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# The Impact of Public Hospital Closure on Medical and Residency Education: Implications and Recommendations

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## Abstract

**Background—**Challenges around safety-net hospital closure have impacted medical student and resident exposure to urban public healthcare sites that may influence their future practice choices.

**Objective—**To assess the impact of the closure of a public safety-net teaching hospital for the clinical medical education of Charles Drew University medical students and residents.

**Method—**Retrospective cohort study of medical students' and residents' and clinical placement into safety-net experiences after the closure of the primary teaching hospital.

**Results—**The hospital closure impacted both medical student and residency training experiences. Only 71% (17/24) of medical student rotations and 13% (23/180) of residents were maintained at public safety-net clinical sittings. The closure of the public safety-net hospital resulted in the loss of 36% of residency training spots sponsored by historically black medical schools in the United States and an even larger negative impact on the number of physicians training in underserved urban areas of Los Angeles County.

**Conclusion—**While the medical educational program changes undertaken in the wake of hospital closure have negatively affected the immediate clinical educational experiences of medical students and residents, it remains to be seen whether the training site location changes will alter their long-term preferences in specialty choice and practice location.

### Keywords

education; hospital/office administration

## BACKGROUND

Producing a diverse physician workforce has been one of several solutions to eliminating health disparities suggested by Institute of Medicine reports, *Unequal Treatment* and *In Our Compelling Interest*.[1,2] Historically black medical schools (HBMSs) play a major role in addressing health disparities through the education of high-quality physicians who contribute significantly to the pool of minority physicians practicing in the underserved communities of the country. The 4 HBMSs—Howard University College of Medicine, Meharry Medical College, Morehouse School of Medicine and Charles R. Drew University of Medicine and

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Science—are unique in: 1) sharing a commitment to producing a diverse physician workforce, 2) sharing common missions to produce high-quality physicians who practice in diverse and medically underserved communities and 3) sharing a heavy reliance on public safety-net hospital (PSNH) systems, both as clinical training sites for medical students and residents and for the delivery of care to surrounding communities. Although both medical schools and communities have been well served by the partnerships between HBMSs and public hospitals, the heavy reliance of HBMSs on public hospitals for education and service has become increasingly problematic. Many recruitment programs in such schools—such as Charles Drew University (CDU)'s program that focuses specifically on the recruitment of medical students and residents interested in underserved areas—have been shown to be predictive of future physician practice in minority and medically underserved areas.[3,4] The dependence of these training programs on PSNHs provides key training opportunities to medical students and residents.

## The Role and Contribution of Historically Black Medical Schools

Medical education provides important exposures to urban and minority populations that influence practice location.[5] During residency training, exposure to underserved, minority and immigrant patients promotes care of these patient populations for all physicians in training, regardless of race.[6] This medical education has been proven effective in producing graduates who elect to practice in underserved communities, as shown in studies of CDU graduates. Specifically, studies have shown that 53% of CDU medical education program graduates practice in medically disadvantaged areas, in contrast to 26% of University of California–Los Angeles graduates, which is a rate greater than the national average.[7] Even after controlling for multiple factors, only race and participation in the CDU medical education program was a significant predictor of future practice in underserved areas.

On a broader scale, the nation's HBMSs have played a central role in assuring a diverse physician workforce. For more than half of the 20th century, 2 of the HBMSs—Howard University and Meharry—trained 85% of all African-American physicians compared to 15% of majority institutions.[8] Currently, these numbers have changed, but the historical role has maintained that more than half of African-American physicians trained at one of the 4 HBMSs.

