COLLEGE of AMERICAN PATHOLOGISTS
Advocacy

2022
Practice Characteristics Survey Report

2022 Practice Characteristics Survey Report

Produced by
CAP Policy Roundtable
Council on Government and Professional Affairs
October 2022

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Overview

The 2022 Practice Characteristics (PC) Survey is the 12th edition of the survey conducted by the College of American Pathologists (CAP) since 1994. The survey provides a primary source of basic data on board-certified pathologists, how they practice, and how they are being compensated. It also tracks changes that are occurring in the workforce among board-certified pathologists.

The 2022 survey is substantially revised from the 2019 survey instrument, which was the last time the CAP conducted the survey. Core questions on pathologist activities were refined to focus on understanding rates of adoption of and experiences with innovative activities and technologies, such as digital pathology and laboratory information systems. New questions were added about the job market for pathologists and about understanding respondents' concerns about threats to pathologist scope of practice. The survey continues to capture data on trends in practice size, distribution of respondents by practice setting, gender mix of respondents, average time worked, and compensation trends. The final draft questionnaire was reviewed by and pretested among members of the Policy Roundtable Subcommittee and its Practice Survey Workgroup. We invite proposals for questions or analyses in future similar surveys at practicesurvey@cap.org.

We sent survey invitations via email to 15,186 board-certified pathologists and received responses from 1,106 pathologists (7.3% response rate). CAP Fellows accounted for 49.8% of the survey invitations (n=7,558), and for 72.2% of survey responses (n=799), for a 10.6% response rate among CAP fellows.

This report is divided into seven sections:

A. Respondent Characteristics

B. Services

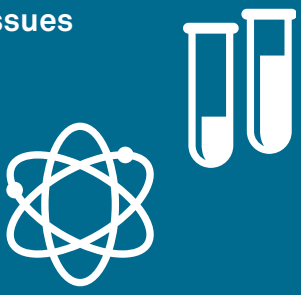
C. Digital Pathology and Remote Sign-Out

D. Laboratory Information Systems (LISs)

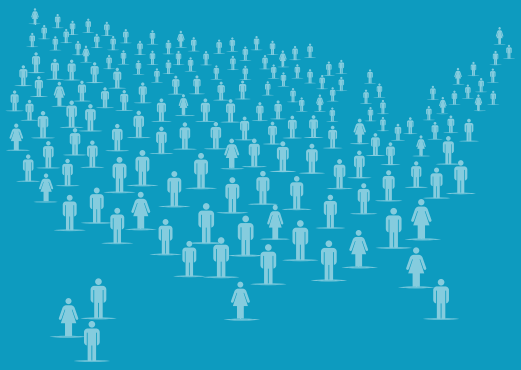
E. Compensation and Benefits

F. Workforce and Hiring

G. Scope of Practice Issues



Although the 2022 Practice Characteristics Survey included questions about pathologists' experiences using artificial intelligence/machine learning tools, we do not include any results from those questions in this report. Since fielding the survey, we have come to understand that there is not a clear definition within pathology about how artificial intelligence is defined and in what kind of tools qualify as artificial intelligence/machine learning tools. We also realized that our questions also did not add any clarity to this lack of definition. As a result, we opted not to report any results, as we felt that they could be misleading.



A. Respondent Characteristics

This section summarizes data on respondent characteristics, including:

- Age and gender distribution of respondents
- Work status, including the share of respondents, by gender who worked full-time vs. part-time, the share who are unemployed, and the median hours worked per week
- Distribution of respondents by practice setting
- Distribution of respondents by practice size
- Employment status of respondents by setting (eg, how many were employees versus owners)
- The extent to which employees of pathologist-owned and multi-specialty physician-owned practices had a pathway to partnership
- The percent of respondents who have held visas

Figure A-1: Survey Respondents, by Age Group and Gender, 2022 vs. 2019

Age Group	2022					2019			
	N	Percentage	Distribution By Gender			N	Percentage	Distribution By Gender	
			Male	Female	Non-Binary/ Not-Listed/ Prefer not to say*			Male	Female
<35	32	3.5%	56%	41%	3%	34	3.4%	38%	62%
35–39	140	15.3%	46%	54%	2%	133	13.5%	38%	82%
40–49	284	30.7%	42%	55%	4%	252	25.6%	42%	58%
50–59	224	24.3%	55%	42%	3%	265	26.9%	54%	46%
60–69	180	19.6%	57%	40%	3%	147	12.6%	62%	38%
70–74	44	4.8%	80%	18%	2%	40	4.1%	85%	15%
75+	16	1.8%	88%	13%	-	23	2.3%	91%	9%
ALL	920	100%	51%	46%	3%	984	100%	51%	46%

* The 2022 Practice Characteristics Survey was the first survey to offer response options other than "male" or "female" for gender.

- As in our 2019 survey, the most respondents to the survey by age range were those ages 40 to 49 years old and 50 to 59 years old, which represented more than half of all survey respondents. Compared to the 2019 survey, there was a substantial increase in the percent of respondents aged 40-49 (over five percentage points), and in those aged 60-69 (seven percentage points). By contrast, the percent of respondents aged 50 to 59 fell by 5.6 percentage points between the 2019 and 2022 surveys.

- Overall, females accounted for 46% of all respondents in both surveys, while males accounted for 51% of respondents. In 2022, 54% of respondents under the age of 50 were female and 43% were male.

Sources:
Q39 - What is your age?

Q40 - To which gender do you most identify?

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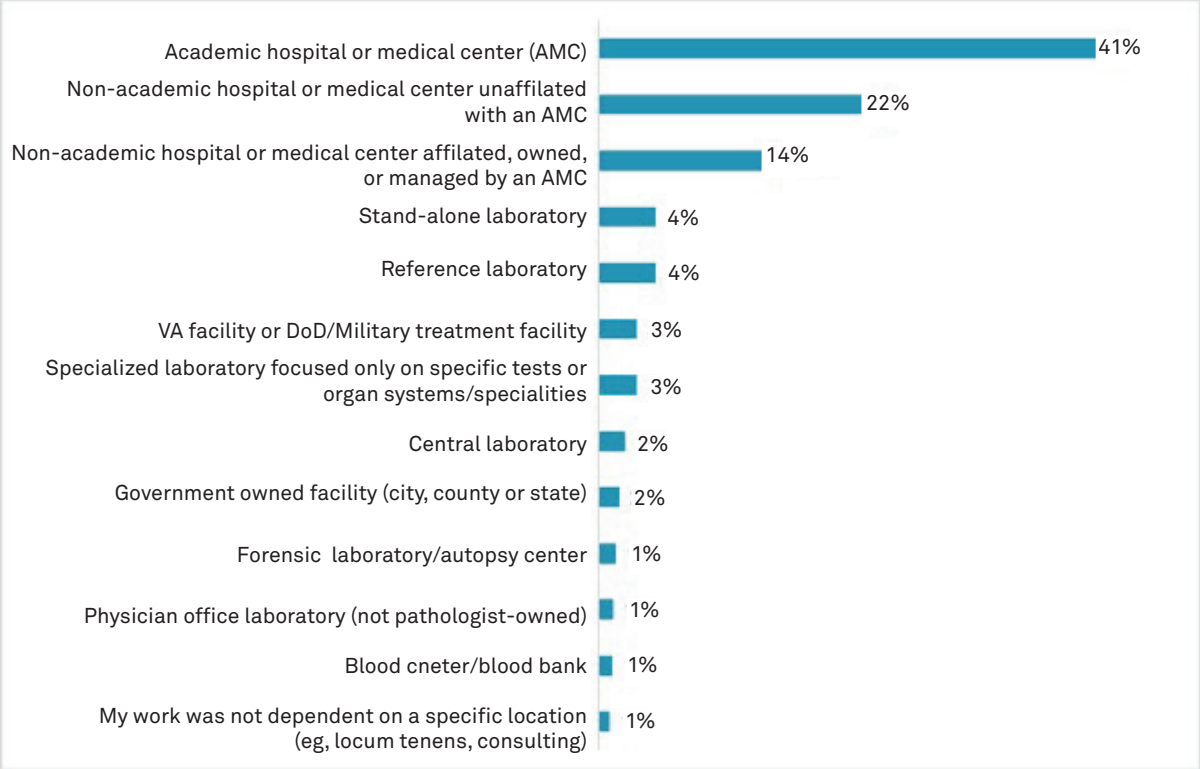
Figure A-2: Work Status, by Gender (n=1012)

	All	Male	Female
% Work full-time	93%	93%	94%
% Work part-time	6%	7%	6%
% Unemployed	<1%	<1%	<1%
Median hours worked per week–full-time	50 hours	50 hours	50 hours
Median hours worked per week–part-time	20 hours	20 hours	25 hours

- Over 90% of male and female respondents reported that they worked full-time at the end of 2021. Nearly all of the remaining respondents reported that they worked part-time. Fewer than 1% reported that they were unemployed.
- The median hours worked per week for both male and female pathologists was 50 hours. This is unchanged from recent surveys.
- For pathologists who said they worked part-time, the median hours worked was 20 hours per week for males and 25 hours for females.

Source:
Q1 - Which of the following best describes your work status at the end of 2021?
Q4 - On average, how many hours per week did you work during 2021? Please round to the nearest whole number. If you were unemployed at some point in 2021, please provide an average only for the time you were employed.

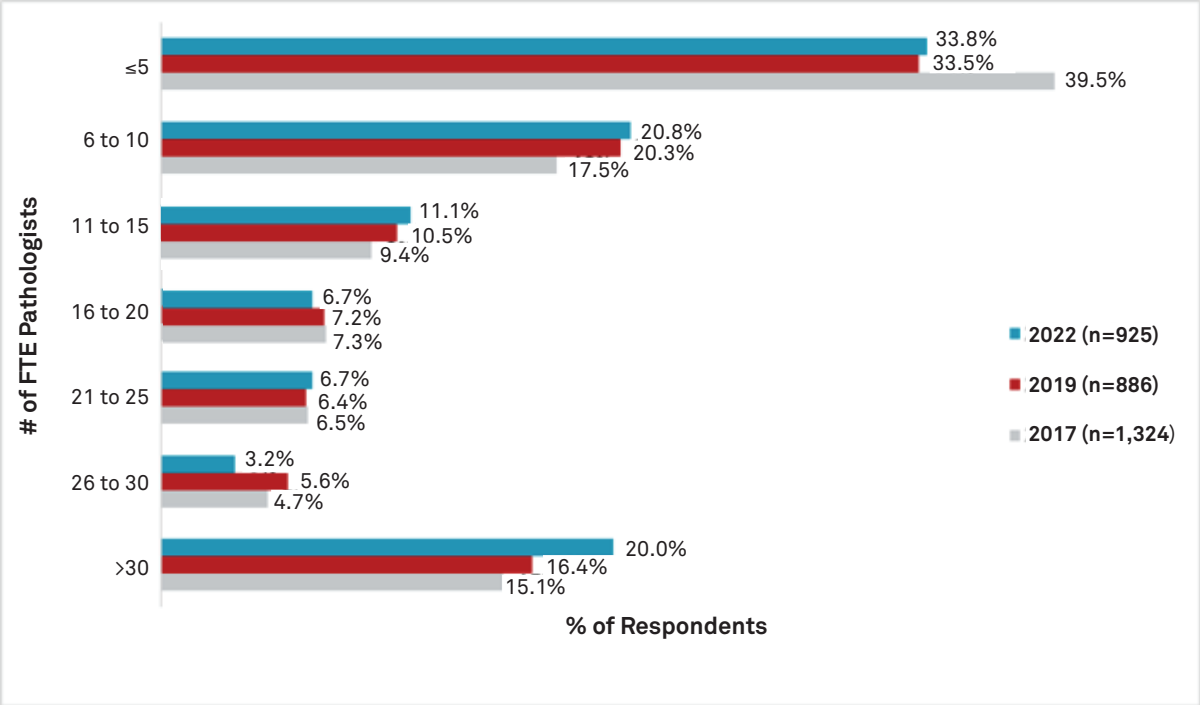
Figure A-3: Practice Settings Where Pathologists Provide the Majority of Their Services (n=1017)



- The highest percentage of respondents spent most of their time working in academic medical centers (41%), followed by non-academic hospitals or medical centers unaffiliated with academic medical centers (22%), and non-academic hospitals or medical centers affiliated with, owned by, or managed by an academic medical center (14%).
- Overall, hospital-based pathologists account for over 75% of respondents.

Source:
Q3 - Which of the following best describes the setting where you provide the majority of your services?

Figure A-4: Distribution of Survey Respondents, by Practice Size (Number of FTEs), 2017-2022



- As in prior years, the largest percentage of respondents worked in a practice with five or fewer full-time equivalent (FTE) pathologists (34%), which is relatively unchanged from 2019, but is significantly lower than 2017.
- Similarly, the percentage of respondents who worked in a practice with six to 25 FTE pathologists was relatively unchanged from the 2019 survey.
- While Figure A-4 shows a decrease between 2019 and 2022 in the percentage of respondents who worked in practices with 26 to 30 FTE pathologists, and an increase in the percentage who worked in practices with >30 FTE pathologists, these changes are not statistically significant.

