

AAIM Perspectives

AAIM is the largest academically focused specialty organization representing departments of internal medicine at medical schools and teaching hospitals in the United States and Canada. As a consortium of five organizations, AAIM represents department chairs and chiefs; clerkship, residency, and fellowship program directors; division chiefs; and academic and business administrators as well as other faculty and staff in departments of internal medicine and their divisions.

Internal Medicine Student Education on Direct-Care Hospital Medicine Services: Results of a National Survey



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Traditionally, internal medicine (IM) inpatient student rotations at clinical sites include teams of students, residents, and an attending physician. With the exponential growth since its relatively recent introduction, hospital medicine has had an expanding and enduring presence in academic medicine. In 2010, the Clerkship Directors in Internal Medicine (CDIM) Annual Survey found 91.0% of responding programs had students learning under the guidance of hospital medicine physicians.¹ Hospital medicine attendings make up a growing portion of IM inpatient teaching faculty and are perceived by trainees as more effective general medicine ward teachers than other medicine or traditional subspecialist attendings.^{2–6}

Although many programs offer hospital medicine rotations for IM residents that promote autonomy, mentorship, and real-world clinical experiences,⁷ few data are available about teaching on direct-care hospitalist services (DCHS), where medical students are paired directly with hospital medicine attendings without interns or residents. In 2010, 9.0% of clerkship directors reported having medical students work directly with hospitalists.¹ In the context of hospital medicine's expanding role in medical education, and coincident with an increasing number of medical school matriculants,⁸ we hypothesize this percentage has increased over the past decade. Contemporary information regarding teaching on DCHS could allow for a better understanding of the advantages and challenges of this model. We queried clerkship directors responding to the 2018 CDIM national survey to investigate current practices related to medical student education on DCHS.

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METHODS

Survey Group

CDIM is a charter organization of the Alliance for Academic Internal Medicine (AAIM). Since 1999, CDIM

Annual Surveys have collected data from IM clerkship directors on essential and timely issues in medical education. The 2018 Annual Survey was sent to all CDIM members (at US/US territory-based medical schools) designated as “clerkship director” via a personal e-mail invitation in the Fall of 2018. Only 1 individual per member school received an invitation to complete the confidential web-based survey. Approximately 96.5% (136 of 141) of Liaison Committee on Medical Education (LCME) fully-accredited schools had CDIM representation during the survey period. An additional 13 schools had “preliminary” or “provisional” LCME accreditation status (granted between 2015 and 2018) at the time but did not yet have full CDIM membership status and, thus, were not surveyed. Further, inclusion of those schools in the survey population might have introduced response bias or survey non-response because of their differential status.

Survey Development

Survey section questions were proposed by CDIM physician-members during Spring 2018, blind-reviewed by the 18-member CDIM Survey and Scholarship Committee, and selected for inclusion based on timeliness and relevance to the third- and fourth-year training experience for medical students. In June and July 2018, the questions were revised by the committee for content validity, using past CDIM Annual Survey question constructs and conventions as best practices for survey design. The elected CDIM Council then live pilot-tested the survey and provided further suggested revisions. After addressing or incorporating those revisions, a second live pilot test was conducted by the committee and by 5 non-committee CDIM members, and final revisions were incorporated. All pilot test data were analyzed for anomalous responses (to test for problematic question content/items) and then addressed. The authors, survey committee members, and council members represented subject matter experts with extensive experience in the clinical clerkship setting.

Survey Content

The final survey included 4 thematic sections, a section on demographic characteristics and professional attributes, and a 2-item screening question for burnout. For the DCHS section, we defined direct-care services as

those where no intern or resident physicians were involved with the care team. Clerkship students were defined as medical students in their first full-time clinical year. Subinterns were defined as medical students who completed their first full-time clinical year and were on an advanced rotation. The section consisted of 22 questions, including multiple-choice, 5-point Likert scale, and open-text response options, and included logical skip and display patterns ([Supplemental Digital Appendix 1](#), available online). Because of conditional logic or item non-response, not all questions were presented to all respondents or were answered.

