Supplementary Online Content

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eAppendix 1. Supplemental Tables: Cohort Description
eAppendix 2. Unadjusted Outcomes
eAppendix 3. Proportions of Different Hospitalization Types
eAppendix 4. Adjusted Outcomes
eAppendix 5. Impact of Denominator Definition on Outcome Capture

This supplementary material has been provided by the authors to give readers additional information about their work.
### eAppendix 1. Supplemental Tables: Cohort Description

#### Table S1A-1: Patients with community-acquired pneumonia (CAP)\(^a\)

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------|-----------|-----------|-------------|------------|-------|
|             | Before HRRP penalty phase | HRRP penalties in effect |          |            |       |
| N (hospitalizations) | 4,379 | 3,859 | 5,813 | 9,894 | 23,945 |
| N (patients) | 4,129 | 3,680 | 5,413 | 9,221 | 21,438 |
| Inpatient (INP) (%)\(^b\) | 92.9 (78.9 - 99.6) | 85.5 (54.7 - 99.2) | 79.9 (60.2 - 95.2) | 74.2 (59.3 - 91.0) | 80.9 (66.6 - 95.4) |
| Observation (OBS) (%) | 7.1 (0.4 - 21.1) | 14.5 (0.8 - 45.3) | 20.1 (4.8 - 39.8) | 25.8 (9.0 - 40.7) | 19.1 (4.6 - 33.4) |
| Inpatient stay < 24 hours | 3.7 (0.9 - 9.2) | 4.5 (0.9 - 8.0) | 3.8 (1.6 - 5.9) | 2.1 (0.7 - 4.1) | 3.2 (2.0 - 5.4) |
| Transport-in\(^c\) | 5.4 (0.9 - 11.3) | 5.6 (1.3 - 14.0) | 5.0 (0.6 - 17.9) | 4.9 (1.2 - 11.6) | 5.1 (1.2 - 11.5) |
| Age (mean) | 71.8 (67.2 - 78.5) | 72.7 (65.2 - 77.8) | 73.5 (67.3 - 77.1) | 73.0 (66.9 - 76.6) | 72.8 (67.9 - 77.0) |
| Sex (% male) | 47.6 (41.5 - 55.8) | 48.5 (43.2 - 58.9) | 47.4 (42.9 - 53.8) | 47.9 (43.6 - 60.3) | 47.8 (45.2 - 56.6) |
| Kaiser Foundation Health Plan, Inc. member (%) | 95.8 (86.6 - 100) | 95.2 (84.0 - 99.7) | 95.3 (84.9 - 98.8) | 94.2 (68.9 - 98.5) | 94.9 (81.1 - 98.8) |
| Met strict HEDIS membership definition\(^d\) (%) | 80.4 (72.0 - 84.6) | 81.1 (68.6 - 87.7) | 80.2 (69.9 - 86.5) | 79.3 (59.3 - 85.5) | 80.0 (67.0 - 85.8) |
| Met public reporting definition\(^d\) (%) | 71.3 (59.3 - 82.0) | 65.3 (38.4 - 82.5) | 60.5 (40.2 - 75.5) | 56.4 (46.9 - 69.5) | 61.5 (49.8 - 72.4) |
| Hospitalization via emergency department (%) | 92.1 (86.4 - 97.0) | 93.0 (82.6 - 97.6) | 94.7 (88.9 - 98.6) | 95.2 (88.0 - 100) | 94.2 (89.5 - 98.0) |
| Charlson score\(^e\) (median) | 3.0 (2.0 - 4.0) | 3.0 (2.0 - 4.0) | 3.0 (3.0 - 4.0) | 4.0 (3.0 - 4.0) | 3.0 (3.0 - 4.0) |
| Charlson score ≥ 4 (%) | 39.4 (29.4 - 51.7) | 39.8 (30.2 - 52.6) | 46.1 (36.6 - 55.8) | 51.1 (44.2 - 55.9) | 45.9 (39.0 - 50.6) |
| COPS2' (mean) | 51.4 (43.7 - 57.9) | 55.6 (46.0 - 66.3) | 66.4 (58.9 - 75.2) | 66.4 (49.8 - 73.6) | 61.9 (50.9 - 69.5) |
| COPS2 ≥ 65 (%) | 32.5 (26.7 - 39.6) | 35.6 (25.9 - 44.3) | 44.1 (37.6 - 52.7) | 44.5 (32.6 - 50.7) | 40.8 (32.0 - 47.4) |
| Admission LAPS2' (mean) | 82.9 (75.6 - 90.1) | 81.0 (70.5 - 86.2) | 80.9 (68.0 - 88.2) | 81.3 (71.3 - 87.8) | 81.4 (74.3 - 87.2) |
| Discharge LAPS2 (mean) | 58.7 (54.5 - 66.3) | 59.2 (53.4 - 66.9) | 58.2 (53.1 - 64.1) | 57.6 (52.0 - 61.4) | 58.2 (54.5 - 62.0) |
| LAPS2 ≥ 110 (%) | 19.1 (10.4 - 27.3) | 18.1 (10.1 - 23.8) | 17.4 (6.0 - 23.5) | 17.5 (10.4 - 25.1) | 17.9 (11.5 - 23.2) |
| Full code at discharge (%) | 70.3 (57.6 - 78.5) | 68.1 (56.1 - 89.8) | 66.8 (55.5 - 80.0) | 69.3 (57.0 - 84.1) | 68.7 (58.7 - 82.8) |
| Length of stay (days) (mean) | 5.3 (4.4 - 6.3) | 5.0 (3.8 - 6.1) | 4.9 (3.9 - 6.8) | 4.7 (3.8 - 5.4) | 4.9 (4.0 - 5.6) |
| Discharge disposition\(^f\) (%) | 73.7 (59.8 - 83.2) | 72.3 (53.9 - 84.4) | 68.0 (50.7 - 79.8) | 68.8 (51.9 - 83.2) | 70.1 (53.6 - 80.5) |

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Table S1A-1: Patients with community-acquired pneumonia (CAP)\textsuperscript{a}

| TIME PERIOD       | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL       |
|-------------------|-----------|-----------|-------------|------------|-------------|
|                   | Before HRRP penalty phase | HRRP penalties in effect |               |            |             |
| Home Health (%)   | 13.7 (6.9 - 29.1) | 15.1 (5.4 - 32.4) | 19.8 (8.3 - 37.0) | 19.8 (8.0 - 34.9) | 17.9 (9.1 - 32.8) |
| Regular SNF (%)   | 9.4 (4.6 - 19.1)  | 9.8 (3.9 - 15.3)  | 9.7 (3.6 - 18.3)  | 9.4 (5.8 - 16.1)  | 9.5 (6.1 - 17.0)  |
| Custodial SNF (%) | 3.1 (1.1 - 7.3)   | 2.8 (0.7 - 8.1)   | 2.5 (1.3 - 5.6)   | 2.0 (0.4 - 4.3)   | 2.5 (0.5 - 5.0)   |
| Hospice referral (%) | 4.1 (0.6 - 7.8) | 4.2 (0.9 - 9.6) | 4.5 (3.0 - 8.3) | 4.0 (0.7 - 9.0) | 4.2 (2.2 - 7.3) |

Outcomes\textsuperscript{h}

|                   | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL       |
|-------------------|-----------|-----------|-------------|------------|-------------|
| Inpatient mortality (%) | 4.3 (1.8 - 8.4) | 4.3 (1.2 - 8.9) | 3.8 (1.1 - 6.2) | 3.3 (0.4 - 4.6) | 3.8 (0.8 - 5.2) |
| 30-day mortality (%) | 9.8 (6.3 - 14.9) | 9.6 (5.0 - 16.2) | 9.8 (6.0 - 13.6) | 8.7 (2.6 - 10.9) | 9.3 (5.8 - 11.6) |
| Any rehospitalization (%) | 16.0 (11.3 - 22.9) | 15.6 (10.6 - 26.1) | 17.8 (12.5 - 25.8) | 17.3 (13.3 - 22.8) | 16.9 (12.8 - 20.0) |
| Any non-elective rehospitalization (%) | 15.0 (9.5 - 22.7) | 14.3 (9.8 - 23.9) | 16.9 (11.8 - 23.5) | 16.3 (12.9 - 21.7) | 15.9 (12.2 - 19.0) |
| Non-elective inpatient rehospitalization (%) | 14.1 (8.3 - 21.4) | 12.9 (9.1 - 20.5) | 14.4 (9.1 - 21.7) | 13.5 (9.0 - 17.8) | 13.7 (9.4 - 16.3) |
| Non-elective observation rehospitalization (%) | 1.4 (0.5 - 3.3) | 1.8 (0.4 - 4.7) | 3.2 (1.4 - 6.6) | 3.6 (0.9 - 8.2) | 2.8 (1.0 - 5.3) |
| 30-day post-discharge mortality (%) | 6.8 (4.2 - 10.8) | 6.3 (2.9 - 10.6) | 7.2 (4.6 - 10.0) | 6.7 (2.9 - 9.0) | 6.8 (5.5 - 8.3) |
| Composite outcome (%) | 19.6 (13.5 - 27.3) | 18.8 (15.1 - 27.3) | 21.5 (15.4 - 27.6) | 20.6 (15.8 - 25.7) | 20.3 (16.6 - 23.8) |

**FOOTNOTES**

\textsuperscript{a} Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

\textsuperscript{b} Hospital episodes where patients transitioned from OBS to INP status are classified as INP.

\textsuperscript{c} Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 1,192 patients, had elevated inpatient (4.3%) and 30-day (11.9%) mortality, compared to 3.8% and 9.3% in the rest of the KPNC CAP cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.

\textsuperscript{d} The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

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Charlson score was calculated using the methodology of Deyo et al. (1992).