## Challenges Facing Academic Programs in Public Safety-Net Hospitals

The term "safety net hospital" refers to a subset of public and not-for-profit hospitals that deliver care to low-income and uninsured patients, serving >10 million patients annually.9 PSNHs and health systems represent a complex and diverse set of healthcare providers linked by a shared mission to serve underserved populations. Despite the critical importance of PSNH in eliminating health disparities, there is no single or stable source of financial support for their service. Federal budget cuts, increasing state budget deficits, increased competition with nonsafety-net hospitals for publicly insured patients and growing needs by the uninsured have severely threatened the financial viability of safety-net hospitals. Despite persistent funding uncertainties, public hospitals have a long history of service to the community with >1,100 PSNH mostly owned and/or operated by state, county and city/municipality governments.[10,11] In addition to being low income, two-thirds (65%) of patients receiving inpatient care through PSNHs are minorities, including blacks, Hispanics, Asians/Pacific Islanders or other nonwhite races.

Many PSNHs are able to respond to their financial and local community's need for specialty care because they operate large residency and nursing education programs that train a disproportionate share of the nation's medical and nursing workforce. About 80% of public acute care hospitals are teaching institutions and train about 15% of all medical and dental residents in any given year.[11] In 2002, acute care hospitals had average operating margins in

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the 4.5% range, while more than half of PSNH had negative margins, with an average margin of −0.3% and were described as being "intact but endangered" and "fragile yet resilient."[12,13] This average margin is dangerously low for an industry that considers levels of <2% to be inadequate for financing working capital, maintaining state-of-the-art medical technology, and renovating and/or replacing aging physical plants. State Medicaid programs, which are often subjected to political forces that lead to significant year-to-year budgetary swings, constitute 49% of the PSNH revenues.

Despite a combination of stresses on the safety net, the market remains resilient, but if the financial stresses are unabated, they may result in a net decrease in public safety-net services in the next several years. As the number of uninsured in the country increases, PSNHs continue to be called on to fill the gaps, stretching resources and services that are already stretched to the breaking point. Combined with higher capital costs, this situation creates a vicious cycle for PSNHs, with increased demand for services on already limited resources, coupled with local political pressures, extreme financial distress, inadequate capitalization and susceptibility to insolvency.[14]

## Local Implications: The Charles Drew University Experience

Unfortunately, in 2007, the confluence of forces affecting PSNHs became very real for the medical educational and residency training programs at CDU. Beginning several years ago, Martin Luther King Jr. (MLK) Hospital began to experience significant challenges, ultimately leading to loss of the hospital's accreditation by the Joint Commission (formerly Joint Commission on Accreditation of Healthcare Organizations) in February 2005. This was followed on September 22, 2006, by MLK's loss of Center for Medicare and Medicaid Services (CMS) certification, which effectively forced the hospital's closure on August 15, 2007, as an acute care inpatient facility. The hospital's loss of CMS accreditation for patient care has led CDU to seek voluntary withdrawal of its Accreditation Council for Graduate Medical Education (ACGME) accreditation as the institutional sponsor of hospital-based GME programs, noting that the hospital no longer constituted "a stable learning and work environment for residents who spend the vast majority of their clinical time at this major participating institution".15 This action, in turn, resulted in the closure of its 15 medical residency programs on June 30, 2007, transfer of the 2 dental programs to other PSNHs, and the outplacement of 168 relocated medical resident physicians and 12 dental residents to other residency programs across the country. In addition, each medical student class has 24 students, who needed to continue their medical training. Despite the longstanding importance of MLK Hospital in providing care to the underserved populations in South Los Angeles, the large publicly funded and county-operated safety-net hospital succumbed to ongoing operational challenges that impacted the ability of the hospital to remain accredited and fully operational. Similarly positioned residency programs and other PSNHs have undergone similar duress (e.g., D.C. General Hospital,16 Charity Hospital17 and Grady Hospital18), but to our knowledge there is little understanding of the impact of safety-net hospital closure on student medical education and physician training experiences.

For these reasons, it is critical to understand the impact of hospital closure on these training programs. Our study aims to measure the impact of PSNH closure on: 1) the geographic location of clinical training sites of medical students and residents relative to the original training site and 2) the type of clinical setting (PSNH or not) in which medical students and residents are subsequently being trained, and finally, 3) to discuss the current effect—and potential future effect—of these changes on efforts to contribute significantly to the pool of underrepresented minority (URM) physicians practicing in the underserved communities across the country.