PERSPECTIVES VIEWPOINTS

- Some institutions pair internal medicine students on inpatient rotations directly with hospitalist attendings. Few data are available about teaching on these direct-care hospitalist services (DCHS).
- Nearly half of clerkship directors reported having DCHS-based student rotations. Compared to traditional teaching services, students on DCHS had exposure to more limited faculty while often seeing a greater number of patients. Most faculty development is not specific to the needs of direct-care hospitalists.

Survey Administration

The survey was administered via Qualtrics Surveys using Secure Socket Layer encryption, with unique survey participation URLs sent to the survey population via e-mail. The survey launched on October 2, 2018, and closed on November 30, 2018, and included 5 e-mail reminders to non-respondents.

Ethical Approval

The study (Number: 18-AAIM-102) was submitted to Pearl Institutional Review Board and was exempt. Only AAIM Surveys staff had access to the survey software and data set during fielding.

Statistical Analysis

Survey data were deidentified prior to analysis. Because of the high survey response rate and lack of statistically significant differences between survey respondents and non-respondents, data was not weight-adjusted for non-response. In addition to descriptive statistics for the summary results, Pearson's χ^2 and Fisher Exact test were used for statistical comparisons between groups of categorical variables. Data analysis was performed in Stata 14.2 (Stata Corp, College Station, Texas).

A total of 48 short phrase comments were written about perceived barriers. Investigators (AN, KTJ) independently analyzed the codes using thematic analysis⁹ and generated codes that were reviewed and consolidated into 5 domains. The final coding list was reconciled with a third investigator (CJL) and applied to the transcript.

RESULTS

A total of 136 CDIM members were administered a 97-question web-based survey. Two were identified as site

Table 1 Characteristics of Survey Respondents and Non-Respondents

	Respondents (n = 110; 82.1%)	Non-respondents (n = 24; 17.9%)	P value*
General Characteristics			
Medical school type			0.758
Public	59.1% (65)	62.5% (15)	
Private	40.9% (45)	37.5% (9)	
US Region [†]			
Northeast	21.8% (24)	30.4% (7)	0.439
Midwest	26.4% (29)	21.7% (5)	0.573
South	40.9% (45)	26.1% (6)	0.146
West	10.9% (12)	21.7% (5)	0.186
Men	54.6% (60)	62.5% (15)	0.477
In-Depth Profiling of Respondents			
Year of birth, median (range)	1975 (1949-1986)		
Educational leadership role in department of medicine			
Clerkship director or co-director	95.5% (105)		
Other	4.6% (5)		
Length of time in role			
<1 year	7.4% (8)		
1-2 years	11.1% (12)		
3-5 years	32.4% (35)		
6-10 years	23.2% (25)		
11-15 years	11.1% (12)		
16-20 years	7.4% (8)		
>20 years	7.4% (8)		
Academic rank			
Assistant Professor	35.5% (39)		
Associate Professor	45.5% (50)		
Professor	19.1% (21)		
Students per medical school class			
1-50	2.7% (3)		
51-80	8.2% (9)		
81-120	20% (22)		
121-200	55.5% (61)		
>200	13.6% (15)		

*Pearson χ^2 statistic used for 2-x-2 comparisons; Fisher Exact Test used when expected cell sizes are less than 5; P values reported at 95% confidence.

[†]Excludes US territories, due to small sizes and data confidentiality.

directors affiliated with the same medical school and were excluded. Of the remaining 134 members, after 5 e-mail reminders from October to November 2018, 110 (82.0%) completed the survey, representing the final analytic cohort.

Clerkship directors who responded to the survey were mostly affiliated with public medical schools (59.1%, 65 of 110) and were men (54.6%, 60 of 110); demographic characteristics did not significantly differ from the 24 non-respondents ($P > 0.14$ for all comparisons; Table 1). There was regional variation among programs, with the Southern United States having the highest (40.9%, 45 of 110) and the Western United

States the lowest (10.9%, 12 of 110) percentages of respondents. Respondents were mostly at medical schools with greater than 120 students per class (69.1%, 76 of 110). Most of the respondents were clerkship directors or codirectors (95.5%, 105 of 110). The remainder were department of medicine vice or associate chairs for education or directors of undergraduate medical education. Most respondents were associate professors (45.5%, 50 of 110). The median respondent age was 43 (± 10) years old, and more than half of respondents had been in their role for 3 to 10 years (55.6%, 60 of 108).

