge, mitigate error, and support decision making" (Informatics section, para.1).

*Essentials of Doctoral Education for Advanced Nursing Practice* authored by the American Association of Colleges of Nursing (AACN) are foundations for the course.

- Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking states, "DNP graduates must understand...practical strategies for balancing productivity with quality of care" (p. 10).
- Essential III: Clinical Scholarship and Analytical Methods for Evidence Based Practice requires that the DNP program prepares the graduate to collect and analyze data, design interventions, predict outcomes, and examine patterns.
- Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care states that graduates should "use information systems/technology to support and improve patient care and healthcare systems" (p. 12).

## REFERENCES

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