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## METHODS

All data were provided from the Office of the Dean of CDU. We compared the locations of CDU medical students participating in educational programs overseen by CDU and the ultimate educational site at which displaced residents continued their training. Medical students' core clinical rotations and residency programs were classified as categorical outcomes—public or other clinical settings—and South Los Angeles, Los Angeles County, or other, more distant, locations. Medical student rotations included core clerkship rotations: family medicine, general surgery, outpatient medicine, primary care, obstetrics/gynecology, outpatient pediatrics, pediatrics, inpatient medicine, psychiatry and surgical subspecialties. Medical student electives were excluded from the analysis. In addition, mileage differences were calculated for relocated medical student rotations using standard driving mileage calculated by Yahoo!Maps between the address of the hospital and the relocated rotation's address.

Among the residency programs, we evaluated whether the relocated residents transferred to non-CDU programs: 1) within South Los Angeles, 2) within Los Angeles County, 3) within California, or 4) outside of California. We then compared prehospital closure to postclosure exposure to medical education experiences in a public hospital for medical students and residents in training. Data were analyzed using a 1-sided Fisher's exact test and values less than $p<0.05$ were considered significant.

## RESULTS

### Impact on Medical Student Rotations in Underserved Areas

Following hospital closure, alternative medical student clerkship locations were selected based on the mission of the university; however, it was not possible to place all students in underserved communities or in the community of South Los Angeles. Out of the 24 impacted students at CDU, all had changes to their rotation schedule after the hospital closure. Table 1 shows the percent of training that was maintained within South Los Angeles, the percent of students transferred to rotations in other public hospitals as well as the average mileage traveled. Primary care rotations, including the longitudinal primary care clerkship, family medicine, and outpatient internal medicine, were not significantly impacted, with 100% of students maintained at the same local community clinic in South Los Angeles. The surgery rotation had been transferred to another public hospital 3 years prior to hospital closure and, therefore, 100% of medical student clerkship activity was maintained at another public hospital 9.8 miles away. All the remaining rotations were maintained at a public clinical sitting at a variable exposure rate ranging from 33% (8/24) for psychiatry and neuroscience to 58% (14/24) for outpatient pediatrics and obstetrics/gynecology. Among the transferred students to other public hospitals, 2 students were reassigned to a facility 40 miles from the original rotation. Transfers resulted in a statistically significantly decline in students working in public clinical settings ($p=0.005$). Inpatient internal medicine rotations had only 42% (10/24) of students working in a public hospital setting ($p<0.001$).

Overall, 71% (17/24) of medical student rotations were maintained in PSNHs ($p=0.001$). Unlike the CDU residents, all students continued training in California; however, only 28% of the rotational months remained in South Los Angeles. In addition, less exposure to working in underserved areas was coupled with longer travel times and distances. Overall distances traveled averaged $16.63 \pm -9.7$, ranging from 0–40 miles from the original location. In addition, before the MLK closure, all medical students rotated through surgical subspecialties (e.g., anesthesiology, ophthalmology, otolaryngology, orthopedics and urology), but since the hospital closure they have only been rotating through urology.

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### Impact on Residency Training

The hospital's closure impacted 17 residency programs, which included 240 medical resident physicians and 12 dental residents. Table 2 shows the distribution of the 180 relocated residents who did not graduate from CDU by June 2007 by specialty in Los Angeles, CA, and nationally. After hospital closure, most residents were relocated across the state of California with 97 out of 180 (54%) across California. However, 83 out of 180 (46 %) were placed out of state; 46% in the northeast, 33% in other western states (excluding California), and only 17% in the midwest and 4% in the south. Nationally, the closure of CDU residency training programs led to the loss of approximately 36% of residency training spots provided by HBMSs in the United States, as well as a significant loss to the complement of training physicians in underserved California urban areas, specifically within Los Angeles County.