Source:
Q5 - At the end of 2021, approximately how many pathologists that were providing pathology specific services were employed at your primary practice? Please include the chief of service and exclude staff who were primarily focused on research

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Figure A-5: Distribution of Survey Respondents, by Practice Size and Practice Setting, 2022 vs. 2019

	2022 N	Number of FTE pathologists per practice			
		Mean		Median	
		2022	2019	2022	2019
ALL SETTINGS	**925**	**18.3**	**18**	**9.4**	**9.9**
Academic medical center (AMC)	**356**	30.2	32.4	21.7	25.8
Non-academic hospital affiliated/owned/ managed by an AMC	**136**	9.7	8.9	6.0	6.4
Non-academic hospital unaffiliated with an AMC	**220**	9.4	8.6	4.8	5.4
Independent laboratory*	**112**	13.9	16.7	5.8	7.0
VA facility or DOD/Military treatment facility	**30**	8.3	7.1	7.2	5.4
Central laboratory	**20**	22.7	19.0	19.3	17.3

Data is provided only for practice setting categories with ≤20 respondents.
* "Independent laboratory" includes reference laboratories, stand-alone laboratories (pathologist-owned), and specialized laboratories.

- There was little difference from our 2019 survey in the overall mean and median practice size by practice setting.
- For two settings—academic medical centers and independent laboratories, mean practice size was *lower* among respondents to the 2022 Practice Characteristics Survey than to the 2019 survey—by just over 2.0 FTEs among respondents working in academic medical centers, and by nearly 3.0 FTEs among respondents working in independent laboratories. By contrast, mean practice size was nearly 1.0 FTE *higher* among 2022 survey respondents for respondents who work in non-academic hospitals, 1.2 FTEs for respondents who work in VA facilities or DOD/ Military treatment facilities, and 3.7 FTEs higher for respondents who work in central laboratories.
- Median practice size was smaller for 2022 survey respondents in nearly all practice settings. The largest difference was for respondents based in academic medical centers, where the median practice size fell 4.1 FTEs between the 2019 and 2022 surveys. Median practice size rose only for central laboratories, and for VA facilities, or DOD/military treatment facilities.

Sources:
Q5 - At the end of 2021, approximately how many pathologists that were providing pathology specific services were employed at your primary practice? Please include the chief of service and exclude staff who were primarily focused on research

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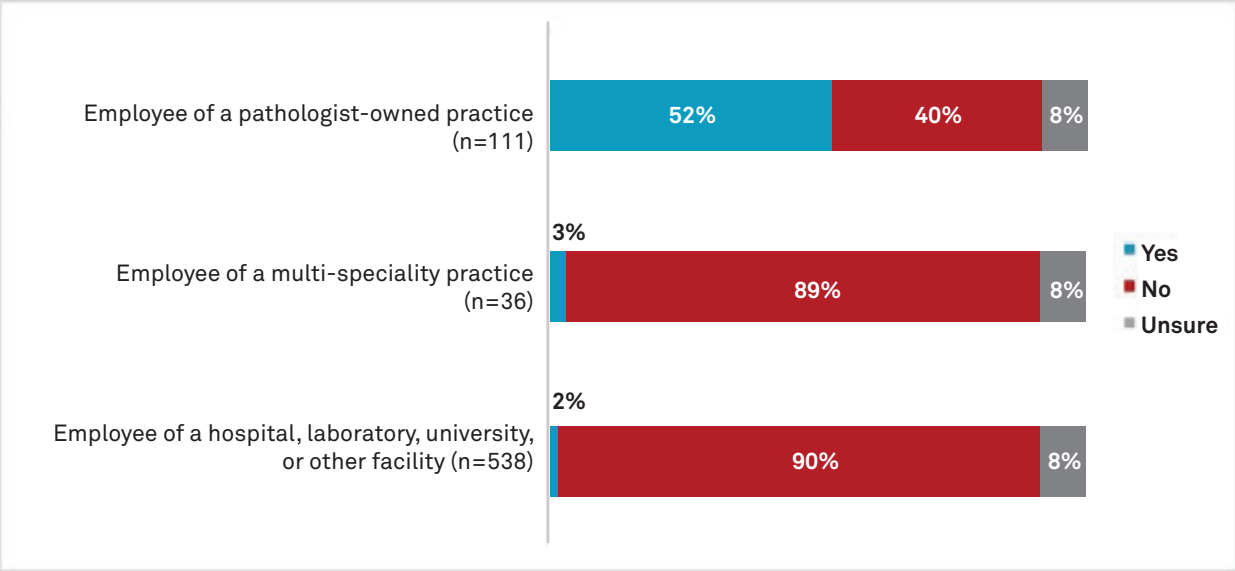
Figure A-6: Employment Type by Setting

Employment/Ownership Status	Practice Setting			
	Academic hospital or medical center (AMC) (n=381)	Non-academic hospital or medical center affiliated, owned, or managed by an AMC (n=133)	Non-academic hospital or medical center unaffiliated with AMC (n=211)	Independent laboratory (n=112)
Facility Employees	91%	44%	26%	29%
Owner or partner of a pathologist-owned practice	3%	29%	42%	21%
Employee of a pathologist-owned practice	2%	20%	23%	18%
Owner or partner of a multispecialty practice	<1%	-	2%	2%
Employee of a multispecialty practice	2%	5%	2%	6%
Locum tenens	<1%	-	1%	1%
Contractor/Consultant	<1%	2%	2%	10%

- The percent of respondents who work for, or are employed by, pathologist-owned or other physician-owned settings varies substantially by practice setting.
- Nearly all respondents who practice in academic medical centers (91%) reported that they are facility employees. Only 3% percent of pathologists who work in academic medical centers reported that they are owners or partners of a pathologist-owned practice, and 2% reported that they are employees of pathologist-owned practices. Fewer than 3% are employed by, or are owners/partners in, a multispecialty-owned practice.
- By contrast, owners/partners in, or employees of, pathologist-owned practices account for nearly half (49%) of respondents who practice in non-academic hospitals that are affiliated, owned, or managed by an AMC and 65% of respondents who practice in non-academic hospitals that are unaffiliated with AMCs. They also account for 39% of respondents who are based in independent laboratories. "Facility employees" account for a substantially larger share of respondents who practice in non-academic hospitals that are affiliated, owned, or managed by an AMC than do those who participate in unaffiliated non-academic hospitals or in independent laboratories.

Source:
Q41 - Which of the following best describes your role in your primary practice setting?

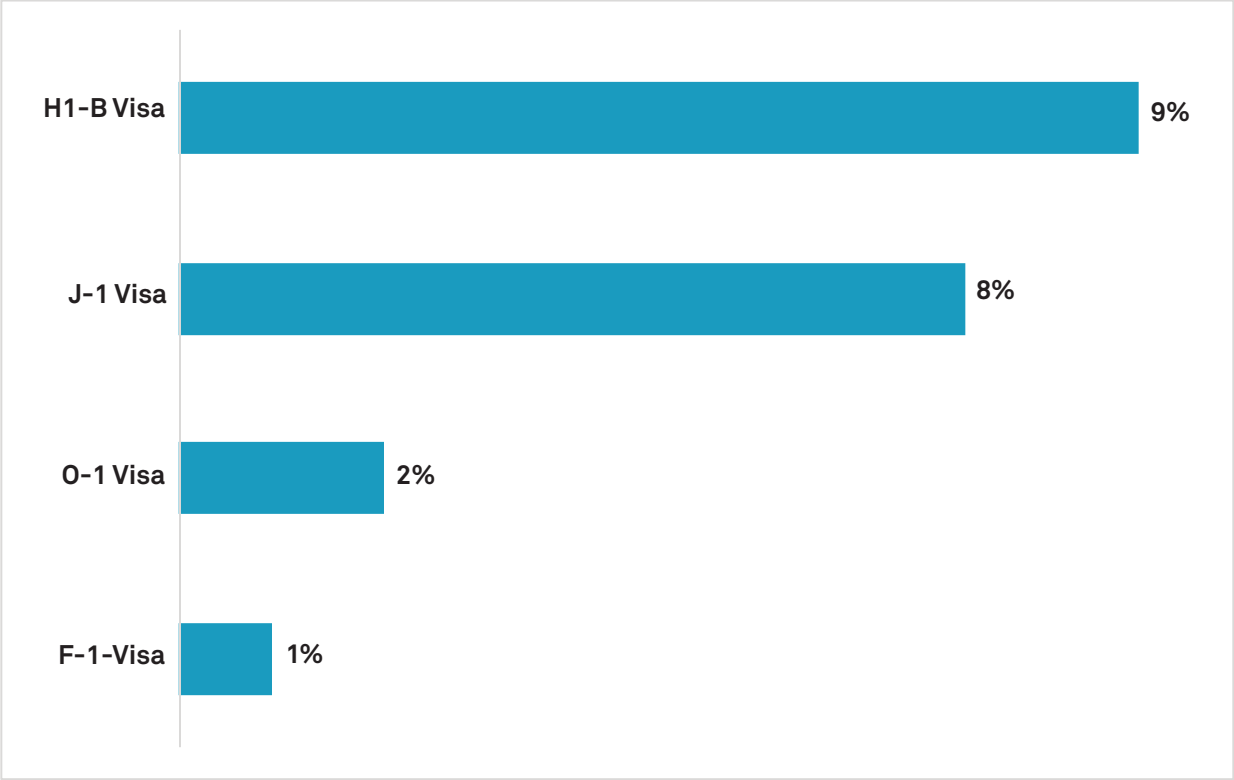
Figure A-7: Pathway to Partnership for Employees by Employer Type



- Just over one-half (52%) of the 111 respondents who are employees of pathologist-owned practices reported their practice offers a pathway to transition to partnership/ownership, while 40% reported that their practices offered no such pathway.
- By contrast, nearly all the 36 employees of multispecialty-owned practices and of hospitals, laboratories, universities, or other facilities did not have a pathway to partnership or ownership.

Source:
Q42 - Does your employer offer a pathway to transition from a non-partner employee to a partner in your group?

Figure A-8: Visas Held by Respondents (n=898)



- Respondents were asked if they had ever held a visa and, if so, which they have had. Respondents could choose more than one visa.
- Just over 13% of respondents have held at least one kind of visa. The most predominant among these are H1-B (9%) and J-1 visas (8%).

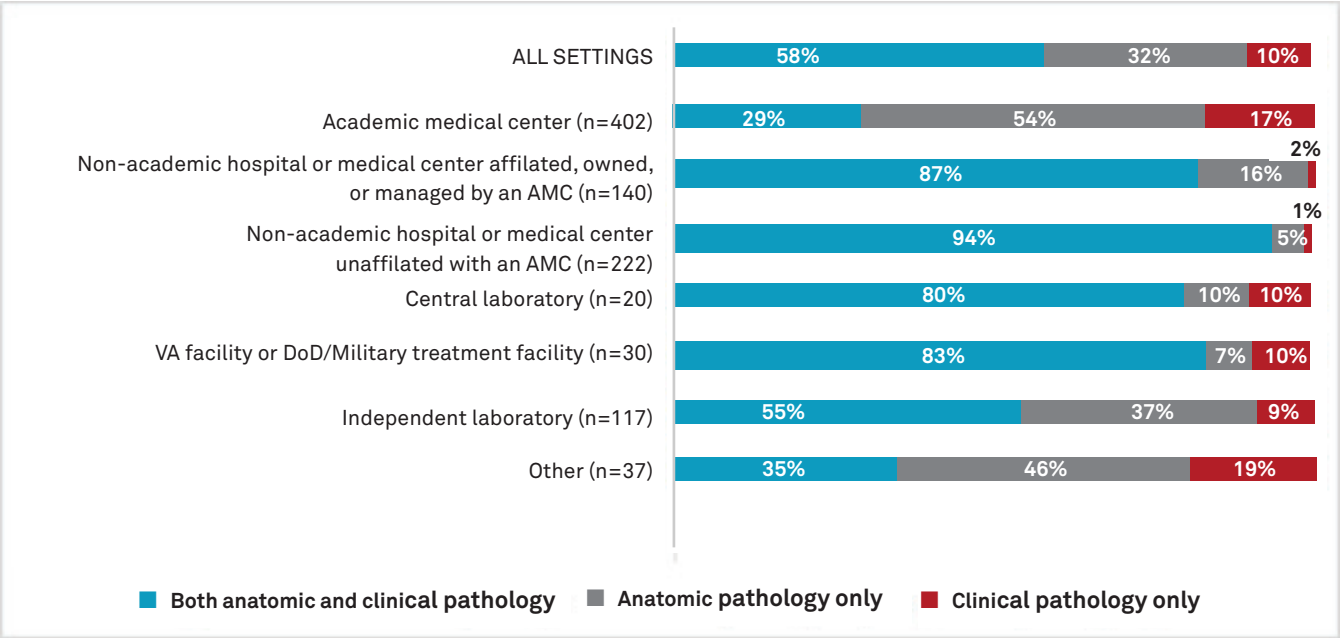
Source:
Q43 - Which of these visas have you ever had? (select all that apply).

