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Public Health Training in Internal Medicine Residency Programs

A National Survey

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Background: The IOM recommends public health training for all physicians. Data characterizing such training of internal medicine (IM) residents are lacking.

Purpose: To describe the current state of public health education at IM residency programs, characterize programs offering public health education, and quantify interest in expanding training opportunities.

Methods: IM residency program directors from the 380 Accreditation Council for Graduate Medical Education–accredited residency programs in the U.S were invited to participate in a cross-sectional survey. Responses were received from 127 programs (33%). Data were collected July–December 2012 and analyzed in January 2013. Participants were queried on domestic public health training offered, perceived resident interest in and satisfaction with this training, and interest in expanding training.

Results: Eighty-four respondents (66%) provide some form of public health training, but structure and content vary widely. In many programs offering public health training, few residents ($<10\%$) receive it. Although 93 programs (73%) integrate public health into core curricula, only three topics were common to a majority of these programs. Sixty-six respondents (52%) offer clinical training at community-based health centers. Most residency program directors (90%) are very or somewhat interested in expanding their public health training.

Conclusions: This study characterizes the structures and content of public health training across IM residency programs. The wide range highlights the diverse definition of "public health training" used by IM residency program directors and lack of universal public health competencies required for IM physicians. Opportunities exist for collaboration among residency programs and between IM and public health educators to share best practices.

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Introduction

General internal medicine (IM) physicians play a vital role in the public health system and performing clinical aspects of the Ten Essential Public Health Services,[1] but data characterizing the formal public health training opportunities for these physicians are lacking. Over the past decade, the IOM has published four reports recommending basic public health training for all physicians, especially those practicing primary care.[2–5] In the most recent of these reports, the IOM called for funding to develop public health curricula in graduate medical education.[2] The IOM defines public health as "fulfilling society's interest in assuring conditions in which people can be healthy."[6]

The IOM further outlines a broad range of content areas pertinent to training public health professionals, including biostatistics, informatics, epidemiology, environmental health, community-based participatory research, and clinical and community preventive service provision [4,5] In 2006, the Association of American Medical Colleges (AAMC) and CDC also acknowledged the importance of public health training for residents,

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jointly funding a 5-year grant program for Regional Medicine–Public Health Education Centers (RMPHECs) to implement public health curricula within residency programs.[7]

According to the Agency for Healthcare Research and Quality, 34% of practicing primary care physicians are trained in IM.[8] Although the Residency Review Committee for IM currently requires that residents demonstrate general knowledge of "epidemiologic and social–behavioral sciences," no specific public health competencies are delineated as program requirements.[9] The Accreditation Council for Graduate Medical Education (ACGME) milestones for IM residency training include several that may be demonstrated through a well-designed public health curriculum, as illustrated in Table 1.[10]

During their training, IM residents may be exposed to the public health system through non-clinical experiences (e.g., health agency site visits, didactic sessions, or research projects) or clinical experiences (e.g., delivering patient care at health department clinics or community health centers). The published literature[11–16] in IM graduate medical education reveals several free-standing curricula that teach individual content areas related to public health, but no cross-sectional information regarding the existence and scope of public health training currently offered across all programs.

According to data from the AAMC, teaching hospitals provide a disproportionate share of health care to uninsured patients, suggesting that many IM residents may at a minimum have inpatient clinical experience that may be relevant for focused discussion around poverty, determinants of health, population health concepts, and the public healthcare system.[17] However, no published study or database reports the number of IM residency programs that offer explicit non-clinical or clinical public health training experiences.

The purpose of this study was to describe the current scope and content of domestic public health education offered at ACGME-accredited IM residency programs across the U.S., characterize traits of programs that offer public health education, and quantify program director interest in expanding public health training for their residents as well as perceived resident interest in public health education.

Methods

Using e-mail addresses from the Association of Program Directors in IM (APDIM) database, program directors from all 380 ACGME-accredited IM residency programs (including categorical and primary care programs) in the U.S. were invited to complete a survey to characterize public health training provided in IM residency programs.

Data Collection

Program directors were e-mailed a link to the online survey in June 2012. Non-participators were sent up to three follow-up e-mails over the subsequent 6-month period. Web-based searches revealed updated contact information for program directors whose e-mails returned undeliverable. Non-responding programs were contacted by phone once to confirm contact information and remind them to participate if they had not already done so. All responses were collected from June to December 2012 and data were analyzed in January 2013. There were no financial incentives to participate.

