The PA Hospitalist: A Review of Recent Literature

Oivind F. Westereng
Pacific University

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The PA Hospitalist: A Review of Recent Literature

Abstract
Background: The PA profession has evolved to the point where PAs are increasingly found in specialty areas of medicine. One of the newer specialties to accept physician assistants into its ranks is the hospitalist profession. Moreover, when the ACGME implemented work hour restrictions on residents, hospitals sought to fill the vacuum with mid-level providers. Very little research has evaluated the efficacy of the PA in this new role, and how the PA compares professionally with the tradition hospital house staff. This paper reviews some of the few studies that examine this issue.

Methods: Exhaustive search of available medical literature using Medline, CINAHL, and Web of Science for key words “physician assistant” and “hospitalist.”

Results: Data from three studies reviews mortality rates, cost of care, length of stay, patient satisfaction, readmission within 30 days and adverse events of PA hospitalists versus traditional house staff. No significant differences were found.

Conclusion: On the surface, there is no data to suggest inferiority of PA hospitalist care compared with residents or tradition inpatient general medical staff, but because the data is so scant, further study is needed.

Degree Type
Capstone Project

Degree Name
Master of Science in Physician Assistant Studies

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Keywords
Physician assistant, hospitalist

Subject Categories
Medicine and Health Sciences

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The PA Hospitalist: A Review of Recent Literature

Oivind F. Westereng

A Clinical Graduate Project Submitted to the Faculty of the

School of Physician Assistant Studies

Pacific University

Hillsboro, OR

For the Masters of Science Degree, August 13, 2010

Faculty Advisor: Dr. Mark Pedemonte
Clinical Graduate Project Coordinators: Annjanette Sommers MS, PAC & Rob Rosenow PharmD, OD
Biography

Oivind “Fred” Westereng was born in New Orleans, Louisiana.
Abstract

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Acknowledgements

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List of Abbreviations

PA…………………………………………………………………...…Physician Assistant
RES..........................................................................................................................Resident
H-PA……………………………………………………… Hospitalist Physician Assistant
ACGME………………………… Accreditation Council for Graduate Medical Education
PCP…………………………………………………………………Primary Care Provider
PACE……………………………………………...Physician Assistant/Clinician Educator
GMS……………………………………………………………General Medicine Service
LOS…………………………………………………………………………Length of Stay
The PA Hospitalist: A Review of Recent Literature

BACKGROUND

The history of the Physician Assistant (PA) profession is generally well-known to those working as PAs. PA programs retell the story to each incoming class partly as a celebration of their growing canon and partly in a pre-emptive defense against those who might wish to limit the role of the PA in practice. The story goes something like this:

Faced with a growing need for medical providers in rural or otherwise underserved areas, a physician extender—the PA—was posited as an experiment to fill the gaps of an over-extended medical community. Initially targeted to make an impact in primary care, the expansion of the physician assistant to specialty and even sub-specialty roles, has progressed over the years, mirroring the overall specialization of medicine in the modern era. Now nearing 45 years as a profession, the PA role shows its strength by continually adapting as medical practice evolves.

One of the more recent areas of specialty, arising in the late 1990s, is the hospitalist. Hospitalists are defined by work place, not the organ system worked upon, and so they are different from the cardiologists or nephrologists who also spend much of their time on hospital wards. The hospitalist works to care for patients from admission to discharge, consulting if needed with specialists. A typical scenario is that of the patient admitted on referral either from the emergency department or the primary care office. That patient sees the hospitalist while admitted, and is then discharged back to the primary care provider (PCP). The key point here is that the PCP, who before would divide time between office and hospital, now hands off the time-consuming work of inpatient medicine to a provider who is always on site, or always on call. And because we
know from the history of the PA profession that wherever physicians go and are over-
extended, so goes the physician assistant, we now find a new professional niche for the
PA, the PA-Hospitalist.

