ESG RESEARCH REPORT

The Life and Times of Cybersecurity Professionals 2021

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A Cooperative Research Project by ESG and ISSA

ISSA
Information Systems Security Association
International

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In early 2021, the Enterprise Strategy Group (ESG) and the Information Systems Security Association (ISSA) conducted the fifth annual research project focused on the lives and experiences of cybersecurity professionals. This year's report is based on data from a global survey of 489 cybersecurity professionals.

The cybersecurity skills gap discussion has been going on for over 10 years, and the data gathered for this project confirms that there has been no significant progress toward a solution to this problem during the five years it has been closely researched. The skills crisis has impacted over half (57%) of organizations. The top ramifications of the skills shortage include an increasing workload (62%), unfilled open job requisitions (38%), and high burnout among staff (38%). Further, 95% of respondents state the cybersecurity skills shortage and its associated impacts have not improved over the past few years while 44% say it has only gotten worse.

What's needed to address the cybersecurity skills shortage? A holistic approach of continuous cybersecurity education (starting with public education) and comprehensive career development, mapping, and planning—all with support and integration with the business. This may seem like a big undertaking, but the research also points to one simple change organizations can make: Increase cybersecurity professional compensation. Indeed, 38% of respondents believe that the lack of competitive compensation is the biggest reason the cybersecurity skills shortage is impacting their organization. In summary, it is time for organizations to:

- Increase the business value placed on security, including the creation of a culture of security at all levels of the organization.

- Offer cybersecurity career advancement opportunities and make a commitment to increased cybersecurity training across the organization.

- Include cybersecurity as part of executive planning and strategy (i.e., with executive management and the board of directors).

Based upon the data gathered as part of this project, the report additionally concludes:

- **Cybersecurity professionals depend upon hands-on experience, basic certifications, and networking.** Information security professionals agree that standard certifications like a CISSP are a professional requirement. Beyond a few common certifications however, the ESG/ISSA data indicates that career progression is really tied to hands-on experience and taking advantage of professional networks. These are essential for beginning a cybersecurity career, skills development, and finding different job opportunities regardless of expertise or experience levels. Certifications should be used to supplement and not replace more practical education vehicles.

- **Security career success and happiness depends upon strong collaboration.** Cybersecurity professionals are happiest when they are asked to participate directly in all IT planning but grow frustrated when they are relegated to a technology administration role and forced to address security needs in later phases of projects. The same is true of the security team's relationship with business management: They want to participate in business planning, but they are often shut out of meetings and not considered in the development of strategic plans. To improve the relationship between security and IT, survey respondents suggest including security participation in all IT projects from their onset, embedding security professionals within IT functional departments and increasing cybersecurity training for IT staff. To enhance the relationship between security and business management, cybersecurity professionals recommend

encouraging cybersecurity participation in business planning, improving cyber-risk identification, and focusing cybersecurity resources on business-critical assets.

- **The cybersecurity training paradox continues and needs attention.** For the fifth straight year, the research reveals a cybersecurity training gap: 91% of respondents agree that cybersecurity professionals must keep up with cybersecurity skills or the organizations they work for are at a disadvantage against cyber-adversaries. Despite this need however, 59% of cybersecurity professionals agree that while they try to keep up with cybersecurity skills development, job requirements often get in the way. ESG and ISSA call this situation the cybersecurity training paradox. CISOs take note: This training gap is quietly increasing cyber-risks at your organization. To address this directly, CISOs must push the organization, ensuring that ample training time and resources are built into every member of the cybersecurity staff's schedule on a continual basis.

- **The cybersecurity skills shortage remains a perpetual problem with no solution in sight.** This year, 57% of organizations claim they are impacted by the global cybersecurity skills shortage. While this is a slight improvement from years past, the situation doesn't appear to be improving. In fact, 44% of survey respondents say that things have gotten worse over the past few years while 51% claim that the situation is about the same as a few years ago. Of those organizations impacted by the cybersecurity skills shortage, the biggest effects include increasing workloads on cybersecurity personnel, new jobs that remain open for weeks or months, high cybersecurity staff burnout and attrition, and an inability to learn or use security technologies to their full potential.