B. Services

This section summarizes data:

- Respondent Practice Type (AP/CP)
- Rural Service Provision
- Self-Referral Rates
- Provision Rates for Specific Services
- PC of CP Billing and Denial Rates

Figure B-1: Practice of Anatomic and Clinical Pathology, by Practice Setting

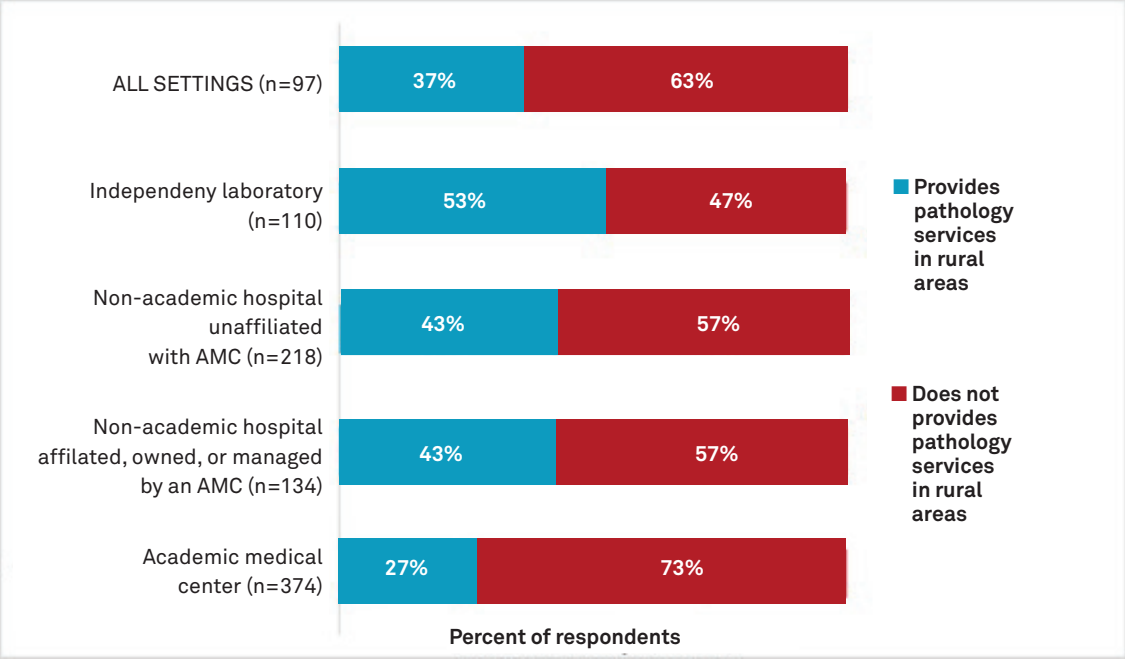


"Other" includes VA facilities or DOD/military treatment facilities; central laboratories; government-owned facilities (city, county, or state); forensic laboratories or autopsy centers; physician office laboratories (not pathologist-owned); blood centers/blood banks; or settings for pathologists whose work is not dependent on a specific location (eg, locum tenens, consulting).

- Overall, 58% of respondents practice both anatomic and clinical pathology, 32% practice only anatomic pathology (AP), and 10% practice only clinical pathology (CP).
- Except for pathologists practicing in academic medical centers, most pathologists practice both AP and CP. For example, 94% of respondents who are based in non-academic hospitals unaffiliated with academic medical centers and 82% of respondents who are based in non-academic hospitals affiliated, owned, or managed by an academic medical center, practice both AP and CP.
- For respondents who are based in academic medical centers, only 29% report practicing both AP and CP. Most of the rest—54%—practice AP only, while 17% practice CP only.

Source:
Q8 - What type of pathology do you currently practice?

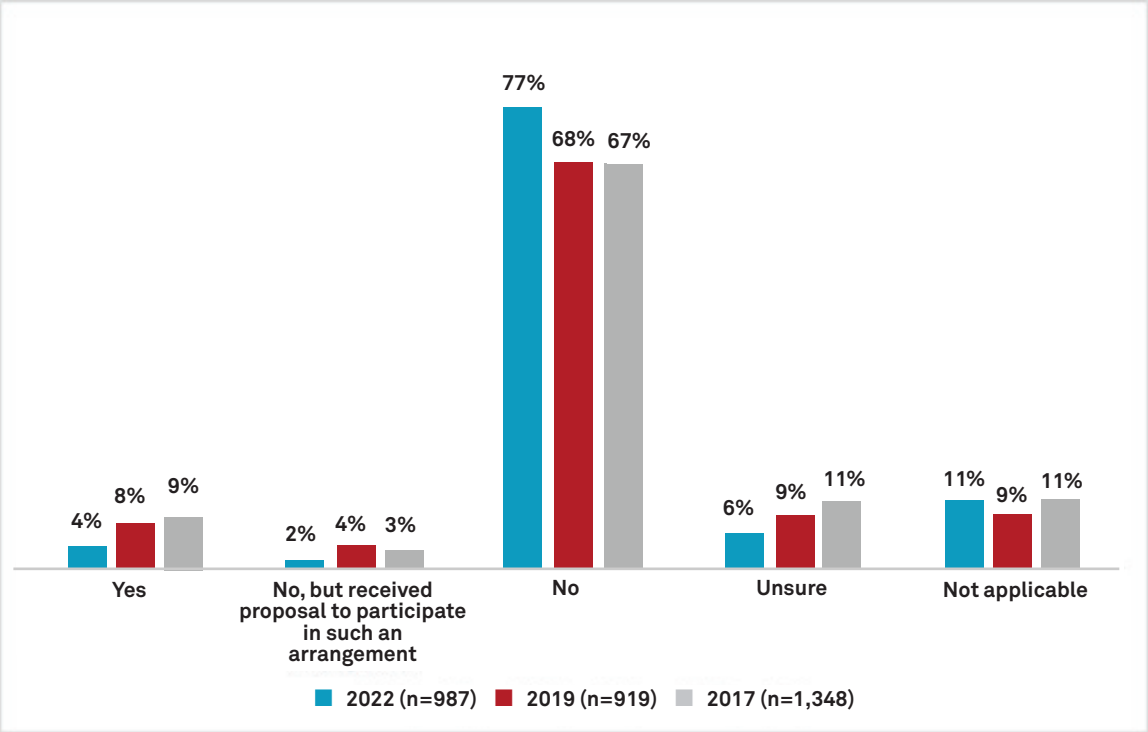
Figure B-2: Pathologists That Provide Services to a Hospital or Laboratory Located in a Rural Area, by Practice Setting



- Overall, 37% of respondents stated that they provide services to a hospital or laboratory that is located in a rural area.
- Slightly over half (53%) of pathologists based in independent laboratories provide services to hospitals or laboratories located in rural areas, while 43% of pathologists based in non-academic hospitals do so.

Source:
Q9 - Do you provide any services to a hospital or laboratory located in a rural area (ie, a non-urban area with a population of 50,000 or less)?

Figure B-3: Pathologists' Participation in Self-Referral Arrangements, 2017-2022



- Four percent of respondents indicated that, in 2022, they or their practice participated in an arrangement where the referring nonpathologist physician had an ownership interest in the histology laboratory used to process the specimens (ie, a "self-referral arrangement"). Another 2% indicated that this did not apply to them but that they had received a proposal to participate in such as arrangement.

- These rates were substantially lower than what was reported in the 2019 and 2017 Practice Characteristics Surveys, when 8% and 9% of respondents, respectively, reported that they or their practice participated in a self-referral arrangement.

Source:
Q7 - Do you or your practice currently participate in an arrangement where a referring non-pathologist physician has an ownership interest in the histology laboratory used to process the specimens (ie, in-office ancillary exception)?

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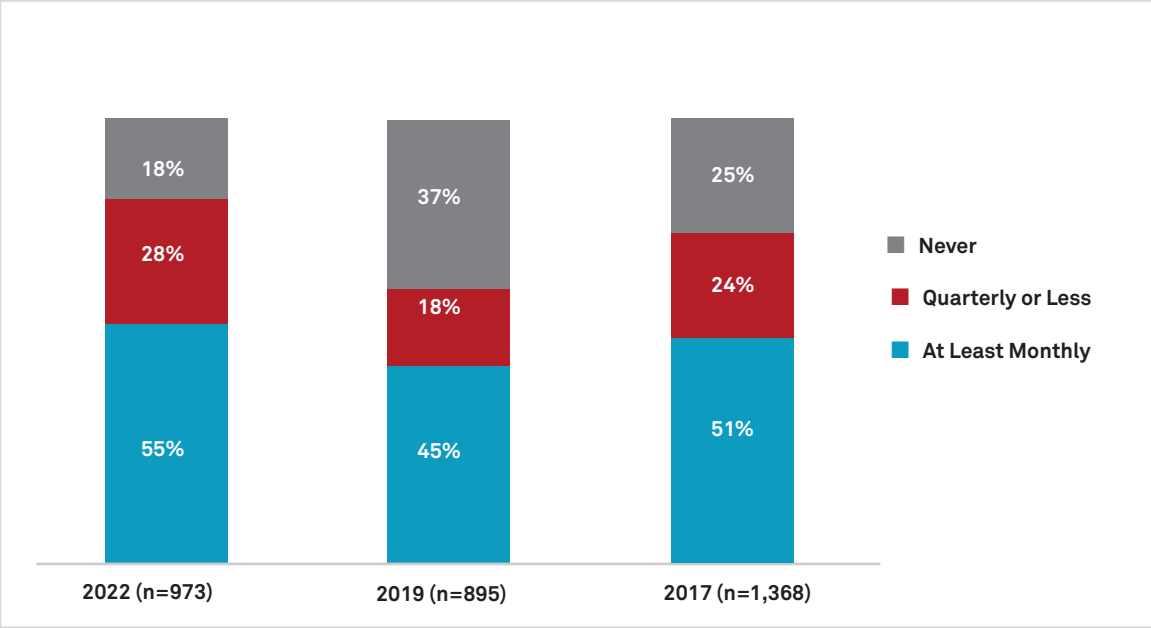
Figure B-4: Percent of Respondents Who Provide Advice on Implications of Test Results on Molecular Diagnostics, 2017-2022



- Over one-half of respondents—55%—reported that they give advice on implications of test results on molecular diagnostics at least monthly. This represents an increase from the 2017 and 2019 Practice Characteristics Surveys.
- Another 28% of respondents reported that they provide such advice quarterly or less frequently, compared to 18% who reported doing so in the 2019 survey and 24% who reported doing so in the 2017 survey.
- Overall, only 18% of respondents reported that they never provide advice on implications of test results on molecular diagnostics, a substantial decrease from 2019 and 2017 surveys.

Source:
Q10 - How often do you provide the following services? (Advice on implications of test results on molecular diagnostics).

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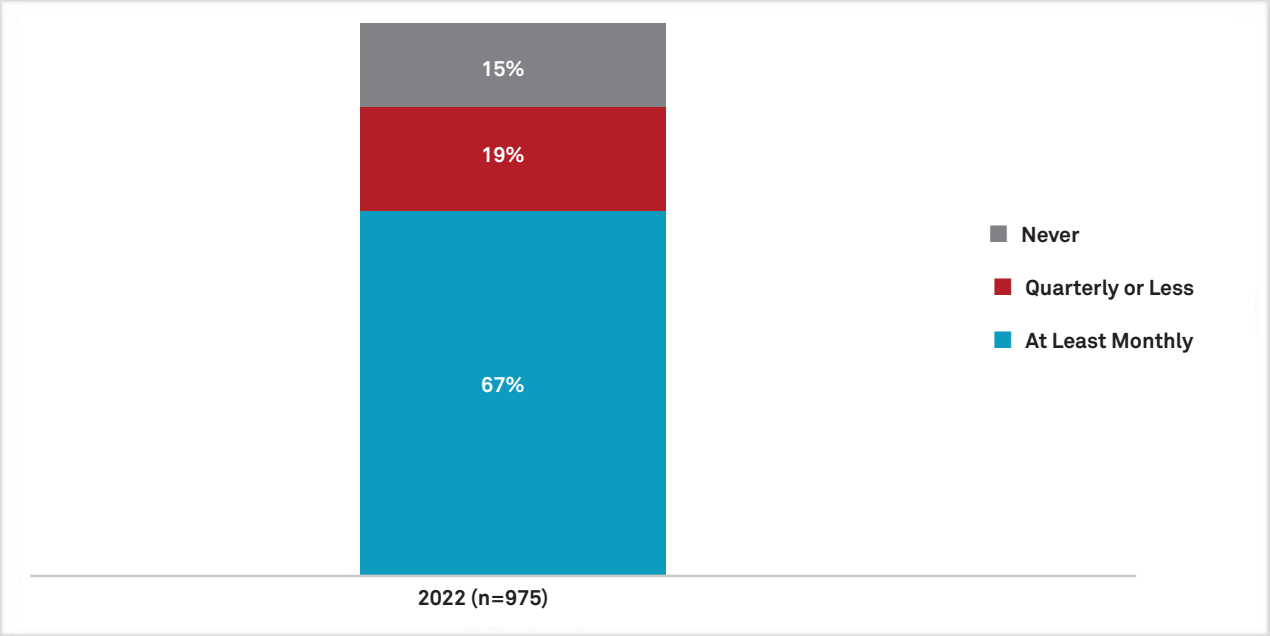
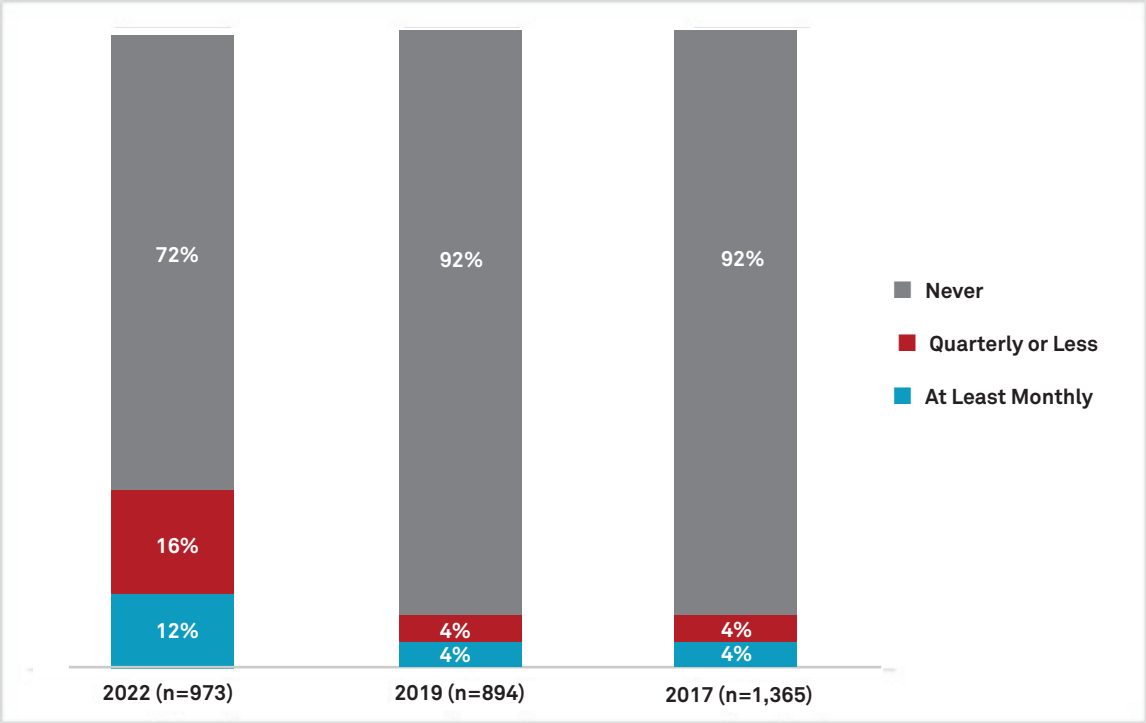
Figure B-5: Percent of Respondents Who Provide Advice to Other Health Care Providers on Non-Molecular Diagnostics, 2022



- Eighty-five percent of respondents reported that they provide advice to other health care providers on issues such as chronic care monitoring, test selection, treatment options, drug selection and optimal dosing, predictive information and wellness/preventive care, and/or implications of clinical pathology (CP) test results.
- Of this total, 67% provide such advice at least monthly, and 19% provide it quarterly or less.
- We did not have sufficient data to compare this to prior years' surveys.

