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Infectious diseases experts:
**AMERICA'S
LINK BACK
TO EVERYDAY
LIFE**

AMERICA'S LINK BACK TO EVERYDAY LIFE

INFECTIOUS DISEASES EXPERTS

When businesses, schools, houses of worship and other institutions were forced to shutter abruptly or adapt to rapidly changing circumstances at the beginning of the COVID-19 pandemic, millions of lives and livelihoods were upended.

How can America's frontline hospital workers be protected from infection? How should hospitalized patients be treated? How soon will a vaccine be developed? How can airline passengers fly safely? What should schools and daycare centers do? Do masks curb infection?

Questions like these and so many others from individuals and local, regional and national institutions demanded quick, accurate answers.

From the first reported case of COVID-19 until today and beyond, infectious diseases experts — including physicians, scientists and public health experts — have charted a path to wellness and normalcy through the dark forest of the pandemic.

The story of infectious diseases experts untangling COVID-19 is one of remarkable service, perseverance, complexity and dexterity. These professionals skillfully, patiently and thoughtfully answered America's call for answers with facts, science, commitment and compassion, in addition to care in the clinic and at the hospital bedside. Their training and preparation guided Americans through the pandemic and helped people begin to get back to everyday life in a world forever changed. They have undertaken this burden with an altruism and sense of purpose characteristic of the specialty, despite personal health risks and lives upended by

the pandemic and its response. Infectious diseases professionals continue this important work, providing expertise learned earlier in the pandemic to inform responses to present-day and future challenges.

Infectious Diseases Experts: America's Link Back to Everyday Life chronicles infectious diseases professionals' experiences mobilizing quickly and working doggedly to mitigate the virus's spread, save lives, provide essential public information and strengthen the public health infrastructure.

This report — a joint collaborative effort between the Infectious Diseases Society of America and the Johns Hopkins Center for Health Security — captures just how valuable infectious diseases professionals are to America's health care system and society and sheds light on critical policies needed to ensure they are well positioned to help America for decades to come. We invite you to learn more.

Sincerely,



Daniel P. McQuillen, MD, FIDSA

President
Infectious Diseases Society of America
Senior Physician
Beth Israel Lahey Health
Lahey Hospital & Medical Center
Assistant Professor of Medicine
Tufts University School of Medicine
Burlington, MA



Tom Inglesby, MD

Director
Johns Hopkins Center for Health Security
Professor
Johns Hopkins Bloomberg School of Public Health
Joint Appointment, Medicine
Johns Hopkins School of Medicine

PREFACE

The COVID-19 pandemic has revealed the critical contributions that infectious diseases (ID) experts make in responding to pandemics, including within hospitals, public health departments and the broader community. It has also revealed the importance of strengthening the ID workforce as a central component of pandemic preparedness and the delivery of high-quality health care.

The purpose of this report is to document the many varied COVID-19 response activities conducted by ID experts from across the United States — from caring directly for patients to conducting clinical trials to consulting on local, state and federal policies — and to highlight what policies are needed to strengthen the ID workforce moving forward.

The report is a joint collaborative effort between the Infectious Diseases Society of America and the Johns Hopkins Center for Health Security. It was informed using data collected through a quantitative survey and qualitative interviews with ID experts from across the country, including rural and urban areas, and from ID experts working across practice settings. The full methodology used can be found at the end of the report.

AUTHORS

Amesh Adalja, MD

Senior Scholar
 Johns Hopkins Center for Health Security
aadalja1@jhu.edu

Amanda Jezek

Senior Vice President, Public Policy &
 Government Relations
 Infectious Diseases Society of America
ajezek@idsociety.org

Diane Meyer, RN, MPH

Senior Analyst
 Johns Hopkins Center for Health Security
dmeyer10@jhmi.edu

CONTRIBUTORS

Elena Martin, MPH

Analyst
 Johns Hopkins Center for Health Security

Matthew Watson

Senior Analyst
 Johns Hopkins Center for Health Security

Kaleem Ahmid, MPH

Visiting Scholar
 Johns Hopkins Center for Health Security

Andrea Weddle

Executive Director
 HIV Medicine Association

Dana Wollins

Vice President, Clinical Affairs &
 Practice Guidelines
 Infectious Diseases Society of America

Paul Skowronek

Senior Vice President
 McCabe Message Partners

EXPERT ADVISORY GROUP

Virginia Dee Banks, MD

IDSA George Counts Interest Group Member
 Northeast Ohio Infectious Diseases Associates

Teena Chopra, MD

IDSA Quality Improvement Committee Member
 Detroit Medical Center

Mary Foote, MD, MPH

IDSA Public Health Committee Member
 NYC Dept. of Health and Mental Hygiene

**Rachel Bender Ignacio,
MD, MPH**

HIVMA Board Member
 University of Washington

Jeanne Marrasso, MD

IDSA Treasurer
 University of Alabama, Birmingham

Jaan Natkin, MD

IDSA Clinical Affairs Committee Member
 Lehigh Valley Physician Group

Liise-anne Pirofski, MD

IDSA Research Committee Vice Chair
 Albert Einstein College of Medicine and
 Montefiore Medical Center

Tina Tan, MD

IDSA Inclusion, Diversity, Equity and
 Access Committee Chair
 Northwestern University

Julie Vaishampayan, MD, MPH

IDSA Public Health Committee Chair
 Stanislaus County Health Dept.

