

Supplemental Digital Content 1. Tables containing descriptive statistics for all quality measures by year, level of integration, and market competition

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sTable 1: Summary Statistics of Quality Measures by Year

| | All integration levels and years | | | | First year of sample | | | | Last year of sample | | | |
|---|----------------------------------|-----------|-------|-------|----------------------|-----------|--------|--------|---------------------|-----------|--------|--------|
| | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max |
| Patient Satisfaction | | | | | 2008 | | | | 2015 | | | |
| Hospital Clean | 0.9078 | 0.0410 | 0.66 | 1 | 0.8954 | 0.0451 | 0.70 | 1 | 0.9136 | 0.0375 | 0.74 | 1 |
| Nurse Communicated Well | 0.9500 | 0.0272 | 0.68 | 1 | 0.9414 | 0.0304 | 0.77 | 1 | 0.9566 | 0.0226 | 0.79 | 1 |
| Doctor Communicated Well | 0.9556 | 0.0212 | 0.75 | 1 | 0.9519 | 0.0224 | 0.83 | 1 | 0.9581 | 0.0197 | 0.85 | 1 |
| Patient Received Help as Soon as Wanted | 0.8964 | 0.0505 | 0.54 | 1 | 0.8787 | 0.0568 | 0.60 | 1 | 0.9080 | 0.0430 | 0.66 | 1 |
| Pain Well Controlled | 0.9295 | 0.0286 | 0.67 | 1 | 0.9231 | 0.0309 | 0.74 | 1 | 0.9338 | 0.0259 | 0.75 | 1 |
| Staff Explained Medicines | 0.7964 | 0.0524 | 0.51 | 1 | 0.7699 | 0.0585 | 0.53 | 1 | 0.8184 | 0.0444 | 0.64 | 0.9700 |
| Hospital Quiet at Night | 0.8865 | 0.0550 | 0.64 | 1 | 0.8621 | 0.0580 | 0.64 | 1 | 0.9021 | 0.0493 | 0.68 | 1 |
| Staff Provided Home Care Instructions Probably/Definitely Recommend Hospital | 0.8333 | 0.0487 | 0.55 | 1 | 0.7992 | 0.0518 | 0.61 | 1 | 0.8671 | 0.0346 | 0.61 | 0.9600 |
| Hospital Rating 7-10 | 0.9484 | 0.0305 | 0.57 | 1 | 0.9429 | 0.0332 | 0.74 | 1 | 0.9510 | 0.0280 | 0.74 | 1 |
| | 0.9133 | 0.0409 | 0.54 | 1 | 0.8967 | 0.0469 | 0.63 | 1 | 0.9231 | 0.0348 | 0.67 | 1 |
| Readmissions | | | | | 2009 | | | | 2015 | | | |
| Heart attack | 0.1895 | 0.0170 | 0.133 | 0.274 | 0.1990 | 0.0134 | 0.1530 | 0.2520 | 0.1697 | 0.0108 | 0.1330 | 0.2080 |
| Heart failure | 0.2377 | 0.0214 | 0.158 | 0.344 | 0.2449 | 0.0207 | 0.1590 | 0.3440 | 0.2195 | 0.0157 | 0.1580 | 0.3170 |
| Pneumonia | 0.1787 | 0.0157 | 0.13 | 0.276 | 0.1815 | 0.0168 | 0.1310 | 0.2760 | 0.1692 | 0.0111 | 0.1320 | 0.2160 |
| Process of Care | | | | | 2008 | | | | 2014 | | | |
| <u>AMI patients:</u> | | | | | | | | | | | | |
| Given Aspirin at Discharge | 0.9808 | 0.0342 | 0.43 | 1 | 0.9634 | 0.0487 | 0.43 | 1 | 0.9895 | 0.0242 | 0.71 | 1 |
| Given PCI Within 90 Minutes Of Arrival | 0.8953 | 0.1217 | 0.16 | 1 | 0.7359 | 0.1620 | 0.16 | 1 | 0.9546 | 0.0675 | 0.24 | 1 |
| <u>Heart failure patients:</u> | | | | | | | | | | | | |
| Given Discharge Instructions | 0.8706 | 0.1519 | 0 | 1 | 0.7548 | 0.1983 | 0 | 1 | 0.9369 | 0.1040 | 0 | 1 |
| Given an Evaluation of Left Ventricular Systolic Function | 0.9550 | 0.0980 | 0 | 1 | 0.9074 | 0.1341 | 0 | 1 | 0.9714 | 0.0888 | 0.08 | 1 |
| Given ACE Inhibitor or ARB for Left Ventricular Systolic Dysfunction | 0.9432 | 0.0707 | 0.35 | 1 | 0.8983 | 0.0850 | 0.35 | 1 | 0.9657 | 0.0639 | 0.36 | 1 |
| <u>Pneumonia patients:</u> | | | | | | | | | | | | |
| Initial ER Blood Culture Performed Prior To First Hospital Dose Of Antibiotics* | 0.9483 | 0.0539 | 0.38 | 1 | 0.9103 | 0.0643 | 0.45 | 1 | 0.9728 | 0.0337 | 0.62 | 1 |
| Given Most Appropriate Initial Antibiotic(s) | 0.9200 | 0.0743 | 0.02 | 1 | 0.8873 | 0.0731 | 0.35 | 1 | 0.9451 | 0.0816 | 0.21 | 1 |