The COrmoridity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

Transports-in (footnote c) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
| TIME PERIOD | Before HRRP penalty phase | HRRP penalties in effect |
|-------------|---------------------------|--------------------------|
| N (hospitalizations) | 6,018 | 7,501 | 14,077 | 17,511 | TOTAL: 45,107 |
| N (patients) | 4,839 | 5,719 | 10,154 | 12,735 | TOTAL: 28,912 |
| Inpatient (INP) (%) | 92.4 (82.1 - 97.3) | 85.7 (60.8 - 97.4) | 83.3 (68.7 - 91.4) | 79.2 (57.3 - 90.2) | TOTAL: 83.3 (72.3 - 91.0) |
| Observation (OBS) (%) | 7.6 (2.7 - 17.9) | 14.3 (2.6 - 39.2) | 16.7 (8.6 - 31.3) | 20.8 (9.8 - 42.7) | TOTAL: 16.7 (9.0 - 27.7) |
| Inpatient stay < 24 hours | 4.3 (0.7 - 8.8) | 3.9 (1.6 - 7.0) | 3.0 (1.3 - 5.6) | 1.8 (0.2 - 3.9) | TOTAL: 2.9 (1.4 - 4.5) |
| Transport-in<sup>c</sup> | 5.0 (0.5 - 10.9) | 5.0 (0.6 - 14.0) | 4.5 (1.3 - 9.2) | 4.2 (0.3 - 8.6) | TOTAL: 4.5 (1.2 - 9.6) |
| Age (mean) | 75.3 (71.3 - 80.0) | 75.0 (72.0 - 79.4) | 75.1 (70.5 - 79.8) | 74.3 (70.2 - 79.2) | 74.8 (71.0 - 79.3) |
| Sex (% male) | 50.7 (44.9 - 60.6) | 51.8 (44.9 - 59.3) | 52.2 (43.8 - 59.7) | 53.3 (47.4 - 58.7) | 52.4 (47.0 - 56.2) |
| Kaiser Foundation Health Plan, Inc. member (%) | 94.5 (87.1 - 99.5) | 94.7 (87.0 - 99.2) | 93.9 (82.0 - 99.1) | 91.0 (65.5 - 98.0) | 93.0 (77.0 - 98.8) |
| Met strict HEDIS membership definition<sup>d</sup> (%) | 78.4 (72.3 - 83.3) | 79.5 (68.8 - 87.9) | 77.7 (64.8 - 84.3) | 74.7 (53.3 - 82.5) | 76.9 (63.5 - 83.5) |
| Met public reporting definition<sup>d</sup> (%) | 68.8 (57.5 - 78.2) | 64.8 (45.6 - 77.1) | 61.9 (42.3 - 73.8) | 57.1 (40.5 - 69.1) | 61.4 (46.4 - 72.6) |
| Hospitalization via emergency department (%) | 91.3 (83.1 - 96.7) | 92.7 (83.2 - 98.6) | 94.3 (85.0 - 99.0) | 94.9 (86.7 - 99.3) | 93.9 (85.4 - 98.6) |
| Charlson score<sup>e</sup> (median) | 4.0 (3.0 - 5.0) | 5.0 (4.0 - 5.0) | 5.0 (4.0 - 6.0) | 5.0 (4.0 - 6.0) | 5.0 (4.0 - 5.0) |
| Charlson score ≥ 4 (%) | 61.4 (48.0 - 72.1) | 65.4 (57.0 - 77.2) | 66.5 (59.3 - 75.1) | 67.8 (58.5 - 78.0) | 66.1 (59.3 - 76.0) |
| COPS2<sup>f</sup> (mean) | 67.8 (59.3 - 74.2) | 74.3 (63.9 - 83.0) | 80.1 (71.3 - 94.1) | 79.3 (62.7 - 89.1) | 77.2 (68.8 - 84.1) |
| COPS2 ≥ 65 (%) | 49.0 (39.9 - 56.0) | 55.0 (47.0 - 61.4) | 59.1 (50.7 - 69.8) | 58.2 (43.4 - 64.8) | 56.7 (48.7 - 62.7) |
| Admission LAPS2<sup>f</sup> (mean) | 83.9 (78.2 - 89.9) | 84.8 (78.5 - 95.0) | 85.7 (77.1 - 92.1) | 84.8 (78.7 - 91.1) | 84.9 (78.4 - 90.1) |
| Discharge LAPS2 (mean) | 71.3 (60.1 - 79.3) | 71.4 (64.3 - 76.3) | 70.6 (62.0 - 75.3) | 69.1 (61.4 - 75.1) | 70.2 (62.0 - 74.1) |
| LAPS2 ≥ 110 (%) | 20.0 (10.9 - 26.6) | 19.9 (12.8 - 33.3) | 20.8 (12.9 - 30.4) | 19.8 (14.3 - 28.9) | 20.2 (15.2 - 27.7) |
| Full code at discharge (%) | 64.7 (39.8 - 73.6) | 65.4 (48.9 - 78.9) | 65.3 (50.0 - 77.1) | 67.6 (49.1 - 84.0) | 66.2 (50.9 - 79.7) |
| Length of stay (days) (mean) | 5.0 (3.8 - 6.2) | 5.2 (3.6 - 6.9) | 4.8 (3.9 - 6.2) | 5.0 (4.3 - 6.5) | 5.0 (4.2 - 6.2) |
| Discharge disposition<sup>f</sup> (%) | | | | | |
| Regular Discharge (%) | 74.0 (64.4 - 86.0) | 72.9 (64.5 - 84.5) | 71.0 (56.1 - 83.6) | 70.1 (50.0 - 85.2) | 71.4 (56.5 - 83.8) |
| Home Health (%) | 14.6 (5.6 - 26.9) | 17.1 (6.7 - 28.3) | 19.4 (7.9 - 34.3) | 21.3 (7.0 - 38.1) | 19.1 (8.4 - 33.6) |
Table S1A-2: Patients with congestive heart failure (CHF)\textsuperscript{a}

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------|-----------|-----------|-------------|------------|-------|
|             | Before HRRP penalty phase | HRRP penalties in effect |             |            |       |
| Regular SNF (%) | 9.2 (2.5 - 18.2) | 8.5 (3.8 - 15.2) | 8.0 (3.4 - 15.3) | 7.4 (3.8 - 12.8) | 8.0 (4.1 - 14.6) |
| Custodial SNF (%) | 2.2 (0.4 - 5.0) | 1.5 (0.3 - 5.4) | 1.7 (0.3 - 2.9) | 1.2 (0.1 - 3.6) | 1.5 (0.4 - 2.8) |
| Hospice referral (%) | 4.9 (2.8 - 9.0) | 5.3 (2.6 - 11.1) | 5.2 (2.7 - 10.2) | 4.9 (1.5 - 12.5) | 5.1 (2.3 - 9.7) |
| Outcomes\textsuperscript{b} |             |           |             |            |       |
| Inpatient mortality (%) | 3.7 (1.2 - 6.3) | 3.3 (0.7 - 7.5) | 3.2 (1.6 - 5.2) | 3.0 (1.7 - 4.5) | 3.2 (1.7 - 4.5) |
| 30-day mortality (%) | 10.4 (6.2 - 14.7) | 10.0 (3.5 - 17.4) | 10.2 (6.5 - 13.6) | 9.6 (6.2 - 12.9) | 9.9 (7.0 - 12.5) |
| Any rehospitalization (%) | 23.0 (15.0 - 28.4) | 24.8 (18.4 - 30.5) | 22.9 (16.3 - 27.7) | 23.1 (17.4 - 29.7) | 23.3 (18.2 - 28.6) |
| Any non-elective rehospitalization (%) | 21.8 (13.9 - 26.4) | 23.4 (16.7 - 29.4) | 21.5 (15.5 - 26.2) | 21.8 (15.7 - 27.7) | 22.0 (16.3 - 26.9) |
| Non-elective inpatient rehospitalization (%) | 20.2 (13.9 - 26.1) | 20.7 (12.3 - 26.2) | 18.7 (13.1 - 23.6) | 17.8 (12.6 - 25.1) | 18.9 (13.1 - 24.5) |
| Non-elective observation rehospitalization (%) | 2.1 (0.7 - 4.8) | 3.4 (0.5 - 7.1) | 3.9 (1.4 - 8.0) | 5.3 (1.7 - 9.9) | 4.1 (2.2 - 6.9) |
| 30-day post-discharge mortality (%) | 8.3 (5.0 - 12.0) | 8.2 (5.1 - 13.4) | 8.3 (5.1 - 11.3) | 7.8 (4.1 - 12.1) | 8.1 (5.7 - 11.5) |
| Composite outcome (%) | 27.0 (19.4 - 33.0) | 28.4 (21.1 - 33.1) | 27.0 (22.5 - 30.8) | 27.0 (21.7 - 32.5) | 27.2 (23.3 - 31.0) |

\textbf{FOOTNOTES}

\textsuperscript{a} Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

\textsuperscript{b} Hospital episodes where patients transitioned from OBS to INP status are classified as INP.

\textsuperscript{c} Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 1,800 patients, had elevated inpatient (3.5%) and 30-day (11.1%) mortality, compared to 3.2% and 9.9% in the rest of the KPNC CHF cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.

\textsuperscript{d} The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

\textsuperscript{e} Charlson score was calculated using the methodology of Deyo et al. (1992).
The COmorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

Transports-in (footnote c) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
Table S1A-3: Patients with acute myocardial infarction (AMI)*