Source:
Q10 - How often do you provide the following services? (Advice to other health care providers; eg, on chronic care monitoring, test selection, treatment options, drug selection and optimal dosing, predictive information and wellness/ preventative care, implications of CP test results).

Figure B-6: Percent of Respondents Who Have Discussions with Patients about the Interpretation of Test Results via Online Patient Portals, 2017-2022



- There was a statistically significant increase from our 2017 and 2019 surveys in the percentage of respondents who discuss interpretation of test results with patients via online portals.
- Twenty-eight percent of respondents reported having had such discussions in 2022—12% at least monthly, and 16% quarterly or less.
- By contrast, in both 2017 and 2019, only 8% of respondents reported having had such conversations via online portals — 4% at least monthly and 4% quarterly or less often.

Source:
Q10 - How often do you provide the following services? (Discussion with a patient about the interpretation of test results via online patient portals).

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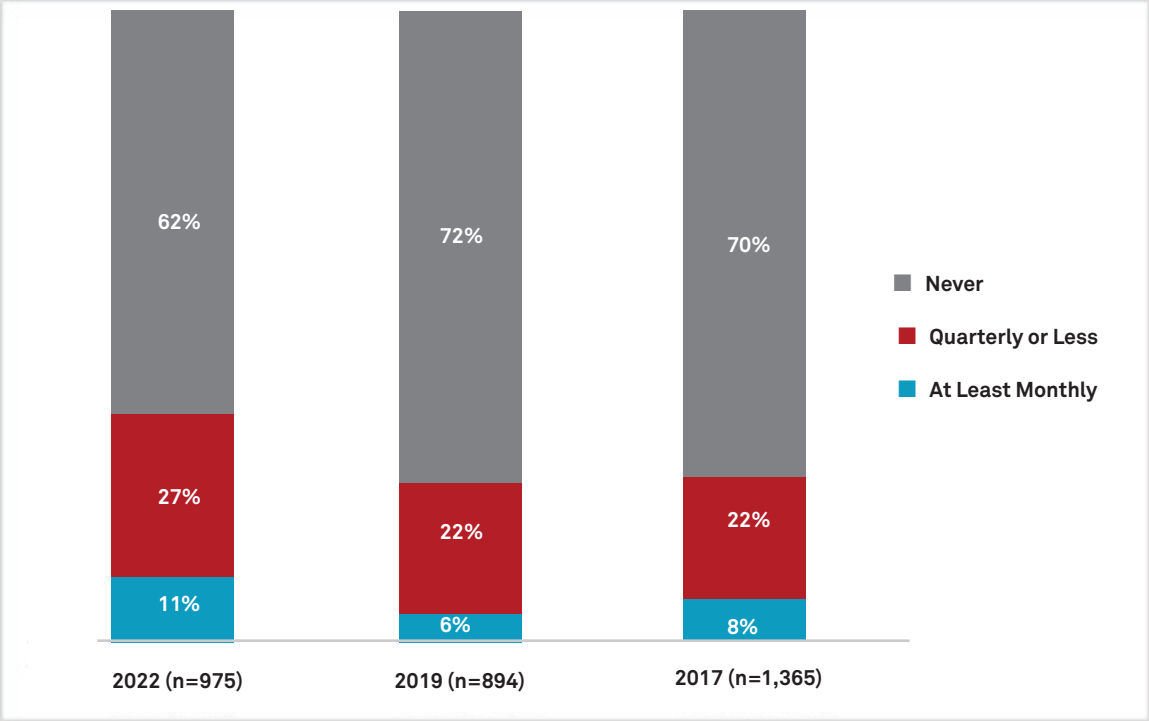
Figure B-7: Percent of Respondents Who Have Discussions with Patients about the Interpretation of Test Results via Telephone or Virtual Visit, 2017-2022



- The percentage of respondents who discuss test results with patients via telephone or virtual visits also increased since 2019, albeit not as substantially as did discussion through online portals.
- Thirty-eight percent of respondents reported having had such discussions via telephone or virtual visits in 2022—11% at least monthly, and 27% quarterly or less.
- By contrast, in both 2017 and 2019, about 30% of respondents reported having had such conversations via telephone or virtual visits — 6% (in 2019) to 8% (in 2017) at least monthly and 22% (in both years) quarterly or less often.

Source:
Q10 - How often do you provide the following services? (Discussion with a patient about the interpretation of test results via telephone or virtual visit.).

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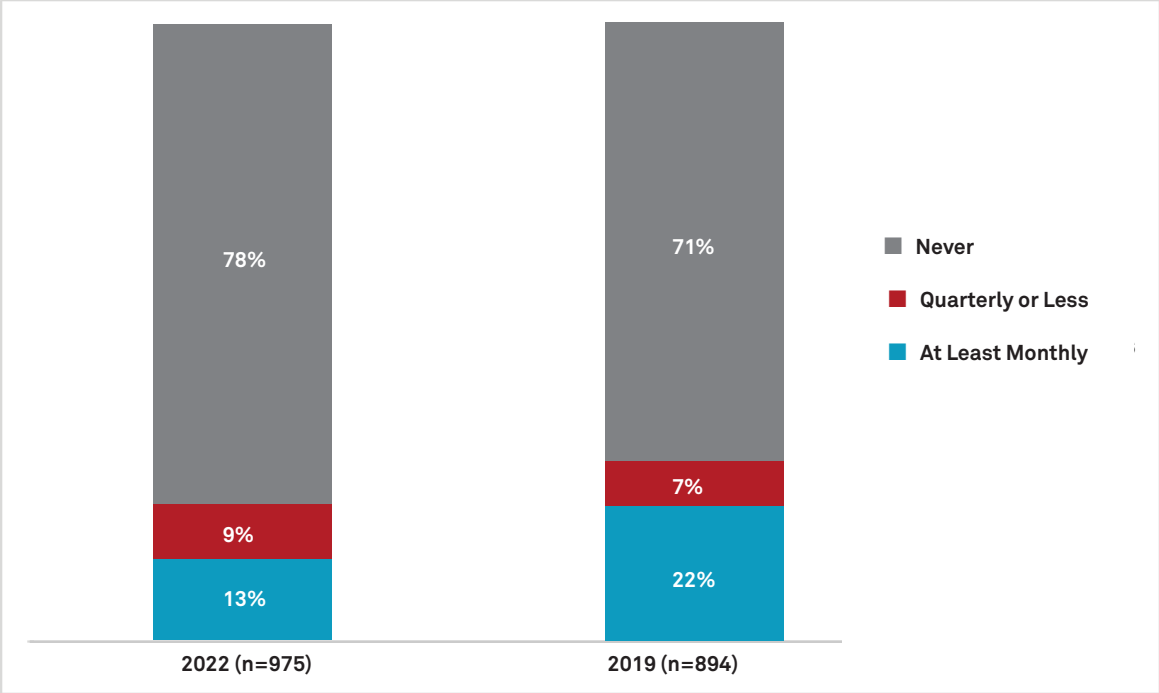
Figure B-8: Percent of Respondents Performing Fine Needle Aspiration (FNA), 2019-2022



- The share of respondents who reported that they perform fine needle aspirations (FNAs) decreased from the 2019 Practice Characteristics Survey.
- The share of respondents who reported performing FNAs as least monthly fell from 22% in 2019 to 13% in 2022. The share who reported performing FNAs quarterly or less often increased slightly between the two survey years, from 7% of respondents in 2019 to 9% in 2022.
- Future surveys will allow for an assessment of whether the decrease observed in this year's survey is a one-time anomaly (due, perhaps, to lower demand for FNAs due to the COVID-19 pandemic) or if it is the beginning of a trend of fewer pathologists performing FNAs.

Source:
Q10 - How often do you provide the following services? (Performance of fine needle aspiration);

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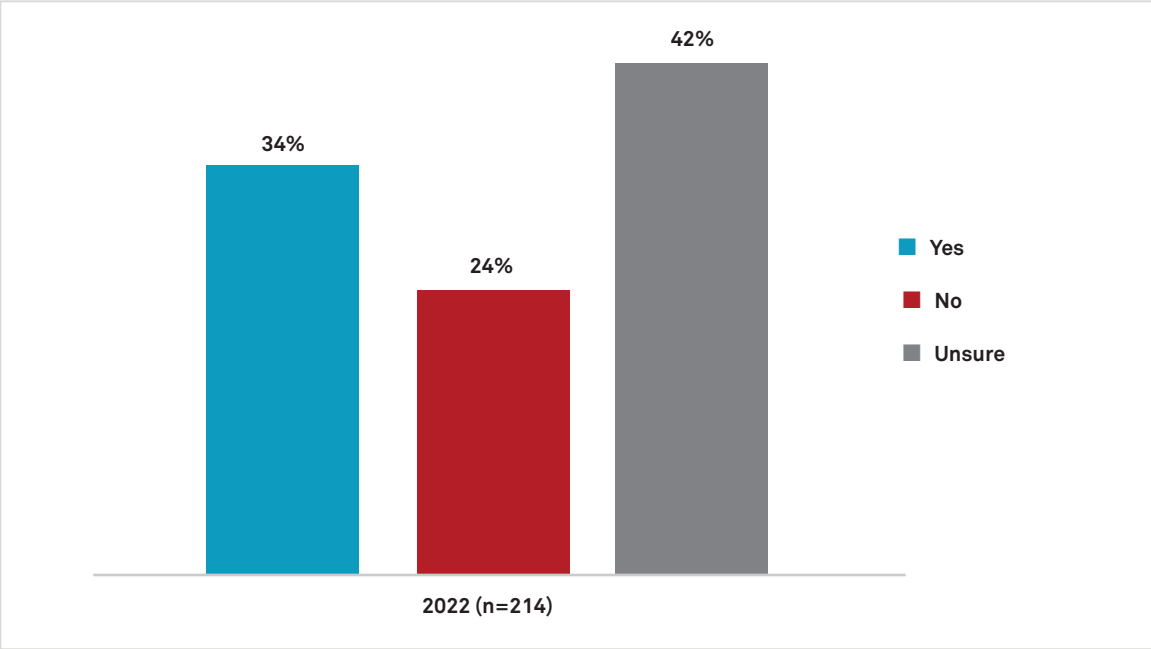
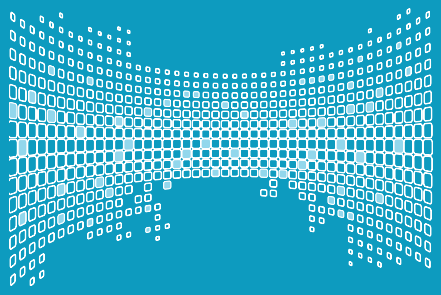
Figure B-9: Denial of Reimbursement for the Professional Component of Clinical Pathology (PC of CP)



- Practice leaders (eg, practice owners, heads of practice, department chairs) were asked whether their practice had been denied reimbursement for the professional component of clinical pathology (PC of CP) by any payer within the last 12 months.
- Just over one-third of respondents — 34% — replied that they or their practice had been denied reimbursement for the PC of CP by a payer, while 24% said they had not been denied payments for such services. 42% were unsure of whether they had been denied payment for these services.

Source:
Q12 - In the last 12 months, have you or your practice been denied reimbursement for the professional component of clinical pathology by any payer?

Q28 - Are you the person who knows the most about the business aspects of your practice (eg, practice owner, academic department chair, head of practice, etc.).