AN ESSENTIAL PART OF THE ID RESPONSE FOR CARE PROVIDERS

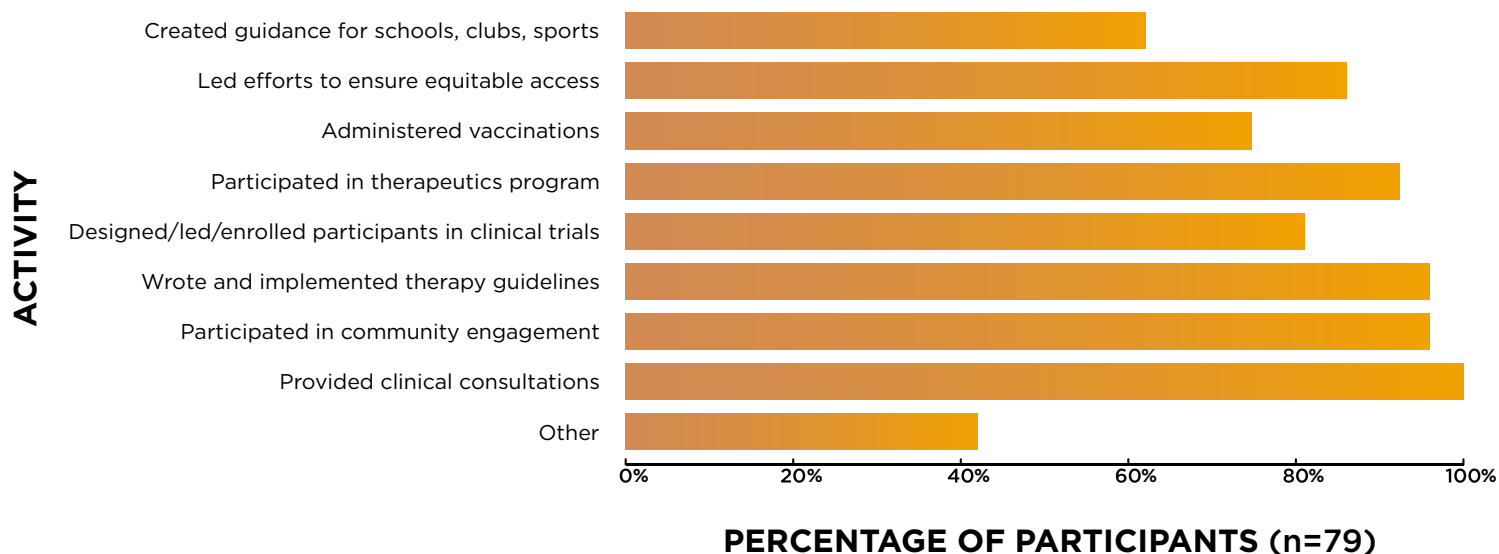
PROTECTING PEOPLE & SAVING LIVES

Infectious diseases experts led lifesaving safety and treatment protocols as essential collaborators with hospital and clinical leadership.

Infectious diseases experts put their unique education and training to use during the COVID-19 pandemic in a multitude of meaningful ways that kept people safe and prevented deaths. A survey of hospital epidemiologists, ID division chiefs and pediatric ID division chiefs found that more than 70% of respondents pursued seven or more pandemic response activities listed below (**Figure 1**) in their hospital or clinical setting.

All respondents reported clinical consultations with patients with suspected or confirmed COVID-19. Other activities included community engagement, such as town halls and media interviews (96.0%); writing, revising or implementing therapy guidelines (96.0%); leading or administering therapeutics (92.4%); leading efforts to ensure equitable access to COVID-19 vaccines, diagnostic tests or treatments (86.1%); designing, leading or enrolling patients in clinical trials (81.0%); participating in local or state vaccination programs (74.7%); and contributing to guidance for schools, clubs or recreational sports (62.0%). ID experts also conducted clinical case investigation and contact tracing, advised hospital staff and participated on their institution's incident command team.

FIGURE 1. Institutional contributions of ID clinicians, fellows and faculty



“I was involved in several other aspects of COVID-19, including treatments, monoclonals, ID meds, vaccines, awareness, protocols, policies, the whole gamut.”



ID physicians and other ID experts interviewed for this paper stated that ID professionals working in clinical environments took on many additional roles in their hospitals or clinics during the pandemic.

Such roles, including caring for extremely large numbers of acutely ill patients, extended far beyond the scope of their usual activities such as clinical, laboratory and infection control responsibilities.