- **Many organizations are making basic mistakes in hiring and recruiting cybersecurity professionals.** More than three-quarters (76%) of respondents say it is extremely or somewhat difficult to recruit and hire security professionals. This is certainly related to supply and demand in the cybersecurity professional market, but survey respondents pointed to some organizational causes as well: 38% said their organization doesn't offer competitive compensation, 29% said their HR department doesn't understand the skills needed for cybersecurity, and 25% said that job postings at their organization tended to be unrealistic. Alarmingly, 59% of respondents said their organization could be doing more to address the cybersecurity skills shortage.

- **Specific cybersecurity experience and skills are in high demand.** When asked which types of cybersecurity talent were most difficult to hire, 41% said mid-career professionals (i.e., 4-7 years of experience), and 30% said senior career professionals (i.e., 7+ years of experience). Interestingly, organizations have less trouble finding cybersecurity leaders, probably because they only need a few. Survey respondents were also asked which skill set areas were in the shortest supply. The top three were cloud computing security, security analysis and investigations, and application security.

- **Cybersecurity job solicitation is frequent and increasing.** Seventy percent of cybersecurity professionals are solicited by recruiters to consider another job at least once per month. This "seller's market" is only gaining momentum: 71% of survey respondents claim that the pace of recruitment solicitation has increased over the past few years.

- **Cybersecurity professionals have recommendations for addressing the skills shortage.** Respondents were asked what their organizations could do to address the impact of the cybersecurity skills shortage. Their top suggestions were to increase the organization's commitment to cybersecurity training, increase compensation levels to make them more competitive, and provide extra incentives like paying for certifications or participation in industry events.

Introduction

Research Objectives

In order to assess the experiences, careers, and opinions of cybersecurity professionals, ESG and ISSA surveyed 389 ISSA members, comprising cybersecurity professionals representing organizations of all sizes, across a variety of industries and geographic locations. Eighty-two percent of survey respondents resided in North America, 8% came from Europe, 5% from Asia, 3% from Africa, and 2% from Central/South America (note: total exceeds 100% due to rounding).

The survey and overall research project were designed to answer the following questions:

- Why did they become cybersecurity professionals?

- How are they developing and advancing their careers?

- Are they happy at their jobs and with their career choices?

- What are the primary pieces of advice cybersecurity professionals would give to those seeking jobs in the cybersecurity field?

- What is necessary for cybersecurity job satisfaction? Alternatively, what alienates cybersecurity professionals and causes them to look for other jobs?

- How important is continuous skills development in the minds of cybersecurity professionals?

- How do cybersecurity professionals develop their skills? What works, and what doesn't work?

- Do the responsibilities and workload associated with cybersecurity jobs get in the way of skills development?

- Do the organizations cybersecurity professionals work at provide adequate training, skills development programs, or services for career advancement?

- Do organizations have CISOs or similar positions in place?

- Are CISOs active participants with executive management teams and the board of directors (or similar oversight group)? Is this level of engagement considered to be sufficient?

- How do cybersecurity professionals rate the performance of their CISO?

- Do cybersecurity professionals believe that their organization has been impacted by the global cybersecurity skills shortage? If so, in what way?

- In which areas do their organizations have the biggest cybersecurity skills deficits?

- Is the cybersecurity skills shortage improving, and are organizations doing enough to address it?

Survey participants represented a wide range of industries including information technology, financial services, government, business services, and manufacturing. For more details, please see the *Research Methodology* and *Respondent Demographics* sections of this report.

Research Findings

The Basic Facts

As in past years, ESG and ISSA got some baseline information regarding cybersecurity professionals' careers. For example:

- 79% of cybersecurity professionals started their careers working in IT.

- When asked which skills were most helpful in the move from IT to cybersecurity, the top responses were IT operations knowledge and skills (61%), analytics skills (53%), hands-on technology knowledge and skills (48%), and business skills (as they relate to IT technologies and processes) (42%).

- When asked the reasons for becoming a cybersecurity professional, the top responses were the chance to use skills and curiosity to address technical challenges (43%), the opportunity to develop technical skills and knowledge (40%), it being a natural career move from IT (34%), and attraction to the morality of the profession (29%).

