to wait in an inpatient unit, and hospital units discharge patients more efficiently when their next patient is visible. The protocol has reduced ED waiting and walkouts, without increasing adverse events.\(^7\)

Second, the Joint Commission should enforce standard LD.04.03.11, which requires hospitals to have processes that support patient flow through the hospital (from ED arrival through hospital discharge) and plans for the care of admitted patients who are in temporary locations like the ED. Effective January 1, 2014, a new element of this standard requires hospitals to measure and address boarding of inpatients for longer than 4 hours.

Third, payment policy should discourage boarding. Emergency department admissions are less profitable on average than elective admissions, which encourages hospitals to give them low priority.\(^4\) This is partly due to the poor payer mix of ED admissions, but the disparity also applies to insured patients, as elective admissions are likely to be for high-margin services, such as procedures. Hospital payments should be adjusted to reduce the financial disparity against emergency admissions. In addition, payers could penalize hospitals when an admitted patient boards for an extended time (eg, > 4 hours) before being placed in an inpatient bed. This would create an incentive against boarding, yet would not exert the same pressure to rapidly move all patients through the ED, as a strict overall LOS target does.

We need to refocus hospitals on the everyday crisis of lengthy ED waiting and boarding time and discourage them from putting the sickest patients at the back of the line. The studies by Le and Hsia\(^1\) and Carrier et al\(^4\) bring important attention to ED and hospital crowding—critical barriers to high quality care of acute medical conditions—and raise important concerns around the use of performance measures.\(^4\) The availability of publicly available quality metrics will allow us to track performance; however, the challenge lies in incentivizing hospitals to improve while watching for unintended consequences.

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**Timeliness of Care in US Emergency Departments: An Analysis of Newly Released Metrics From the Centers for Medicare & Medicaid Services**

The relationship between increasing emergency department (ED) crowding and worse outcomes for patients has been well documented.\(^1,2\) This evidence has created growing recognition among federal policy makers that the quality of emergency care should be measured. In July 2013, the Centers for Medicare & Medicaid Services\(^3\) made several quality measures of ED timeliness publicly available online. These data provide a national portrait of the ability of EDs to provide timely care, an essential concern given the severity and time sensitivity of many acute illnesses and injuries.

We investigated how hospital EDs perform on measurements of timely care and whether certain hospital characteristics or patient populations are associated with poor timeliness of ED care. Previous literature on ED timeliness of care has been limited to investigations with non-nationally representative samples or to 1 or 2 measures of timeliness of care.\(^1,4-7\)

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**Figure.** Distribution of Hospital-Level Means of Emergency Department Measures of Timely Care

<table>
<thead>
<tr>
<th>Discharged patients</th>
<th>Admitted patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wait time</strong></td>
<td><strong>Wait time</strong></td>
</tr>
<tr>
<td><strong>Length of stay</strong></td>
<td><strong>Length of stay</strong></td>
</tr>
</tbody>
</table>

The bottom and top of the box represent the 25th and 75th percentiles of the hospital-reported means times for that measure, with the middle line representing the median. The whiskers represent the minimum and maximum reported values for each measure.

- Time of arrival to time seen by a health care professional.
- Time of arrival to time being sent home.
- Time of arrival to time leaving the emergency department for an inpatient bed.
- Time the physician decides to admit a patient to time the patient leaves the emergency department for an inpatient bed.
Methods | This study was considered exempt by the Committee on Human Research at the University of California, San Francisco. We conducted a cross-sectional analysis using 4 aggregate hospital-level ED measures in the Centers for Medicare & Medicaid Services Hospital Compare database calculated from the medical records of adult ED patients between April 1, 2012, and March 31, 2013. These measures include wait time (time of arrival to time seen by a health care professional) for discharged patients, length of stay (time of arrival to time sent home for discharged patients or leaving the ED for admitted patients), and boarding time (time the physician decides to admit a patient to time the patient leaves the ED for an inpatient bed).

We incorporated hospital predictors of interest from the 2012 American Hospital Association Annual Survey, Rural-Urban Commuting Area codes, Medicare 2011 cost reports, and the 2012 Medicare Impact File. We included only acute care, general, and nonfederal hospitals.

We provided descriptive statistics on each ED measure and the results of a multivariable model adjusting for all hospital characteristics to identify the independent relationship between these characteristics and ED timeliness. All analyses were performed using statistical software (STATA 11; StataCorp LP).