In total, 31% of residency spots were maintained in Los Angeles County (Table 3). All of the residency training programs in South Los Angeles were lost. Additionally, the closure of the CDU programs led to the permanent loss of anesthesiology, emergency medicine, geriatrics and otolaryngology residency training programs within any of the nation's 4 HBMSs. At the state level, the vast majority of residents were not maintained in training in Los Angeles County. Compared to preclosure residency training, only 54% (97/180) stayed in California training programs, a significant reduction from preclosure levels of training in the state ($p<0.001$). Stratifying the residents by institution type showed that just 23 out of 180 residents (13%) relocated to a PSNH with 157 out of 180 residents (87%) continuing their training in other hospital settings. The exposure to training in a PSNH was significantly different compared to preclosure exposure ($p<0.001$ for each category).

## STUDY LIMITATIONS

This study is limited in its ability to evaluate the overall impact of the hospital closure. Given the short-time frame since hospital closure, it is not possible to describe the full implications of medical student and resident training relocation, particularly on future practice choices. Only after physicians in training have completed their training and made decisions about practice location and specialty choice will we be able to evaluate the long-term consequences of reduced exposure to public hospital training. However, since 2 major determinants of whether a physician will practice in a medically underserved (physician shortage) area are geographic location of the medical education training site and the mission of the affiliated medical school,[3] the loss of the MLK Hospital as a training site may have a large impact on physicians who may have served in medically underserved areas. In addition, we cannot fully speak to the qualitative experiences of medical students' and residents' educational training experiences at their new residency programs and clerkship training sites. For these reasons, future studies will need to follow the medical student and resident cohort relocated by the hospital closure and compare them to previous groups of graduates of CDU-sponsored educational programs with quantitative and qualitative measures. In addition, future studies can compare hospital resources on the quality of training for the medical student and resident cohort impacted by the hospital closure.

We also are limited by available information on the choices that residents had when choosing a new residency program. It is possible that their choices were influenced heavily by lack of available residency slots or by PSNH choices. The students did not have a choice in where their clerkship rotations were reassigned, but the residents may have had a significantly different experience. In future longitudinal studies, the choices available to residents should be ascertained.

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## DISCUSION

During the medical student and resident placement process, many decisions were impacted by the challenge of immediately placing the very large number of students and residents in clinical rotations affected by the closure of MLK Hospital. The plan for medical student rotations was facilitated by partnerships with University of California Los Angeles. However, the loss of all CDU residency programs forced the placement of all current residents and future applicants to residency programs across the country. Only 13% of the displaced residents continued their residency training in other PSNHs. We realize that some of the other hospital settings may have a similar mission to serve minority and underserved population; however, the educational opportunities lost cannot be underestimated. In addition, it cannot be ignored that all of residency training was lost from South Los Angeles, one of the most significantly underserved areas in California and the nation. The impact of resident relocation to non-PSNH, nonurban and non-Californian sites not only has the potential to decrease the number of physicians trained and motivated to serve in underserved and minority communities, but also decreases the number of physicians in training that serve California and, specifically, South Los Angeles.

South Los Angeles was particularly served by MLK Hospital. This community has the highest rate of poverty in Los Angeles County, with nearly one-third (28%) of the population living <100% of the federal poverty level and the highest rates of uninsured with 32% of non-elderly adults and 11% of children without insurance.[19] In addition, nearly 1 million people live in a 5-mile radius of the hospital now without emergency or inpatient services. South Los Angeles is no longer a training ground for residents. The CDU students are training close by for some rotations but are dispersed throughout the county for other rotations. This issue may have a long-term negative impact, as many of the trainees are ethnic minorities that would add to a healthcare workforce that is unbalanced and struggling to achieve reasonable minority representation, especially in communities of color. In a state as diverse as California, we would expect a higher degree of physician diversity, yet unfortunately, this is not the case. According to a 2007 Center for California Health Workforce Studies report, African Americans, who are 6.7% of the state's population, comprise only 3.2% of California's physicians, and Latinos, who are one-third of the population, comprise only 5.2% of California's physicians.20