- 28% of survey respondents say that either they or other cybersecurity professionals they know have experienced significant personal issues because of stress associated with the cybersecurity profession (i.e., drug abuse, alcohol abuse, depression, etc.).

- 50% of cybersecurity professionals surveyed say that job stress levels increased this past year as a result of remote worker support due to the COVID-19 pandemic. To help alleviate stresses caused by the pandemic, 36% of organizations instituted more CISO "check-ins" with staff, 32% created online social meetings for the cybersecurity team, and 24% added formal stress management programs driven by HR.

Survey respondents were also asked whether their organization employed a CISO. Those that did were asked several other related questions. On this topic, the research revealed:

- 73% of survey respondents say that their organization employs a CISO while 5% say their organization employs a virtual CISO (vCISO).

- Of those organizations that employ a CISO, 43% say that the CISO reports to the CIO, 29% say the CISO reports to the CEO, 9% say COO, 9% say "other," and 10% don't know.

- 61% of respondents say their CISO is an active participant with executive management and the board of directors (or similar oversight group), 14% say their CISO is not an active participant with executive management and the board of directors (or similar oversight group), and 24% don't know. 51% think their organization's CISO's level of participation with executive management and the board of directors is adequate, 23% do not think their organization's CISO's level of participation with executive management and the board of directors is adequate, and 26% don't know.

- 43% believe their CISO has been very effective, 49% believe their CISO has been somewhat effective, 6% say their CISO hasn't been very effective, and 2% claim their CISO has not been effective at all.

- When asked to identify the most important qualities of a successful CISO, 39% said leadership skills while 30% said operational skills. The remaining 31% included business skills, technical skills, management skills, communications skills, and other.

- Survey respondents were asked which factors are likeliest to cause CISOs to leave one organization for another. The most popular answers were: CISOs are offered a higher compensation package at another organization (33%), the organization doesn't have a culture that emphasizes cybersecurity (31%), and cybersecurity budgets are not commensurate with the organization's size and industry (29%).

Getting a Cybersecurity Job

For the first time, ESG and ISSA asked cybersecurity professionals how they found their current job (see Figure 1). The highest percentage (38%) say that they found their job by networking with industry contacts while 24% were contacted by an industry recruiter and 22% responded to a job posting at their company (see Figure 1). Not surprisingly, there is a slight correlation between methods used for finding a job and seniority. Senior cybersecurity professionals are more likely to find their jobs through industry contacts and recruiters while those with less experience are more likely to use job postings. This information should help guide CISOs and HR professionals as they compete to fill job requisitions.

Figure 1. How Cybersecurity Professionals Found Their Current Jobs

Of the following, which one most closely describes how you came to be hired by your current employer? (Percent of respondents, N=489)

I heard about my current job through my college/university placement office, 2%

Other, 14%

Job posting by my organization, 22%

Networking with industry contacts, 38%

Contacted by a recruiter, 24%
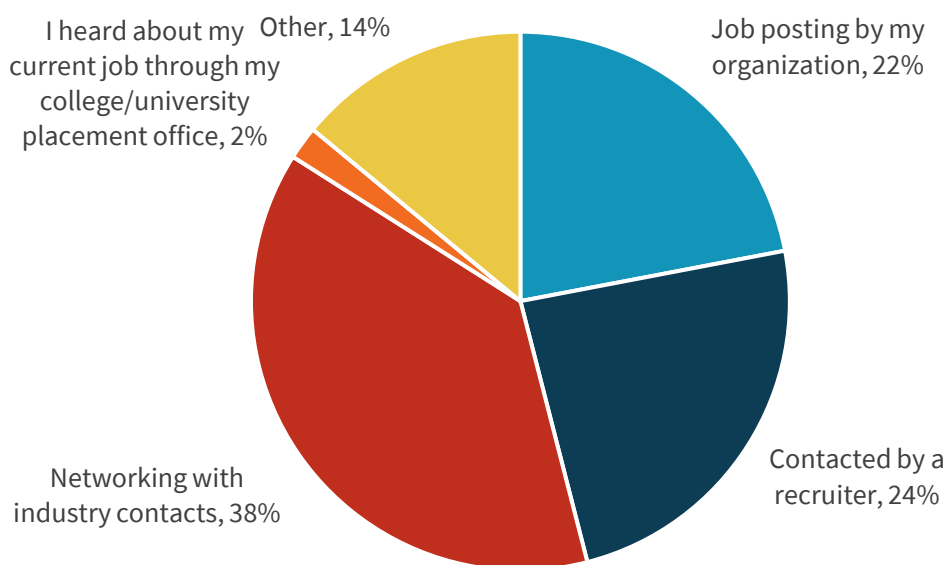
Source: Enterprise Strategy Group