DCHS Student Rotations

Among survey respondents, 45.5% (50 of 110) reported having students work with direct-care hospitalists (Figure 1). Of respondents who reported students work on DCCHS, 60.0% (30 of 50) represented public institutions. Most (85.7%, $n = 42$) were placing subinterns, many (61.2%, $n = 30$) were placing clerkship students, and a small percentage (4.1%, $n = 2$) were placing elective students on this service. There was no association between census region and whether students rotated on DCCHS ($P > 0.43$ for all comparisons). Of the respondents, 54.5% (60 of 110) reported not using DCCHS-based models; however, 61.7% (37 of 60) had considered having students work on DCCHS.

Students on DCCHS

Of respondents using DCCHS-based models for clerkship student education, 33.3% (10 of 30) reported that DCCHS represented the only inpatient exposure because the students did not have any additional time working on traditional teaching services (TTS). When asked how often clerkship students on DCCHS worked directly with advanced practice providers (APPs), such as physician assistants or nurse practitioners, compared to TTS, 85.2% (23 of 27) reported “about the same” or “less often.” Of the programs using DCCHS-based rotations for any medical student education, 80.0% (44 of 50) responded to questions related to student-faculty interactions and student caseloads. Compared with TTS, 90.9% (40 of 44) reported students worked with “about the same” or “fewer” faculty, whereas 88.6% (39 of 44) reported students covered “about the same” or “more” patients.

Direct-Care Hospital Medicine Faculty

Of those using DCCHS-based models, 85.7% (42 of 49) reported that hospitalists at their institutions also attended on resident services. Of those, 19 of 42 (45.2% response rate) further specified that a median of 90% (range 10%-100%) of hospitalists also attend on resident services. The majority (77.6%, 38 of 49) reported that faculty do not receive additional monetary compensation for teaching on the DCCHS.