Another key activity ID experts undertook was translating continuously evolving state, federal or professional society COVID-19 guidance for local efforts to treat, test, isolate and quarantine patients and properly use personal protective equipment. Most participants (72.2%) reported that they spent more than 20 hours a week on these activities, and more than half (58.2%) were not offered any additional compensation for this work. This scenario indicates that health care facilities were not appropriately staffed or resourced to accommodate the increased workload necessary to respond to the pandemic and instead relied upon existing staff to absorb considerable additional work on a volunteer basis. [In a country where 80% of counties have no infectious diseases specialist and many others have less than the national average \(Walensky and McQuillen\)](#), this is an unsustainable model that results in further burnout and gaps in our health care system’s preparedness and response infrastructure.



Infectious diseases experts were heavily integrated into health care systems’ emergency management systems. While the pandemic response required intense involvement from critical care and emergency medicine physicians, the leadership and continual involvement of infectious diseases experts were essential. [ID experts developed protocols that helped hospitals safely continue cancer care, surgical services and other core hospital functions as the nation locked down.](#)

“There were a lot of people reaching out saying thank goodness that we have an ID physician locally here that we can run questions by — that was probably the experience for all of us.”



Additionally, ID experts developed protocols and infrastructure for administering monoclonal antibodies, antiviral treatments and vaccines. Such treatments and vaccines had a multitude of benefits to millions of people, preventing serious illness and hospitalization, and alleviating some of the pressure on overwhelmed emergency departments and hospitals. In some instances, ID experts developed systematic approaches to ensure limited quantities of therapies were prioritized for high-risk underserved populations who were disproportionately impacted by COVID-19. In locations where COVID-19 clinical trials were being conducted, infectious diseases experts led those efforts with a focus on diverse enrollment, including patients from underserved communities who bore a disproportionate burden of COVID-19. The presence of ID experts made it easier for a geographic area to be a trial site for this lifesaving medical breakthrough, expanding access to clinical trials for historically underrepresented populations. In addition to clinical trials, ID experts also led basic and translational research to improve our understanding and approaches to preventing, diagnosing and treating COVID-19.

AN ESSENTIAL PART OF THE ID RESPONSE FOR COMMUNITIES

MITIGATING VIRAL SPREAD

Infectious diseases experts established testing sites to help reduce community spread.

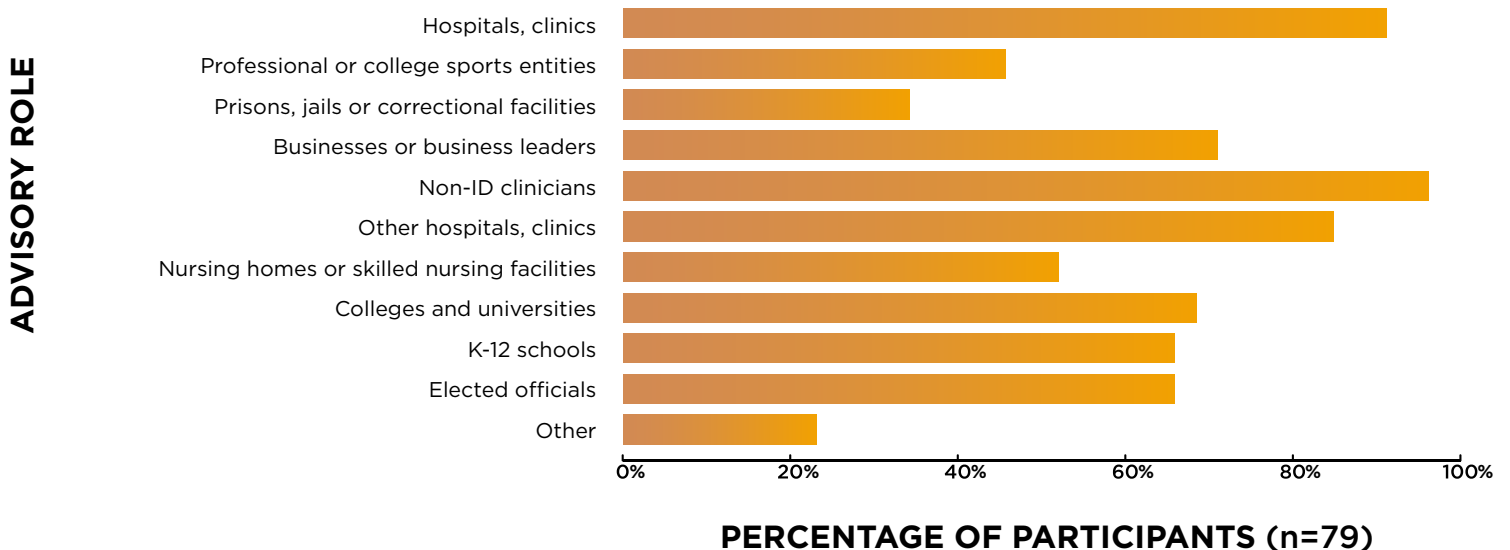


ID experts' efforts to keep people safe and prevent deaths extended well beyond the bounds of their health system, hospital or clinical care institution. A large majority (60%) of the IDSA members surveyed for this report said they took on seven or more of 10 crucial advisory roles during the pandemic (**Figure 2**), including in their local community.