Despite the ongoing cybersecurity skills shortage, skilled candidates often complain that it can be very difficult to begin a cybersecurity career. When meeting entry-level candidates, ESG analysts and ISSA members are often asked for advice in this area. In 2021, ESG and ISSA addressed this issue directly by including a new survey question asking survey respondents for their recommendations for those seeking to enter the cybersecurity field. Nearly half (49%) of respondents suggested getting a basic cybersecurity certification, 42% proposed joining a professional industry organization, and 36% recommended finding a mentor who is willing to help develop skills and career plan (see Figure 2). This guidance will hopefully help entry-level candidates jumpstart their careers.

Figure 2. Advice for Individuals Who Want to Get into Cybersecurity

If you were advising someone who wanted to get into the cybersecurity field, what are the primary pieces of advice would you give them? (Percent of respondents, N=489, three responses accepted)

Advice	Percent
Get a basic cybersecurity certification	49%
Join a professional industry organization	42%
Find a mentor who is willing to help you develop skills and career plans	36%
Learn and try to specialize on a particular cybersecurity area	29%
Develop your business skills to better understand how cybersecurity can support the business	26%
Monitor trends in cybersecurity so you understand current issues and opportunities	26%
Seek out an internship where you can get hands-on experience	25%
Develop your interpersonal and communications skills	20%
Enroll in college-level computer science and/or cybersecurity classes	16%
Attend industry events (i.e., RSA, Black Hat, etc.) and attend training sessions	15%
Network online	4%
Other	3%

Source: Enterprise Strategy Group

Cybersecurity Careers Depend upon Hands-on Experience and Some Certifications

Cybersecurity is highlighted by a plethora of esoteric technical certifications, so ESG and ISSA have continually asked survey respondents to tell us which certifications they've achieved, and which are most important. As in past years, survey respondents were asked to write in the answer to this question, and the top responses are listed in Figure 3. Of those certifications achieved, the most useful ones for getting a job are graphed in Figure 4 . In both graphics, the certified information systems security professional (CISSP) from (ISC)² stands out—it's the most popular certification and the one that's most important for getting a cybersecurity job. Other certifications may be important tactically but should be viewed as vehicles for career advancement (in some cases) or to help cybersecurity professionals gain general knowledge in a cybersecurity subdiscipline (for example, certified ethical hacker).

Cybersecurity professionals pursue a CISSP certification after accruing the requisite number of years of experience as this certification is a requirement for most available jobs. Beyond the CISSP, however, survey respondents take a more tactical approach to additional certifications based upon their skills, interests, and career plans. ESG and ISSA believe this is the right approach for certifications and career development. Rather than fill their resumes with acronyms, cybersecurity

professionals should focus on hands-on training, mentoring, and professional networking as primary means for skills development. Rather, certifications should supplement these activities.

Figure 3. Top Five Cybersecurity Certifications Achieved

Which security certifications have you achieved? (Percent of respondents, N=427, multiple responses accepted)

Certification	Percent
Certified Information Systems Security Professional (CISSP)	59%
Certified Information Security Manager (CISM)	25%
CompTIA Security+	24%
Certified Information Security Auditor (CISA)	19%
Certified Ethical Hacker (CEH)	17%

Source: Enterprise Strategy Group

Figure 4. Top Five Most Important Certification Necessary to Get a Job

Of the security certifications you have achieved, which is most important to you in terms of getting a job in the cybersecurity field? (Percent of respondents, N=427, multiple responses accepted)

Certification	Percent
Certified Information Systems Security Professional (CISSP)	51%
Certified Information Security Manager (CISM)	13%
CompTIA Security+	10%
Certified Information Security Auditor (CISA)	6%
Certified in Risk and Information Systems Control (CRISC)	4%

Source: Enterprise Strategy Group

ESG and ISSA have long held the belief that hands-on experience is the most important factor in cybersecurity career development, but this assumption was based on anecdotal data. In 2021, ESG and ISSA tested the hypothesis in the survey.