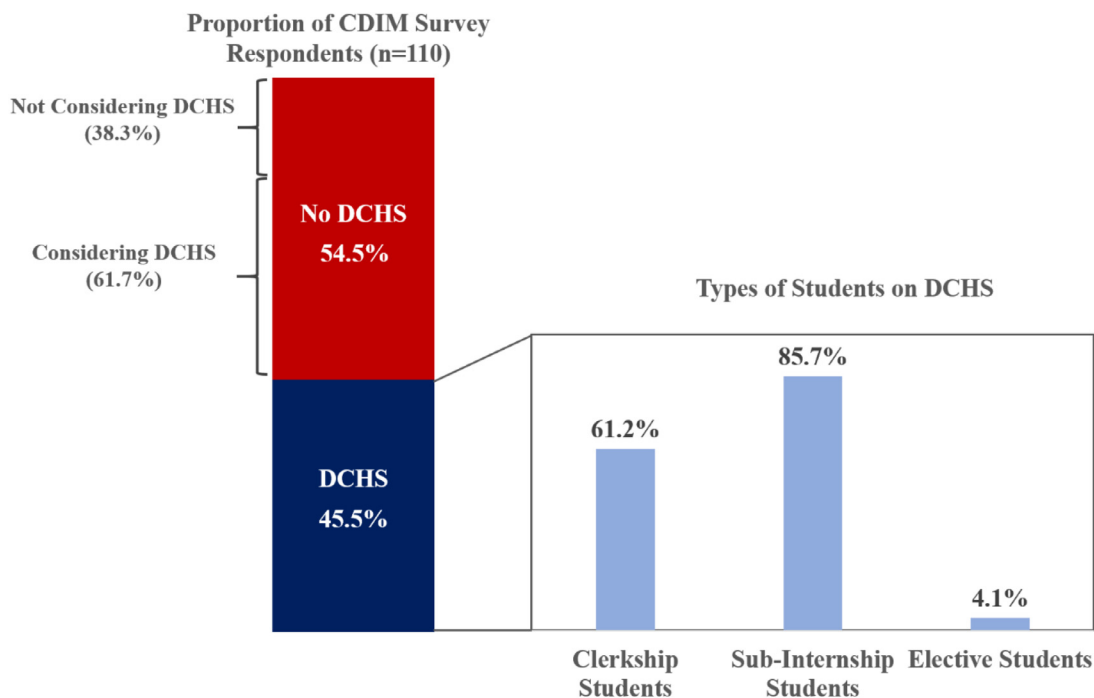


Figure 1 Clerkship Directors in Internal Medicine (CDIM) Survey Respondents Utilizing Direct-Care Hospitalist Services (DCHS) for Student Education.

Regarding meeting LCME expectations for ensuring DCHS faculty are familiar with course objectives, e-mailing or posting on an orientation site was used in 85.7% (n = 42) of cases, and faculty review at an orientation meeting was used in 59.2% (n = 29) of cases. Of clerkship directors using DCHS-based rotations, 98.0% (49 of 50) collected student evaluations of direct-care faculty. The majority (84.4%, 38 of 45) shared them with those faculty, and most (63.8%, 30 of 47) had a method for reviewing evaluations to provide faculty feedback on teaching skills.

Clerkship-Specific Direct-Care Faculty Development

Of those who reported placing clerkship students on DCHS, 70.0% (21 of 30) provided faculty development to their DCHS faculty. Faculty development was provided through in-person sessions in all cases and included online attestations in 13.3% of cases. Among respondents who provided faculty development, most (66.7%, 14 of 21) did not provide faculty development materials specific to the needs of direct-care hospitalists teaching core clerkship students.

Perceived Barriers

Clerkship directors who were considering DCHS for medical student rotations reported several barriers, with 82.4% of respondents citing lack of faculty interest, 26.5% citing lack of hospital administration support, 23.5% citing lack of departmental administrative

support, 17.7% citing no perceived need, and 14.7% citing barriers related to faculty time and caseloads. In institutions not considering DCHS for student education, having inadequate faculty resources was the most commonly identified barrier (43.5%). In addition, 43.6% (48 of 110) of all survey respondents provided short-phrase comments about perceived barriers to having students working with direct-care faculty. We identified 5 major domains for barriers (ie, health systems factors as well as clerkship/subinternship director, student, DCHS faculty, and learning environment considerations) (Table 2).

DISCUSSION

In this contemporary national study of IM clerkship directors, we found a striking rise in the percentage of clerkships placing students on DCHS from 9.0% in 2010¹ to 45.5% in 2018, with nearly two-thirds of the remaining programs considering such models. This trend may reflect the growth and success of hospital medicine in medical education delivery, coupled with changing learner and educator needs.

Reemergence of Apprenticeship Models

Notably, our results highlight a DCHS learning experience reminiscent of an apprenticeship model. In clinical apprenticeships, the clinician-teacher integrates practice with teaching and prioritizes the 1:1 apprentice-to-teacher relationship through a continuity of supervision. The apprentice constructs their

Table 2 Domains and Themes From Qualitative Analysis of 48 Clerkship Directors in Internal Medicine Member Respondents' Answer to the Question "What Barriers Do You Perceive in Having Students Work With Direct-Care Faculty?"