The most common roles included advising non-ID clinicians (96.2%), their own hospital/clinic (91.1%) and other hospitals/clinics (84.8%). Participants also advised local business leaders (70.9%), colleges and universities (68.4%), elected officials (65.8%), K-12 schools (65.8%), skilled nursing facilities or nursing homes (51.9%), professional or college sports entities (45.6%) and local jails/prisons (34.2%).

FIGURE 2. Advisory roles undertaken by ID physicians during the COVID-19 pandemic

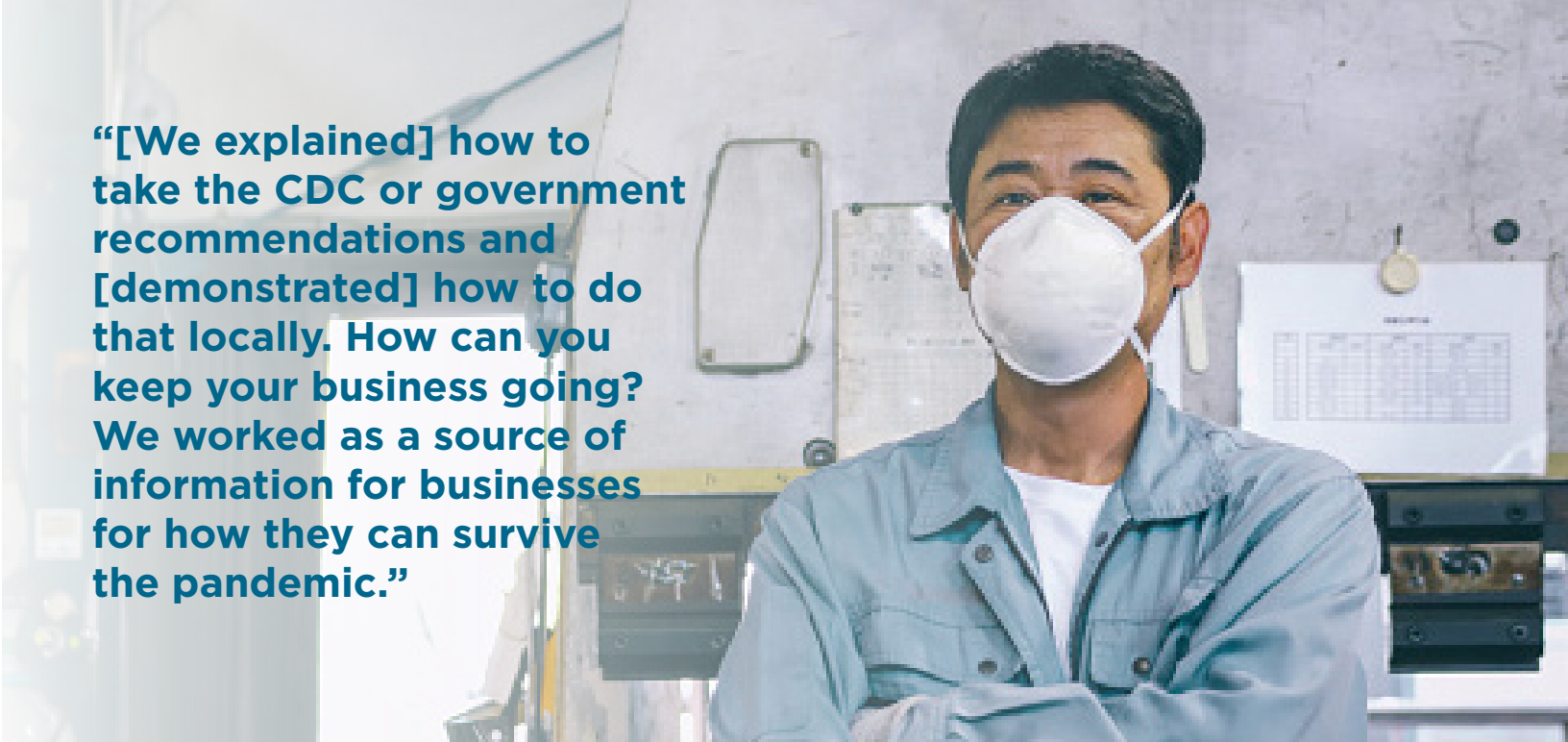


“Multiple school districts reached out to ask for guidance, especially early on, when there really wasn’t a whole lot of guidance, and they wanted input.”

ID experts had extensive involvement advising organizations in their community regarding COVID-19 mitigation. While ID experts have engaged in these types of activities during previous severe flu, HIV or other infectious disease outbreaks, the magnitude of community-based activities undertaken by ID experts during COVID-19 was exponentially greater in terms of the number of ID experts engaging in these efforts, the expanse of community needs and the amount of time spent on these activities.

The organizations most often cited as seeking guidance by ID experts included schools, day care centers, youth sports and religious institutions. With schools, guidance included operational aspects of in-classroom instruction, extracurricular activities, vaccination policy, masking policy and testing. Implementing ID experts’ guidance has been widely credited with minimizing COVID-19 transmission in schools and allowing in-person learning to occur.