The data supports this long-held belief again. Only 1% of respondents believe security certifications are more important than hands-on experience. Alternatively, 52% believe that hands-on experience is more important than certifications while 46% place equal value on hands-on experience and certification achievement (see Figure 5). Based on the research, ESG and ISSA believe that those who believe that hands-on experience and achieving security certifications are equally important have the CISSP certification in mind, as this is considered a foundational requirement for a cybersecurity career.

Based upon this data, aspiring and advancing cybersecurity professionals should take a balanced approach to skills development. As previously stated, hands-on experience should be supplemented with the appropriate security certifications on an as-needed basis.

Figure 5. Hands-on Experience versus Cybersecurity Certifications for Skills Development

Which of the following statements do you believe is most accurate when it comes to an individual becoming knowledgeable, proficient, and productive in a cybersecurity career? (Percent of respondents, N=489)

Hands-on experience is more important than achieving security certifications	Achieving security certifications is more important than hands-on experience	Hands-on experience and achieving security certifications are equally important	Don't know/no opinion
52%	1%	46%	1%
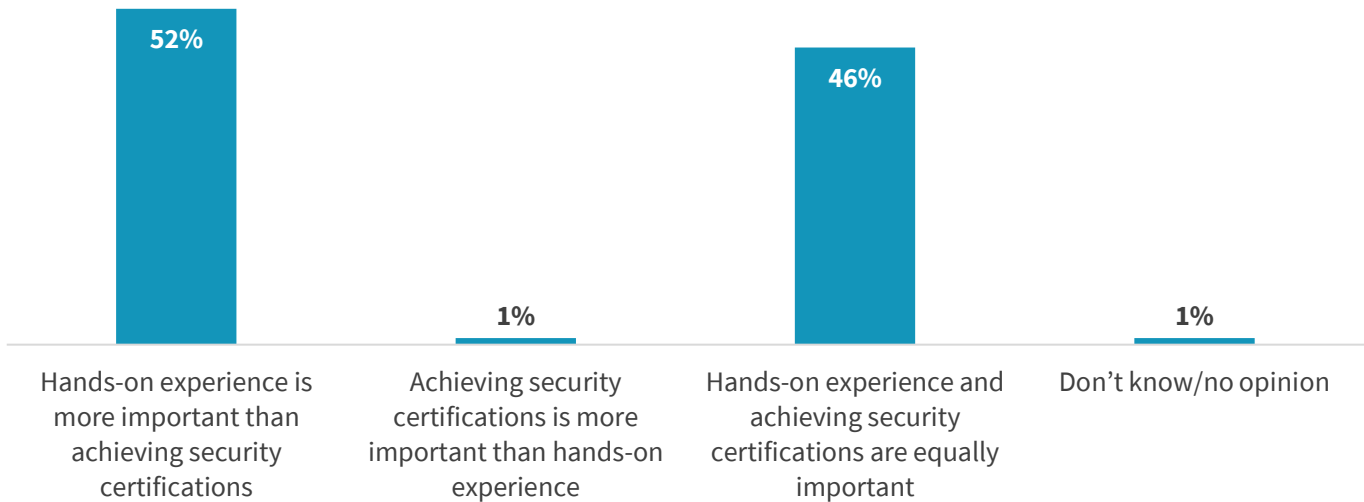
Source: Enterprise Strategy Group

Cybersecurity Professionals: A 360 Degree View

What are the most important factors that distinguish a satisfactory and unsatisfactory cybersecurity job? This question has been a constant in the ESG/ISSA research study for five years. Interestingly, the results have been fairly consistent. The top three priorities in 2021 are business management's commitment to strong cybersecurity, competitive or industry-leading financial compensation, and the ability to work with highly skilled and talented cybersecurity staff (see Figure 6).

CISOs and HR executives take note, as this data represents what it will take to hire and retain cybersecurity professionals.