Results | Our sample consisted of 3692 hospitals with EDs that reported at least 1 ED measure to the Centers for Medicare & Medicaid Services. Most were nonteaching (72.1%), private nonprofit (63.4%) hospitals located in urban areas (52.2%). For patients discharged from the ED, the median wait time to see a health care professional was approximately half an hour, and the length of stay was just over 2 hours. For admitted patients, the median length of stay in the ED was more than 4 hours, approximately one-third of which was accounted for by boarding time. Extreme variability existed for all measures (Figure).

The characteristics that were uniformly statistically associated with the 4 measures based on multivariable models are listed in the Table. The length of stay for patients ultimately discharged was longer at large hospitals (158.2 vs 145.0 [medium] and 133.5 [small], minutes, P < .001) and at urban hospitals (149.2 vs 142.1 [suburban], 134.6 [large rural town], and 131.2 [small town or isolated rural area] minutes, P < .001). Public hospitals (149.5 vs 132.9 [for profit] and 145.4 [private nonprofit] minutes, P < .001) and major teaching hospitals (172.6 vs 145.3 [minor] and 139.2 [nonteaching] minutes, P < .001) had the longest length of stay. These findings were similar for the other 3 measures.

Discussion | Our findings provide a crucial starting point for discussion on the status quo of ED quality and on ED quality metrics. Given the variation in hospital ED performance, our results suggest a potential for improvement in ED timeliness. However, if these measures are translated into pay-for-performance incentives, the financial pressures faced by larger, urban, major teaching, public hospitals may be exacerbated.

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Author Contributions: Mr Le had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: All authors.
Renal Artery Revascularization: Updated Meta-analysis With the CORAL Trial

Arguments for renal artery revascularization include blood pressure control, stabilization of renal function, and reduction in adverse cardiovascular events. We previously reported on the randomized clinical trial data to 2009 regarding renal artery revascularization compared with medical therapy. The report concluded that renal artery revascularization was associated with marginal improvement in serum creatinine levels (P=.06) and no improvement in systolic blood pressure (P=.32), although there was need for fewer antihypertensive medications (P<.001). Since then, the Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL) Trial has been published.

Methods | Details of the previous meta-analysis have been described. Briefly, the MEDLINE database was searched for trials published from study inception through June 2010. We required that patients were randomized to percutaneous revascularization of a renal artery stenosis with or without stenting vs medical therapy alone. Three independent reviewers extracted data elements. Summary relative risks and 95% CIs were calculated for dichotomous variables using a DerSimonian and Laird random-effects model. For continuous variables, the weighted mean difference (WMD) and 95% CIs were computed using a random-effects model. The Begg funnel plot assessed for publication bias, while heterogeneity was assessed by the I² measure.

An updated search of the MEDLINE database was performed from June 2010 to November 2013, which revealed 2 additional trials. Data from these trials were extracted (by 2 of us: A.A.B. and D.J.K.) and added to our preexisting database. One minor discrepancy was resolved by discussion. Analyses were performed with STATA statistical software (version 12.0; StataCorp LP).

Overall, there were 8 studies in 2223 patients. The 5 later studies routinely used stents. The mean age ranged from 59 to 72 years, and the proportion of women ranged from 27% to 50%. At baseline, the mean number of antihypertensive medications was 2.43, and the mean systolic blood pressure ranged from 131 to 182 mm Hg. The mean duration of follow-up was 34.2 months.

Renal artery revascularization was not associated with a change in systolic blood pressure from baseline when compared with medical therapy (WMD, 0.12; 95% CI, −0.97 to 1.21; P=.83) but was associated with a reduction in the number of antihypertensive medications required at follow-up (2.96 vs 3.18; WMD, −0.23; 95% CI, −0.33 to −0.12; P<.001). There was no evidence of heterogeneity (I² = 0) or publication bias (I² = .45 for change in systolic blood pressure; P=.85 for medications at follow-up). Revascularization was not associated with a reduction in adverse cardiovascular or renal outcomes compared with medical therapy (Figure). Results were similar when restricted to stent-only trials.

Discussion | Among patients with renal artery stenosis and hypertension and/or chronic kidney disease, revascularization was of marginal benefit. This therapy slightly reduced the need for antihypertensive medications. However, revascularization did not reduce adverse cardiovascular or renal outcomes compared with medical therapy over a mean follow-up of 34 months.

Patients enrolled in the CORAL Trial likely mirrored clinical practice in that the degree of renal artery stenosis was somewhat modest, and the frequency of bilateral renal artery stenosis was low. Also, in the CORAL Trial, the average blood pressure at baseline was 150 mm Hg, a value at which revascularization may be unlikely to provide much benefit. It still remains plausible that revascularization could benefit patients with severe bilateral stenoses, or a critical stenosis that supplies a solitary kidney; however, such a trial is unlikely to be performed. Currently, the only class I recommendation for