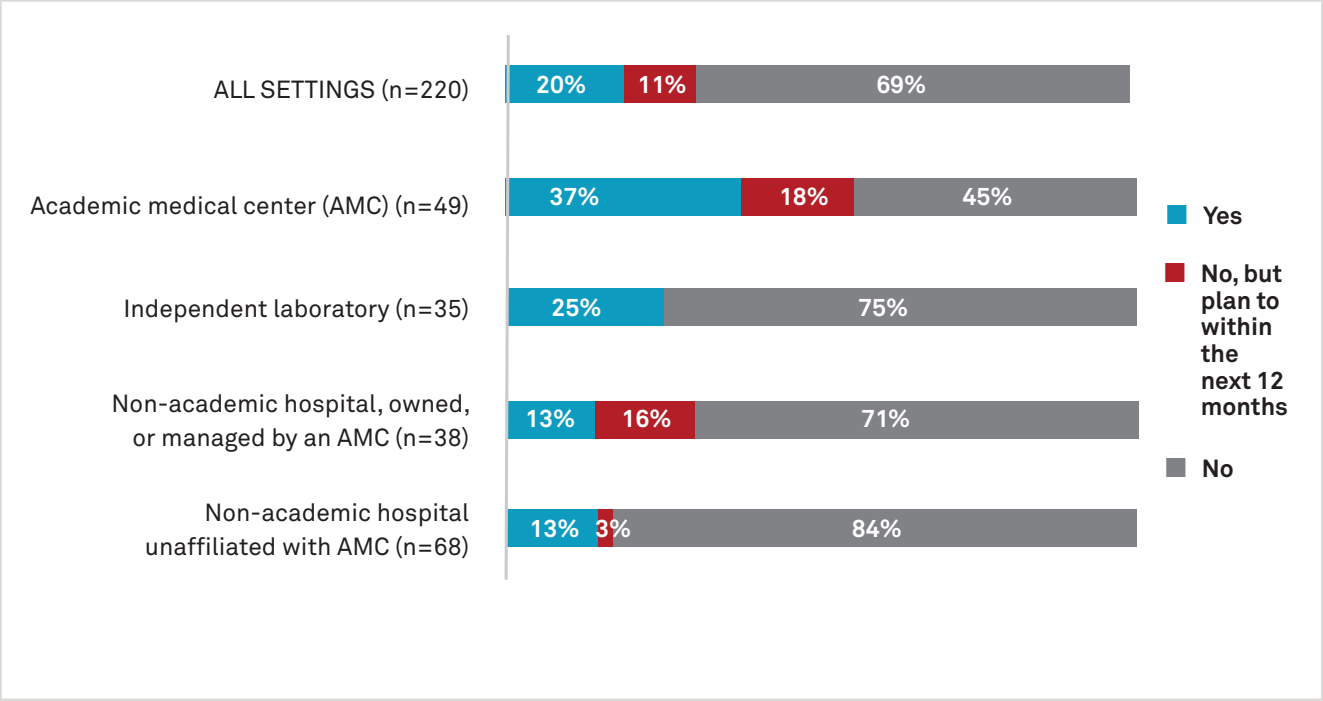


C. Digital Pathology and Remote Sign-Out

This section summarizes data on:

- Rates of use of whole slide imaging by pathology practices
- Added costs of whole slide imaging
- Barriers to Adoption of Whole Slide Imaging
- Respondents' use of remote sign-out
- Ways in which remote sign-out is utilized

Figure C-1: Percent of Practice Leaders Whose Practices Digitize Slides for Whole Slide Imaging (WSI), by Setting



- To obtain an estimate of how many pathology practices are digitizing slides for whole slide imaging (WSI), our analysis focuses on practice leaders who responded to the question "Does your practice digitize slides for whole slide imaging?"

- Overall, 20% of practice leaders reported that their practice digitizes slides for WSI. But that percentage varies by setting. For example, 37% of practice leaders based in academic medical centers reported that WSI is used in their practice, and an additional 18% expect their practices to start digitizing slides for WSI within the next 12 months.

- By contrast, 25% of practice leaders based in independent laboratories report that their practices digitize slides for WSI, and 13%based in non-academic hospitals reported that they currently digitize slides for use in WSI. While 16% of practice leaders based in non-academic hospitals owned, managed, or affiliated with an AMC expect their practices to start using WSI within the next 12 months, only 3% of those unaffiliated with an AMC expect to do so.

Source:
Q13 - Does your practice digitize slides for whole slide imaging?

Figure C-2: Uses of Whole Slide Imaging

	% of Respondents Using Whole Slide Imaging (n=291)	% of All Respondents (n=974)
Education and training, including CME	74%	22%
Research	55%	16%
Intradepartmental consultations	49%	15%
Filing/archiving slide images (in lieu of saving glass slides)	41%	12%
Primary diagnosis	40%	12%
Interpretation of special studies performed at a reference laboratory (eg, immunohistochemistry)	24%	7%
Extradepartmental consultations	21%	6%
Medicolegal cases/review	9%	3%
Other	4%	1%
Tumor Boards	3%	1%

- Respondents whose practices digitize slides for WSI were asked how WSI is used in their practice.
- Forty percent of practice leaders whose practices digitize slides for WSI (12% of all respondents) use WSI for primary diagnosis.
- Far more practices reported using WSI for education and training (74% of those using WSI; 22% of all respondents); research (55% of those using WSI; 16% of all respondents); and interdepartmental consultations (49% of those using WSI; 15% of all respondents).
- A substantial percentage of respondents also use WSI for filing/arching slide images, interpretation of special studies performed at a reference laboratory, and extradepartmental consultation.

Source:
Q14 - How is whole-slide imaging used in your practice? (select all that apply).

Figure C-3: Added Costs of Whole Slide Imaging (n=276)

	% of Respondents Whose Practice Uses Whole Slide Imaging
Data storage	84%
Equipment	83%
Non-physician time	70%
Other physician work (eg, quality assurance, validation)	41%
Physician interpretation	36%
No additional cost for using whole slide imaging	4%
Other	3%

- Respondents who said that they or their practice digitize slides for WSI, regardless of whether they were practice leaders, were asked which aspects of WSI added costs to their practice when compared to the costs of using a microscope.
- More than 80% of these respondents (ie, those whose practices use WSI) cited data storage and equipment as sources of additional costs relative to using a microscope. Seventy percent cited non-physician time as a source of additional cost.
- Two aspects of additional physician work—physician interpretation and "other physician work" (eg, quality assurance, validation) were also cited by a substantial number of respondents who use WSI as sources of additional costs to their practices.

Source:
Q15 - When compared to using a microscope, which of the following aspects of whole slide imaging add cost to your practice? (select all that apply).

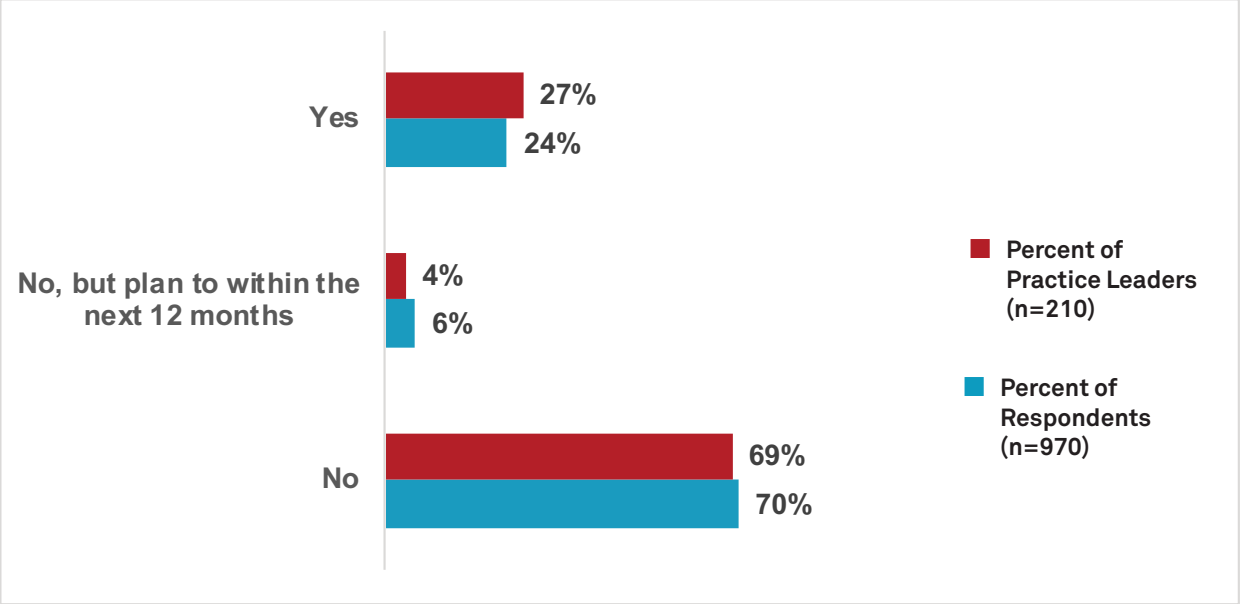
Figure C-4: Barriers to Implementation of Whole Slide Imaging (n=554)

	% of Respondents Whose Practice Do Not Use Whole Slide Imaging
Equipment cost	67%
IT infrastructure	64%
Demonstrating economic viability	53%
Data storage cost	50%
Other administrative challenges (eg, additional accreditation standards, validation, competency)	46%
Availability of non-physician personnel	42%
Cost of non-physician time	36%
Additional physician time and/or intensity	35%
Other	9%
I don't see any barriers	5%

- Respondents whose practices did not digitize slides for WSI were asked what they felt were the barriers that prevented their practice from implementing WSI.
- The most frequently cited barriers included equipment cost (cited by 67% of respondents whose practices are not using WSI) and IT infrastructure (cited by 64% of these respondents).
- Other top barriers to implementing WSI were demonstrating economic viability (53%), data storage cost (50%), "other administrative challenges" (46%) and the availability of nonphysician personnel (42%).

Source:
Q16 - What barriers, if any, do you feel prevent your practice from implementing whole slide imaging? (select all that apply).

Figure C-5: Percent of Respondents That Perform Remote Sign-Out of Any Kind



- Twenty-seven percent of practice leader respondents—and 24% of respondents overall—reported that they perform remote sign-out of any kind. An additional 4% of practice leaders and 6% of respondents overall reported that they do not currently perform any kind of remote sign-out, but plan to do so within the next 12 months.

Source:
Q17 - Do you perform any form of remote sign-out?

Figure C-6: Utilization of Remote Sign-Out, 2021-2022

	2022 Practice Characteristics Survey (June 2022) (n=970)	2021 COVID-19 Pathologist Impact Survey (Feb. 2021) (n=560)
Digital pathology primary diagnosis	8.2%	8.0%
Glass slides transported to remote site (eg, home, hotel, etc.)	6.7%	6.6%
Interpretation of other pathology tests (eg, flow, molecular, electrophoresis)	14.2%	6.3%
Other	2.0%	2.1%

- About 8.2% of all respondents use digital pathology for primary diagnosis as a tool for remote sign-out, a figure similar to that found in the CAP COVID-19 Pathologist Impact Survey, conducted in early 2021. Also, 6.7% of all respondents transport glass slides to remote sites, a nearly identical share to the 2021 survey.

- There was a substantial increase from 2021 in the share of respondents who use remote sign-out for interpretation of other pathology tests. In this year's survey, 14.2% of all respondents reported that they use remote sign-out for this purpose, compared to 6.3% of respondents in the early 2021 COVID-19 Pathologist Impact Survey.

Source:
Q18 - Which of the following have you used for remote sign-out? (select all that apply);

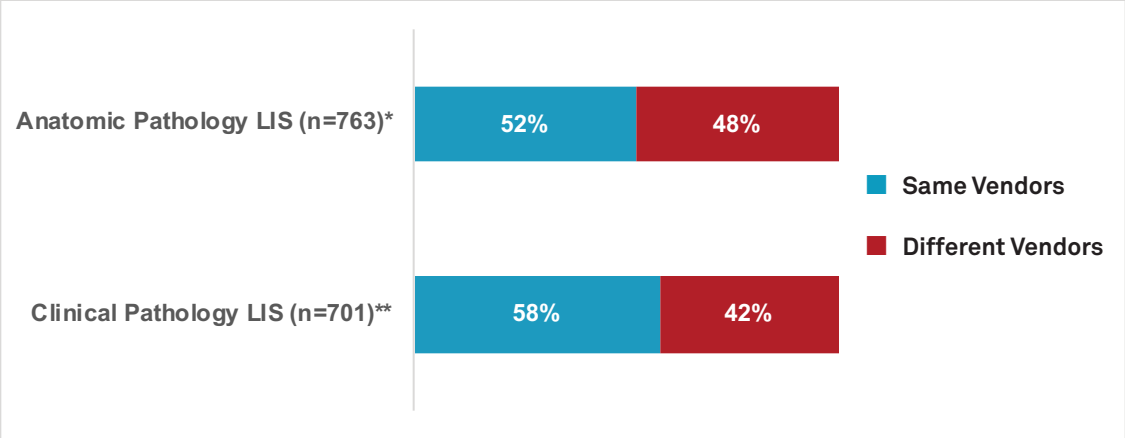
2021 CAP COVID-19 Pathologist Impact Survey

D. Laboratory Information Systems (LISs)

This section summarizes data on:

- LIS-EHR Directionality
- LIS Demographic Data Capture Rates

Figure D-1: Relationship between Laboratory Information Systems (LIS) and Electronic Health Records (EHR)