ID experts also served as advisors in other community settings and industries. For example, some ID experts were heavily engaged in nursing home testing and outbreak management, significantly increasing the resiliency of nursing homes. In some cases, these activities entailed all types of infection control, not just COVID-19. ID experts interviewed for this paper also gave guidance to prisons, meatpacking plants and farms that rely upon migrant workers, which helped prevent transmission and interruptions in America’s food supply. More than 40% of survey participants reported spending more than 20 hours per week on these activities, and most (72.2%) were not compensated. Participants reported that, despite these additional roles within and outside of their institutions, most (72.2%) were unable to transfer pre-pandemic work to other staff. These data indicate that we do not have a sufficient number of ID experts in our health care facilities and communities to manage the workload associated with pandemic preparedness and response, and we instead rely upon individuals to volunteer their time and expertise in addition to their professional responsibilities. It will be critical to appropriately staff and resource pandemic preparedness and response efforts to ensure the appropriate infrastructure exists to manage future public health outbreaks and emergencies.



“[We explained] how to take the CDC or government recommendations and [demonstrated] how to do that locally. How can you keep your business going? We worked as a source of information for businesses for how they can survive the pandemic.”

ID experts also reported engaging in human resource consulting for businesses, high-touch event planning (e.g., keeping the U.S. presidential inauguration and vice presidential debates safe), cruise line operations, airline/airport operations, film industry operations, collegiate and professional sports, and financial firm pandemic forecasting. Such activities minimized economic disruption and helped facilitate the economic recovery of the United States. Importantly, ID experts were also involved in translating guidance from government authorities and other bodies to help America recover.

AN ESSENTIAL PART OF THE ID RESPONSE FOR CONSUMERS

PROVIDING ESSENTIAL PUBLIC INFORMATION

Infectious diseases experts keep the public informed on the latest COVID-19 developments.

Community forums, social media postings and national and local media interviews relied on infectious diseases expertise to help people protect themselves and their loved ones.



“People with expertise in infectious diseases became trusted sources of information within media, press, TV, radio, Twitter, social media... you name it.”

Soon after the United States declared COVID-19 a public health emergency in March 2020, ID experts used media and social media to inform the public and communicate the latest COVID-19 developments, including how to prevent spread, and later in the pandemic, the importance of getting vaccinated.



“I was asked to...come to a [local] university Facebook [Live], did lectures, did TV media interviews including a TV program.”

Through press briefings and interviews, IDSA media relations efforts in 2020 and 2021 resulted in almost 32,000 articles published sharing expert guidance for the general public.



“I got pulled into a lot of interviews with journalists and media locally to continue to keep the word out even on Paxlovid.”

“As an infectious diseases physician, not a media person, it was actually hard, especially because you were trying to give medical information and trying to do what is medically right, but could be used to support or conflict with a politician’s statement.”



Many think of Dr. Anthony Fauci and other national experts leading the way in communicating to the public, but ID experts in communities were powerful messengers who used all communications tools available to them. For many, public education meant distilling complex and evolving information about the pandemic in a politically charged environment.

AN ESSENTIAL PART OF THE ID RESPONSE FOR PUBLIC HEALTH

STRENGTHENING PUBLIC HEALTH INFRASTRUCTURE

Infectious diseases experts collaborated with government, public health experts and other clinicians to bolster public health.



“We know that public health moves at the speed of trust.”

Infectious diseases physicians were force multipliers for governmental public health authorities, augmenting the reach and impact of limited public health personnel. Especially in rural areas, where infectious diseases expertise may be scarce, infectious diseases physicians engaged with public health officials to lend their expertise, integrate messages and provide situational awareness.

“We had to learn to do public health. I had no idea how to approach people, how you talk to people, how you convince people to do something that argues against what they want to do but that makes scientific sense.”

“We help amplify public health departments. Partly because many places don’t have that expertise that is readily available. We have local county public health officers, but they will reach out to [regional hospitals] so I can share my expertise to those areas where they really kind of need someone who does what I do.”

“We [ID practitioners] are part of the public health infrastructure without working for public health. We are part of the safety net of public health. Public health and clinical medicine overlap during a pandemic. That overlap is where we sit.”

Public health interviewees said that communities with infectious diseases physicians were more resilient than those without. Another emphasized the need to consider the intersections of clinical medicine and public health on future pandemic preparedness.

ID experts were recruited to state, local and federal working groups or advisory bodies tasked with major operational roles and activities ranging from local decision-making processes to securing supply chains for testing materials.

Some interviewees said that because the pandemic sometimes provoked political disagreements, a nongovernmental expert such as a local infectious diseases physician was viewed as a trusted source of information with a high level of credibility. Such a role, some interviewees said, allowed them to amplify public health messages in a more receptive manner. For example, one interviewee stated,

“I’m on television every week. And I can’t tell you the impact I think I have had not just on the African American community, just the community. People come up to me in the grocery store and say, ‘We see you on TV all the time, we don’t know any of these people on CNN and MSNBC, and we trust you.’”