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------|-----------|-----------|-------------|------------|-------|
|             | Before HRRP penalty phase | HRRP penalties in effect |             |           |       |
| N (hospitalizations) | 4,194 | 5,471 | 10,131 | 15,684 | 35,480 |
| N (patients) | 3,945 | 5,158 | 9,348 | 14,339 | 31,187 |
| Inpatient (INP) (%) | 96.2 (89.6 - 99.2) | 94.8 (82.7 - 100) | 90.5 (75.9 - 97.5) | 84.1 (49.2 - 94.0) | 89.0 (70.5 - 95.2) |
| Observation (OBS) (%) | 3.8 (0.8 - 10.4) | 5.2 (0.5 - 17.3) | 9.5 (2.5 - 24.1) | 15.9 (6.0 - 50.8) | 11.0 (4.8 - 29.5) |
| Inpatient stay < 24 hours (%) | 7.0 (2.5 - 14.0) | 8.0 (2.1 - 17.4) | 7.0 (2.1 - 15.4) | 5.3 (2.3 - 14.3) | 6.4 (2.4 - 11.5) |
| Transport-in (%) | 13.5 (1.3 - 28.2) | 12.8 (3.1 - 33.3) | 11.3 (2.3 - 29.2) | 9.3 (0.3 - 20.6) | 10.9 (3.6 - 26.1) |
| Age (mean) | 69.6 (66.6 - 73.1) | 69.0 (66.4 - 71.8) | 69.3 (66.5 - 73.7) | 68.4 (65.5 - 76.2) | 68.9 (66.4 - 72.5) |
| Sex (% male) | 62.0 (48.9 - 70.6) | 62.5 (47.8 - 70.9) | 63.1 (50.3 - 70.0) | 63.6 (55.9 - 71.9) | 63.1 (54.7 - 69.7) |
| Kaiser Foundation Health Plan, Inc. member (%) | 94.5 (86.4 - 98.8) | 94.4 (86.0 - 100) | 93.0 (80.6 - 98.7) | 90.5 (68.9 - 98.1) | 92.3 (80.7 - 97.6) |
| Met strict HEDIS membership definition (%) | 81.7 (74.0 - 87.4) | 82.3 (72.8 - 87.6) | 80.3 (69.0 - 88.0) | 77.8 (59.6 - 84.8) | 79.6 (70.0 - 85.9) |
| Met public reporting definition (%) | 73.4 (65.0 - 81.7) | 72.2 (58.0 - 78.8) | 67.5 (52.3 - 78.1) | 61.2 (36.7 - 73.5) | 66.1 (54.5 - 76.9) |
| Hospitalization via emergency department (%) | 82.0 (39.4 - 98.0) | 82.9 (50.1 - 95.9) | 84.4 (52.4 - 97.7) | 87.5 (62.6 - 99.5) | 85.3 (53.9 - 96.6) |
| Charlson score* (median) | 2.0 (1.0 - 3.0) | 2.0 (1.0 - 4.0) | 2.0 (1.0 - 4.0) | 2.0 (1.0 - 4.0) | 2.0 (1.0 - 4.0) |
| Charlson score ≥ 4 (%) | 32.8 (20.4 - 47.4) | 32.9 (22.2 - 57.8) | 35.8 (28.1 - 52.3) | 36.9 (26.2 - 61.8) | 35.5 (28.1 - 51.5) |
| COPS2* (mean) | 32.2 (25.3 - 42.1) | 33.3 (27.3 - 49.8) | 37.9 (30.4 - 48.6) | 37.8 (28.8 - 59.9) | 36.5 (31.2 - 47.3) |
| COPS2 ≥ 65 (%) | 16.7 (9.2 - 31.7) | 16.7 (11.4 - 31.1) | 20.6 (15.1 - 36.4) | 20.3 (11.7 - 50.0) | 19.4 (15.2 - 33.9) |
| Admission LAPS2* (mean) | 70.5 (60.1 - 84.9) | 70.2 (59.2 - 82.8) | 71.1 (62.4 - 88.0) | 69.3 (58.7 - 103) | 70.1 (61.7 - 87.1) |
| Discharge LAPS2 (mean) | 56.6 (47.1 - 62.9) | 55.4 (44.4 - 70.0) | 53.2 (46.8 - 62.0) | 52.5 (45.6 - 65.6) | 53.7 (49.8 - 62.8) |
| LAPS2 ≥ 110 (%) | 14.5 (5.4 - 24.0) | 13.5 (6.3 - 25.4) | 14.3 (9.3 - 22.1) | 12.6 (8.0 - 37.5) | 13.5 (9.5 - 21.1) |
| Full code at discharge (%) | 85.9 (79.1 - 92.9) | 87.0 (78.3 - 93.8) | 86.8 (69.2 - 92.9) | 89.0 (67.7 - 92.3) | 87.7 (78.1 - 92.0) |
| Length of stay (days) (mean) | 5.2 (4.3 - 6.7) | 4.9 (4.2 - 5.7) | 4.7 (4.3 - 5.8) | 4.7 (4.0 - 5.5) | 4.8 (4.3 - 5.4) |
| Discharge disposition (%) | Regular Discharge (%) | 82.8 (68.8 - 89.1) | 83.9 (78.0 - 87.2) | 83.2 (74.4 - 89.5) | 84.5 (71.0 - 91.0) | 83.8 (76.9 - 88.9) |
| Home Health (%) | 9.5 (5.8 - 16.3) | 10.4 (5.8 - 15.8) | 11.6 (6.7 - 15.9) | 11.2 (5.7 - 22.6) | 11.0 (6.8 - 16.2) |
Table S1A-3: Patients with acute myocardial infarction (AMI)\(^a\)

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------|-----------|-----------|-------------|------------|-------|
|             | Before HRRP penalty phase | HRRP penalties in effect |             |            |       |
| Regular SNF (%) | 6.7 (2.4 - 14.0) | 4.9 (2.6 - 8.8) | 4.5 (1.6 - 8.5) | 3.7 (1.6 - 6.5) | 4.5 (2.4 - 7.3) |
| Custodial SNF (%) | 1.0 (0.3 - 5.7) | 0.8 (0.3 - 4.5) | 0.8 (0.3 - 2.6) | 0.5 (0.1 - 1.4) | 0.7 (0.3 - 2.5) |
| Hospice referral (%) | 1.8 (0.3 - 6.6) | 1.8 (0.3 - 4.5) | 2.6 (0.6 - 13.6) | 2.0 (0.7 - 8.8) | 2.1 (0.8 - 6.7) |
| Outcomes\(^b\) |           |           |             |            |       |
| Inpatient mortality (%) | 4.8 (2.1 - 9.3) | 4.5 (0.6 - 8.6) | 4.3 (2.7 - 11.6) | 4.1 (1.5 - 6.8) | 4.3 (2.0 - 6.9) |
| 30-day mortality (%) | 7.6 (2.8 - 13.3) | 7.5 (2.7 - 15.3) | 7.4 (4.5 - 20.9) | 6.7 (4.0 - 25.0) | 7.1 (4.6 - 12.9) |
| Any rehospitalization (%) | 16.7 (10.9 - 22.3) | 15.2 (10.6 - 26.4) | 14.0 (9.6 - 23.1) | 13.6 (10.2 - 29.0) | 14.3 (11.3 - 18.6) |
| Any non-elective rehospitalization (%) | 14.8 (10.3 - 20.4) | 13.6 (7.7 - 24.0) | 12.5 (9.0 - 23.1) | 12.1 (7.3 - 29.0) | 12.8 (8.7 - 17.5) |
| Non-elective inpatient rehospitalization (%) | 13.2 (8.7 - 19.1) | 10.9 (6.7 - 16.8) | 10.1 (7.3 - 23.1) | 8.9 (5.9 - 22.6) | 10.0 (7.6 - 15.0) |
| Non-elective observation rehospitalization (%) | 2.1 (0.5 - 4.3) | 3.4 (0.7 - 9.4) | 2.9 (1.5 - 5.2) | 4.1 (1.0 - 9.7) | 3.4 (1.5 - 6.0) |
| 30-day post-discharge mortality (%) | 3.8 (0.3 - 8.6) | 3.5 (1.2 - 6.5) | 3.6 (1.7 - 12.8) | 3.1 (1.6 – 22.6) | 3.4 (1.7 – 8.1) |
| Composite outcome (%) | 17.4 (10.9 - 27.4) | 16.2 (12.1 - 26.4) | 14.9 (11.5 - 35.9) | 14.2 (11.0 – 45.2) | 15.1 (12.5 – 24.4) |

**FOOTNOTES**

\(^a\) Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

\(^b\) Hospital episodes where patients transitioned from OBS to INP status are classified as INP.

\(^c\) Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 3,762 patients, had lower inpatient (3.8%) and 30-day (6.6%) mortality, compared to 4.3% and 7.1% in the rest of the KPNC AMI cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.

\(^d\) The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

\(^e\) Charlson score was calculated using the methodology of Deyo et al. (1992).
f The Comorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

g Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

h Transports-in (footnote c) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
| TIME PERIOD           | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|----------------------|-----------|-----------|-------------|------------|-------|
|                      | Before HRRP penalty phase | HRRP penalties in effect |                      |            |       |
| N (hospitalizations) | 160,693   | 213,952   | 360,529     | 544,319    | 1,279,493 |
| N (patients)         | 120,235   | 153,741   | 238,734     | 335,698    | 656,338  |
| Inpatient (INP) (%)  | 90.3 (81.9 - 95.4) | 87.0 (78.7 - 94.0) | 83.9 (71.7 - 91.4) | 79.5 (58.5 - 89.6) | 83.4 (71.1 - 90.7) |
| Observation (OBS) (%)| 9.7 (4.6 - 18.1)  | 13.0 (6.0 - 21.3) | 16.1 (8.6 - 28.3) | 20.5 (10.4 - 41.5) | 16.6 (9.3 - 28.9) |
| Inpatient stay < 24 hours | 7.0 (4.5 - 9.4)    | 6.0 (4.1 - 7.9)    | 4.8 (3.1 - 6.5)    | 4.7 (2.0 - 7.0)    | 5.2 (3.6 - 6.9)    |
| Transport-in (%)     | 4.4 (1.2 - 7.8)    | 4.4 (1.5 - 8.3)    | 4.1 (1.9 - 8.5)    | 4.3 (0.3 - 8.6)    | 4.3 (1.4 - 8.4)    |
| Age (mean)           | 63.8 (59.6 - 68.8) | 63.9 (59.8 - 68.4) | 64.6 (61.2 - 69.2) | 65.1 (62.2 - 69.8) | 64.6 (61.4 - 69.2) |
| Sex (% male)         | 45.3 (40.0 - 52.3) | 45.7 (40.0 - 52.5) | 46.5 (41.4 - 53.1) | 47.6 (43.6 - 53.1) | 46.7 (42.0 - 52.9) |
| Kaiser Foundation Health Plan, Inc. member (%) | 94.7 (86.1 - 97.7) | 94.6 (84.2 - 97.9) | 94.2 (84.5 - 98.1) | 92.8 (64.9 - 97.7) | 93.8 (77.3 - 97.9) |
| Met strict HEDIS membership definition (%) | 82.0 (74.1 - 85.3) | 82.3 (72.4 - 86.7) | 81.1 (71.6 - 85.8) | 79.0 (54.0 - 84.9) | 80.5 (65.1 - 85.2) |
| Met public reporting definition (%) | 68.4 (59.2 - 75.9) | 66.9 (55.4 - 76.2) | 64.2 (52.1 - 72.3) | 58.7 (39.5 - 69.5) | 62.8 (48.0 - 70.3) |
| Hospitalization via emergency department (%) | 64.7 (50.5 - 84.5) | 65.5 (54.3 - 79.0) | 67.3 (55.0 - 80.4) | 70.0 (54.2 - 85.2) | 67.8 (54.4 - 79.9) |
| Charlson score* (median) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 2.0) |
| Charlson score ≥ 4 (%) | 27.2 (23.6 - 32.7) | 28.9 (24.1 - 35.3) | 31.7 (26.1 - 38.9) | 37.2 (31.1 - 42.7) | 33.0 (27.6 - 38.6) |
| COPS2* (mean)        | 35.9 (33.3 - 43.0) | 38.6 (34.6 - 46.0) | 43.9 (38.1 - 52.8) | 46.8 (38.6 - 52.3) | 43.2 (37.4 - 50.3) |
| COPS2 ≥ 65 (%)       | 19.3 (17.4 - 25.0) | 21.2 (18.0 - 27.0) | 25.3 (20.6 - 32.2) | 27.8 (21.4 - 32.1) | 24.9 (20.1 - 30.3) |
| Admission LAPS2* (mean) | 53.1 (44.0 - 62.2) | 53.9 (44.5 - 62.5) | 55.9 (45.1 - 65.6) | 58.3 (47.1 - 68.9) | 56.3 (45.7 - 65.5) |
| Discharge LAPS2 (mean) | 44.8 (39.1 - 50.1) | 45.1 (41.7 - 50.1) | 44.8 (41.5 - 49.8) | 45.8 (41.0 - 50.3) | 45.3 (41.5 - 49.5) |
| LAPS2 ≥ 110 (%)      | 9.6 (6.7 - 14.4)   | 10.3 (6.7 - 14.4)  | 11.2 (6.6 - 15.4)  | 12.2 (7.8 - 16.5)  | 11.3 (7.1 - 15.4)  |
| Full code at discharge (%) | 86.2 (78.6 - 91.1) | 85.8 (78.7 - 92.2) | 85.1 (78.7 - 91.5) | 85.0 (78.0 - 90.8) | 85.3 (78.4 - 91.2) |
| Length of stay (days) (mean) | 5.0 (4.2 - 5.7)     | 5.0 (4.0 - 5.5)     | 4.9 (3.7 - 5.5)     | 4.8 (3.8 - 5.5)     | 4.9 (3.9 - 5.4)     |
| Discharge disposition (%) | 75.8 (71.9 - 85.5) | 74.3 (68.9 - 85.2) | 72.3 (65.5 - 85.0) | 71.5 (52.7 - 87.7) | 72.7 (62.0 - 86.3) |