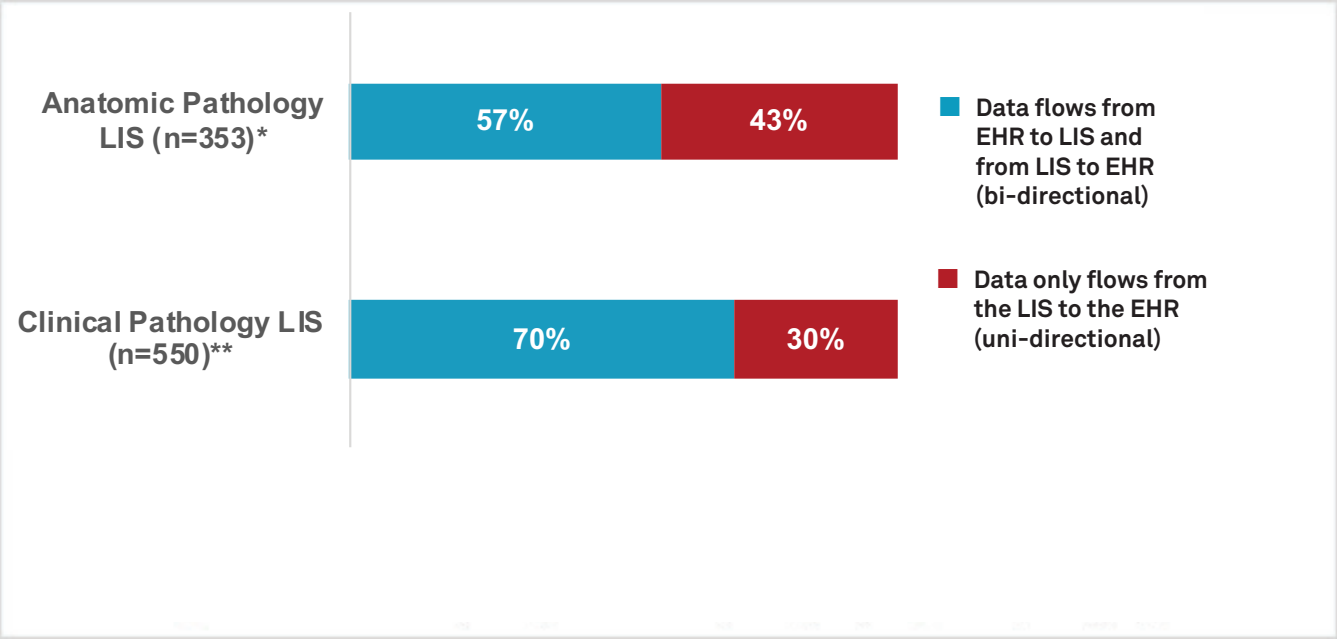


*Excludes 113 "unsure" responses **Excludes 151 "unsure" responses

- Respondents were asked whether their laboratory's clinical and anatomic laboratory information systems (LIS) were from the same vendor as their hospitals' electronic health record (EHR) system, or if they were from different vendors.
- For both CP and AP LISs, more than half of the systems were from the same vendor–58% (n=701) reported that their CP LIS was from the same vendor as the EHR, and 52% (n=763) reported their AP LIS was from the same vendor as the EHR.

Source:
Q22 - Are your laboratory's clinical and anatomic laboratory information systems (LIS) from the same vendor as your hospital's EHR system or are they from different vendors?

Figure D-2: Bi-directionality of LISs and EHRs

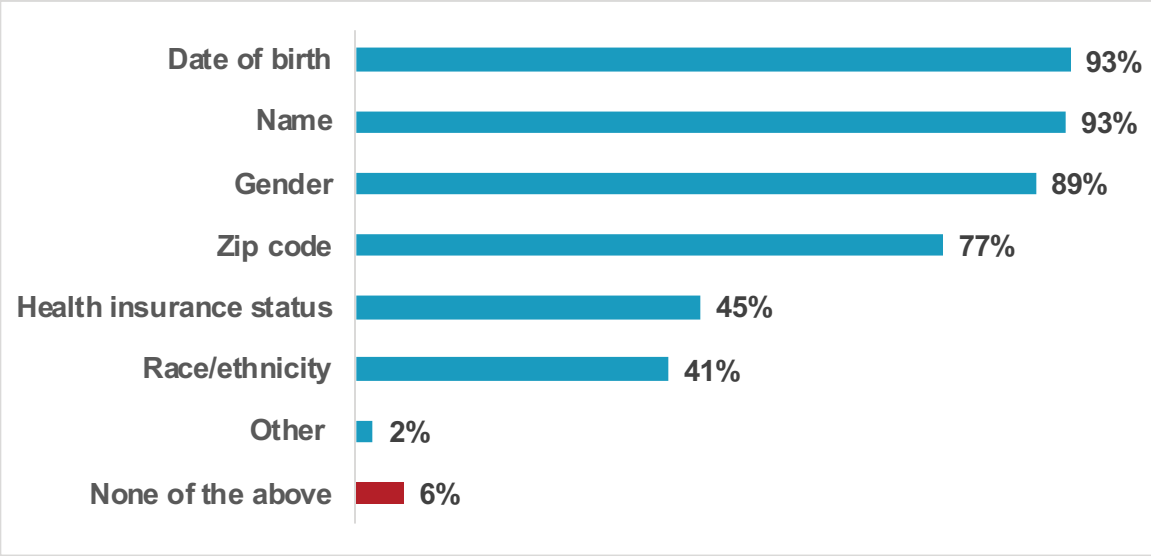


*Excludes 224 "unsure" responses **Excludes 281 "unsure" responses

- Respondents were also asked whether the data flows between their LIS and EHR were bi-directional (ie, if data flowed both ways between the LIS and the EHR) or uni-directional (ie, if data flowed only from the LIS to the EHR).
- 70% (n=550) reported that their CP LIS was bi-directional with respect to their hospital EHR, and 57% (n=353) reported that their AP LIS was bi-directional with respect to the hospital EHR.

Source:
Q23 - With respect to your hospital EHR, does your laboratory data easily flow from the EHR to your LIS (ie, is the data bi-directional) or does data only flow from the LIS to the EHR (uni-directional)?

Figure D-3: Patient Demographic Data Uploaded from the Hospital's EHR into LIS (n=663)



*Excludes 211 "Unsure" responses.

- Respondents reported on what kinds of data were consistently uploaded from their hospital's EHR to their LIS.
- Nearly 90% or more respondents (n=663) reported that patients' date of birth, name, and gender were consistently uploaded from the hospitals' EHR to the LIS. Nearly 80% reported that patient ZIP code was uploaded as well.
- Patients' health insurance status and race/ethnicity were uploaded to fewer than half of the LISs from the hospital EHRs (45% and 41% respectively).

Source:
Q24 - Which of the following patient demographic data from your hospital's EHR are uploaded into your LIS consistently? (select all that apply).

Figure D-4: Patient Demographic Data Uploaded from the Hospital's EHR into the LIS, by LIS / EHR Directionality

	Anatomic Pathology LIS		Clinical Pathology LIS	
	Bi-directional (n=351)	Uni-directional (n=265)	Bi-directional (n=386)	Bi-directional (n=386)
Name	88%	66%	85%	67%
Date of birth	88%	66%	86%	69%
Gender	85%	62%	83%	63%
ZIP Code	53%	26%	50%	25%
Health insurance status	51%	24%	48%	21%
Race/ethnicity	44%	25%	43%	25%
Unsure	11%	25%	12%	25%
None of the above	1%	8%	2%	7%
Other	2%	1%	3%	1%

*Excludes "Unsure" responses.

- Bi-directional LISs tend to have higher rates of demographic data reported than do unidirectional systems. This applies for both AP and CP LISs.
- For example, while over 80% of bi-directional AP and CP LISs consistently receive data from the EHR on patient name, date of birth, and gender, fewer than 70% of unidirectional LISs do so.
- For data on ZIP code, health insurance status, and race/ethnicity, bi-directional LISs are about twice as likely to have data consistently uploaded from the EHR as are unidirectional LISs.

Source:
Q23 - With respect to your hospital EHR, does your laboratory data easily flow from the EHR to your LIS (ie, is the data bi-directional) or does data only flow from the LIS to the EHR (uni-directional)?

Q24 - Which of the following patient demographic data from your hospital's EHR are uploaded into your LIS consistently? (select all that apply).

E. Compensation and Benefits

This section summarizes data on:

- Trends in pathologist compensation
- Pathologist benefits received

Figure E-1: Pathologist Compensation, by Setting and Years in Practice, 2021

		Salary			Total Compensation		
		Academic Medical Centers	Non-Academic Hospitals (All)	Independent Laboratories	Academic Medical Centers	Non-Academic Hospitals (All)	Independent Laboratories
≤ 3 years in practice	n	20	13	<10	20	13	<10
	25th percentile	$207,500	$235,000	*	$208,750	$260,060	*
	Median	$214,250	$283,000	*	$227,500	$292,500	*
	75th percentile	$220,250	$300,000	*	$245,970	$345,000	*
	Mean	$201,498	$261,692	*	$216,573	$300,658	*
4-10 years in practice	n	114	80	21	114	81	21
	25th percentile	$210,000	$240,000	$240,000	$220,000	$260,000	$276,724
	Median	$230,000	$270,000	$272,000	$241,000	$315,000	$312,000
	75th percentile	$265,000	$309,000	$300,000	$290,000	$390,000	$371,000
	Mean	$243,996	$271,948	$288,619	$265,455	$335,610	$340,273
11-20 years in practice	n	83	74	24	83	74	24
	25th percentile	$250,000	$253,500	$287,250	$256,065	$312,100	$318,750
	Median	$279,000	$310,000	$312,500	$300,000	$369,000	$360,500
	75th percentile	$320,000	$397,500	$363,750	$331,000	$465,750	$396,250
	Mean	$286,668	$360,095	$330,316	$312,001	$430,377	$390,325
>20 years in practice	n	62	77	24	62	78	24
	25th percentile	$294,825	$250,000	$265,000	$301,250	$300,000	$309,750
	Median	$322,500	$300,000	$300,000	$376,896	$358,000	$350,000
	75th percentile	$388,750	$400,000	$362,500	$420,000	$469,500	$510,000
	Mean	$340,365	$328,442	$324,375	$395,622	$416,704	$415,958

Data does not include the cash value of employer-provided retirement contributions or other income from professional pathology services.

* Not reported because there were fewer than 10 respondents.

- We asked respondents to provide their gross income earned as a pathologist in 2021 in several categories, including base salary, signing bonus, reallocation allowance, other case compensation and other income from professional pathology services. Figure E-1 presents 2021 salary and total compensation for respondents who worked full-time and whose practices are based in academic medical centers (AMCs), non-academic hospitals, or independent laboratories.

- Although we provide data on salary for informational purposes, most of the analysis focuses on trends in total compensation. Focusing on salary in isolation can be deceptive because of the substantial variability among respondents in how much of total compensation is represented by salary. For example, median and mean salaries exceed 90% of total compensation among academic pathologists with up to 20 years in practice. However, for all other pathologist cohorts shown in Figure E-1, median and mean salaries are between 78% and 87% of the corresponding total compensation (depending on the years-in-practice cohort).

- Median pathologist total compensation tends to be substantially lower for those respondents based in academic medical centers (AMCs) than for those based in non-academic hospitals or in independent laboratories:
  - Among respondents with ≤3 years in practice, median compensation was $227,500 for those based in AMCs, compared to $292,500 for those based in non-academic hospitals. (This variance may not be representative due to the small number of observations—20 observations for those practicing in academic medical centers and only 13 observations for those practicing in non-academic hospitals).
  - There is a similar gap in total compensation among respondents with more than 3 years and fewer than 20 years in practice. For example, among those with 4-10 years in practice, median compensation was $241,000 for those based in AMCs, compared to roughly $315,000 for those based in non-academic hospitals and $312,000 for those based in independent laboratories. The trend is similar among those with 11-20 years in practice. However, median total compensation for academic pathologists with >20 years in practice was slightly higher than for their counterparts in non-academic hospitals and independent laboratories.

- The patterns observed in median compensation by year-in-practice cohort and setting is also observed when examining differences in mean compensation, with the exception of academic pathologists with >20 years in practice. For this cohort, mean total compensation is below that of their counterparts in non-academic settings.

Source:
Q26 - Please list your gross income earned as a pathologist in 2021in each of the following categories: annual base salary, signing bonus, relocation allowance, other cash compensation (bonuses, incentive compensation, profit sharing, etc.).

2019 CAP Practice Characteristics Survey Report

Figure E-2: Changes in Median Compensation for Pathologists, by Practice Setting and Years in Practice, 2018-2021

	Average Annual % Change in Median Compensation, 2018-2021		
	Academic Medical Centers	Non-Academic Hospitals (All)	Independent Laboratories
≤ 3 years in practice	+1.7%	+8.8%	*
4-10 years in practice	+ <0.5%	-1.0%	-1.9%
11-20 years in practice	+2.0%	-0.1%	-0.9%
>20 years in practice	+4.0%	-2.4%	-1.0%

* Not reported because there were fewer than 10 respondents.

- Figure E-2 shows the average annual percentage change in median compensation between 2018 (the last year for which we have data on pathologist compensation) and 2021 (data collected in this survey) for each for the year-in-practice/practice setting cohorts shown in Figure E-1.
- The largest changes were +8.8% for pathologists based in non-academic hospitals who had ≤ 3 years in practice and +4.0% for those based in academic medical centers with >20 years in practice. However, none of the differences shown in Figure E-2 were statistically significant.