ID experts helped to build trust, particularly within communities especially vulnerable to the outcomes of COVID-19, including communities of color. One interviewee stated,

“Once I became a staple around increasing vaccine confidence in marginalized communities, I would get called upon.”

ID experts were called upon to help translate guidelines into actionable messages for the public. One interviewee stated,



“Every time a new recommendation or guideline comes out from CDC, I get a surge of calls from people who need help interpreting those guidelines. In every case, there needs to be expert interpretation of the guidelines. They want to ask all their specific questions about how to implement that guideline, and that’s the type of expertise that they’re looking for.”

AN ESSENTIAL PART OF AMERICA'S HEALTH CARE WORKFORCE

RECOMMENDATIONS TO ADDRESS WORKFORCE CHALLENGES

Infectious diseases professionals need policymakers' support to continue to guide America through the pandemic and ensure it is prepared for what's next.

ID experts need continued, robust partnerships with Congress, the Administration and the health care institutions they serve to attract, train and retain the expert workforce America needs today and to adequately prepare for future crises.

ID experts' experiences when pressed into action to serve America during the pandemic shed considerable light on the workforce challenges facing the ID specialty. Several factors contribute to a lack of robust workforce for the future of ID. These include high medical school debt, lower compensation than nearly all other medical specialties, and insufficient public health and ID research funding (which limits training and employment opportunities). These issues impact the nation's ability to recruit the necessary ID workforce to respond to and recover from pandemic challenges.


ID WORKFORCE CHALLENGES & RECOMMENDATIONS

CHALLENGE:

America has a shortage of infectious diseases physicians.

[Nearly 80% of U.S. counties do not have a single infectious diseases physician](#), leaving the majority of communities and individuals with little to no access to ID expertise and services. There are even fewer pediatric ID experts. Persistent recruitment challenges — driven by inadequate funding for training, burnout, medical student debt and compensation disparities — threaten the availability of ID experts for future public health emergencies.

From 2011 through 2016, ID experienced a more than 20% reduction in applicants to fellowship training programs. In 2020, a year in which there was heightened interest in medical careers due to the pandemic, 75% of infectious diseases fellowship training programs filled all of their fellowship slots. In 2021, only 70% of ID training programs filled. By comparison, most other internal medicine subspecialties filled all or nearly all of their training programs. Pediatric infectious diseases fellowship training programs filled only 46% of their slots in 2020. In 2007, 23.1% of pediatric ID fellows were from populations underrepresented in medicine, and that level fell to 11.7% in 2019.



This challenge is driven by high student debt and lower compensation than most other medical specialties, which are major disincentives to becoming an infectious diseases physician.

The [average medical student](#) carries more than \$240,000 in educational debt and \$215,900 in medical student debt. Individuals from populations underrepresented in medicine are more likely to have educational debt and higher levels of debt upon graduation, making financial concerns a potentially greater barrier for them to enter ID. This is a particular concern given the need for a diverse ID workforce to promote health equity and reduce the disproportionate impact of infectious diseases and public health emergencies on underserved communities. Existing loan repayment programs target other types of providers — primary care, mental health, substance use, etc. — as opposed to infectious diseases experts.

In spite of the high financial barrier to entering medical school, ID physicians are paid less than the majority of their physician counterparts in other areas of medicine, even though they work longer hours and have greater administrative responsibilities. According to data published in Medscape in 2021, average annual salaries for ID physicians are below all other medical specialties except pediatrics, family medicine, endocrinology and public health, and even below the average salary for general internal medicine. This occurs in spite of ID training and certification requiring an additional two to three years of study and training. The highest compensated specialties have average annual compensation that is double the average annual compensation of ID physicians. Longstanding undervaluation of the billing codes used by ID physicians — primarily evaluation and management codes — is one key factor driving the payment disparity between ID physicians and physicians who primarily perform procedures. While outpatient E/M codes were revalued in 2021, the majority of ID physician services fall under inpatient E/M codes, which have not yet been revalued.

While other specialties have experienced higher rates of compensation growth over the last five years, ID physician compensation has been relatively flat compared to other specialties. An important underlying factor is that in addition to their clinical work, ID physicians routinely provide a broad spectrum of nonclinical services that are not adequately compensated, in part because they cannot be definitively measured and captured through relative value units derived from fee-for-service clinical activities. These services include administrative roles such as medical director of infection prevention, medical director of antibiotic stewardship, section/division head of ID and a variety of roles related to quality, patient safety and institutional culture. Due to the intensity of administrative responsibilities, the effective hourly rate (i.e., what an individual is actually paid) is often far less than their contracted hourly rate. ID physicians are also among the most sought after and trusted medical educators, often with inadequate recognition in terms of compensation and/or time. The result is that ID physicians' contributions in terms of full-time equivalent metrics may not be aligned such that the full clinical and nonclinical work of ID physicians is captured.