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| TIME PERIOD          | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL          |
|---------------------|-----------|-----------|-------------|------------|---------------|
| **Before HRRP penalty phase** |           |           |             |            |               |
| Regular SNF (%)     | 10.3 (6.9 - 15.8) | 10.9 (6.4 - 15.6) | 10.3 (6.6 - 16.0) | 9.5 (5.4 - 13.7) | 10.1 (6.0 - 14.9) |
| Custodial SNF (%)   | 1.6 (0.8 - 2.4)    | 1.6 (0.9 - 3.1)    | 1.5 (0.7 - 2.8)    | 1.1 (0.5 - 2.2)   | 1.4 (0.8 - 2.5)   |
| Hospice referral (%)| 2.4 (1.7 - 3.7)    | 2.4 (1.5 - 4.2)    | 2.5 (1.7 - 4.7)    | 2.5 (1.6 - 4.0)   | 2.5 (1.6 - 4.2)   |
| **HRRP penalties in effect** |           |           |             |            |               |
| Regular SNF (%)     | 10.3 (6.6 - 16.0) | 10.9 (6.4 - 15.6) | 10.3 (6.6 - 16.0) | 9.5 (5.4 - 13.7) | 10.1 (6.0 - 14.9) |
| Custodial SNF (%)   | 1.5 (0.7 - 2.8)    | 1.1 (0.5 - 2.2)    | 1.4 (0.8 - 2.5)    | 1.4 (0.8 - 2.5)   | 1.4 (0.8 - 2.5)   |
| Hospice referral (%)| 2.5 (1.7 - 4.7)    | 2.5 (1.6 - 4.0)    | 2.5 (1.6 - 4.2)    | 2.5 (1.6 - 4.2)   | 2.5 (1.6 - 4.2)   |

**FOOTNOTES**

- Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

- Hospital episodes where patients transitioned from OBS to INP status are classified as INP.

- Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 47,514 patients, had elevated inpatient (5.1%) and 30-day (9.5%) mortality, compared to 2.7% and 5.8% in the rest of the KPNC NCCA cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.

- The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

- Charlson score was calculated using the methodology of Deyo et al. (1992).
The COmorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

Transports-in (footnote c) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
| TIME PERIOD | Before HRRP penalty phase | HRRP penalties in effect |
|------------|---------------------------|--------------------------|
| N (hospitalizations) | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
| N (patients) | 158,787 | 201,104 | 327,950 | 467,193 | 1,155,034 |
| Inpatient stay < 24 hours | 7.6 (4.6 - 10.3) | 6.8 (4.7 - 9.0) | 5.7 (4.1 - 7.6) | 5.8 (3.0 - 8.5) | 6.2 (4.2 - 8.1) |
| Transport-in<sup>m</sup> | 4.7 (1.2 - 8.6) | 4.7 (1.6 - 8.9) | 4.4 (2.2 - 9.0) | 4.6 (0.4 - 9.0) | 4.6 (1.6 - 8.8) |
| Age (mean) | 64.4 (60.4 - 68.8) | 64.3 (60.0 - 68.5) | 65.0 (61.6 - 68.9) | 65.4 (62.2 - 69.5) | 65.0 (61.7 - 69.1) |
| Sex (% male) | 46.1 (40.7 - 53.1) | 46.6 (39.9 - 53.3) | 47.4 (41.1 - 54.2) | 48.3 (43.2 - 54.8) | 47.4 (41.8 - 54.1) |
| Kaiser Foundation Health Plan, Inc. member (%) | 94.8 (86.3 - 97.8) | 94.8 (84.9 - 98.0) | 94.3 (84.7 - 98.2) | 92.7 (65.4 - 97.7) | 93.8 (77.7 - 97.9) |
| Met strict HEDIS membership definition<sup>3</sup> (%) | 81.5 (73.8 - 85.2) | 82.0 (72.4 - 86.4) | 80.6 (70.8 - 85.2) | 78.2 (53.8 - 84.0) | 80.0 (64.7 - 84.8) |
| Met public reporting definition<sup>2</sup> (%) | 75.7 (66.9 - 80.8) | 76.8 (67.1 - 82.5) | 76.4 (66.1 - 81.5) | 73.8 (49.7 - 80.5) | 75.3 (59.8 - 81.2) |
| Hospitalization via emergency department (%) | 64.4 (51.3 - 84.5) | 64.0 (52.1 - 78.2) | 65.7 (53.1 - 78.3) | 67.6 (52.6 - 84.5) | 66.0 (52.8 - 78.4) |
| Charlson score<sup>4</sup> (median) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 3.0) | 2.0 (2.0 - 3.0) | 2.0 (2.0 - 2.0) |
| Charlson score ≥ 4 (%) | 28.9 (24.9 - 35.2) | 30.1 (24.9 - 36.6) | 33.2 (27.3 - 41.9) | 38.2 (31.6 - 44.2) | 34.1 (28.5 - 40.0) |
| COPS2<sup>6</sup> (mean) | 37.5 (34.6 - 45.2) | 40.0 (34.8 - 48.1) | 45.5 (38.3 - 56.3) | 48.1 (39.9 - 54.2) | 44.5 (38.5 - 52.2) |
| COPS2 ≥ 65 (%) | 20.8 (18.3 - 27.1) | 22.5 (18.1 - 29.0) | 26.7 (21.1 - 35.5) | 29.0 (22.0 - 34.0) | 26.1 (21.1 - 32.0) |
| Admission LAPS2<sup>6</sup> (mean) | 55.5 (46.7 - 66.2) | 55.7 (46.5 - 65.0) | 58.0 (47.1 - 69.3) | 60.4 (48.9 - 72.4) | 58.2 (47.6 - 68.5) |
| Discharge LAPS2 (mean) | 46.0 (41.1 - 51.9) | 46.1 (42.9 - 50.8) | 45.8 (41.9 - 51.1) | 46.3 (41.2 - 51.1) | 46.1 (41.9 - 50.0) |
| LAPS2 ≥ 110 (%) | 11.0 (7.7 - 15.9) | 11.6 (7.5 - 16.8) | 12.8 (7.5 - 18.5) | 14.0 (9.1 - 18.9) | 12.8 (8.1 - 17.6) |
| Full code at discharge (%) | 85.2 (78.9 - 89.6) | 85.3 (78.6 - 92.4) | 84.7 (79.5 - 90.4) | 84.7 (78.4 - 90.3) | 84.9 (78.8 - 90.6) |
| Length of stay (days) (mean) | 5.3 (4.5 - 6.0) | 5.3 (4.4 - 5.9) | 5.3 (4.1 - 5.9) | 5.3 (4.2 - 6.0) | 5.3 (4.3 - 5.8) |
| Discharge disposition<sup>7</sup> (%) | 74.4 (70.5 - 83.8) | 72.6 (66.7 - 84.4) | 70.1 (61.3 - 83.3) | 68.5 (45.3 - 86.3) | 70.5 (57.9 - 84.9) |
| Regular Discharge (%) | 13.1 (7.7 - 19.1) | 14.3 (7.7 - 20.1) | 17.3 (8.0 - 25.2) | 19.8 (6.8 - 36.7) | 17.2 (7.4 - 24.9) |
| Home Health (%) | 10.8 (7.5 - 16.6) | 11.4 (6.5 - 16.5) | 11.0 (7.3 - 17.9) | 10.4 (6.0 - 15.5) | 10.8 (6.6 - 16.4) |
| Custodial SNF (%) | 1.7 (1.0 - 2.7) | 1.6 (0.9 - 3.5) | 1.6 (0.8 - 3.1) | 1.2 (0.5 - 2.6) | 1.5 (0.8 - 2.9) |

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| TIME PERIOD               | Before HRRP penalty phase | HRRP penalties in effect |
|--------------------------|---------------------------|--------------------------|
| Hospice referral (%)     | 2.6 (1.8 - 4.0)           | 2.6 (1.7 - 4.6)          |
| Inpatient mortality (%)  | 3.0 (2.0 - 4.4)           | 3.0 (2.1 - 4.2)          |
| 30-day mortality (%)     | 6.2 (3.9 - 8.0)           | 6.3 (4.1 - 8.0)          |
| Any rehospitalization (%)| 14.7 (12.7 - 17.1)        | 14.5 (11.9 - 17.9)       |
| Any non-elective rehospitalization (%) | 12.2 (10.1 - 15.1) | 12.2 (9.6 - 15.8)         |
| Non-elective inpatient rehospitalization (%) | 11.3 (9.3 - 14.2) | 10.9 (8.1 - 14.4)         |
| Non-elective observation rehospitalization (%) | 1.2 (0.7 - 1.7) | 1.7 (0.5 - 2.8)          |
| 30-day post-discharge mortality (%) | 4.1 (2.5 - 5.7) | 4.2 (3.0 - 5.8)          |
| Composite outcome (%)    | 15.1 (11.9 - 19.2)        | 15.1 (13.0 - 19.8)       |