But why did these physicians suddenly become over-worked in the later 1990s? Previ-
ously, there had been a seemingly never-ending supply of residents and resident
work-hours to pick up any and all patient care from off-duty MDs. Residents were the
perfect solution, or so it appeared, as they were cost effective, easy to direct, and
competent, and would work literally around the clock for their attending physicians. This
was considered part of their education. But working around the clock has its drawbacks.

When the Accreditation Council for Graduate Medical Education (ACGME) tightened
rules regarding the maximum number of work hours for residents over concerns of sleep
deprivation, the physician assistant became an attractive adjunct to hospital staff and
began to carve out a new role outside of primary care.\textsuperscript{3-4} Add to this the rise of the
hospitalist profession in the late 1990s, and hospitals began to see more mid-level
providers in the role of full-time hospitalist staff. Few studies have examined the PA
specifically as a hospitalist.\textsuperscript{5} Despite the lack of study this looms as an important
question, partly because the PA hospitalist is already a reality and only shows signs of
growing in practice, but also because measures of quality and cost and appropriate use of
resources should be an ongoing aspect of the search for solutions to rising health care
costs in this country. This paper reviews studies of the physician assistant specifically in
the role of hospitalist, comparing the care provided by PAs to that of residents and
traditional house staff. Measured outcomes within the studies reviewed include length of
stay, cost of care, mortality, readmission soon after discharge, and patient satisfaction. It
seeks to answer the clinical question, Can a physician assistant working as a hospitalist and caring for general medicine patients, as part of a team with physician hospitalists, provide care that is comparable to the traditional framework of residents caring for patients under house staff supervision?

METHODS

Research for this paper proceeded with an initial search of online academic databases. The search engines Medline, Web of Science, and CINAHL were used to cover the major and minor medical tomes. Search terms included “physician assistant” and “hospitalist.” Non-related articles were ignored, while particular exclusion criteria were applied to the remaining sources. Seeking to include only articles that centered on the clinical question, exclusion criteria limited sources to articles published in English, articles that evaluated health care settings in the United States, and articles that specifically looked at PAs in the role of hospitalists. This paper does not review literature focusing solely on nurse practitioners, nor studies of PAs in other subspecialty roles such as cardiology, nephrology, and pediatrics, or articles on PAs in any of the surgical specialties.

As articles made the cut for inclusion, their reference and bibliographic sections were combed for additional articles that either examined the clinical question, or provided adjunctive information applicable to history, background, or understanding of the larger context. Those additional articles were also examined for bibliographic leads, and the process continued until leads were exhausted.
None of the articles inspected were randomized controlled trials, and so validity of the research was difficult to assess. Nevertheless, some indication of validity could still be ascertained from the individual design of each study, and any deviations from that design. Validity was measured by examining the patient characteristics tables within each study for demographic difference, including severity of illness. Validity was also measured by the manner in which patients were assigned to the physician assistant teams versus the resident teams. For example, if a significant protocol difference existed to funnel patients to the PA teams versus the resident teams, it points to pre-existing bias in the selection of patients. Finally, because this is a comparison primarily of PAs with residents, any significant differences between the ancillary members of the teams that might bestow advantages to one side or the other were noted, such as if a PA team had access to staff resources not available to the comparison group of providers.

RESULTS

Searching the academic databases for “physician assistant” returns thousands of articles. Many of these articles focus on the well-established roles of PAs who have worked in medical subspecialties. There are articles describing the implementation of PAs within surgical services, articles centered on the introduction of PAs as neonatal care specialists, and numerous other examples of where and how physician assistants are employed as adjuncts to doctors treating inpatients. Today the cardiology or gastroenterology PA is well known within the hospital walls, and while an important resource, is not the focus of this paper. A search for “hospitalist” within Medline returns
846 articles published in English. Combining the two terms returns only seven articles, and only three of these actually define and examine the clinical question.