A review of the published literature revealed no suitable survey tools; a study in the pediatrics literature reporting the frequency of global health training among pediatrics residencies served as a partial template for the survey design.[18] The survey tool was

Table 1. Accreditation Council for Graduate Medical Education internal medicine milestones pertinent to a public health curriculum

Patient care (PC)	Develops customized, prioritized care plans for the most complex patients, incorporating diagnostic uncertainty and cost-effectiveness principles (PC2)
Medical knowledge (MK)	Possesses the scientific, socioeconomic, and behavioral knowledge required to successfully diagnose and treat medically uncommon, ambiguous, and complex conditions (MK1) Understands the concepts of pretest probability and test performance characteristics (MK2)
Practice-based learning and mimprovement (PBLI)	Uses common principles and techniques of quality improvement to continuously improve care for a panel of patients (PBLI2) Is able to lead a quality improvement project (PBLI2)
Interpersonal and communication skills (ICS)	Models cross-cultural communication and establishes therapeutic relationships with persons of diverse socioeconomic backgrounds (ICS1)
Professionalism (PROF)	Role models consistent respect for patient's unique characteristics and needs (PROF3)
Systems-based practice (SBP)	Teaches patients and healthcare team members to recognize and address common barriers to cost-effective care and appropriate use of resources (SBP3) Actively participates in initiatives and care-delivery models designed to overcome or mitigate barriers to cost-effective, high-quality care (SBP3)

designed by two IM physician faculty members and one IM resident with master's-level education in public health using information from the IOM reports[4,5] and competencies for medical students recommended by RMPHECs,[19] augmented by a literature review of active GME-level curricula.[11–15] The survey was reviewed by an external cross-institutional panel of four IM physicians with experience in teaching public health to medical professionals, and their input was incorporated in the final version of the survey.

The survey consisted of 43 questions delivered using the SurveyMonkey® website (www.surveymonkey.com; see Appendix for full survey). Given the breadth of the IOM's definition of public health[6] and the far-reaching content areas that could be included in a public health curriculum for physicians, for the purposes of this survey, domestic public health was explicitly defined as population health, community health, health disparities, social determinants of health, health care for the underserved, health care for vulnerable populations, community-oriented primary care, health systems, and health policy.

This definition was used in order to minimize false-positive responses. Preventive health, epidemiology, and biostatistics training were excluded from our study because these content areas are ACGME requirements for all IM residents and are tested on the U.S. Medical Licensing Examination.

Participants were asked about the following demographic characteristics of their programs: categorical versus primary care, number of residents, training facility setting, and location. The survey queried whether programs offered a special educational track in the following areas: public/community/population health, urban health, rural health, or a primary care track emphasizing public health, and the percentage of their residents in these tracks. Participants were asked which, if any, public health topics were integrated into program core curriculum or offered as part of an elective curriculum.

Participants were asked whether they offered longitudinal or short-term clinical training at a community-based health center. For any program reporting non-clinical or clinical public health training, rate of resident participation was queried. The survey also assessed program director interest in expanding public health training, as well as program director perception of residents' satisfaction with, and interest in, public health training.

Participants were invited to submit information for inclusion in a publicly available online database of public health training opportunities in IM residency programs. Participation was optional.

Statistical Analysis

Percentages of participant responses were calculated for questions regarding program characteristics, types of public health training opportunities, public health topics taught, perceived resident interest in public health, and program director interest in expanding public health training. Missing responses to any particular question were excluded from data analysis for that question.

Programs were categorized into two groups based on whether they offered "some" versus "no" public health training. "Some" public health training was defined as either offering a special educational track related to public health, a non-clinical public health elective rotation, or short-term or longitudinal clinical training at a community health center. Fisher's exact tests were performed (SAS, version 9.2) to test for correlation between the above groups and primary hospital setting, location, categorical versus primary care, perceived resident interest in and satisfaction with public health training, and program interest in expanding public health training, respectively.

This study was declared exempt by the George Washington University IRB.

Results

Of the 380 IM programs that were invited to participate, 127 (33%) returned surveys. Respondents included directors from 112 categorical programs and 16 primary care programs, with one survey respondent indicating both program types. Program characteristics are outlined in Table 2. Respondents were representative of all IM programs when characteristics of survey respondents were compared to aggregate data available from Fellowship and Residency Electronic Interactive Database (FREIDA; Table 2).[20] Overall, 34% of participating programs offered no public health training.