*First year is 2013

sTable 1: Summary Statistics of Quality Measures by Year (continued)

| | All integration levels and years | | | | First year of sample | | | | Last year of sample | | | |
|---|----------------------------------|-----------|------|-----|----------------------|-----------|------|-----|---------------------|-----------|------|-----|
| | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max | Mean | Std. Dev. | Min | Max |
| Process of Care (cont.) | | | | | 2008 | | | | 2014 | | | |
| <u>Surgical patients:</u> | | | | | | | | | | | | |
| Received Preventative Antibiotics One Hour Before Incision | 0.9529 | 0.0762 | 0.14 | 1 | 0.8550 | 0.1364 | 0.14 | 1 | 0.9797 | 0.0464 | 0.33 | 1 |
| Received the Appropriate Preventative Antibiotic(s) for Their Surgery | 0.9676 | 0.0511 | 0 | 1 | 0.9233 | 0.0902 | 0.26 | 1 | 0.9840 | 0.0274 | 0.75 | 1 |
| Preventative Antibiotic(s) are Stopped Within 24 hours After Surgery | 0.9353 | 0.0927 | 0.03 | 1 | 0.8193 | 0.1532 | 0.07 | 1 | 0.9740 | 0.0479 | 0.22 | 1 |
| Doctors Ordered Treatments to Prevent Blood Clots For Certain Surgeries* | 0.9212 | 0.1137 | 0 | 1 | 0.8069 | 0.1665 | 0 | 1 | 0.9722 | 0.0514 | 0.06 | 1 |
| Received Treatment To Prevent Blood Clots Within 24 Hours Before or After Selected to Prevent Blood Clots | 0.9204 | 0.1122 | 0 | 1 | 0.7793 | 0.1704 | 0 | 1 | 0.9768 | 0.0539 | 0.12 | 1 |
| | | | | | 2010 | | | | 2014 | | | |
| Taking beta blockers before coming to the hospital were kept on beta before and after surgery | 0.9460 | 0.0748 | 0 | 1 | 0.9114 | 0.0947 | 0.11 | 1 | 0.9652 | 0.0589 | 0.27 | 1 |
| <u>Outpatients:</u> | | | | | | | | | | | | |
| Chest pain or possible heart attack treated with aspirin within 24 hours of arrival | 0.9615 | 0.0480 | 0.46 | 1 | 0.9506 | 0.0530 | 0.46 | 1 | 0.9665 | 0.0503 | 0.63 | 1 |
| Having surgery and got antibiotic at the right time within 1 hour before surgery | 0.9452 | 0.0734 | 0.03 | 1 | 0.9032 | 0.0947 | 0.03 | 1 | 0.9699 | 0.0529 | 0.10 | 1 |
| Having surgery and got the right kind of antibiotic | 0.9540 | 0.0605 | 0 | 1 | 0.9325 | 0.0739 | 0.23 | 1 | 0.9732 | 0.0464 | 0 | 1 |