Figure 6. Factors Determining Job Satisfaction

Which of the following are the biggest factors for determining your level of job satisfaction? (Percent of respondents, N=489, three responses accepted)

Business management's commitment to strong cybersecurity — **43%**

Competitive or industry-leading financial compensation — **39%**

The ability to work with a highly skilled and talented cybersecurity staff — **33%**

Organization provides support and financial incentives, enabling cybersecurity staff to advance their careers — **32%**

Organization provides opportunities for career advancements and promotions — **28%**

Strong leadership from the CISO and other security managers — **22%**

The ability to learn business processes and work closely with business units — **20%**

The ability to work with the latest types of IT and/or cybersecurity technologies — **19%**

Clear, concise, and consistent job descriptions and responsibilities that are agreed upon by business, IT, and security management — **16%**

Organization has a mentoring program where an employee can learn from more experienced peers — **7%**

Other — **9%**

Source: Enterprise Strategy Group

With job satisfaction in mind, ESG and ISSA also wanted insight into the most stressful aspects of a cybersecurity job. Nearly two-thirds (32%) of survey respondents claim it is finding out about IT/initiatives/projects that were started by other teams (within the organization) with no security oversight (see Figure 7). This makes sense. Security professionals want to be engaged in projects from the start so they can "bake in" rather than "bolt on" security. Similarly, nearly one-third (31%) of respondents believe it is stressful working with disinterested business managers while another 31% point to the overwhelming workload. Similar to the top response, 24% of security professionals believe it is stressful keeping up with the security needs of new IT initiatives. Clearly, cybersecurity professionals want to be involved in projects from the start and want to see cybersecurity commitment from business and IT associates. When these conditions are absent, organizations will likely face high employee burnout and staff attrition.

Figure 7. Most Stressful Aspects of Cybersecurity Jobs

What are the most stressful aspects of your job as a cybersecurity professional? (Percent of respondents, N=489, three responses accepted)

Aspect	Percent
IT initiatives/projects that were started by other teams within my organization with no security oversight	32%
Working with disinterested business managers	31%
The overwhelming workload	31%
Constant emergencies and disruptions that take me away from my primary tasks	30%
Keeping up with the security needs of new IT initiatives	24%
The fear of getting something wrong	21%
Keeping up with internal and regulatory compliance audits	15%
Monitoring the security status of third parties my organization does business with	14%
The lack of security oversight in application development	14%
Technology issues	12%
Coordinating with IT operations teams to remediate security issues	12%
Coping with end-user mistakes	10%
Sorting through the myriad of security technologies used by my organization	10%
The lack of solid career counseling or career path	9%

Source: Enterprise Strategy Group

As in the past, security professionals were asked their opinions on several topics (see Figure 8). A few stats stand out:

- Conflict between the need for training and time allocated to training remains a critical issue: 91% of respondents agree that cybersecurity professionals must keep up with their skills or their organizations are at a significant
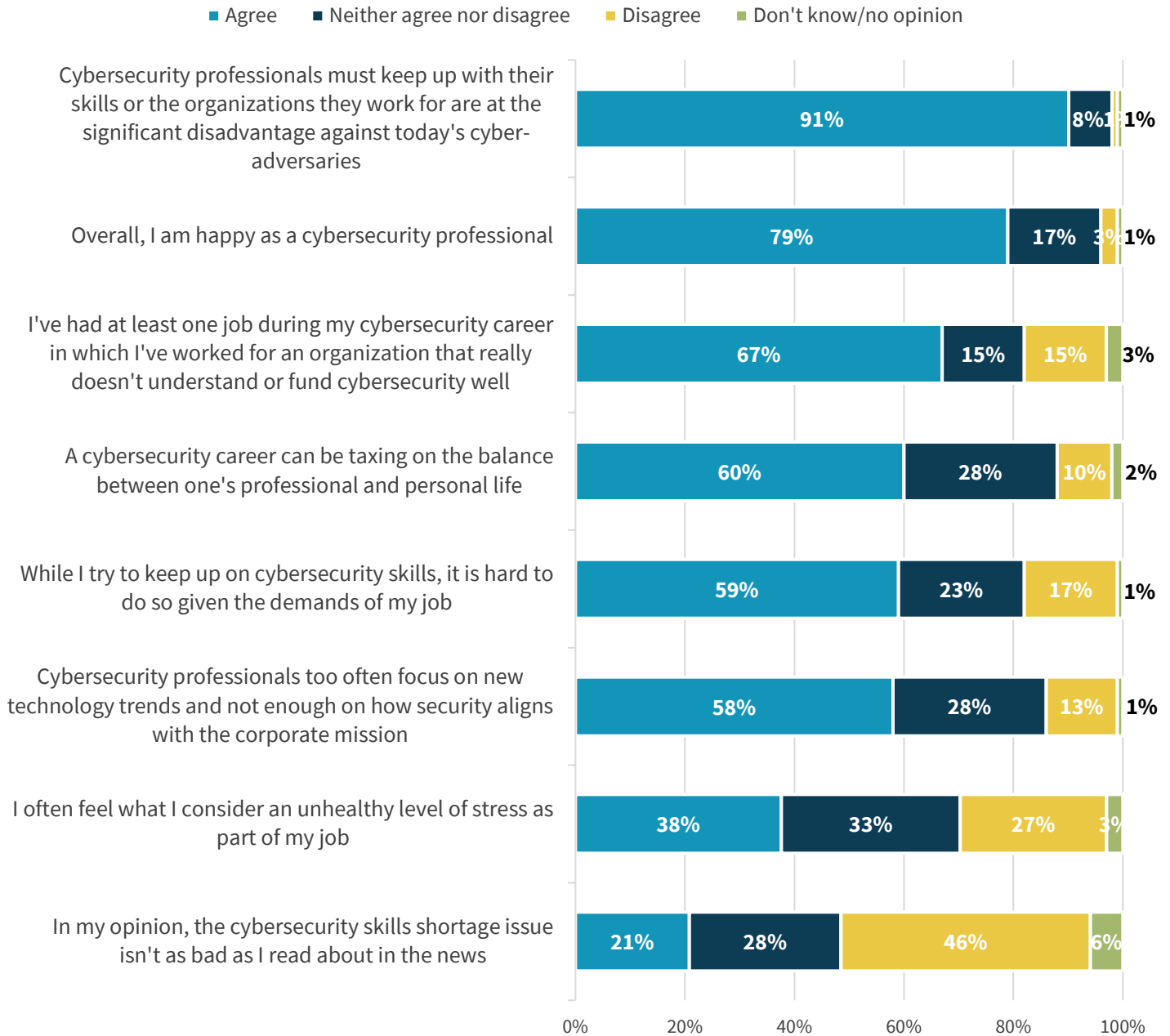
disadvantage, yet 59% agree that while they try to keep up on cybersecurity skills, it is hard to do given the demands of their jobs. ESG and ISSA call this situation the cybersecurity training paradox. CISOs take note and make sure to convince the organization that ample training time and resources are an absolute requirement.

- Cybersecurity professionals tend to pride themselves on their endurance and competitiveness, masking the personal price these jobs can have. The research supports this as 60% agree that a cybersecurity career can be taxing on one's work/life balance, and 38% agree that they often feel an unhealthy level of stress with their jobs. Accordingly, CISOs should constantly monitor the mental health of team members while establishing programs for stress relief.

- 58% of survey respondents agree that security professionals spend too much time on the technical aspects of cybersecurity and not enough time on how cybersecurity aligns with the corporate mission. ESG and ISSA believe this is a fundamental industry dilemma, sometimes called the "shiny object problem." To address this, CISOs must always reinforce the business focus of cybersecurity within the security team.

Interestingly, despite the personal challenges represented in this data, 79% of cybersecurity professionals agree that they are happy as cybersecurity professionals. ESG and ISSA believe that this commitment to the mission regardless of the challenges is what makes cybersecurity professionals special. Rather than business or technical professionals, cybersecurity professionals behave like dedicated public servants, with a focus tilting toward the greater good rather than personal accolades.