FOOTNOTES

a Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

b Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 46,072 patients, had elevated inpatient (5.6%) and 30-day (10.3%) mortality, compared to 3.1% and 6.5% in the rest of the KPNC INP cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.

c The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

d Charlson score was calculated using the methodology of Deyo et al. (1992).

e The COmorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.
Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

Transports-in (footnote b) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
| Table S1A-6: Observation hospitalizations only<sup>a</sup> |
|-----------------------------------------------|
| **TIME PERIOD** | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
| **Before HRRP penalty phase** | **HRRP penalties in effect** |
| N (hospitalizations) | 16,497 | 29,679 | 62,600 | 120,215 | 228,991 |
| N (patients) | 15,633 | 26,906 | 54,450 | 98,849 | 177,129 |
| Transport-in<sup>b</sup> | 4.3 (0.3 - 8.7) | 4.4 (1.2 - 8.5) | 3.9 (1.6 - 8.7) | 3.7 (0.2 - 7.3) | 3.9 (1.2 - 7.8) |
| Age (mean) | 66.0 (60.6 - 73.1) | 66.3 (62.2 - 70.9) | 66.5 (59.3 - 71.8) | 66.3 (61.1 - 72.0) | 66.3 (60.8 - 71.8) |
| Sex (% male) | 44.5 (39.9 - 54.9) | 44.9 (40.4 - 52.6) | 45.7 (41.6 - 51.5) | 47.7 (43.8 - 51.5) | 46.6 (43.7 - 50.6) |
| Kaiser Foundation Health Plan, Inc. member (%) | 93.9 (86.0 - 98.4) | 93.4 (82.8 - 97.9) | 93.8 (84.2 - 97.7) | 92.8 (63.3 - 97.8) | 93.2 (76.2 - 97.8) |
| Met strict HEDIS membership definition<sup>c</sup> (%) | 84.3 (76.1 - 88.7) | 83.5 (72.7 - 90.0) | 82.6 (73.8 - 88.4) | 81.3 (55.7 - 87.8) | 82.2 (67.7 - 88.2) |
| Met public reporting definition<sup>d</sup> (%) | 0 | 0 | 0 | 0 | 0 |
| Hospitalization via emergency department (%) | 88.8 (66.3 - 96.3) | 89.3 (79.1 - 96.9) | 87.4 (72.8 - 92.8) | 87.0 (73.3 - 94.3) | 87.5 (74.4 - 94.0) |
| Charlson score<sup>e</sup> (median) | 2.0 (1.0 - 2.0) | 2.0 (1.0 - 2.0) | 2.0 (2.0 - 2.0) | 2.0 (2.0 - 2.0) | 2.0 (2.0 - 2.0) |
| Charlson score ≥ 4 (%) | 28.1 (22.6 - 33.7) | 31.9 (25.6 - 44.1) | 33.7 (28.2 - 38.3) | 38.9 (33.7 - 45.6) | 35.8 (30.1 - 42.3) |
| COPS2<sup>e</sup> (mean) | 34.9 (31.3 - 39.1) | 39.6 (33.7 - 47.1) | 44.7 (40.0 - 48.7) | 46.9 (37.3 - 52.7) | 44.5 (39.7 - 49.5) |
| COPS2 ≥ 65 (%) | 17.9 (14.4 - 21.2) | 21.9 (14.8 - 29.5) | 26.2 (21.4 - 31.4) | 28.1 (20.2 - 34.8) | 26.1 (22.3 - 31.0) |
| Admission LAPS2<sup>e</sup> (mean) | 53.1 (40.9 - 62.9) | 55.7 (44.3 - 67.0) | 56.6 (45.9 - 62.3) | 57.4 (48.1 - 65.7) | 56.7 (47.3 - 63.1) |
| Discharge LAPS2 (mean) | 48.8 (41.1 - 57.0) | 48.4 (42.7 - 53.1) | 48.1 (43.3 - 53.5) | 49.0 (42.1 - 55.6) | 48.6 (43.9 - 54.3) |
| LAPS2 ≥ 110 (%) | 4.1 (1.5 - 7.7) | 5.5 (2.3 - 9.3) | 6.3 (3.6 - 8.8) | 6.8 (3.8 - 9.8) | 6.3 (3.7 – 8.5) |
| Full code at discharge (%) | 83.8 (69.8 - 91.4) | 82.2 (74.2 - 88.2) | 81.8 (72.7 - 91.4) | 83.1 (73.3 - 90.5) | 82.7 (73.0 - 90.4) |
| Length of stay (days) (mean) | 2.4 (2.2 - 2.5) | 2.6 (2.3 - 2.9) | 2.7 (2.4 - 3.0) | 2.7 (2.3 - 3.4) | 2.7 (2.4 - 3.1) |
| Discharge disposition<sup>f</sup> (%) | | | | | |
| Regular Discharge (%) | 89.5 (83.6 - 96.3) | 86.3 (75.3 - 93.0) | 84.6 (77.9 - 90.1) | 84.1 (73.3 - 92.6) | 84.9 (76.5 - 91.2) |
| Home Health (%) | 5.2 (1.0 - 10.2) | 6.9 (2.8 - 12.7) | 8.7 (4.8 - 15.1) | 10.1 (4.5 - 16.5) | 9.0 (4.6 - 14.4) |
| Regular SNF (%) | 4.4 (0.7 - 10.0) | 5.7 (2.3 - 10.5) | 5.5 (2.7 - 10.0) | 4.9 (2.3 - 8.7) | 5.1 (2.9 - 9.1) |
| Custodial SNF (%) | 1.0 (0.2 - 2.3) | 1.1 (0.5 - 2.0) | 1.1 (0.1 - 2.3) | 0.8 (0.2 - 1.8) | 1.0 (0.5 - 2.0) |
| Hospice referral (%) | 1.5 (0.4 - 3.3) | 1.8 (1.1 - 3.5) | 2.1 (1.0 - 3.4) | 2.0 (0.7 - 3.5) | 2.0 (1.0 - 3.1) |

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Table S1A-6: Observation hospitalizations only

| TIME PERIOD       | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------------|-----------|-----------|-------------|------------|-------|
|                   | Before HRRP penalty phase | HRRP penalties in effect |
| Outcomes          |           |           |             |            |       |
| Inpatient mortality (%) | 0.6 (0.1 – 1.2) | 0.8 (0.1 – 1.6) | 1.1 (0.2 – 2.2) | 1.0 (0.3 – 2.4) | 1.0 (0.3 – 1.9) |
| 30-day mortality (%) | 2.9 (0.8 – 5.1) | 3.6 (1.6 – 6.2) | 4.1 (2.4 – 6.3) | 3.8 (2.3 – 6.0) | 3.8 (2.5 – 5.9) |
| Any rehospitalization (%) | 11.6 (6.8 – 13.7) | 12.7 (8.7 – 15.7) | 12.6 (10.7 – 15.2) | 12.8 (10.3 – 15.3) | 12.6 (10.4 – 14.6) |
| Any non-elective rehospitalization (%) | 9.9 (5.6 – 12.6) | 10.8 (7.0 – 12.7) | 10.9 (9.3 – 12.8) | 11.2 (9.0 – 14.0) | 11.0 (9.1 – 13.3) |
| Non-elective inpatient rehospitalization (%) | 8.4 (5.1 – 11.2) | 8.5 (5.8 – 10.7) | 8.3 (6.2 – 11.4) | 8.2 (6.2 – 9.8) | 8.3 (6.2 – 9.8) |
| Non-elective observation rehospitalization (%) | 1.8 (0.4 – 2.5) | 2.9 (1.1 – 4.7) | 3.2 (1.4 – 4.4) | 3.7 (1.8 – 5.7) | 3.3 (2.0 – 4.5) |
| 30-day post-discharge mortality (%) | 2.4 (0.5 – 4.0) | 3.0 (1.2 – 5.3) | 3.2 (2.3 – 4.6) | 3.0 (1.8 – 4.4) | 3.0 (2.0 – 4.3) |
| Composite outcome (%) | 11.5 (5.6 – 15.5) | 12.8 (7.6 – 15.0) | 13.1 (11.3 – 15.4) | 13.3 (11.0 – 16.7) | 13.1 (10.7 – 15.9) |

FOOTNOTES

a Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

b Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 8,448 patients, had elevated inpatient (1.2%) and 30-day (4.2%) mortality, compared to 1.0% and 3.8% in the rest of the KPNC OBS cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.

c The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

d Charlson score was calculated using the methodology of Deyo et al. (1992).

e The COmorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

f Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

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Transports-in (footnote b) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.