The first in-depth look at this issue was published in the *Journal of Hospital Medicine* in 2008. This is a retrospective cohort study examining the quality of care provided by PA/Hospitalist teams versus that of traditional house staff. The study, “Implementation of a Physician Assistant/Hospitalist Service in an Academic Medical Center: Impact on Efficiency and Patient Outcomes,” examined 5194 patients admitted to the general medicine service of a 747 bed academic medical center between July 2005 and June 2006. A team of physician assistants and hospitalists cared for 992 of these patients, and the remaining 4202 were seen by the traditional house staff made up of an attending physician, junior or senior residents, interns, and medical students. Measured outcomes included inpatient mortality, transfer to ICU, length of stay, cost of care, readmissions, and patient satisfaction with quality of care.6

The far-reaching effect of the ACGME duty hour requirements was the impetus for the implementation of PA hospitalist staffing at this facility. This large hospital located in the northeastern United States developed its own physician assistant hospitalist team as a way to reduce resident work hours while at the same time exploring the professional potential of its PA employees. This was a novel approach to care for this facility. Previously, physician assistants had worked at this facility mostly within the surgical specialties. As part of the study a set of 15 beds was placed specifically under the care of a team comprised of one physician hospitalist and two PAs during the day, and one hospitalist, one PA and one medical resident or fellow at night. This constituted the Physician Assistant/Clinician Educator (PACE) team. The General Medicine Service
(GMS) served as comparison. The GMS consisted of teams of one attending physician, one junior or senior resident, two interns, and one or two medical students.  

The PACE team did not accept patients transferred from the ICU, or incoming patients transferred from another facility. Aside from these restrictions, there were no special triage rules that limited the type or severity of patient illness seen by the PAs, and the final analysis of the data accounted for these restrictions by ignoring those patients in the GMS group that could not have been seen by the PACE group. The duties of the physician assistants, who had all had some inpatient hospital experience previously, included gathering histories and performing physical exams, charting and documentation of progress, formulating care plans and writing orders, communicating with nurses, consultants, and family members of patients, and writing discharge orders. As this was a teaching hospital, the physician assistants also took part in more academic pursuits. They helped develop a PA hospitalist curriculum, performed chart review, presented cases on grand rounds, and carried out several other education initiatives.  

The hospital’s administrative database served as the sole source of clinical patient data used in analysis and was used to identify patients as cared for by one team or the other. Data on the number and severity of diagnoses, the patients’ clinical course and disposition, and also readmission to the hospital (within 72 hours, 14 days, or 30 days) were all available through examination of the hospital database. Also available was information on cost and length of stay. Patient satisfaction was charted through a Press-Ganey survey distributed to a random sample of patients after discharge.  

Patient demographics were also easily accessible via the database and showed that for the most part these were statistically homogenous groups. One notable exception is
the patients of the PACE team were slightly younger, and had slightly lower co-
morbidities scores as measured by CMI and Charlson scales. Of the patients the PACE
service saw, 19.1% were between ages 18 and 44, 35.5% between 45 and 64, and 45.5%
were 65 and older. This compared with 18.2%, 31.9%, and 49.9% for the house staff
service. The Charlson score, a measure of comorbidity, uses the presence or absence of
different medical conditions such as myocardial infarction, congestive heart failure,
peripheral vascular disease, cerebrovascular disease, chronic pulmonary disease, and
diabetes to quantify morbidity and to attempt to predict complications.\(^7\) Scored from 0 to
3+ in this study, a higher number correlates with more severe comorbidity. Data showed
that 27.2% of the PACE patients had a Charlson of 0, versus 24.9% of house staff
patients. Also, 34% of the PACE patients had a Charlson of 3+, versus 37.6% of house
staff patients with a Charlson of 3+. Patients in both groups matched closely on gender,
ethnicity, discharge to home, and insurance coverage (an indirect measure of socio-
economic status).\(^6\)