HBMSs' mission continues to aim to increase the number of minority physicians who are committed to service. There is an imminent risk and challenge that rises from the fact that most PSNHs and HBMSs are heavily dependent on one another. The history of the HBMS was tied to addressing the needs for a stronger healthcare workforce dedicated to caring for their local medically underserved communities, as well as similar communities throughout the nation. Unfortunately, with only 78% of CDU medical student rotations remaining in this community and none of the residency programs able to maintain operations in South Los Angeles, the approach of the university to continue to address the needs of the community, as well as the state and nation, must be re-examined.

These challenges are not new. CDU has been facing the same challenges that exist in many of the historically black medical education programs that are tied to PSNH, with the most recent example at Grady Hospital in Atlanta.[17] The challenge of securing funding to meet the educational requirements of the ACGME has uncovered the difficulties posed by delayed responses and inflexibility of the public hospital system. In addition, the present Medicare approach to the financing of resident education, which links reimbursement of educational costs to hospitals rather than academic institutions and then imposes a cap on the number of resident positions eligible for Medicare funding at each hospital, makes the movement of educational experiences from one site to another nearly impossible. The inability to move Medicare funding of education to alternative sites in the wake of the closure of MLK Hospital was a significant factor in the closure of CDU-sponsored residency programs. Conversely, the

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lack of similar constraints on medical student education made it possible to continue those educational activities, albeit in settings that have different characteristics than those relied upon prior to the hospital's closure.

## SUMMARY AND CONCLUSION

The Association of American Medical Colleges (AAMC) noted in a January 25, 2002, letter to then-CMS Administrator Thomas Scully:

> Teaching hospital closures can disrupt the balance of educational programs within a geographic area. The loss of a residency program that is the only one of its kind within a community can have important detrimental effects on the likelihood of these types of physician specialists practicing in that area.

The recent experiences at CDU can serve as a cautionary tale for healthcare policy-makers and those who oversee medical education programs that are dependent upon a PSNH as a primary site for clinical experiences for medical students and residents. As PSNHs across the country face multiple and growing challenges, including continuing increases in uninsured patients and simultaneous declines in the Medicaid funding and other traditional sources of financial support, it is inevitable that pressures on hospital operations will increase. As this occurs, it is likely that additional PSNHs will be faced with the risk of closures or significant reductions in funding for clinical training programs, which in turn, will create new challenges for the medical education programs that have been the longstanding foundation for such settings. To avoid potentially catastrophic consequences for the education of a diverse physician workforce with a commitment to the care of the underserved, it is incumbent upon the educational leaders of HBMSs to take the following steps: 1) promote public-private support to ensure the educational mission to provide the critically needed healthcare workforce for underserved communities remains sustainable,[21] 2) develop contingency plans that will enable their educational programs to survive changes at their affiliated safety net hospitals, and 3) promote legislative interventions that will assure that CMS rules on GME financing will support the continuing existence of residency training programs in underserved urban settings. The unintended consequences of the closure of MLK Hospital in Los Angeles on physicians committed to serving urban underserved communities has yet to be seen. The resulting reduction in medical student and resident exposure to a PSNH setting is certainly not a step in the right direction toward the goal of eliminating health disparities and assuring a physician workforce that reflects the diversity of underserved urban populations.