Table S1A-7: Patients under 65 years of age

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------|-----------|-----------|-------------|------------|-------|
| N (hospitalizations) | 81,779 | 106,151 | 171,103 | 251,642 | 610,675 |
| N (patients) | 62,959 | 79,807 | 120,166 | 168,126 | 363,284 |
| Inpatient (INP) (%) | 91.3 (82.9 - 95.7) | 88.3 (81.4 - 94.4) | 85.0 (73.4 - 91.8) | 80.3 (61.1 - 89.7) | 84.5 (74.0 - 90.9) |
| Observation (OBS) (%) | 8.7 (4.3 - 17.1) | 11.7 (5.6 - 18.6) | 15.0 (8.2 - 26.6) | 19.7 (10.3 - 38.9) | 15.9 (9.1 - 26.0) |
| Inpatient stay < 24 hours | 8.5 (5.4 - 10.8) | 7.5 (5.0 - 10.0) | 6.0 (4.2 - 8.4) | 5.6 (3.0 - 8.8) | 6.5 (4.2 - 8.6) |
| Transport-in (%) | 4.2 (1.4 - 7.5) | 4.3 (1.8 - 7.7) | 4.1 (1.5 - 8.3) | 4.1 (0.3 - 7.9) | 4.0 (1.1 - 7.8) |
| Age (mean) | 49.1 (46.6 - 51.8) | 48.9 (47.0 - 51.2) | 49.2 (46.8 - 51.3) | 49.3 (48.0 - 51.8) | 49.2 (47.5 - 51.5) |
| Sex (% male) | 46.2 (36.6 - 53.3) | 46.7 (38.0 - 54.0) | 47.9 (38.7 - 56.3) | 49.7 (44.6 - 55.4) | 49.2 (41.0 - 55.1) |
| Kaiser Foundation Health Plan, Inc. member (%) | 92.0 (80.3 - 96.7) | 91.7 (77.8 - 96.7) | 90.8 (78.8 - 96.7) | 88.7 (59.6 - 95.8) | 90.3 (72.8 - 96.3) |
| Met strict HEDIS membership definition (%) | 79.3 (69.6 - 84.7) | 79.5 (67.5 - 86.1) | 77.5 (66.2 - 84.3) | 74.4 (49.1 - 81.6) | 76.8 (61.3 - 83.7) |
| Met public reporting definition (%) | 66.1 (56.7 - 76.0) | 64.8 (52.7 - 76.1) | 61.7 (50.7 - 69.3) | 55.5 (36.2 - 64.5) | 60.3 (46.7 - 68.2) |
| Hospitalization via emergency department (%) | 59.4 (43.0 - 83.0) | 60.3 (44.5 - 76.8) | 62.3 (44.0 - 77.4) | 66.1 (45.9 - 77.2) | 63.1 (44.7 - 73.9) |
| Charlson score (median) | 1.0 (0.0 - 1.0) | 1.0 (0.0 - 1.0) | 1.0 (0.0 - 1.0) | 1.0 (0.0 - 1.0) | 1.0 (0.0 - 1.0) |
| Charlson score ≥ 4 (%) | 17.4 (12.6 - 22.1) | 17.8 (12.7 - 24.5) | 19.9 (13.7 - 28.0) | 22.6 (16.7 - 27.4) | 20.3 (15.1 - 26.4) |
| COPS2 (mean) | 28.1 (24.5 - 35.7) | 29.3 (24.5 - 37.6) | 31.9 (25.0 - 41.4) | 33.3 (24.6 - 38.6) | 31.5 (25.2 - 38.8) |
| COPS2 ≥ 65 (%) | 13.4 (10.6 - 18.7) | 14.2 (10.4 - 21.0) | 16.1 (10.3 - 23.2) | 17.2 (10.7 - 21.2) | 15.8 (10.7 - 21.4) |
| Admission LAPS2 (mean) | 43.9 (36.8 - 54.9) | 44.1 (36.5 - 52.3) | 46.2 (37.8 - 55.1) | 48.9 (39.7 - 57.1) | 46.7 (38.2 - 53.9) |
| Discharge LAPS2 (mean) | 38.6 (34.7 - 44.1) | 38.3 (35.2 - 42.7) | 38.1 (34.8 - 42.8) | 39.0 (33.2 - 44.8) | 38.6 (34.7 - 42.7) |
| LAPS2 ≥ 110 (%) | 5.0 (3.0 - 7.9) | 5.3 (2.9 - 7.8) | 6.0 (3.3 - 8.6) | 6.8 (3.8 - 10.0) | 6.1 (3.4 - 8.5) |
| Full code at discharge (%) | 97.1 (95.3 - 98.0) | 97.0 (95.7 - 98.6) | 97.1 (95.9 - 98.4) | 97.2 (96.1 - 98.2) | 97.1 (96.0 - 97.9) |
| Length of stay (days) (mean) | 4.7 (3.9 - 5.3) | 4.7 (3.7 - 5.4) | 4.7 (3.5 - 5.4) | 4.6 (3.7 - 5.2) | 4.7 (3.7 - 5.3) |
Table S1A-7: Patients under 65 years of age

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL |
|-------------|-----------|-----------|-------------|------------|-------|
|             | Before HRRP penalty phase | HRRP penalties in effect |
| Discharge disposition | | | | | |
| Regular Discharge (%) | 87.2 (83.0 - 94.0) | 86.2 (82.3 - 93.9) | 84.9 (81.1 - 94.3) | 84.4 (68.1 - 95.7) | 85.2 (77.0 - 94.8) |
| Home Health (%) | 8.8 (3.1 - 13.7) | 9.4 (3.4 - 13.2) | 11.0 (2.8 - 15.6) | 12.1 (2.5 - 24.8) | 10.9 (2.8 - 15.4) |
| Regular SNF (%) | 3.5 (1.9 - 6.7) | 3.9 (2.1 - 7.1) | 3.6 (2.1 - 7.1) | 3.2 (1.6 - 6.3) | 3.5 (1.9 - 6.5) |
| Custodial SNF (%) | 0.4 (0.1 - 1.0) | 0.5 (0.1 - 1.4) | 0.5 (0.2 - 1.3) | 0.3 (0.0 - 0.8) | 0.4 (0.1 - 1.0) |
| Hospice referral (%) | 0.7 (0.3 - 1.0) | 0.7 (0.4 - 1.4) | 0.7 (0.5 - 1.1) | 0.7 (0.3 - 1.0) | 0.7 (0.5 - 1.0) |
| Outcomes | | | | | |
| Inpatient mortality (%) | 1.3 (0.8 - 2.4) | 1.3 (0.9 - 1.8) | 1.4 (0.9 - 2.0) | 1.4 (0.8 - 2.0) | 1.4 (0.9 - 1.8) |
| 30-day mortality (%) | 2.3 (1.6 - 3.6) | 2.4 (1.6 - 3.2) | 2.4 (1.6 - 3.4) | 2.5 (1.4 - 3.5) | 2.5 (1.6 - 3.1) |
| Any rehospitalization (%) | 12.3 (8.7 - 15.5) | 12.0 (9.0 - 15.3) | 12.2 (9.4 - 14.9) | 12.6 (10.8 - 14.6) | 12.3 (10.4 - 14.8) |
| Any non-elective rehospitalization (%) | 9.5 (7.1 - 13.1) | 9.5 (7.1 - 13.0) | 9.7 (7.9 - 12.7) | 10.2 (7.6 - 13.0) | 9.8 (8.0 - 12.9) |
| Non-elective inpatient rehospitalization (%) | 8.8 (6.4 - 12.0) | 8.3 (5.8 - 11.9) | 8.3 (6.0 - 10.6) | 8.4 (6.5 - 10.7) | 8.4 (6.8 - 10.7) |
| Non-elective observation rehospitalization (%) | 1.0 (0.5 - 1.9) | 1.5 (0.5 - 2.7) | 1.8 (1.1 - 2.8) | 2.4 (1.4 - 4.0) | 1.9 (1.1 - 2.9) |
| 30-day post-discharge mortality (%) | 1.4 (1.0 - 2.0) | 1.4 (0.8 - 2.1) | 1.4 (0.8 - 1.9) | 1.5 (0.8 - 2.0) | 1.4 (1.0 - 1.9) |
| Composite outcome (%) | 10.4 (8.0 - 14.3) | 10.4 (7.7 - 14.1) | 10.6 (8.5 - 13.8) | 11.0 (8.4 - 14.1) | 10.7 (8.7 - 13.9) |

**FOOTNOTES**

a Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years.

b Hospital episodes where patients transitioned from OBS to INP status are classified as INP.

c Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 23,051 patients, had elevated inpatient (2.5%) and 30-day (3.5%) mortality, compared to 1.4% and 2.5% in the rest of the KPNB under 65 cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details.
The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours.

Charlson score was calculated using the methodology of Deyo et al. (1992).

The COmorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient's worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

Transports-in (footnote c) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
| TIME PERIOD          | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL       |
|----------------------|-----------|-----------|-------------|------------|-------------|
|                      | Before HRRP penalty phase | HRRP penalties in effect |              |            |             |
| N (hospitalizations) | 93,505    | 124,632   | 219,447     | 335,766    | 773,350     |
| N (patients)         | 64,579    | 81,826    | 130,831     | 184,691    | 330,667     |
| Inpatient (INP) (%)  | 89.9 (81.4 - 95.5) | 86.1 (73.1 - 93.9) | 83.1 (70.7 - 90.5) | 79.0 (56.2 - 89.8) | 82.6 (69.0 - 90.2) |
| Observation (OBS) (%)| 10.1 (4.5 - 18.6) | 13.9 (6.1 - 26.9) | 16.9 (9.5 - 29.3) | 21.0 (10.2 - 43.8) | 17.4 (9.8 - 31.0) |
| Inpatient stay < 24 hours | 5.4 (2.7 - 7.9) | 4.7 (2.6 - 6.6) | 3.8 (2.3 - 5.2) | 3.8 (1.2 - 5.8) | 4.1 (2.8 - 5.1) |
| Transport-in%        | 5.0 (1.0 - 9.2) | 5.0 (1.4 - 10.3) | 4.5 (2.3 - 9.8) | 4.5 (0.4 - 9.5) | 4.7 (1.7 - 9.6) |
| Age (mean)           | 78.0 (76.6 - 79.0) | 77.9 (76.4 - 78.9) | 77.8 (76.2 - 79.0) | 77.8 (76.4 - 79.1) | 77.8 (76.3 - 78.9) |
| Sex (% male)         | 45.7 (43.2 - 53.0) | 46.0 (42.4 - 52.6) | 46.5 (43.8 - 52.0) | 47.1 (43.3 - 52.5) | 46.6 (43.8 - 52.4) |
| Kaiser Foundation Health Plan, Inc. member (%) | 97.1 (92.9 - 98.9) | 97.2 (92.1 - 98.9) | 96.8 (89.4 - 99.0) | 95.7 (70.4 - 98.8) | 96.4 (82.1 - 98.9) |
| Met strict HEDIS membership definition% | 84.0 (79.1 - 88.8) | 84.6 (78.2 - 89.3) | 83.6 (75.5 - 88.2) | 82.2 (59.1 - 87.2) | 83.2 (69.3 - 88.1) |
| Hospitalization via emergency department (%) | 73.1 (57.8 - 89.7) | 73.1 (59.9 - 90.9) | 74.5 (59.1 - 90.7) | 75.7 (60.4 - 96.1) | 74.6 (59.6 - 93.1) |
| Charlson score* (median) | 3.0 (2.0 - 4.0) | 3.0 (2.0 - 4.0) | 3.0 (2.0 - 4.0) | 4.0 (3.0 - 4.0) | 3.0 (2.0 - 4.0) |
| Charlson score ≥ 4 (%) | 38.8 (31.3 - 50.4) | 41.0 (32.0 - 53.9) | 43.8 (34.5 - 52.6) | 50.1 (39.8 - 58.3) | 45.5 (35.8 - 54.8) |
| COPS2* (mean)        | 45.3 (40.2 - 52.2) | 49.1 (41.7 - 56.9) | 55.8 (48.2 - 64.9) | 58.8 (51.0 - 66.6) | 54.7 (47.2 - 61.8) |
| COPS2 ≥ 65 (%)       | 26.8 (21.9 - 34.2) | 29.5 (24.1 - 37.6) | 34.9 (28.5 - 43.3) | 37.5 (30.6 - 45.5) | 34.2 (27.8 - 41.7) |
| Admission LAPS2* (mean) | 65.3 (55.1 - 81.2) | 65.7 (54.5 - 81.0) | 66.8 (53.9 - 80.2) | 67.9 (55.7 - 81.8) | 66.9 (54.9 - 81.2) |
| Discharge LAPS2 (mean) | 53.1 (47.0 - 59.9) | 53.3 (49.2 - 59.3) | 52.4 (47.9 - 57.3) | 52.7 (46.7 - 58.2) | 52.7 (47.9 - 58.0) |
| LAPS2 ≥ 110 (%)      | 15.0 (11.2 - 23.9) | 15.6 (10.0 - 22.9) | 16.2 (9.7 - 22.4) | 16.9 (10.3 - 22.5) | 16.3 (10.5 - 22.7) |
| Full code at discharge (%) | 74.3 (66.1 - 80.9) | 74.3 (67.0 - 83.4) | 73.9 (67.5 - 82.3) | 74.4 (67.9 - 82.9) | 74.2 (67.7 - 82.4) |
| Length of stay (days) (mean) | 5.2 (4.5 - 6.0) | 5.2 (4.3 - 5.9) | 5.0 (4.0 - 5.6) | 4.9 (4.1 - 5.7) | 5.0 (4.2 - 5.7) |
| Discharge disposition (%) |              |              |              |              |              |
| Regular Discharge (%) | 65.6 (58.5 - 74.6) | 64.1 (56.5 - 75.1) | 62.5 (52.9 - 74.8) | 62.0 (42.4 - 79.2) | 62.9 (50.8 - 76.9) |
| Home Health (%)      | 15.5 (11.2 - 24.1) | 16.8 (10.2 - 25.5) | 19.9 (12.3 - 30.2) | 22.3 (10.3 - 35.5) | 19.9 (11.2 - 29.6) |