Source:
Q26 - Please list your gross income earned as a pathologist in 2021 in each of the following categories: Annual base salary; Signing bonus; Relocation allowance; Other cash compensation (bonuses, incentive compensation, profit sharing, etc. Do not include the cash value of employer-provided retirement contributions; other income from professional pathology services.

2019 CAP Practice Characteristics Survey Report

Figure E-3: Employer/Practice Benefits Offered to Pathologists

Benefit	All Settings (n=945)	Practice Setting			
		Academic Medical Center (AMC) (n=386)	Non-Academic hospital owned by, affiliated with, or managed by an AMC (n=136)	Non-Academic hospital unaffiliated with an AMC (n=212)	Independent laboratory (n=113)
Paid vacation	**90%**	96%	94%	85%	77%
Health insurance	**87%**	96%	90%	78%	76%
Retirement contributions (eg, 401(k), 403(b))	**85%**	94%	84%	78%	73%
Paid malpractice premiums (all or a portion)	**80%**	83%	85%	83%	70%
Dental Insurance	**76%**	90%	74%	57%	70%
Paid CME (all or a portion)	**75%**	84%	82%	67%	64%
Paid sick time	**68%**	82%	63%	54%	46%
Life Insurance	**66%**	84%	57%	48%	53%
Short-term disability	**59%**	78%	57%	38%	49%
Long-term disability	**53%**	69%	48%	40%	39%
Tuition reimbursement other than CME (all or a portion)	**12%**	22%	5%	4%	8%
Not applicable; I am self employed	**5%**	1%	3%	8%	12%
Stock options	**5%**	1%	4%	6%	17%
Other	**3%**	2%	6%	2%	3%
Payment toward medical school loans	**2%**	1%	2%	2%	-
None, employer does not offer benefits	**1%**	1%	1%	1%	3%

- Nearly all pathologists who are not self-employed receive some form of employer-provided benefits. The most prevalent benefits are paid vacation (90% of respondents), health insurance (87%), retirement contributions (85%) and a contribution toward payment of malpractice premiums (80%).

- There is substantial variation by setting in the percent of respondents who receive these benefits.
  - o For example, at least 90% of respondents based in academic medical centers (AMCs) receive paid vacation, health insurance, retirement contributions, and dental insurance. Over 80%

Source:
Q27 - Which of the following benefits did your employer or practice offer during 2021? (select all that apply).

also receive payment toward malpractice premiums, payments toward the costs of continuing medical education (CME), paid sick time, and life insurance benefits. Nearly 80% have short-term disability insurance and nearly 70% have long-term disability insurance.

- Fewer pathologists in non-academic hospitals are provided with all these benefits. While over 80% receive paid vacation, health insurance, payments toward malpractice premiums and toward CME, fewer receive dental insurance, paid sick time, or life insurance.
- On average, the benefits package among respondents based in non-academic hospitals is richer for those whose institution is owned by, affiliated with, or managed by an AMC.
- Pathologists based in AMCs are more likely than their non-academic peers to have at least some of their continuing medical education (CME) expenses paid as an employer-provided benefit.
- Among respondents who are based in independent laboratories, 12% reported that they do not get employer-provided benefits because they are self-employed. Excluding this number, respondents based in independent laboratories tend to have comparable or better employer-provided benefits, on average, than those who work in non-academic hospitals, but not as many as those provided to respondents based in AMCs. A notable exception is stock options, which are available to 17% of respondents based in independent laboratories.

F. Workforce and Hiring

This section summarizes data from practice leaders on:

- Key indicators of the job market for pathologists, 2022 versus 2021
- Difficulty hiring pathologists relative to previous years
- Reasons for inability to fill pathologist positions
- Difficulty hiring laboratory staff
- Impact of visa issues on the consideration of candidates for open pathologist positions

Figure F-1: Key Job Market Indicators, 2022 vs 2021

	2022 (n=214) (Practice Characteristics Survey)	2021(n=282) (Practice Leader Survey)
Practices hiring at least one pathologist	59%	56%
Average number of open full-time equivalent (FTE) positions per practice	3.1%	2.4%
% of open FTE positions that are new (ie, not a replacement for an already existing position)	34.3%	45.5%
% of positions that are filled or that practice leader intends to fill	67.8%	73.6%

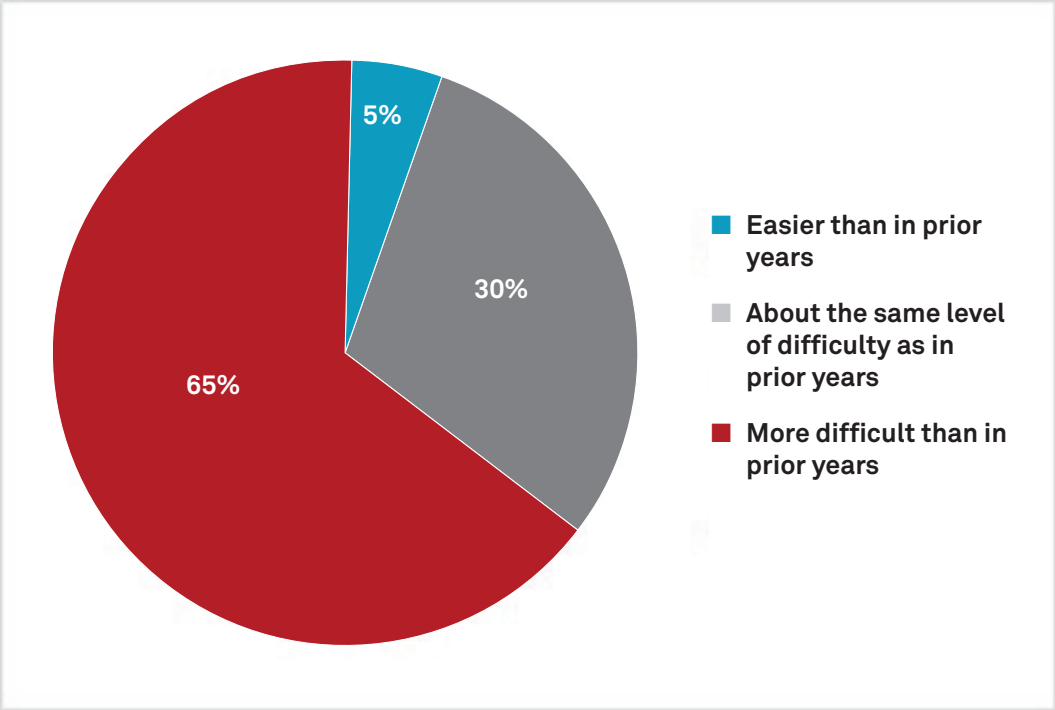
- The survey asked respondents who self-identified as practice leaders about their plans to hire pathologists in 2022. These results were compared to similar questions in the CAP's 2021 Practice Leader Survey.
- The share of practices expecting to hire at least one pathologist was similar in both years, with 59% of practice leaders expecting to hire at least one pathologist in 2022 compared to 56% in 2021. However, practices seeking pathologists in 2022 were hiring more FTE pathologists than in 2021—an average of 3.1 FTEs per hiring practice in 2022 versus 2.4 FTEs per hiring practice in 2021.
- Another difference between the 2022 and 2021 surveys was in the percentage of FTE positions that were newly created positions; ie, were not to replace vacancies of existing positions caused by retirement or other reasons. The 2022 respondents reported that just over one-third of open positions—34.3%—were "new" positions, while 2021 respondents reported that nearly one-half of open positions—45.5%—were "new".
- In addition, the 2022 survey respondents were slightly less optimistic about being able to fill their open positions. While, in 2021, practice leaders reported that they filled or intended to fill 73.6% of their open positions, in 2022 they reported that they filled or intend to fill only 67.8% of open positions.

Source:
Q30 - In your practice, how many FTE pathologist positions do you intend to fill (or have already filled) in calendar year 2022? If none, please enter "0".;

Q31 - Of the pathologist position(s) you intend to fill (or have already filled) in 2022, how many: (Do not include recruitment for residency or fellowship positions.

2021 CAP Practice Leader Survey Report

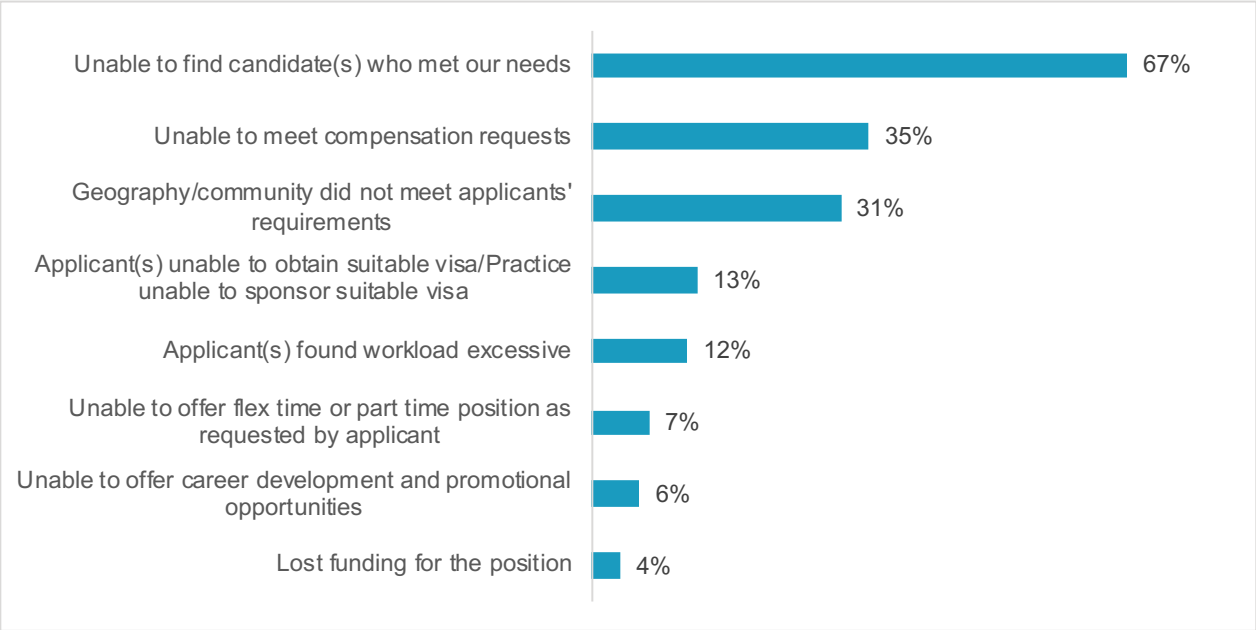
Figure F-2: Difficulty Hiring Pathologists Relative to Prior Years (n=203)



- Practice leaders who reported that their practice was planning to hire at least one pathologist in 2022 were asked whether they thought that pathologist recruitment in 2022 was easier, more difficult, or about the same level of difficulty as in prior years.
- Nearly two-thirds of these practice leaders—65%—responded that the job market was more difficult in 2022 than in previous years. Only 5% felt that the job market was easier than in prior years, while 30% felt that it was about the same level of difficulty as in prior years.

Source:
Q33 - Relative to prior years, would you say that recruitment for pathologists in 2022 has been:

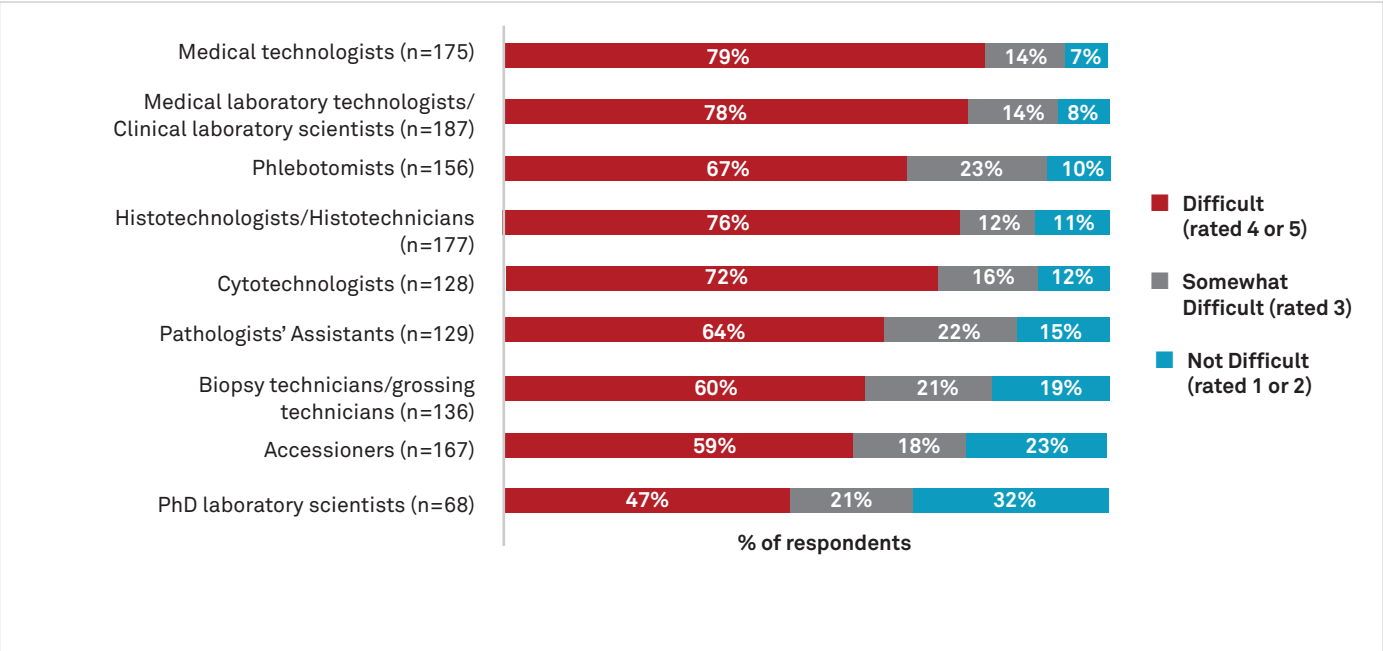
Figure F-3: Reasons for Inability to Fill Pathologists Positions (n=86)



- Respondents who could not fill their open pathologist positions—or felt that they would not be able to fill their open positions—were asked to indicate the reasons why they could not do so. Respondents could choose more than one response.
- The most widely cited barrier for filling positions is the inability to find candidates who meet their needs. This option was selected by 67% of respondents (n=86), followed by an inability to meet job candidates' compensation requests (35%) and that the geography/community did not meet the job applicants' requirements (31%).
- Visa issues—either an inability of the applicant to obtain a suitable visa or of the practice to sponsor the applicant for a visa—were cited by 13% of respondents. In addition, 12% reported that the applicant found the workload to be excessive.