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## Table 1

Medical student rotations after hospital closure in public hospitals

| Medical Student Rotations | Training within South Los Angeles after Hospital Closure | Percent Training in PSNH (Year 07/08) | Average Miles Traveled |
|---|---|---|---|
| Family medicine | Yes | 100% (24/24)[†] | 0 |
| General surgery | No | 100% (24/24)[†] | 9.64 |
| Outpatient medicine | Yes | 100% (24/24)[†] | 0 |
| Primary care | Yes | 100% (24/24)[†] | 0 |
| Obstetrics/gynecology | No | 58% (14/24)[*] | 22.8 |
| Outpatient pediatrics | Yes | 58% (14/24)[*] | 0 |
| Pediatrics | No | 50% (12/24)[*] | 9.64 |
| Inpatient medicine | No | 42% (10/24)[*] | 14.9 |
| Psychiatry | No | 33% (8/24)[*] | 9.64 |
| Surgical subspecialties | No | 0% (0/24)[*] | n/a |
| TOTAL | 28% (7/24) | **71% (17/24)**[§] | 16.63 ± 9.7 |

Note: All statistical tests were performed using 1-sided Fisher's exact test for significance comparing posthospital closure to prehospital closure. Surgical subspecialties include anesthesiology, otolaryngology, orthopedics and ophthalmology, and are no longer available to medical students.

[*] $p<0.001$

[§] $p=0.005$

[†] Nonsignificant change. Source: Charles Drew University, Office of the College of Medicine Dean.

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## Table 2

National Redistribution of Charles Drew University residents in Los Angeles County, CA, and nationwide (N=180)

| | Within South LA | Within LA County | Within California | Northeast | South | Midwest | West |
|---|---|---|---|---|---|---|---|
| Program | | | CA | NY, CT, PA | VA, AL, LA | IA, KS, MI, IL, MN, OH | AZ, TX, OR |
| Anesthesiology | | 15 | 15 | | | | |
| Dermatology | | 3 | 4 | | | 2 | |
| Emergency medicine | | 1 | 1 | 10 | | 3 | 12 |
| Endocrinology | | 3 | 3 | | | 3 | |
| Family medicine | | 7 | 9 | 3 | 2 | 2 | |
| Gastroenterology | | 2 | 3 | | | | 2 |
| General dentistry | | 4 | 4 | | | | |
| Geriatrics (all graduated) | | | | | | | |
| Infectious diseases | | | | 1 | | | |
| Internal medicine | | 4 | 14 | 5 | | 2 | 5 |
| Obstetrics & gynecology | | 2 | 4 | 3 | 1 | | 1 |
| Ophthalmology | | 1 | 2 | 2 | 1 | | 1 |
| Oral surgery | | 8 | 8 | | | | |
| Orthopedics | | | 3 | 2 | | | 2 |
| Otolaryngology | | | 4 | | | | |
| Pediatrics | | 2 | 10 | 8 | | 2 | 2 |
| Psychiatry | | 3 | 13 | 4 | | | 2 |
| | 0 (0%) | 55 (31%) | 97(54%) | 38 (21%) | 4 (2%) | 14 (8%) | 27 (15%) |
| TOTAL | | | | | | | |

Residents were transitioned to residency programs by June 30, 2007. All numbers represent individual residents who were working at Martin Luther King Jr. and enrolled in Charles Drew University residency programs. This chart does not include applicants applying to these residency programs. Source: Charles Drew University, Office of the College of Medicine Dean.

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**Table 3**

Residents and medical student rotations transitioned geographically by hospital type, state and city

| Program Yr 07–08 | Residents Transferred after Hospital Closure | Medical Student Rotations Transferred after Hospital Closure |
|---|---|---|
| City | | |
| Within South Los Angeles | 0% (0/180) | 40% (10/24)* |
| Other areas of Los Angeles County but outside South Los Angeles | 31% (55/180) | 60% (14/24)* |
| State | | |
| Within California | 54% (97/180)* | 100% (24/24)† |
| Outside of California | 46% (83/180)* | 0% (0/24)† |
| Hospital Type | | |
| Public hospital | 13% (23/180)* | 71% (17/24)§ |
| Other hospital settings | 87% (157/180)* | 29% (7/24)* |

All statistical tests were performed using 1-sided Fisher's exact test for significance comparing posthospital closure to prehospital closure;

*$p<0.001$

§$p=0.001$

†Nonsignificant change. Source: Charles Drew University, Office of the College of Medicine Dean.