The disparity in compensation that exists for ID compared to other fields of medicine in the United States has become obvious during the pandemic, when ID physicians needed to respond emergently to protect public health — and did so without additional resources. Current Medicare payment systems do not include a permanent mechanism to reimburse health care providers for the critical nonclinical activities associated with managing infectious disease outbreaks, such as leading teams; developing and updating guidance on infection prevention, detection and treatment; training personnel; advising hospital leadership; and managing supplies. As a result, there is no policy in place to account for the increased level of physician effort and expense incurred as a result of delivering care to patients during the COVID-19 public health emergency.

RECOMMENDATIONS:



Relieve medical student debt.

Congress should enact and fund legislation (such as the Bio-preparedness Workforce Pilot Program included in the PREVENT Pandemics Act) to provide a loan repayment opportunity for health care professionals with expertise in infectious diseases or emergency preparedness who work in medically underserved

CMS should revalue inpatient E/M reimbursement codes to reflect historic relativity between these codes and the office and outpatient visit codes, which were revalued in 2021.

areas, health care professional shortage areas or federal facilities such as VA hospitals and Ryan White-funded clinics. This approach will reduce financial barriers to entering the ID field, help to increase the diversity of the ID workforce and ensure a more equitable distribution of ID experts in all communities.



Ensure ID experts' compensation adequately reflects their contributions and value so they can continue leading America out of the pandemic and help the nation prepare for the next crisis.

Since inpatient care is typically more complex than outpatient care, compensation for inpatient E/M codes has historically been adjusted upward relative to outpatient E/M codes. CMS should revalue inpatient E/M reimbursement codes to reflect historic relativity between these codes and the office and outpatient visit codes, which were revalued in 2021. For example, inpatient cases typically involve more severe illness, additional comorbidities, and more complex diagnostic processes and treatments. This approach will help ensure that payments for inpatient ID services reflect the level of care provided and reduce compensation disparities that hinder recruitment to the field.

CMS should also implement a permanent mechanism to reimburse clinicians for critical activities associated with managing infectious diseases outbreaks that would automatically initiate payment to clinicians under the Medicare Physician Fee Schedule for services associated with these unanticipated events. Creating a modifier that infectious diseases physicians and other clinicians may append to current E/M codes would provide a solution to ensure that resources are available for care delivered during circumstances of heightened work, such as infectious diseases outbreaks.

CHALLENGE:

Inadequate funding for research and public health makes institutions and health departments less able to hire, train and retain ID experts.

To ensure the availability of ID physicians to fulfill critical roles within their institutions and health systems, health care institutions must ensure adequate compensation for roles such as medical directors of infection prevention and control, hospital epidemiology, antibiotic stewardship, travel medicine or wound care; fellowship program director; section or division head of ID; and other administrative and programmatic roles that ID physicians often fill. ID expertise is crucial for these roles, and ID physicians often take them on in addition to other clinical, research, teaching or public health responsibilities. In addition to adequate compensation, ID experts must be provided with adequate protected time for these roles and sufficient resources for support staff and technology to enable them to perform these roles optimally.

According to IDSA data, about 28% of infectious diseases physicians are employed by academic medical centers, often in roles that involve a combination of patient care, research, administrative/programmatic tasks (e.g., infection prevention and control, antimicrobial stewardship), teaching and administration. Academic medical centers serve as the primary training sites for infectious diseases fellows. Insufficient National Institutes of Health and National Institute of Allergy and Infectious Diseases funding for training, early career research and career advancement makes it difficult to train and retain the next generation of academic ID physicians and researchers.

According to IDSA membership data, only a small percentage of ID physicians work full time in public health. A larger proportion of ID physicians spend a portion of their time working at state or local public health departments, which rely upon the U.S. Centers for Disease Control and Prevention for the majority of their funding. Lack of sufficient, sustained public health funding diminishes the ability of state and local health departments to employ ID experts.

RECOMMENDATION:



Increase NIAID and CDC funding to hire, train and retain ID experts.

Congress should increase funding for NIAID to support training, early career research and career advancement crucial to ensuring we produce highly trained ID physicians and support the ID physician-scientist pipeline. Congress should increase funding for CDC to allow state and local health departments to hire and retain ID experts in public health. Funding must be sustained over time to provide the predictability necessary to sustain careers and ensure that ID experts are well established in advance of future public health emergencies.

CHALLENGE:

ID physicians are all affected by burnout.

Throughout the pandemic, burnout has been a serious problem across health care, due to a significantly increased workload, inability to take time off, uncertainty, lack of workplace flexibility and high loss of life. For infectious diseases experts, these challenges were particularly severe, as too few infectious diseases-trained experts were available to shoulder the increased demand. Many ID specialists and their families were personally and often profoundly affected by the disease, further increasing the workload and stress level of their colleagues. ID physicians across all employment settings worked on average 30% more in 2020 than their non-ID peers. For health system-employed and private practice ID physicians, this difference is largely caused by increased clinical workload, with nonclinical activities that are incremental to the clinical load. For ID physicians employed by an academic medical center, nonclinical responsibilities have grown significantly. On top of official compensated work, most infectious diseases experts spent a significant amount of time on uncompensated duties, often in excess of 20 hours per week, during the pandemic.