Within categorical programs, 7% (8/112) offered public health, population health, or community health special educational tracks; 3% (3/110) offered rural health tracks; 3% (3/110) offered urban health tracks; and 17% (18/109) offered primary care tracks, of which 50% (9/18) reported emphasizing public health. Within primary care programs, 56% (9/16) reported emphasizing public health.

Seventy-three percent (90/123) of all programs reported that public health was integrated into the core curriculum, comprising 72% (78/108) of categorical programs and 80% (12/15) of primary care programs. In addition, 31% (38/123) of all programs offered a non-clinical elective public health rotation, including 27% (29/108) of categorical programs and 60% (9/15) of primary care programs. Table 3 lists topics included in core and elective curricula and their frequencies.

Clinical training at community health sites was reported in 52% (66/124) of IM residency programs (Figure 1). Of these programs, 55% (36/66) offered longitudinal experiences and 82% (54/66) offered short-term experiences, each with varying degrees of resident participation.

Categorical programs were more likely than primary care programs to offer no explicit public health training ($p<0.001$). Ninety-seven percent of programs that offered no public health training were categorical. There was a strong association between primary hospital setting and public health training ($p<0.001$); university hospital programs were more likely to offer public health training (83%, 39/47), followed by community hospitals (64%, 7/11) and university-affiliated community

Table 2. Characteristics of respondents versus all Accreditation Council for Graduate Medical Education–accredited programs in the American Medical Association Graduate Medical Education database, %

Program characteristic	FREIDA database	All programs (*n*=127)	Categorical (*n*=112)	Primary care (*n*=16)
Number of residents[a]				
≤30	22.0	21.3	17.9	43.8
31–50	31.0	29.1	27.7	43.8
>50	46.0	49.6	54.5	12.5
Primary training hospital setting				
University hospital	34.0	36.2	33.9	56.3
Community hospital	12.0	8.7	9.8	0.0
Community hospital University affiliated	51.0	47.2	49.1	31.3
Military hospital	N/A[b]	3.2	3.6	0.0
Other[c]	N/A[b]	3.9	3.6	12.5
Location				
Urban	N/A[b]	74.8	73.2	81.3
Suburban	N/A[b]	21.3	23.2	12.5
Rural	N/A[b]	3.9	3.6	6.3

[a]Number of residents includes total residency positions through all years of training.
[b]Data not available from Graduate Medical Education Database (FRIEDA).[20]
[c]Qualities of "other" primary training hospital setting were not elicited in the survey.
FREIDA, Fellowship and Residency Electronic Interactive Database; N/A, not applicable

hospitals (54%, 34/63). All responding military-affiliated programs (*n*=4) reported no public health training.

Only 4% of program directors believed that a majority of their residents had significant interest in public health, whereas 42% reported that a majority of their residents had little or no interest in public health (Figures 2A and B). Programs that offered no public health training were more likely than those offering some form of public health training to report that <10% of their residents have a significant interest in public health (p=0.022).

Regarding perception of resident satisfaction, 69% (80/116) of all program directors believed residents were somewhat satisfied with public health training in their IM residency programs, with only 2% (2/116) of program directors believing residents are unsatisfied (Figure 2C). There was no association between whether a program offered public health training and perceived resident satisfaction with offered public health training (p=0.79).

Overall, 92% of program directors were very or somewhat interested in expanding public health training. Interest varied between categorical and primary care programs (Figure 2D). Programs offering no public health training were more likely than those offering some training to be uninterested in expanding training offerings, and were less likely to be very interested in doing so (p=0.028).