Financially, cost of care was 3.9% lower for the PA team but length of stay was
5% higher. There were no statistically significant outcomes were seen between the two
groups in number of ICU transfers, with 2.0 per 100 for the PACE team and 2.3 per 100
for the house staff. The data also showed no real statistical difference between mortality,
or readmissions.\(^6\)

Following the publication of this PACE experiment in 2008, another study with a
similar focus surfaced. *The American Journal of Medical Quality* published “Replacing
an Academic Internal Medicine Residency Program With a Physician Assistant-
Hospitalist Model: A Comparative Analysis Study.”\(^8\)
Again, pressure to curtail resident work hours, plus changes that reduced the total number of residents available to care for patients at this hospital, prompted implementation of a physician assistant hospitalist service. In this study, 30 residents and 9.5 (full time equivalent) attendings were replaced by 23 physician assistants and 12.5 (full time equivalent) attendings. The PAs worked the same assignments the residents had previously staffed. PAs rotated through the general medicine floors, ICU, coronary care, and subacute/intermediate care. The PAs also engaged in a two-year hospital medicine post-graduate training program to enhance their clinical skills. The physician assistants were supervised by attending physicians who were available on the medical floor for direct consult 24 hours a day, when PAs were on duty. The residents, on the other hand, had an attending available for direct supervision or consult on the medical floor during the day shift only. Unlike the PACE and GMS groups created in the previous study, this hospital simply replaced a number of residents with PAs. There was no teaming of residents with hospitalists. Thus, the comparison groups here are PAs supervised by attendings against the traditional resident model.8

As in the earlier study, hospital records were used to compare the care given by the PAs against the care provided by residents. Measures of comparison included patient mortality, “adverse events” as defined by state criteria, readmissions within 30 days of discharge, and patient satisfaction.8

Prospectively, 5508 medical admissions handled by the PA-hospitalist service from July 1, 1998 to June 30, 2000 were observed and compared with a retrospective analysis of the 5458 medical residency patients admitted from July 1, 1996 to June 30, 1998. Most measured outcomes were similar between the two groups. All cause mortality
was lower at 2.7% in the PA group compared to the resident group’s 4.3%. There were 5 adverse events with the PAs versus 9 with the residents. The PAs had ten more readmissions with 66 compared to the 56 of the residents. Patient satisfaction scored at 96% for the PAs against 95% for the residents.8

The remaining data was published in condensed form prior to presentation at the Society of General Internal Medicine’s 32nd Annual Meeting in Miami Beach, Florida, May 13-16, 2009. The document, published in *The Journal of General Internal Medicine* in April of 2009, presents data from a retrospective cohort study. The authors used the hospital’s administrative database of general medical patients to compare hospitalist PAs with residents. Entitled “A Comparison of General Medical Inpatient Care Provided by a Hospitalist-Physician Assistant Model With a Traditional Resident Based Model,” the collected data indicated no major differences between provider type in inpatient mortality or readmissions.9

After the ACGME rule changes forced the hospital to find an answer to the hours lost to resident work restrictions, the staff created and implemented two new teams, each comprised of physician assistants partnered with hospitalists. These two teams worked in addition to the six already-existing resident teams caring for general medicine patients. The hospitalist-physician assistant (H-PA) teams accepted patients regardless of diagnosis or severity of illness, but only if admitted between 7 am and 3 pm on a weekday. H-PA patients were never transferred to the care of the resident (RES) teams. Using the hospital’s patient database, the researchers selected out patients appropriate to their inclusion criteria for analysis. They excluded patients under 18 years of age, those admitted on Saturday or Sunday, and those beginning their hospital stay initially in the
ICU. Date ranges for the study were January 2005 through December 2006. The end result was identification of 1916 patients assigned to the H-PA teams to be compared against 6535 assigned to the RES group.9