*First year is 2013

sTable 2: Mean Processes of Care Adherence by Integration and Market Competition

| | Surgical Patients | | | | | |
|--------------------------------|---|--|--|---|---|---|
| | Received Preventative Antibiotics One Hour Before Incision | Received the Appropriate Preventative Antibiotic(s) for Their Surgery | Preventative Antibiotic(s) are Stopped Within 24 hours After Surgery | Doctors Ordered Treatments to Prevent Blood Clots For Certain Surgeries | Received Treatment To Prevent Blood Clots Within 24 Hours Before or After Selected to Prevent Blood Clots | Taking beta blockers before coming to the hospital were kept on beta before and after surgery |
| <u>Integration level:</u> | | | | | | |
| No Integration | 95.04% | 96.52% | 93.02% | 91.18% | 91.18% | 94.11% |
| Independent Physician Assoc. | 93.99% | 96.07% | 91.59% | 89.59% | 89.53% | 92.07% |
| Open Physician Hospital Org. | 95.49% | 97.07% | 92.95% | 91.22% | 91.03% | 94.78% |
| Closed Physician Hospital Org. | 94.67% | 96.53% | 92.48% | 91.93% | 91.17% | 95.14% |
| Fully Integrated Org. | 95.61% | 96.96% | 94.28% | 93.17% | 93.08% | 95.02% |
| <u>Market Concentration</u> | | | | | | |
| Quartile 1 (low HHI) | 95.50% | 96.78% | 93.44% | 92.04% | 92.26% | 94.78% |
| Quartile 2 | 95.32% | 96.84% | 93.44% | 92.00% | 91.71% | 94.63% |
| Quartile 3 | 95.21% | 96.74% | 93.45% | 92.18% | 92.03% | 94.23% |
| Quartile 4 (high HHI) | 95.14% | 96.67% | 93.79% | 92.26% | 92.14% | 94.77% |
| | Outpatients | | | | | |
| | Chest pain or possible heart attack treated with aspirin within 24 hours of arrival | Average number of minutes before outpatients with chest pain or possible heart attack got an ECG | Having surgery and got antibiotic at the right time within 1 hour before surgery | Having surgery and got the right kind of antibiotic | | |
| <u>Integration level:</u> | | | | | | |
| No Integration | 95.85% | 9.03 | 94.31% | 95.30% | | |
| Independent Physician Assoc. | 95.68% | 8.93 | 93.34% | 94.23% | | |
| Open Physician Hospital Org. | 96.02% | 8.03 | 94.37% | 95.00% | | |
| Closed Physician Hospital Org. | 95.57% | 8.29 | 94.29% | 95.18% | | |
| Fully Integrated Org. | 96.49% | 8.27 | 94.74% | 95.61% | | |
| <u>Market Concentration</u> | | | | | | |
| Quartile 1 (low HHI) | 96.16% | 8.14 | 94.74% | 95.46% | | |
| Quartile 2 | 96.34% | 7.90 | 94.43% | 95.47% | | |
| Quartile 3 | 96.00% | 9.52 | 94.40% | 95.35% | | |
| Quartile 4 (high HHI) | 96.11% | 9.00 | 94.50% | 95.32% | | |

sTable 2: Mean Processes of Care Adherence by Integration and Market Competition (continued)

| | Heart attack (AMI) patients | | Heart Failure Patients | | | Pneumonia patients | |
|--------------------------------|-----------------------------|--|------------------------------|---|--|--|--|
| | Given Aspirin at Discharge | Given PCI Within 90 Minutes Of Arrival | Given Discharge Instructions | Given an Evaluation of Left Ventricular Systolic Function | Given ACE Inhibitor or ARB for Left Ventricular Systolic Dysfunction | Initial Emergency Room Blood Culture Performed Prior To The First Hospital Dose Of Antibiotics | Given Most Appropriate Initial Antibiotic(s) |
| <u>Integration level:</u> | | | | | | | |
| No Integration | 97.82% | 88.85% | 86.25% | 94.34% | 93.75% | 94.65% | 91.24% |
| Independent Physician Assoc. | 97.10% | 88.61% | 83.46% | 93.54% | 93.48% | 94.37% | 90.40% |
| Open Physician Hospital Org. | 97.56% | 88.43% | 85.94% | 96.16% | 93.65% | 94.73% | 91.82% |
| Closed Physician Hospital Org. | 98.02% | 89.49% | 87.04% | 96.35% | 94.00% | 94.72% | 92.02% |
| Fully Integrated Org. | 98.35% | 89.92% | 87.97% | 96.19% | 94.81% | 95.02% | 92.64% |
| <u>Market Concentration</u> | | | | | | | |
| Quartile 1 (low HHI) | 98.04% | 89.21% | 87.07% | 96.10% | 94.63% | 95.01% | 92.37% |
| Quartile 2 | 98.33% | 90.05% | 87.57% | 95.78% | 94.69% | 94.93% | 92.10% |
| Quartile 3 | 97.95% | 89.81% | 86.59% | 95.04% | 94.05% | 94.71% | 91.64% |
| Quartile 4 (high HHI) | 98.01% | 89.07% | 87.00% | 95.06% | 93.91% | 94.66% | 91.89% |