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Table S1A-8: Patients ≥ 65 years of age

| TIME PERIOD       | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL       |
|-------------------|-----------|-----------|-------------|------------|-------------|
|                   | Before HRRP penalty phase | HRRP penalties in effect |
| Regular SNF (%)   | 16.2 (10.8 - 24.5) | 16.6 (10.9 - 24.8) | 15.3 (11.0 - 22.5) | 13.9 (9.1 - 18.7) | 15.0 (10.2 - 21.1) |
| Custodial SNF (%) | 2.7 (1.4 - 3.9)    | 2.5 (1.3 - 4.6)    | 2.4 (1.3 - 4.3)    | 1.8 (0.8 - 3.3)    | 2.2 (1.3 - 3.7)    |
| Hospice referral (%) | 4.1 (3.0 - 5.9) | 4.0 (2.7 - 6.7) | 4.1 (2.8 - 7.7) | 4.1 (2.6 - 6.2) | 4.1 (2.8 - 6.7) |
| Rates employ hospitalization episodes (which can include linked stays for patients who were transported) as the denominator. Numbers in parentheses always refer to the range across the 21 study hospitals. The period preceding the penalty phase of the Hospital Readmissions Reductions Program (HRRP), which took effect on 10/1/12, is divided into two epochs, with the first of these constituting the reference period for multivariate analyses and other comparisons. The period after the penalty phase also is divided into two epochs, with the first of these (through the end of 2014) matching that of the study of Gupta et al. and the second the remaining years. |
| Hospital episodes where patients transitioned from OBS to INP status are classified as INP. |
| Refers to patients whose linked hospitalization episode began at a hospital not owned by Kaiser Foundation Hospitals, Inc. These hospitalizations, involving 29,969 patients, had elevated inpatient (6.8%) and 30-day (13.7%) mortality, compared to 3.9% and 8.9% in the rest of the KPNC 65+ cohort. Since we lacked information on their initial illness severity (the most important component of our mortality risk adjustment model) they are not included in inpatient and 30-day mortality analyses but are included in rehospitalization analyses, where admission illness severity plays a smaller role. See Escobar et al., 2008, 2013 and 2015, for details. |
| The HEDIS membership definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months. The public reporting definition only includes patients meeting HEDIS membership criteria and excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours. |
| Charlson score was calculated using the methodology of Deyo et al. (1992). |
The COmorbidity Point Score, version 2 (COPS2) is assigned based on all diagnoses incurred by a patient in the 12 months preceding the index hospitalization. The univariate relationship of COPS2 with 30-day mortality is as follows: 0-39, 1.7%; 40-64, 5.2%; 65+, 9.0%. The Laboratory-based Acute Physiology Score, version 2 (LAPS2) is assigned based on a patient’s worst vital signs, pulse oximetry, neurological status, and 16 laboratory test results in the preceding 24 (discharge LAPS2) or 72 hours (admission LAPS2). The univariate relationship of an admission LAPS2 with 30-day mortality is as follows: 0-59, 1.0%; 60-109, 5.0%; 110+, 13.7%; for LAPS2dc, the relationship is 0-59, 2.2%; 60-109, 8.1%; 110+, 20.5%.

Refers to disposition among patients discharged alive from the hospital. SNF = skilled nursing facility. Note that hospice referral is independent of discharge disposition.

Transports-in (footnote c) are excluded from inpatient and 30-day mortality. Only patients who survived to discharge are included in the post-discharge outcomes. Non-elective rehospitalizations are those that began in the ED, were for an ambulatory care sensitive condition, and/or had a LAPS2 ≥ 60, as described in Escobar et al. (2015). Composite outcome = non-elective rehospitalization or death within 30 days after discharge.
## Table S1A-9: Proportions of very ill patients

| TIME PERIOD          | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL | P<sup>+</sup> |
|----------------------|-----------|-----------|-------------|------------|-------|--------------|
| **Table 1 ALL**      |           |           |             |            |       |              |
| **Before HRRP penalty phase** | | | | | | |
| N                    | 175,284   | 230,783   | 390,550     | 587,408    | 1,384,025 |              |
| % with COPS2 ≥ 65    | 20.5 (18.4 - 26.4) | 22.5 (18.8 - 28.1) | 26.7 (21.8 - 33.7) | 28.8 (22.3 - 33.0) | 26.1 (21.2 - 31.5) | <.0001 |
| % with LAPS2 ≥ 110   | 10.3 (7.4 – 14.7) | 10.8 (7.1 – 15.9) | 11.7 (6.9 – 15.8) | 12.5 (8.3 - 16.6) | 11.7 (7.6 - 15.5) | <.0001 |
| % with Charlson ≥ 4  | 28.8 (24.6 - 35.0) | 30.4 (25.0 - 37.6) | 33.3 (27.4 - 40.4) | 38.4 (31.9 - 43.4) | 34.4 (28.7 - 40.0) | <.0001 |
| **APDX Table 1A-1 CAP** | | | | | | |
| N                    | 4,379     | 3,859     | 5,813       | 9,894      | 23,945 |              |
| % with COPS2 ≥ 65    | 32.5 (26.7 - 39.6) | 35.6 (25.9 - 44.3) | 44.1 (37.6 - 52.7) | 44.5 (32.6 - 50.7) | 40.8 (32.0 - 47.4) | <.0001 |
| % with LAPS2 ≥ 110   | 19.1 (10.4 - 27.3) | 18.1 (10.1 - 23.8) | 17.4 (6.0 - 23.5) | 17.5 (10.4 - 25.1) | 17.9 (11.5 - 23.2) | 0.0980 |
| % with Charlson ≥ 4  | 39.4 (29.4 - 51.7) | 39.8 (30.2 - 52.6) | 46.1 (36.6 - 55.8) | 51.1 (44.2 - 55.9) | 45.9 (39.0 - 50.6) | <.0001 |
| **APDX Table 1A-2 CHF** | | | | | | |
| N                    | 6,018     | 7,501     | 14,077      | 17,511     | 45,107 |              |
| % with COPS2 ≥ 65    | 49.0 (39.9 - 56.0) | 55.0 (47.0 - 61.4) | 59.1 (50.7 - 69.8) | 58.2 (43.4 - 64.8) | 56.7 (48.7 - 62.7) | <.0001 |
| % with LAPS2 ≥ 110   | 20.0 (10.9 - 26.6) | 19.9 (12.8 - 33.3) | 20.8 (12.9 - 30.4) | 19.8 (14.3 - 28.9) | 20.2 (15.2 - 27.7) | 0.2281 |
| % with Charlson ≥ 4  | 61.4 (48.0 - 72.1) | 65.4 (57.0 - 77.2) | 66.5 (59.3 - 75.1) | 67.8 (58.5 - 78.0) | 66.1 (59.3 - 76.0) | <.0001 |
| **APDX Table 1A-3 AMI** | | | | | | |
| N                    | 4,194     | 5,471     | 10,131      | 15,684     | 35,480 |              |
| % with COPS2 ≥ 65    | 16.7 (9.2 - 31.7) | 16.7 (11.4 - 31.1) | 20.6 (15.1 - 36.4) | 20.3 (11.7 - 50.0) | 19.4 (15.2 - 33.9) | <.0001 |
| % with LAPS2 ≥ 110   | 14.5 (5.4 - 24.0) | 13.5 (6.3 - 25.4) | 14.3 (9.3 - 22.1) | 12.6 (8.0 - 37.5) | 13.5 (9.5 - 21.1) | 0.0005 |
| % with Charlson ≥ 4  | 32.8 (20.4 - 47.4) | 32.9 (22.2 - 57.8) | 35.8 (28.1 - 52.3) | 36.9 (26.2 - 61.8) | 35.5 (28.1 - 51.5) | <.0001 |
| **APDX Table 1A-4 No CAP-CHF-AMI** | | | | | | |
| N                    | 160,693   | 213,952   | 360,529     | 544,319    | 1,279,493 |              |
| % with COPS2 ≥ 65    | 19.3 (17.4 - 25.0) | 21.2 (18.0 - 27.0) | 25.3 (20.6 - 32.2) | 27.8 (21.4 - 32.1) | 24.9 (20.1 - 30.3) | <.0001 |
| % with LAPS2 ≥ 110   | 9.6 (6.7 - 14.4) | 10.3 (6.7 - 14.4) | 11.2 (6.6 - 15.4) | 12.2 (7.8 - 16.5) | 11.3 (7.1 - 15.4) | <.0001 |