Retrospective comparisons of patients showed that patients cared for by the H-PA teams had a longer hospital stay (adjusted difference, 0.33 day; P=0.002). Cost of stay was also higher (adjusted difference, $1452; P=0.001), but after adjustment for length of stay, reduced in significance (adjusted difference, $347; P=0.10). Mortality rate was not significantly different (odds ratio 1.35; 95% confidence interval [CI], 0.88 to 2.07). Likewise, readmission within 30 days was also similar between the groups (odds ratio, 0.90; 95% CI, 0.76 to 1.06).9

DISCUSSION

The physician assistant profession has continued to grow and PAs are working in more and more areas of medicine as healthcare delivery evolves. The hospitalist PA is but one of the new roles now accepted in many American medical institutions. It is interesting that these new roles have evolved almost ad hoc, and mostly in reaction to budgetary and work-hour pressures rather than thoughtful consideration of how to best nurture and advance progressive models of care and professionalism as a whole.

One of the larger issues here is that a new way of delivering care has been invented, implemented, and largely accepted, without much comparative analysis to show the efficacy or appropriateness of the new model. This paper reviews a few studies that have attempted to answer any concerns, but for various reasons, none of them proves definitive.
After reviewing the articles that specifically address the question of PA hospitalist performance, some things become more clear. One is that the entry of the PA into the realm of hospital medicine shows promise. None of the trials report a massive drop in quality of care or conclude that the PA profession should be reigned in to align with its original, more limited scope of practice. It is clear, however, that further study must occur. And the studies to come must begin by addressing the limitations of the research reviewed above. Specifically, randomized homogenous patient populations should be compared at various institutions as treated by similar teams, using standards that compare the same important patient outcomes between groups.

The first study, “Implementation of a Physician Assistant/Hospitalist Service in an Academic Medical Center: Impact on Efficiency and Patient Outcomes” suffered from several limitations. To begin with, this was a retrospective analysis. As such it consisted of looking backward at records and offers no ability for patient follow-up. Secondly, this was not a randomized trial. Thirdly, demographic differences between groups point to possible confounding variables between patient populations. In addition, this article focused on only one hospital location and results may not be appropriately generalized. One of the measured outcomes, patient satisfaction, was plagued by a low response rate of patient satisfaction surveys. Given how important the patient’s perspective is in the medical arena, this is a notable flaw. Finally there was limited power to detect clinically important differences in mortality and ICU transfers, two of the gravest measures of quality of care one can propose.

The second study, “Replacing an Academic Internal Medicine Residency Program With a Physician Assistant-Hospitalist Model: A Comparative Analysis Study” is
weakened by missing data and a potentially fatal design flaw. Firstly, one of the easiest to measure and most telling pieces of data was not included. The study failed to measure length of stay, an important factor that can indicate not only cost of stay, but also has important implications regarding the efficiency with which care is delivered to patients. Also not unimportant are the iatrogenic complications that increase in probability with each extra day a patient is confined to a hospital bed. More troubling however, is the design of the comparison groups. The researchers compared the PA/Hospitalist team to residents, not to Hospitalist/Resident teams. Like the proverbial fruits unfairly juxtaposed, this serves to call much, if not all, of the data into question. If one assumes that the PA functions in this comparison at the level of a resident, then the PA is given an extra advantage by being partnered with a fully trained and experienced physician. Performance can be expected to differ between the two groups.

The final study examined, “A comparison of general medical inpatient care provided by a hospitalist-physician assistant model with a traditional resident based model” raises some special problems. Firstly, this was not a peer-reviewed study that qualified for journal publication, but instead the abstract of a presentation at a medical conference. Whether it can be qualified as a published trial at all is doubtful. However, because of the overall lack of research on this topic, it is included here despite reservations. The study itself is not robust. Patient assignment to the two opposing healthcare teams was non-randomized, and the analysis is entirely retrospective. And finally, it is unclear from this abstract what comprised a physician assistant team and what comprised the resident team. The reader has no indication of what supervision the
physician assistants received in comparison with the residents, and so it is difficult to make any deductions.