RECOMMENDATION:



Reduce burnout by increasing the size of the ID workforce and ensuring experts have access to flexible benefits.

Increasing the size and ensuring equitable distribution of the ID workforce will allow for greater workplace flexibility, time off and work/life balance, all of which are central to promoting wellness and decreasing burnout. Comprehensive family leave and sick leave programs are essential to ensure ID and other health care professionals are able to take time necessary to care for themselves and family members. Health care institutions should prioritize and destigmatize wellness and mental health through a variety of strategies, including expanding access to mental health services, appointing a chief wellness officer and implementing metrics to assess progress on employee mental health and wellness.



Learn more about the work of infectious diseases experts at [ValueofID.org](https://valueofid.org)

ADDENDUM: METHODOLOGY



EXPERT ADVISORY GROUP

An expert advisory group was established to provide guidance on survey development, help draft key informant interview questions and provide suggestions for potential study participants. Members were briefed at the beginning and end of data collection. The advisory group was made up of members of IDSA with representation across practice settings, provider types, geography, race/ethnicity and gender (see **Expert Advisory Group**).



ONLINE SURVEY

The online survey consisted of 15 open- and close-ended questions. These questions were drafted with input from the expert advisory group and focused on activities conducted during the COVID-19 pandemic within and outside of participants' institutions. Survey requests were emailed to all members of IDSA who identified as hospital epidemiologists, ID division chiefs or pediatric ID division chiefs. Additional follow-up with potential participants was conducted to ensure representation from diverse geographic areas. Survey results were imported into Stata version 16.0. Basic descriptive statistics were used to compute the number and percentages of participant responses across survey questions.



KEY INFORMANT INTERVIEWS

Potential key informants were identified through the authors' professional networks, the expert advisory group and snowball sampling. Targeted efforts were made to recruit a sample that was reflective of the wide range of ID contributions to the COVID-19 pandemic and included representation across practice settings (e.g., academic medical centers, public health, private practice), provider types (e.g., physicians, nurses, infection preventionists), geography (e.g., rural, urban), race/ethnicity and gender. Potential participants were sent interview requests via email. Interviews were conducted until thematic saturation was achieved.

A semi-structured interview guide was developed with input from the expert advisory group. Topic areas included roles and responsibilities assumed during the pandemic, activities conducted, hours spent on these activities, compensation and relationships with outside organizations (e.g., local churches, schools). Interviews lasted approximately 30 minutes, were conducted using the Zoom video platform and were recorded with the participants' permission. Interview themes were iteratively discussed among the researchers to identify findings relevant to the study question and purpose and are summarized below.

This study was determined to be exempt by the Johns Hopkins University Bloomberg School of Public Health Institutional Review Board.

TABLE 1. Survey participant characteristics

CHARACTERISTIC	NUMBER (%)
Expertise	
Hospital epidemiologist	21/79 (26.6)
ID division chief (adult)	36/79 (45.6)
ID division chief (pediatric)	17/79 (21.5)
Other	5/79 (6.3)
Region	
Northeast	18/79 (22.8)
Mid-Atlantic	10/79 (12.6)
South	15/79 (19.0)
Midwest	17/79 (21.5)
Southwest	7/79 (8.9)
West	12/79 (15.2)
Local population	
Rural	9/79 (11.4)
Suburban	25/79 (31.6)
Urban	44/79 (55.7)
Other	1/79 (1.3)

DESCRIPTION OF STUDY PARTICIPANTS

Online Survey

The survey was sent to 415 IDSA members who identified as hospital epidemiologists, ID division chiefs or pediatric ID division chiefs. Seventy-nine surveys were completed and returned to the research team (19.0% response rate). All regions of the United States were represented in the final sample. The sample consisted primarily of adult ID division chiefs (n=36). Most respondents worked in urban areas (n=44).

Key Informant Interviews

In total, 34 key informant interviews were conducted. Key informants included primarily physicians (n=29), but also included a nurse, a hospital epidemiologist, a pharmacist and others. Most worked in community hospitals (n=14) and academic medical institutions (n=13). Most were from urban areas (n=15), and all regions of the U.S. were represented.

TABLE 2. Key informant characteristics

CHARACTERISTIC	NUMBER (%)
Region	
Northeast	4/34 (11.7)
Mid-Atlantic	4/34 (11.7)
South	4/34 (11.7)
Midwest	11/34 (32.4)
Southwest	3/34 (8.8)
West	8/34 (23.5)
Organization type	
Academic medical institution	13/34 (38.2)
Community hospital	14/34 (41.2)
Public health department	4/34 (11.7)
Private practice	2/34 (5.9)
Other	1/34 (2.9)
Provider type	
Physician	29/34 (85.3)
Nurse	1/34 (2.9)
Hospital epidemiologist	1/34 (2.9)
Pharmacist	1/34 (2.9)
Other	2/34 (5.9)
Local population*	
Rural	10/33 (30.3)
Suburban	8/33 (24.2)
Urban	15/33 (45.4)

*Local population for state health departments not included due to the diversity of populations represented in the state