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Advanced practice providers in the infectious disease workforce: A nationwide utilization survey

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ABSTRACT

Background: Shortages of infectious disease (ID) physicians is an identified workforce problem. The COVID-19 pandemic has exacerbated this care gap, leaving many communities without access to an ID physician. More advanced practice providers (APPs), specifically nurse practitioners and physician assistants, work as healthcare extenders, yet are not well described in ID.

Purpose: Evaluate collaboration between ID physicians and APPs, and potential barriers to utilization of APPs.

Methods: Anonymous and voluntary surveys; one for physicians, another for APPs. We collected experience, practice setting, familiarity regarding APPs in ID, use of APPs, and perceived barriers/concerns for utilization of APPs.

Discussion: Nationwide, 218 ID physicians and 93 APPs in ID responded. 71% (155) of ID physicians use APPs. Of APPs, 53% (49) had >5 years ID experience. Responses highlighted opportunities for dedicated ID education, collaboration, and clarification of practice scope.

Conclusion: APPs are an experienced group who provide ID care, working alongside physicians to meet ID workforce needs.

1. Introduction

Recent shortages of Infectious Disease (ID) fellowship applicants and practicing ID physicians is a challenge recognized by the ID workforce and the Infectious Diseases Society of America (IDSA).1-3 While ID consultations are associated with optimal patient care, including lower mortality rates and shorter length of hospital stays,4 the physician subspecialty group providing this care is shrinking. The COVID-19 pandemic has exacerbated this care gap, leaving many healthcare systems and communities without access to an ID physician during this critical time.5

Advanced practice providers (APPs), including nurse practitioners and physician assistants, are healthcare providers practicing within a multitude of medical and surgical specialties as care extenders often integrated into medical teams. In recent years, more sub-specialties are employing APPs, though little is known about the utilization of APPs in ID clinical practice.6 Although APPs have been utilized in ID, their clinical scope, roles, and training specifically within this specialty remain ill-defined.7

While APPs can act as independent providers to evaluate patients in person or through telehealth, interpret labs, order imaging, prescribe medications, and provide continuity of care for patients with infectious disease complications, collaboration with ID physicians is also not well documented. To better understand the current landscape of APPs working in ID, we created two surveys to evaluate collaboration between physicians and APPs, and any potential barriers that may exist to utilization of APPs within the ID field.

2. Methods

We developed Institutional Review Board (IRB) exempt, anonymous and voluntary surveys created using a REDCap data collection tool.8 One survey was directed to ID fellowship trained physicians and the other directed to APPs working in ID. Surveys were launched concurrently,
and distributed by social media, key stakeholder emails to physicians established in the ID community, former ID fellows, other contacts at large academic institutions, and IDSA online community forums. The survey period was from 12/1/2019-1/31/2020. For physician respondents, we recorded demographics, ID practice setting, familiarity regarding APPs working in ID, current use of APPs, and perceived barriers/concerns for utilization of APPs. From APP respondents, we collected demographic information, practice setting, years of experience as an APP in ID, and perceived barriers/concerns practicing in ID.

3. Results

3.1. Physician survey

In total, 218 ID physicians participated in the survey across all geographic regions of the United States, with the largest portion, 63 (29%) in the west (Fig. 1). Physicians self-reported providing many types of sub-specialty ID care (Table 1). Physicians work setting included 104 (48%) in a university or academic medical center, 80 (37%) in hospital or clinics, 28 (13%) in private practice, and 6 (2%) in other settings. Among 218 physician respondents, 155 (71%) report use of APPs in their ID practice. Of those physicians currently utilizing APPs, 84 (54%) work a university or academic medical setting, 50 (32%) in a hospital or clinic setting, 20 (13%) in private practice, and 1 (1%) in other setting. Geographic distribution of the 155 physicians currently utilizing APPs include, 42 (27%) in the south, 40 (26%) in the west, 35 (23%) in the midwest, 33 (21%) in the northeast, and 5 (3%) no response. Overall, 81 (37%) indicated they were very familiar, and 79 (36%) extremely familiar with APPs working in ID. In addition, 142 of 218 total physician respondents answered questions (n = 76, no response) regarding APP utilization, 81 (57%) reported no concerns with the utilization of APPs in ID (Table 1). Reasons for not utilizing APPs in ID practice were primarily centered around educational gaps.