CONCLUSION

Physician assistants continue to make inroads into new areas of medicine as models of healthcare delivery change in the U.S. The hospitalist PA is one of the more recent evolutions and reinforces the viability and robustness of the PA profession as it nears its 45th year in existence. While it would be reassuring to consult scientific data that quantifiably legitimizes each new role of the PA, such studies do not always exist. Those that do exist often leave fundamental questions unanswered. None of the studies reviewed here offer any finding that clearly shows superiority of resident care over physician assistant care. Likewise, physician assistant hospitalists did not significantly outperform residents working the general medicine floors of the hospitals in question. Therefore the question remains; can the physician assistant reliably be trusted to function as a member of a hospitalist team and care for patients in a setting previously reserved for physicians alone?

Currently the data is not strong enough to make far-reaching policy recommendations to implement PA hospitalist teams on a wider basis, or to replace wholesale, the traditional resident system seen in hospitals today. The data does appear to show that the PA hospitalist does not adversely affect patient care or outcomes; providing competent care often for lower costs and comparable patient satisfaction. This may be reason enough to accept PAs in a hospitalist role and is at least a good indication for further study of the issue. Regardless, given the trends of the profession since its
inception, today’s PAs do not seem likely to wait for permission before continuing their development and expansion into new areas of medicine.
REFERENCES


TABLES

Table 1: Demographics of Patients in Physician Assistant Hospitalist Service, Roy et al.6

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>PACE (n=992)</th>
<th>House Staff (n=4202)</th>
<th>P value</th>
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<td>Admissions between 22:00 and 07:00</td>
<td>43.8</td>
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<tr>
<td>Discharge to home</td>
<td>81.1</td>
<td>80.5</td>
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Table 2: Quality and Efficacy for PACE and House Staff Services, Roy et al.⁶

<table>
<thead>
<tr>
<th></th>
<th>PACE</th>
<th>House Staff</th>
<th>Unadjusted % Difference, 95% CI</th>
<th>Adjusted % Difference, 95% CI</th>
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<tr>
<td>LOS, days, median (IQR)</td>
<td>2.6 (1.6, 4.4)</td>
<td>2.6 (1.4, 4.6)</td>
<td>10.1% (25.6% to 16.1%)</td>
<td>15.0% (20.4% to 110.0%)</td>
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<td>Total costs, USD, median (IQR)</td>
<td>4,536 (2,848, 7,201)</td>
<td>4,749 (3,046, 8,161)</td>
<td>29.1% (214.0% to 23.8%)</td>
<td>23.9% (27.5% to 20.3%)</td>
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<td>72-hour readmissions/100 discharges</td>
<td>0.8</td>
<td>1.3</td>
<td>0.6 (0.3–1.3)</td>
<td>0.7 (0.2–1.8)</td>
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<td>14-day readmissions/100 discharges</td>
<td>5.4</td>
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<td>1.0 (0.7–1.4)</td>
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<td>30-day readmissions/100 discharges</td>
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<td>8.1</td>
<td>1.0 (0.8–1.3)</td>
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</tr>
<tr>
<td>ICU transfers/100 discharges</td>
<td>2.0</td>
<td>2.3</td>
<td>0.9 (0.5–1.4)</td>
<td>1.4 (0.8–2.4)</td>
</tr>
<tr>
<td>Inpatient mortality/100 discharges</td>
<td>0.7</td>
<td>1.2</td>
<td>0.6 (0.3–1.3)</td>
<td>0.8 (0.3–1.8)</td>
</tr>
</tbody>
</table>

Table 3: Characteristics of PA-Hospitalist Model and Medical Residency Model, Dhuper and Choksi⁸