Discussion

This cross-sectional national survey of IM categorical and primary care program directors is the first published description of how public health training is integrated within IM training across U.S. residency programs. Our findings reveal that most programs (66% of survey respondents) provide some form of public health training, but structure and content vary widely. This study did not identify the factors that determine how programs establish public health training curricula, but previous publications outlining individual electives at various institutions suggest that these training opportunities arise from a combination of institutional missions, faculty interest, resident interest, program location, program recruitment strategies, and available funding opportunities.[11,12,21,22]

At most programs that offer public health training, only a select group of residents receive it. Twelve of 13 categorical programs that offered public health educational tracks stated that less than 10% of their residents participated. Similarly, although the majority of respondents reported clinical training opportunities at community-based health centers, participation by less than 10% of residents was reported more frequently than participation by more than 50% of residents. We hypothesize that participation may be determined by resident interest, limitations of resident schedules, and availability of public health and community partners.[12,14–16]

Among programs that offered public health training as part of their curricula, content varied widely. Of the respondents that reported integrating public health topics into their core curricula, most covered the U.S. healthcare system, health policy, and "community resources for the uninsured/underinsured. No single

Table 3. Curricular topics covered by programs reporting public health incorporation into core and elective curricula, %

Curricular topic	Core curriculum[a]			Elective curriculum[b]		
	All program (*n*=93)	Categorical (*n*=78)	Primary care (*n*=15)	All program (*n*=93)	Categorical (*n*=78)	Primary care (*n*=15)
The U.S. healthcare system	67.7	68.0	66.7	11.8	31.0	13.3
Community resources for the uninsured/underinsured	54.8	56.4	46.7	14.0	37.9	13.3
Health policy	55.9	55.1	60.0	16.1	41.4	20.0
Health advocacy	36.6	35.9	40.0	10.8	27.6	13.3
Community-oriented primary care	22.6	24.4	13.3	8.6	24.1	6.7
Community-based health interventions	19.4	21.8	6.7	11.8	31.0	13.3
Federally qualified health centers	12.9	12.8	13.3	11.8	20.7	33.3
Health disparities	11.8	0	73.3	21.5	55.2	26.7
Social determinants of health	7.5	0	46.7	15.1	37.9	20.0
Community needs assessment skills	6.5	5.1	13.3	7.5	20.7	6.7
Public health workforce development	5.4	6.4	0	4.3	6.9	13.3
Public health agencies (local/state/federal)	4.3	0	27.7	20.4	48.3	33.3
Community vital statistics/epidemiology	4.3	0	27.7	12.9	27.6	26.7

[a]Other core curriculum topics identified by individual programs include health literacy, tuberculosis, global health, health systems, and medical–legal partnerships for patient advocacy (one program gave each response).
[b]Other elective curriculum topics identified by individual programs include resident-chosen topics at the New York City Department of Health, rotation with an infectious disease expert at the Minnesota Department of Health, school-based health, and "sexually transmitted diseases, tuberculosis and HIV care in the urban medically underserved population" (one program gave each response).

other topic was taught by more than 40% of programs. Of the respondents that reported elective training in public health, no one topic was taught by more than 22% of programs. Although none of the categorical programs included health disparities or social determinants of health in their core curricula, they were the most popular topics offered in elective opportunities.

It is unclear if the particular topics taught in a public health curriculum were dictated by faculty champions, overall resident interest, the interests of small groups of residents, or institutional missions and how they may have evolved over time within programs. This wide range of content reflects the broad public health content areas recommended by the IOM[4–6] and highlights the lack of a universally accepted set of public health competencies required for IM physicians.

Since the administration of this survey, Kaprielian et al.[23] have suggested a curricular roadmap organizing the skills and knowledge needed for population-based care and health improvement for medical students, physician assistant students, and family medicine residents. This framework may serve as a catalyst for interested IM educators; it remains to be seen how this may impact overall IM training.

In the absence of public health training guidelines or requirements for IM physicians, each residency program is free to determine whether or not to teach public health content and to select its own curricular focus. This study suggests that the availability of public health training within programs is reinforced by residency program directors' views.

The vast majority of program directors think their residents are satisfied with their public health training, regardless of whether their program offers it. Most directors of programs that do not currently provide public health training believed that the majority of their residents have little to no interest in receiving it, and they were less likely to be interested in expanding the public health training they offer.