3.2. APP survey

93 APPs who self-reported working in ID responded to the survey with a geographic distribution comparable to physicians (Fig. 1). The sub-specialty care ID APPs provided was similar to the ID physician responses with the majority of APPs working in outpatient Adult ID 49 (53%), but also in a variety of settings including outpatient parenteral antimicrobial therapy (OPAT), infection control, and inpatient roles (Table 1).

Self-reported number of years of experience working in ID specifically as an APP were as follows: 1% (n = 1) no response, 14% (n = 13) with 1 year, 32% (n = 30) with 2–4 years, 24% (n = 22) with 5–9 years, 11% (n = 10) with 10–15 years, and 18% (n = 17) with over 16 years. APPs reported practice barriers primarily focused around lack of formal ID specific educational opportunities. Other barriers included: 35 (38%) APPs reported misunderstanding concerning their scope of practice, 27 (29%) of APPs were not recognized as peers, and 22 (24%) of APPs reported not being used at top of licensure (Table 1).

4. Discussion

Infectious Disease APPs are an experienced practice group who provide ID care in a multitude of settings, working alongside physicians to meet the current needs of the ID workforce. Highlighted in our data are also important practice areas where APP use could be further expanded include, antimicrobial stewardship, infection control, clinical research, and other areas where APPs are used less frequently but are vital to patient care. Certain needs were notable from the survey results, including specific, directed educational opportunities, demonstrated in both the physician surveys and the APP surveys. APPs noted that often their role was misunderstood and that they were not utilized at the top of their licensure, or in a space wherein they had little additional support from collaborating physicians.

Our surveys suggest educational gaps are a concern to both ID physicians and APPs. Many of the perceived barriers to APP utilization in ID practices appear to be linked to lack of formal ID education. APPs often experience “on the job training” once hired, but this can be challenging for practicing physicians. This suggests an opportunity for more formal resource development and structured APP specific ID education. One healthcare system has successfully created APP ID fellowships, with structured didactics followed by clinical rotations where APPs are paired with physicians in ID that could serve as models for such education. Academic centers, particularly those with formal ID physician fellowships, could structure standardized training that could be modified to provide clinically directed programs for APPs providing both a broad overview, and specific areas of focus (e.g. Human Immunodeficiency Virus [HIV] care). Other hospital systems have formed fellowship programs for internal medicine specialties, noting cost savings and a mechanism for hiring experienced APPs already familiar with their organization and patient population.

Several groups have described the value of APPs within ID. The University of Pittsburgh described such expansion with APP additions to their OPAT Program, and demonstrated successful reduction in 30-day readmissions from 14.7% down to 9.6%. The addition of APPs also allowed for expansion of follow-up care from 29.5% to 39.3% for their OPAT population. Similarly, the University of Texas MD Anderson Cancer Center also described their expansion of APP services on their immunocompromised ID service, noting a 48% increase in inpatient consults, and 74% increase for outpatient consults from 2006 – 2009. In our survey 16 (11%) of physicians were concerned about loss of physician revenue, however as seen in this study, the addition of an APP increased consults and visits, resulting in higher revenue stream. Of note, this group also concurrently formed a tailored educational program for APPs, and provided “on the job training” for their newly hired
Table 1
Perceived barriers/concerns of ID physicians and APPs.