<table>
<thead>
<tr>
<th></th>
<th>PA–Hospitalist Model</th>
<th>Medical Residency Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients per resident or PA</td>
<td>7-10</td>
<td>7-10</td>
</tr>
<tr>
<td>Work hours per week</td>
<td>56-60</td>
<td>56-60</td>
</tr>
<tr>
<td>No. of hours in educational activities</td>
<td>16-20</td>
<td>16-20</td>
</tr>
<tr>
<td>Direct Patient Care Hours</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Years in program</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Typical Medical Team</td>
<td>2 PAs; 1 PA student; 1 medical attending</td>
<td>2 interns (PGY 1); 1 resident (PGY 2 or 3); 1 medical student; 1 medical attending</td>
</tr>
</tbody>
</table>
Table 4: Quality Measures for PA-Hospitalist Model and Medical Residency Model, Dhuper and Choksi\cite{8}

<table>
<thead>
<tr>
<th></th>
<th>PA–Hospitalist Model</th>
<th>Medical Residency Model</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>0.027</td>
<td>0.043</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CMI adjusted mortality</td>
<td>0.019</td>
<td>0.029</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Quality issues related to deaths</td>
<td>5/148</td>
<td>8/235</td>
<td>.99</td>
</tr>
<tr>
<td>Adverse events</td>
<td>9</td>
<td>5</td>
<td>.29</td>
</tr>
<tr>
<td>Readmissions</td>
<td>56</td>
<td>66</td>
<td>.34</td>
</tr>
<tr>
<td>Quality issues related to readmissions</td>
<td>1/56</td>
<td>4/66</td>
<td>.24</td>
</tr>
<tr>
<td>Patient satisfaction %</td>
<td>95</td>
<td>96</td>
<td>.33</td>
</tr>
</tbody>
</table>

Table 5: Adjusted Care Outcomes of H-PA versus RES Teams, Singh, et al.\cite{9}
(Adjustments for age, ethnicity, sex, pay status, presence of PCP, ER vs. non-ER admission, and co-morbidities)

<table>
<thead>
<tr>
<th></th>
<th>LOS Difference, (95% CI)</th>
<th>Cost Difference, (95% CI)</th>
<th>Mortality Odds Ratio, (95% CI)</th>
<th>30 day Readmission Odds Ratio, (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unadjusted</td>
<td>0.46 (0.24–0.39)</td>
<td>1949 (1091–2805)</td>
<td>1.4 (0.93–2.16)</td>
<td>0.91 (0.80–1.05)</td>
</tr>
<tr>
<td>Adjusted</td>
<td>0.35 (0.13–0.56)</td>
<td>1452 (634–2270)</td>
<td>1.35 (0.88–2.07)</td>
<td>0.90 (0.76–1.06)</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Population</td>
<td>Intervention</td>
<td>Comparison</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>------------</td>
<td>--------------</td>
<td>------------</td>
</tr>
<tr>
<td>Roy et al. / Implementation of a Physician Assistant/Hospitalist Service in an Academic Medical Center: Impact on Efficiency and Patient Outcomes / Journal of Hospital Medicine Vol 3 / No 5 / September/October 2008</td>
<td>2008</td>
<td>Inpatients</td>
<td>PA Hospitalist care</td>
<td>Care provided by traditional House staff, or Residents</td>
</tr>
<tr>
<td>Dhuper and Choksi / Replacing an academic internal medicine residency program with a physician assistant--hospitalist model: a comparative analysis study / American Journal of Medical Quality 2009; 24; 132</td>
<td>2009</td>
<td>Inpatients</td>
<td>PA Hospitalist care</td>
<td>Medical residents</td>
</tr>
<tr>
<td>Singh et al. / A Comparison of general medical inpatient care provided by a hospitalist-physician assistant model with a traditional resident based model / Journal of General Internal Medicine Vol 24, Supplement 1, April 2009</td>
<td>2009</td>
<td>Inpatients</td>
<td>PA Hospitalist</td>
<td>Medical residents</td>
</tr>
</tbody>
</table>