By contrast, directors of programs that currently offer some degree of public health training were more likely to be interested in expanding that training. Although more than 40% of program directors believed that the majority

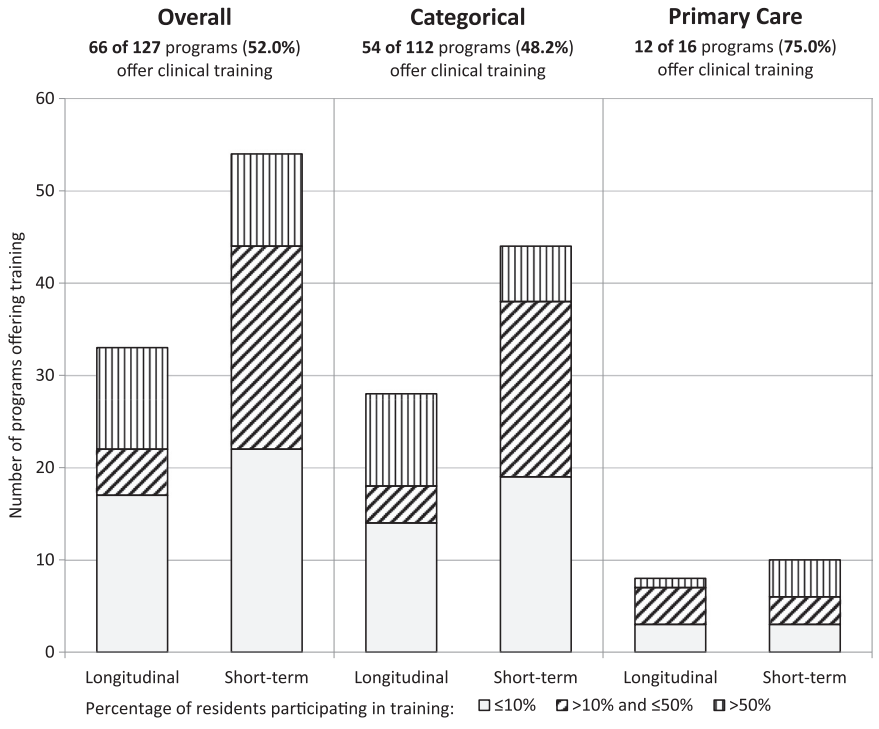

Figure 1. Clinical training opportunities at community health centers and resident participation.

of their residents had little or no interest in learning about public health, no published study of resident interest exists. Further research is needed to determine whether the supply of public health training opportunities adequately meets resident demand.

Although this study is the most complete characterization of public health training across IM residency programs to date, it has several limitations. First, the challenge of concisely and completely defining public health in the absence of accepted competencies has already been discussed. Second, the survey response rate was 33% despite attempts to maximize participation.

There may be several reasons for this, including the initial e-mail being sent in June when program directors are orienting new interns, the prioritization of other curricular components over public health, perhaps introducing nonparticipation bias, and that electronic surveys are impersonal and easily ignored. This response rate is consistent with a usual response rate of 37% that has been reported elsewhere for electronic surveys.[24]

Third, the prevalence of public health training and interest in expanding this training may be over-reported because of selection bias of respondents. Fourth, all data were self-reported, possibly resulting in social desirability bias. It is notable that although nearly three-quarters of programs reported incorporating public health into their core curricula, the majority did not identify specific public health topics included in their curricula.

Further study is needed to examine how program directors' own public health training or professional experience may influence their interest in expanding training or their perceptions of residents' views. Another interesting area for further study is whether an association exists between IM residency programs offering public health training and affiliation with a university that contains a public health school.

In an environment of accountable care organizations, patient-centered medical homes, and payment reform, clinical competency in public health will be paramount. In response to the numerous calls to integrate public health training into IM residency, this study suggests a strong interest among a subset of residency program directors to expand public health training opportunities for IM residents; nearly 90% of survey respondents stated they were either very interested or somewhat interested in expanding their program's public health training. To support this expansion, a common definition of public health to be used by IM educators must be established to subsequently drive the development of core public health competencies expected of all graduating IM residents.

Further study is needed to determine and share best practices in curriculum design and implementation. Although some ACGME milestones, as outlined in Table 1, may be achieved through public health curricula, they are nonspecific and do not clearly map to the Ten Essential Public Health Services. We believe that the creation of specific public health competencies for IM residents may drive increased availability and uniformity of public health training. Building bridges between public health schools and IM residency programs where they exist on the same medical campuses may be an appropriate first step and might allow for tailoring curricula to local resources and needs.

We used additional information collected from this survey to create a directory of public health training opportunities within IM residency programs (now available through the Society of General IM website at www.sgim.org/career-center/public-health-training-directory).