Major domains, themes, and subthemes	Representative quotations
Health systems factors	
<i>Clinical workload barriers</i>	
High hospitalist caseload	"It increases their workload if they don't have a reduction in clinical cap."
Productivity pressures	"Students will reduce efficiency of hospitalists and lower wRVUs."
Workload administrative burden	"Direct-care faculty feel they are too busy with paperwork to teach students."
Institution precludes using MS note for billing	"The opportunity to bill for student notes may overcome this problem."
Insufficient time to teach	"Workload is such that it does not allow adequate time for teaching."
Insufficient time to provide feedback	"The barriers are . . . the ability of faculty to acutely observe students to provide meaningful formative and summative feedback."
<i>Structural barriers</i>	
Limited space for learners on teams	"All space currently available for teaching is filled with residents and PA/NP students."
Suboptimal case-related learning	"The barriers are . . . opportunities to admit new patients not just those tucked in overnight or by an admitting hospitalist."
Oversight considerations	"The administration hired a new hospitalist section leader . . . and they got rid of the rotation." "They are not part of our general IM division, so we fear we would not be able to demand that they complete evaluations as we are not in a supervisory role."
Clerkship/subinternship director considerations	
<i>Administrative burden/funding needs</i>	
Logistical planning and funding	"Need to support the director (with protected effort) as it takes additional logistics and faculty development."
Faculty development delivery	"Instructing the individual faculty members on our student curriculum, expectations, etc."
<i>Ensuring comparable experiences</i>	
Variability of faculty teaching	"[A] student would be sure to get some good and some not-so-good teaching."
Site variability (differences in service structures)	"We had students round with our hospitalists at one clinical site but when [they] got busy they requested to not have students. We do, however, have students work with hospitalists at a second clinical site."
Inability to offer experience to all students	"[N]ot all medical students would be able to obtain this experience, setting up the potential for disparity."
Student considerations	
<i>Supervision needs</i>	
Difference in skill level of clerkship vs subinternship student	"MS-4 students generally fair a little better."
<i>Learning abilities</i>	
Self-directed learners	"Need identified students that can already work with a higher level of independence."
Struggling learners	"Not the place for a 'struggling' [MS-3]."
Capability to contribute to team	"Need for students to be contributing member of team."
DCHS faculty considerations	
<i>Teaching attitudes and aptitudes</i>	
Variable teaching interest and ability	"Our hospitalists don't want to teach." "Most of our direct care hospitalists do not teach routinely and so are less comfortable with learners."
Comparison to traditional teaching services	"[O]ur hospitalists prefer to have a . . . medicine resident act as a 'buffer'."
<i>Building a teaching cadre</i>	
Hospitalist recruitment	"[D]ifficulty of recruiting the direct care hospitalists to take on the task."
Lack of hospitalist continuity	"The barriers are . . . training of faculty with such high turnover rates."

Table 2 (Continued)

Major domains, themes, and subthemes	Representative quotations
Learning environment considerations	
Work rounds experience	"The hospitalists do not have an academic rounding structure and so students do not get the shared experience on patients they are not evaluating."
Interprofessional exposure	"Loss of having a team and more formal teaching rounds with an attending, pharmacists, other students, interns."
DCHS = direct-care hospitalist service; IM = internal medicine; MS = medical student; NP = nurse practitioner; PA = physician assistant; wRVU = work relative value unit.	

professional identity through this relationship and by building a rich patient caseload.^{10,11} Clerkship directors in this survey reported that compared to TTS, students on DCHS had exposure to a more limited set of faculty while often seeing a greater number of patients, mirroring some salient themes of apprenticeship.

DCHS and the Student

Of those using DCHS-based models for student education, programs reported pairing subinterns more than clerkship students with DCHS faculty. It is unknown what drives this trend. Possible reasons include hospital or medical school request or a perceived need to place advanced learners on DCHS. Further studies are needed to investigate whether a more advanced and presumably more autonomous learner would benefit the most from this rotation, or whether equipping the student-faculty pairs with curricular tools could mitigate any reticence in placing clerkship students on DCHS. Further studies are needed to understand how DCHS could meet the needs of an early student or a student needing remediation.

Notably, DCHS represent the only inpatient exposure for some clerkship students, with one-third of respondents reporting that students on DCHS do not have additional time working on TTS. As programs adopt this model, attention should be given to the student experience because prior research has suggested a blended experience involving both TTS and DCHS may be preferred.¹² In cases where exposure to TTS in addition to DCHS is not feasible, faculty development is critical, particularly given that students on DCHS interact with a more limited set of supervising physicians, each of whom could potentially have more impact on the student's learning trajectory given the close student-teacher relationships.