sTable 3: Mean Readmission Rates by Integration and Market Competition

| | AMI | Heart Failure | Pneumonia |
|--------------------------------|--------|---------------|-----------|
| <u>Integration level:</u> | | | |
| No Integration | 19.10% | 23.97% | 17.92% |
| Independent Physician Assoc. | 19.15% | 23.93% | 17.84% |
| Open Physician Hospital Org. | 19.00% | 23.90% | 17.98% |
| Closed Physician Hospital Org. | 19.28% | 24.10% | 18.06% |
| Fully Integrated Org. | 18.82% | 23.58% | 17.80% |
| <u>Market Concentration</u> | | | |
| Quartile 1 (low HHI) | 19.30% | 24.24% | 18.15% |
| Quartile 2 | 18.88% | 23.73% | 17.87% |
| Quartile 3 | 18.94% | 23.70% | 17.81% |
| Quartile 4 (high HHI) | 18.69% | 23.43% | 17.66% |

sTable 4: Mean Patient Satisfaction Scores by Integration and Market Competition

| | Hospital Clean | Nurse Communicated Well | Doctor Communicated Well | Patient Received Help as Soon as Wanted | Pain Well Controlled | Staff Explained Medicines | Hospital Quiet at Night | Staff Provided Home Care Instructions | Probably/ Definitely Recommend Hospital | Hospital Rating 7-10 |
|-------------------------------------|----------------|-------------------------|--------------------------|---|----------------------|---------------------------|-------------------------|---------------------------------------|---|----------------------|
| <u>Integration level:</u> | | | | | | | | | | |
| No Integration Independent | 90.60% | 94.71% | 95.57% | 89.51% | 92.71% | 79.56% | 89.03% | 82.97% | 94.40% | 91.04% |
| Physician Assoc. Open Physician | 90.83% | 94.55% | 95.28% | 88.98% | 92.63% | 78.95% | 88.32% | 82.38% | 94.48% | 90.92% |
| Hospital Org. Closed Physician | 90.85% | 95.06% | 95.59% | 89.63% | 92.99% | 79.41% | 89.24% | 82.93% | 94.82% | 91.20% |
| Hospital Org. Fully Integrated Org. | 90.30% | 94.52% | 95.27% | 88.69% | 92.62% | 78.73% | 88.08% | 82.61% | 94.44% | 90.64% |
| Fully Integrated Org. | 90.93% | 95.27% | 95.61% | 89.89% | 93.16% | 79.89% | 88.43% | 83.78% | 95.20% | 91.64% |
| <u>Market Concentration</u> | | | | | | | | | | |
| Quartile 1 (low HHI) | 90.02% | 94.33% | 95.19% | 90.76% | 92.46% | 78.49% | 87.81% | 82.39% | 94.33% | 90.81% |
| Quartile 2 | 90.54% | 94.87% | 95.46% | 90.10% | 92.84% | 79.46% | 88.50% | 82.42% | 94.70% | 91.21% |
| Quartile 3 | 91.06% | 95.28% | 95.73% | 89.36% | 93.13% | 80.07% | 88.89% | 83.46% | 95.04% | 91.47% |
| Quartile 4 (high HHI) | 91.48% | 95.52% | 95.87% | 89.34% | 93.39% | 80.54% | 89.39% | 84.07% | 95.30% | 91.82% |