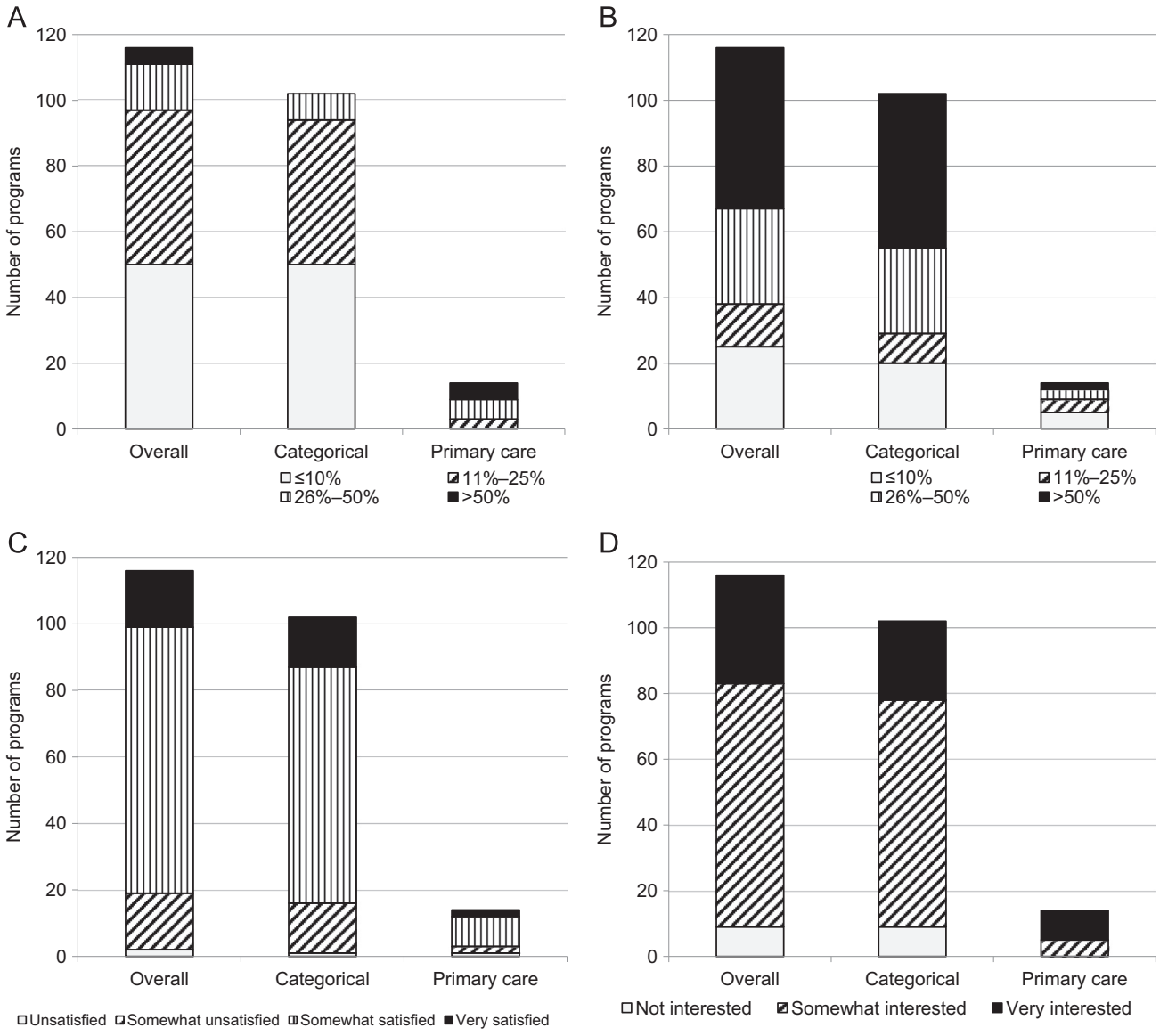

Figure 2. (**A**) Percentage of residents perceived to have significant interest in public health training. (**B**) Percentage of residents perceived to have little or no interest in public health training. (**C**) Perceived resident satisfaction with public health training. (**D**) Program interest in expanding public health training.

We hope that this directory will serve as a resource for medical students and residents seeking training opportunities and for faculty seeking colleagues at different institutions with whom to share best practices for designing and implementing successful public health curricula.

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Appendix

Supplementary data

Supplementary data associated with this article can be found at http://dx.doi.org/10.1016/j.amepre.2014.07.024.