Training and Retaining DCHS Faculty

Faculty in academic medicine face increasing rates of burnout related to a myriad of competing pressures. Robust literature exists regarding prevalence of burnout in hospital medicine, with calls to prioritize institutional changes that decrease burnout and increase

faculty vitality and resilience.^{13–15} The DCHS model is distinguished from the TTS model by 1:1 teaching delivered without the assistance of residents to offload clinical care and teaching responsibilities. Thus, the DCHS teaching model may prove particularly burdensome for educators. Although a substantial overlap between faculty on DCHS and TTS was observed at most responding sites, there was variability. Further characterizing these faculty and how the two environments may impact teaching attitudes and aptitudes could help identify gaps in the support structure for DCHS faculty. This could in turn find potential opportunities for curating the optimal DCHS teaching experience.

Tailored resources should be devoted to the development and retention of direct-care faculty. First, directed investment in faculty development is needed to best equip these hospitalists with the skills, capacity, and curricula to be effective, efficient, and resilient. Unfortunately, our survey shows that 30.0% of respondents who use DCHS for student education do not provide faculty development to DCHS teaching faculty. Even among clerkships that do provide faculty development, most are generic for all teaching faculty and not specific to DCHS needs. To meet this need, we propose developing and evaluating curricula paired with faculty development that leverages the unique aspects of DCHS and coordinates the efforts of busy direct-care hospitalists. Curricula could include tailored schedules, educational handoff tools, or student-driven teaching syllabi that aim to increase predictability, decrease variability, maintain transparent communication between all team members, and allow for independent study time. Such curricular innovations could equip DCHS faculty with the skills to use limited teaching time more efficiently on targeted professional activities over the course of the rotation.

Given the high clinical and teaching pressures related to DCHS, appropriate compensation, such as a reduction in patient census, is critical to promoting long-term retention. At present, our survey additionally highlights that monetary compensation is rarely provided for this teaching role.

Barriers to Effective DCHS Student Rotation Success

Most programs that are not currently using DCHS for medical student rotations are considering them. This represents the further potential of expanding the footprint of DCHS in the medical education landscape. The survey results inform several thematic barriers to its more widespread adoption. The barriers perceived by clerkship directors varied according to whether institutions were considering DCHS for medical student education. Qualitative data analyses suggest that perceived systems factors, stakeholder considerations, and effects on the learning environment may pose obstacles to successful employment of DCHS for student education. Comparing clerkship directors' perceptions with those of key stakeholders, including practicing hospitalists, is an important next step in substantiating or refuting these perceptions and could facilitate mitigation and institutional buy-in. At large, greater focus on faculty development and provision of structural supports may lessen barriers to DCHS use.

Study Limitations

Although the survey response rate was more than 80.0% and there were no significant differences between CDIM member respondents and non-respondents, it is possible that there are other variables unaccounted for that might explain the variation in survey responses. Although most but not all accredited medical schools have CDIM representation, the results are not fully representative of the entire population of IM core clerkships as of the survey period. Further, despite the rigorous survey question development and review process, the relative newness of the survey section topic might limit the construct validity of the items in the questions. However, the results can be described as closely representative of the eligible CDIM member population as of the survey period. Experiences and perceptions were based on reported information from clerkship directors. Although they are key stakeholders in student education, this does limit insight into student, faculty, departmental, and hospital medicine leadership experiences and views. Finally, these data lack information on educational outcomes of DCHS and how they compare to TTS.

CONCLUSIONS

This national survey of clerkship directors provides a perspective on the current distribution of IM rotation student teaching models in the United States, highlighting the underrecognized widespread use of DCHS in education delivery. As programs and educators grapple with and consider this emerging teaching model, dedicated research is needed to track the experiences of students, faculty, and program directors, as well as the effect on student career selection in IM. Generic faculty

development tools and inpatient teaching curricula should be tailored to meet the needs of DCHS participants, leveraging the unique aspects of apprenticeship afforded by this model. DCHS is poised to be a predominant form of medical education for our clinical students; further study of this model and structured curricular initiatives are needed to ensure its future success. By formalizing and supporting the DCHS-based model, investing in its teaching faculty, and preparing students to thrive in such an environment, this commonly employed rotation may evolve into a successful and enduring apprenticeship model for education delivery.

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SUPPLEMENTARY DATA

Supplementary data associated with this article can be found in the online version at <https://doi.org/10.1016/j.amjmed.2020.03.016>.