| Survey Responses | n (%)         |
|------------------|--------------|
| **Physician ID Practice type** | n = 218 (%) |
| Inpatient Adult ID | 185 (85%)    |
| Outpatient Adult ID | 162 (74%)    |
| HIV Outpatient care | 152 (70%)    |
| HIV Inpatient care | 137 (63%)    |
| Clinical Education | 132 (61%)    |
| Antimicrobial Stewardship | 131 (60%)    |
| OPAT | 128 (59%) |
| Clinical Research | 111 (51%) |
| Infection Control | 104 (48%) |
| Transplant ID | 83 (38%) |
| Travel Medicine | 79 (36%) |
| Infusion Center | 38 (17%) |
| Pediatric ID | 26 (12%) |
| Other | 4 (2%) |
| **Physician reported reasons/concerns for not utilizing APPs** | n = 142 (%) |
| No concerns | 81 (57%) |
| No standardized ID specific training | 22 (15%) |
| Practice has sufficient staffing | 19 (13%) |
| Amount of time training would take | 17 (12%) |
| Loss of physician revenue | 16 (11%) |
| Not comfortable providing job training | 12 (8%) |
| Legal (malpractice) ramifications | 11 (8%) |
| Concerned about proper billing | 10 (7%) |
| Do not feel equipped to provide oversight | 7 (5%) |
| **Other reasons (Open End Responses)** |               |
| Knowledge gaps | 6 (4%) |
| Lack of funding | 4 (3%) |
| Lack of weekend/call coverage | 4 (3%) |
| Decision made by other administration | 3 (2%) |
| In process of hiring APP | 2 (1%) |
| **APP ID Practice Type** | n = 93 (%) |
| Outpatient Adult ID | 49 (53%) |
| Inpatient Adult ID | 47 (51%) |
| HIV Outpatient care | 37 (40%) |
| OPAT | 24 (26%) |
| Clinical Research | 21 (23%) |
| Antimicrobial Stewardship | 20 (22%) |
| Transplant ID | 19 (20%) |
| HIV Inpatient care | 15 (16%) |
| Travel Medicine | 14 (15%) |
| Pediatric ID | 13 (14%) |
| Clinical Education | 13 (14%) |
| Infection Control | 8 (9%) |
| Infusion Center | 8 (9%) |
| Other | 8 (9%) |
| **APP reported barriers to practicing in ID sub-specialty** | n = 93 (%) |
| Lack of formal ID education and training | 53 (58%) |
| Misconceptions about APP practice scope | 35 (38%) |
| Not recognized as a peer | 27 (29%) |
| Isolation within the group | 26 (28%) |
| Not being used at top of licensure | 22 (24%) |
| N/A | 20 (22%) |
| Lack of physician support for complex cases | 8 (9%) |
| Other | 5 (5%) |

Abbreviations: ID, Infectious Disease; APP, Advanced Practice Provider; HIV, Human Immunodeficiency Virus; OPAT, Outpatient Parenteral Antimicrobial Therapy.

*Only 142 of the total 218 physician respondents answered the survey question about concerns with APP utilization.

Physicians and APPs.

A more recent publication from University of Pittsburgh Medical Center highlights the benefits of APP inclusion in multiple specialties through interprofessional collaboration, formal APP educational fellowships, and APP mentoring programs. Their system initially employed 129 APPs in 2016, with an increase to 208 APPs in 2019. Patient scheduling access increased by 55% for new patients with concurrent identification of specific patients an APP could see independently, allowing for increased productivity in their ambulatory facility. Furthermore, development of formal physician(APP mentorship programs provided teaching, support, and direct feedback.

A limitation for our study includes the voluntary and anonymous nature of the surveys dispersed through key stakeholder emails and social media. Potential bias towards those physicians working with APPs may be represented as those physicians may have been more likely to complete the survey. We may not have captured other reasons for not utilizing APPs in ID practice given the small number of physicians who did not report using APPs in practice. A limited number of survey respondents from certain geographic locations may be represented. Therefore, this data may be not be representative of all healthcare systems or practice plans.

5. Conclusion

Physician and APP collaboration within ID is likely to expand with the current strains on the workforce. With the 2020–2024 strategic initiatives of IDSA including the growth and development of the ID workforce, inclusion of APPs can help to support this medical specialty to continue to provide high quality patient care and expand opportunities to care for our communities. Focused efforts within IDSA to develop APP mentorship and educational opportunities could contribute to continued ID workforce advancement in the future. As we have seen over the past year, continued need for ID providers has been amplified by the COVID-19 pandemic. Ongoing interprofessional collaboration between physicians, APPs, and other clinicians will be necessary to provide team-based, high quality patient care within ID well into the future.

Declaration of competing interest

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