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Table S1A-9: Proportions of very ill patients

| TIME PERIOD | 6/10-5/11 | 6/11-9/12 | 10/12-12/14 | 1/15-12/17 | TOTAL | \(p^b\) |
|-------------|-----------|-----------|-------------|------------|-------|--------|
| **Before HRRP penalty phase** | | | | | | |
| % with Charlson ≥ 4 | 27.2 (23.6 - 32.7) | 28.9 (24.1 - 35.3) | 31.7 (26.1 - 38.9) | 37.2 (31.1 - 42.7) | 33.0 (27.6 - 38.6) | <.0001 |
| APDX Table 1A-5 INP | | | | | | |
| N | 158,787 | 201,104 | 327,950 | 467,193 | 1,155,034 | | |
| % with COPS2 ≥ 65 | 20.8 (18.3 - 27.1) | 22.5 (18.1 - 29.0) | 26.7 (21.1 - 35.5) | 29.0 (22.0 - 34.0) | 26.1 (21.1 - 32.0) | <.0001 |
| % with LAPS2 ≥ 110 | 11.0 (7.7 - 15.9) | 11.6 (7.5 - 16.8) | 12.8 (7.5 - 18.5) | 14.0 (9.1 - 18.9) | 12.8 (8.1 - 17.6) | <.0001 |
| % with Charlson ≥ 4 | 28.9 (24.9 - 35.2) | 30.1 (24.9 - 36.6) | 33.2 (27.3 - 41.9) | 38.2 (31.6 - 44.2) | 34.1 (28.5 - 40.0) | <.0001 |
| APDX Table 1A-6 OBS | | | | | | |
| N | 16,497 | 29,679 | 62,600 | 120,215 | 228,991 | | |
| % with COPS2 ≥ 65 | 17.9 (14.4 - 21.2) | 21.9 (14.8 - 29.5) | 26.2 (21.4 - 31.4) | 28.1 (20.2 - 34.8) | 26.1 (22.3 - 31.0) | <.0001 |
| % with LAPS2 ≥ 110 | 4.1 (1.5 - 7.7) | 5.5 (2.3 - 9.3) | 6.3 (3.6 - 8.8) | 6.8 (3.8 - 9.8) | 6.3 (3.7 - 8.5) | <.0001 |
| % with Charlson ≥ 4 | 28.1 (22.6 - 33.7) | 31.9 (25.6 - 44.1) | 33.7 (28.2 - 38.3) | 38.9 (33.7 - 45.6) | 35.8 (30.1 - 42.3) | <.0001 |
| APDX Table 1A-7 < 65 | | | | | | |
| N | 81,779 | 171,103 | 251,642 | 610,675 | | | |
| % with COPS2 ≥ 65 | 13.4 (10.6 - 18.7) | 14.2 (10.4 - 21.0) | 16.1 (10.3 - 23.2) | 17.2 (10.7 - 21.2) | 15.8 (10.7 - 21.4) | <.0001 |
| % with LAPS2 ≥ 110 | 5.0 (3.0 - 7.9) | 5.3 (2.9 - 7.9) | 6.0 (3.3 - 8.6) | 6.8 (3.8 - 10.0) | 6.1 (3.4 - 8.5) | <.0001 |
| % with Charlson ≥ 4 | 17.4 (12.6 - 22.1) | 17.8 (12.7 - 24.5) | 19.9 (13.7 - 28.0) | 22.6 (16.7 - 27.4) | 20.3 (15.1 - 26.4) | <.0001 |
| APDX Table 1A-8 65+ | | | | | | |
| N | 93,505 | 219,447 | 335,766 | 773,350 | | | |
| % with COPS2 ≥ 65 | 26.8 (21.9 - 34.2) | 29.5 (24.1 - 37.6) | 34.9 (28.5 - 43.3) | 37.5 (30.6 - 45.5) | 34.2 (27.8 - 41.7) | <.0001 |
| % with LAPS2 ≥ 110 | 15.0 (11.2 - 23.9) | 15.6 (10.0 - 22.9) | 16.2 (9.7 - 22.4) | 16.9 (10.3 - 22.5) | 16.3 (10.5 - 22.7) | <.0001 |
| % with Charlson ≥ 4 | 38.8 (31.3 - 50.4) | 41.0 (32.0 - 53.9) | 43.8 (34.5 - 52.6) | 50.1 (39.8 - 58.3) | 45.5 (35.8 - 54.8) | <.0001 |

**FOOTNOTES**

a Numbers in this table show the proportion of very ill patients (using longitudinal comorbidity or severity of illness) in the entire cohort (Table 1 in the main text) or in the various patient subsets (Appendix tables 1A-1 through 1A-8). Numbers in parentheses refer to the range across the 21 study hospitals.

b P value is for comparison of proportions over time. See main text for details.
eAppendix 2. Unadjusted Outcomes

Figure 2A-1: Patients with community-acquired pneumonia (CAP)
Figure 2A-2: Patients with congestive heart failure (CHF)
Figure 2A-3: Patients with acute myocardial infarction (AMI)
Figure 2A-4: Patients without CAP, CHF, or AMI
Figure 2A-6: Observation hospitalizations only
**eAppendix 3. Proportions of Different Hospitalization Types**

Figure 3A-1: Patients under 65 years of age
Figure 3A-2: Patients ≥ 65 years of age
eAppendix 4. Adjusted Outcomes

Figure 4A-1: Inpatient Mortality, All Hospitalizations
Figure 4A-2: 30-day Mortality, All Hospitalizations
Figure 4A-3: 30-day Composite Outcome, All Hospitalizations
Figure 4A-4: Non-elective Rehospitalization, Index Stays Meeting Public Reporting Definition
## Appendix 5. Impact of Denominator Definition on Outcome Capture

### Table S5A-1: Patients < 65 years of age

| Event Type                              | DENOMINATOR<sup>a</sup> |
|-----------------------------------------|--------------------------|
|                                         | INPATIENT          | PUBLIC REPORTING         |
|                                         | 6/10 – 5/11 | 1/17 – 12/17 | 6/10 – 5/11 | 1/17 – 12/17 |
| Hospitalizations                        | 91.3          | 80.2          | 66.1        | 53.8         |
| Multiple hospitalization patients       | 88.9          | 77.0          | 62.3        | 50.6         |
| COPS2 ≥ 65 hospitalizations<sup>b</sup> | 92.4          | 82.3          | 71.6        | 63.6         |
| COPS2 < 65 hospitalizations             | 91.2          | 79.7          | 65.3        | 51.7         |
| LAPS2 ≥ 110 hospitalizations<sup>b</sup> | 97.3          | 92.3          | 56.4        | 47.7         |
| LAPS2 < 110 hospitalizations            | 91.0          | 79.3          | 66.6        | 54.3         |
| Inpatient deaths                        | 98.5          | 95.5          | 9.8         | 4.2          |
| 30-day deaths                           | 97.1          | 92.7          | 10.5        | 5.8          |
| Non-elective rehospitalizations<sup>c</sup> | 92.6          | 82.5          | 57.0        | 43.7         |
| Deaths within 30 days of discharge      | 96.1          | 88.8          | 13.5        | 8.9          |
| Composite outcome<sup>d</sup>           | 92.9          | 83.1          | 53.0        | 40.8         |

### Footnotes

- **a** Table shows the proportion of outcomes captured when one restricts the denominator to inpatient hospitalizations only (left side) or hospitalizations that met the public reporting definition. The public reporting definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months; it excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours from both the numerator and denominator, and it does not include mortality as an outcome. See text and Table 2 for additional details.

- **b** See text, footnotes to Table 1, and Escobar et al. (2013) for a description of the COPS2 and LAPS2 scores. Patients with scores at these levels are very ill patients.

- **c** See text and Escobar et al. (2015) for our definition of non-elective rehospitalization. Hospitalizations for observation are included in the base total.

- **d** The composite outcome is non-elective rehospitalization or death within 30 days of hospital discharge. Hospitalizations for observation are included.
### Table S5A-2: Patients ≥ 65 years of age

| Event Type                              | INPATIENT 6/10 – 5/11 | INPATIENT 1/17 – 12/17 | PUBLIC REPORTING 6/10 – 5/11 | PUBLIC REPORTING 1/17 – 12/17 |
|-----------------------------------------|------------------------|------------------------|------------------------------|-------------------------------|
| Hospitalizations                        | 89.9                   | 79.2                   | 70.7                         | 59.7                          |
| Multiple hospitalization patients       | 87.3                   | 73.9                   | 64.9                         | 53.7                          |
| COPS2 ≥ 65 hospitalizations²            | 91.5                   | 79.6                   | 68.4                         | 60.6                          |
| COPS2 < 65 hospitalizations             | 89.4                   | 79.0                   | 71.5                         | 59.2                          |
| LAPS2 ≥ 110 hospitalizations            | 95.9                   | 88.3                   | 57.8                         | 53.7                          |
| LAPS2 < 110 hospitalizations            | 88.9                   | 77.4                   | 72.9                         | 60.9                          |
| Inpatient deaths                        | 97.9                   | 93.1                   | 2.8                          | 1.6                           |
| 30-day deaths                           | 96.4                   | 89.7                   | 4.5                          | 2.9                           |
| Non-elective rehospitalizations³       | 91.8                   | 81.5                   | 58.6                         | 45.9                          |
| Deaths within 30 days of discharge      | 95.2                   | 87.8                   | 6.2                          | 4.4                           |
| Composite outcome⁴                      | 92.7                   | 83.1                   | 46.2                         | 36.3                          |

**FOOTNOTES**

a Table shows the proportion of outcomes captured when one restricts the denominator to inpatient hospitalizations only (left side) or hospitalizations that met the public reporting definition. The public reporting definition restricts the denominator to patients with continuous health plan membership in the 12 months preceding and the 30 days following hospital discharge, with a maximum gap in coverage of 45 days in the preceding 12 months; it excludes OBS hospitalizations and INP hospitalizations with length of stay < 24 hours from both the numerator and denominator; and it does not include mortality as an outcome. See text and Table 2 for additional details.

b See text, footnotes to Table 1, and Escobar et al. (2013) for a description of the COPS2 and LAPS2 scores. Patients with scores at these levels are very ill patients.

c See text and Escobar et al. (2015) for our definition of non-elective rehospitalization. Hospitalizations for observation are included in the base total.

d The composite outcome is non-elective rehospitalization or death within 30 days of hospital discharge. Hospitalizations for observation are included.