Source:
Q32 - If your practice was unable to fill positions, please indicate the reasons: (select all that apply).

Figure F-4: Difficulty Hiring Laboratory Staff



- Practice leaders were asked to rate on a five-point scale how difficult it has been to hire various types of laboratory staff. A rating of 4 or 5 is considered "difficult", a rating of 3 is considered "somewhat difficult", and a rating of 1 or 2 is considered "not difficult".

- With one exception (for PhD laboratory scientists), nearly 60% or more of practice leader respondents reported that it was "difficult" to hire laboratory staff. The greatest level of difficulty was for medical technologists (79%), medical laboratory technologists/ clinical laboratory scientists (78%), histotechnologists/ histotechnicians (76%), and cytotechnologists (72%).

- Even though 32% reported it was not difficult to hire PhD laboratory scientists, 47% still found it difficult to hire for this position.

- There were only three areas where more than 15% of respondents reported that it was not "difficult" or "somewhat difficult" to hire laboratory staff: biopsy technicians/grossing technicians (19% reported hiring as "not difficult", accessioners (23%), and PhD laboratory scientists (32%).

Source:
Q36 - Within the past 12 months, how difficult has it been for your laboratory/practice to hire the following laboratory staff?

Figure F-5: Impact of Visa Issues on Consideration of Candidates for Open Pathologist Positions (n=220)

In the last two years, did visa issues prevent your practice from either considering or hiring candidates for an open position?	
Visa issues prevented us from considering certain candidates*	20%
Yes, visa issues prevented us from hiring certain candidates*	10%
No, visa issues had no impact on our hiring	10%
Unsure	7%

*Includes 10 respondents (4.5%) who said that visa issues prevented them from both considering and from hiring certain candidates.

- Practice leaders were asked whether visa issues prevented their practice from either considering certain candidates for open pathologist positions or from hiring certain candidates for these positions.
- Overall, 25% of practice leaders reported that visa issues had an impact on their hiring decisions—20% of practice leaders reported that visa issues had prevented their practice from considering certain candidates for open positions, and 10% had prevented them from hiring certain candidates. (Five percent of practice leaders reported that visa issues prevented their practice from both considering and hiring certain candidates.)

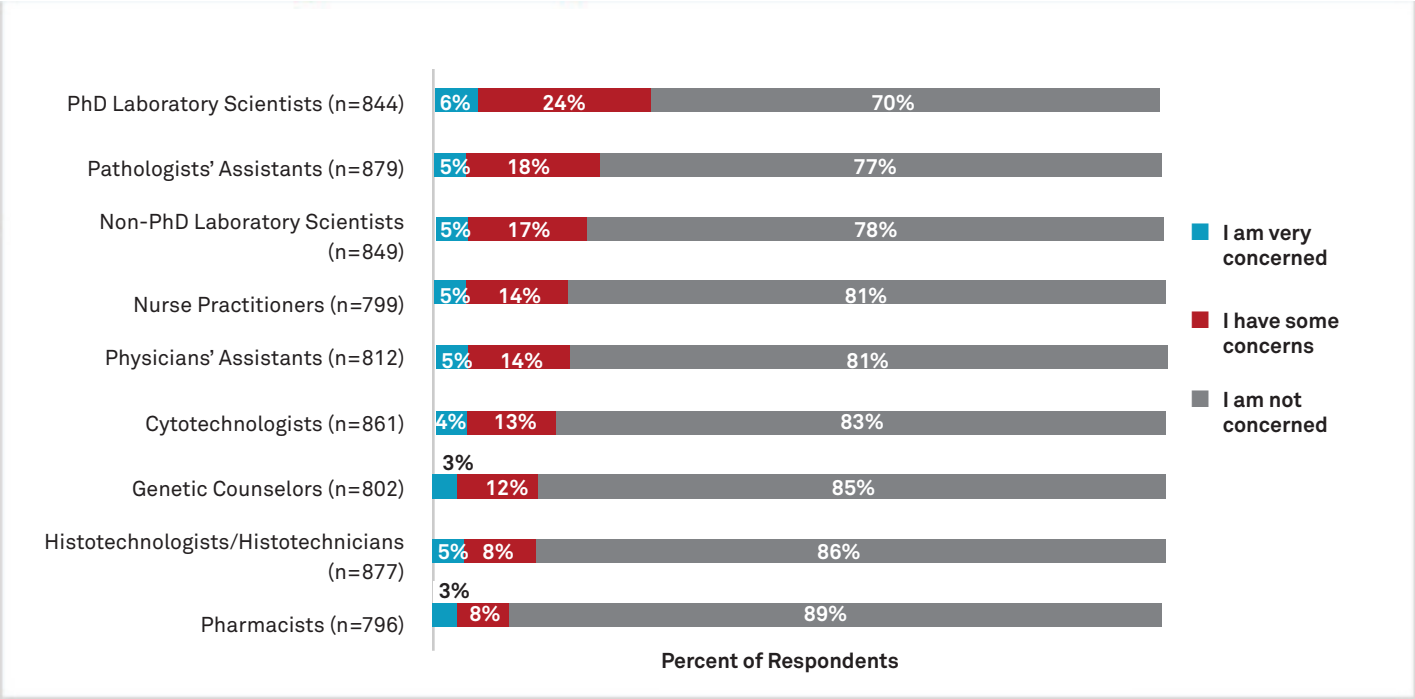
Source:
Q34 -In the last two years, did visa issues prevent your practice from either considering or hiring candidates for an open position? (Select all that apply).

G. Scope of Practice Issues

This section summarizes data on:

- Pathologists concerns about threats or infringements to their role as a pathologist in their practice
- The level of actual infringements that respondents have experienced in the last 24 months

Figure G-1: Concerns About Threats or Infringements to Pathologist Scope of Practice (Medical Decision-Making)



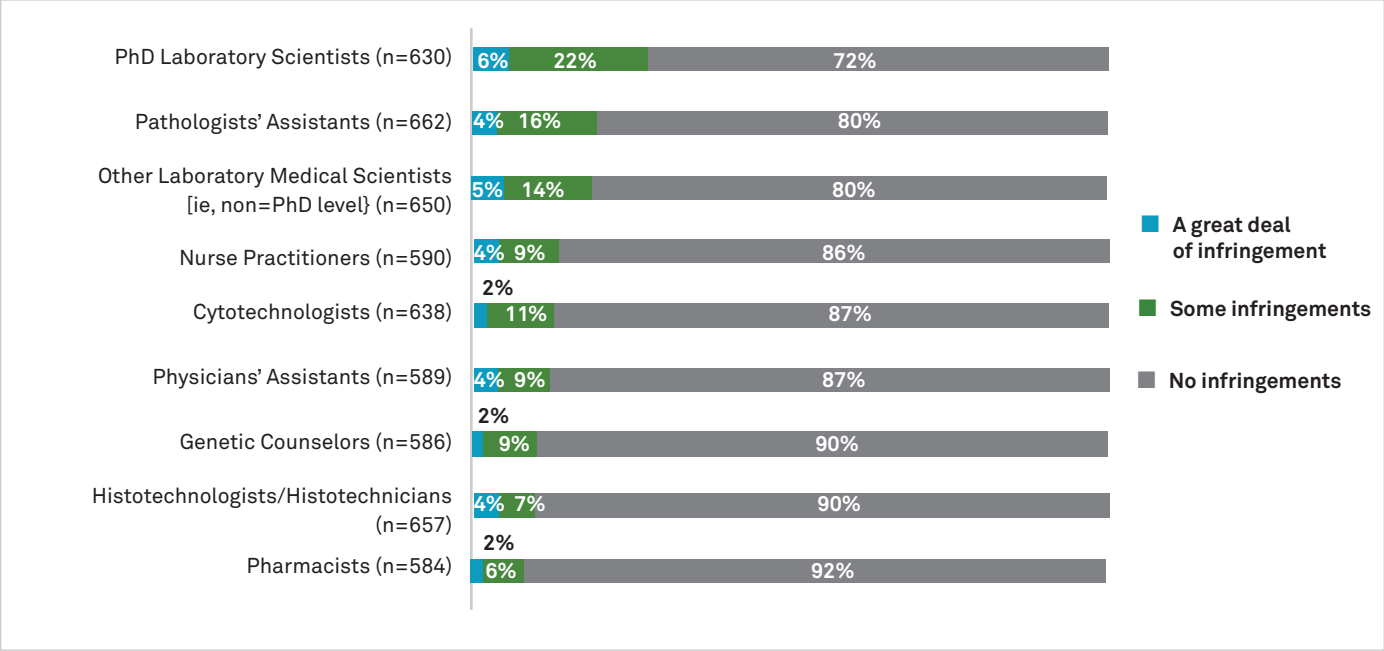
- Respondents were asked whether they had any concerns about threats or infringements to their medical decision-making role as a pathologist in their practice from various laboratory or medical professionals.

- The share of respondents who were "very concerned" about threats or infringements to pathologist scope of practice ranged from between 3% (for pharmacists and genetic counselors) to 6% (for PhD laboratory scientists).

- Greater numbers of respondents reported that they had "some concerns" about threats to infringements to pathologist scope of practice from some of these professions. For example, 24% of respondents had some concerns about scope of practice infringements from PhD laboratory scientists; 28% had some concerns about pathologists' assistants, and 17% had some concerns about non-PhD medical scientists. Fewer than 15% of respondents had "some concerns" about scope of practice threats or infringements from nurse practitioners, physicians' assistants, cytotechnologists, and genetic counselors. Eight percent had "some concerns" about such threats from histotechnologists/histotechnicians or from pharmacists.

Source:
Q37 - For each of the following professions, which of the following best describes your level of concern about threats or infringements to your role as a pathologist (medical decision-making) in your practice.

Figure G-2: Scope of Practice Infringements Experienced in Last 24 Months



- Respondents were asked to identify the level of scope of practice infringements that their practice had in the preceding 24 months—either a great deal of i nfringement, some infringements, or no infringement.

- For the most part, fewer than 5% of respondents reported their practice experiencing "a great deal of infringement" from any of these professions. The only exceptions are for PhD Laboratory Scientists (for which 6% reported a great deal of infringement) and non-PhD laboratory medical scientists (5% reported a great deal of infringement).

- A greater number of respondents reported their practice had experienced "some infringements" to pathologist scope of practice from some of these professions. For example, 22% reported "some infringements" from PhD laboratory scientists; 16% from pathologists' assistants, and 14% from non-PhD medical scientists. Roughly 10% of respondents reported that their practice had experienced "some infringements" in pathologist scope of practice from nurse practitioners, physicians' assistants, cytotechnologists, and genetic counselors. Smaller numbers reported any infringements from histotechnologists/histotechnicians or from pharmacists.

Source:
Q37 - For each of the following professions, which of the following best describes the level of infringement your practice has experienced in the past 24 months.

Appendix—Respondents by State/Territory

State or Territory	Number of Responses	Percent of Responses
Alabama	8	0.8%
Alaska	1	0.1%
Arizona	12	1.2%
Arkansas	10	1.0%
California	117	11.2%
Colorado	22	2.1%
Connecticut	16	1.5%
Delaware	5	0.5%
District of Columbia	6	0.6%
Florida	42	4.0%
Georgia	26	2..5%
Hawaii	4	0.4%
Idaho	4	0.4%
Illinois	45	4.3%
Indiana	16	1.5%
Iowa	8	0.8%
Kansas	11	1.1%
Kentucky	13	1.2%
Louisiana	12	1.2%
Maine	1	0.1%
Maryland	23	2.2%
Massachusetts	28	2.7%
Michigan	31	3.0%
Minnesota	13	1.2%
Mississippi	13	1.2%
Missouri	21	2.0%
Montana	2	0,2%
Nebraska	10	1.0%
Nevada	1	0.1%
New Hampshire	5	0.5%
New Jersey	28	2.7%
New Mexico	11	1.1%
New York	81	7.8%
North Carolina	48	4.6%
North Dakota	5	0.5%

Ohio	57	5.5%
Oklahoma	11	1.1%
Oregon	11	1.1%
Pennsylvania	56	5.4%
Puerto Rico	2	0.2%
Rhode Island	5	0.5%
South Carolina	12	1.2%
South Dakota	6	0.6%
Tennessee	22	2.1%
Texas	75	7.2%
Utah	8	0.8%
Vermont	6	0.6%
Virginia	22	2.1%
Washington	23	2.2%
West Virginia	4	0.4%
Wisconsin	22	2.1%
Wyoming	1	0.1%