Figure 8. Respondents' Sentiments on Cybersecurity Careers

Please select one response per row that best reflects your opinion on each statement.
(Percent of respondents, N=489)

■ Agree   ■ Neither agree nor disagree   ■ Disagree   ■ Don't know/no opinion

Cybersecurity professionals must keep up with their skills or the organizations they work for are at the significant disadvantage against today's cyber-adversaries: Agree 91%, Neither agree nor disagree 8%, Disagree 1%, Don't know/no opinion 1%

Overall, I am happy as a cybersecurity professional: Agree 79%, Neither agree nor disagree 17%, Disagree 3%, Don't know/no opinion 1%

I've had at least one job during my cybersecurity career in which I've worked for an organization that really doesn't understand or fund cybersecurity well: Agree 67%, Neither agree nor disagree 15%, Disagree 15%, Don't know/no opinion 3%

A cybersecurity career can be taxing on the balance between one's professional and personal life: Agree 60%, Neither agree nor disagree 28%, Disagree 10%, Don't know/no opinion 2%

While I try to keep up on cybersecurity skills, it is hard to do so given the demands of my job: Agree 59%, Neither agree nor disagree 23%, Disagree 17%, Don't know/no opinion 1%

Cybersecurity professionals too often focus on new technology trends and not enough on how security aligns with the corporate mission: Agree 58%, Neither agree nor disagree 28%, Disagree 13%, Don't know/no opinion 1%

I often feel what I consider an unhealthy level of stress as part of my job: Agree 38%, Neither agree nor disagree 33%, Disagree 27%, Don't know/no opinion 3%

In my opinion, the cybersecurity skills shortage issue isn't as bad as I read about in the news: Agree 21%, Neither agree nor disagree 28%, Disagree 46%, Don't know/no opinion 6%
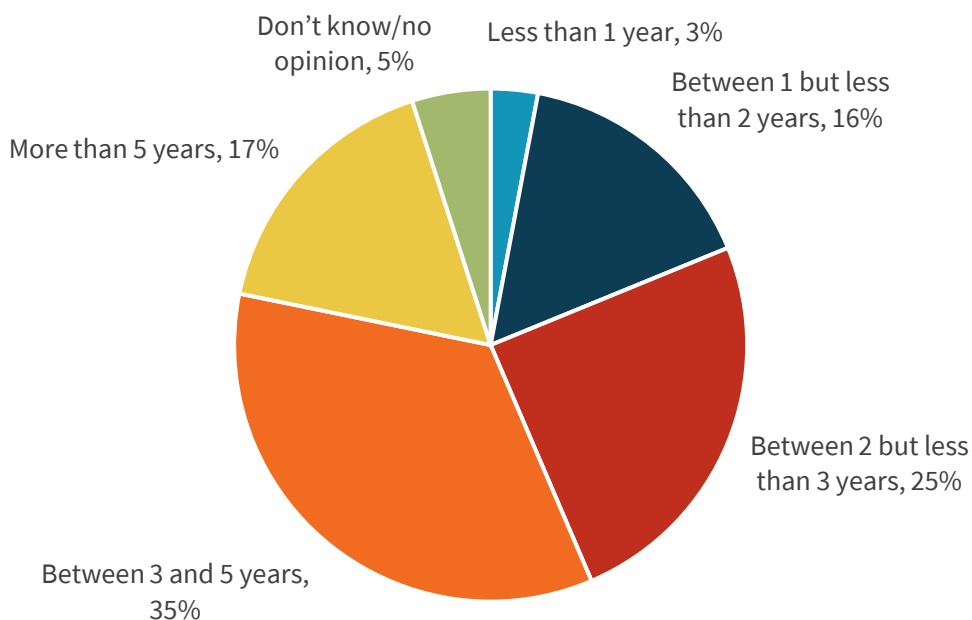
Source: Enterprise Strategy Group

In another opinion question, survey respondents were asked how long it takes a cybersecurity professional to become proficient at their job. The plurality of respondents (35%) believe it takes anywhere from 3 to 5 years to develop real cybersecurity proficiency, while 25% say 2 to 3 years and 17% claim it takes more than 5 years (see Figure 9). Three to 5 years is a long time. CISOs should do everything they can to accelerate staff skills development and retain employees with this level of experience.

Figure 9. Length of Time Required to Develop Cybersecurity Proficiency

In your opinion, how long does it take a cybersecurity professional to become proficient (i.e., knowledgeable, productive, etc.)? (Percent of respondents, N=489)
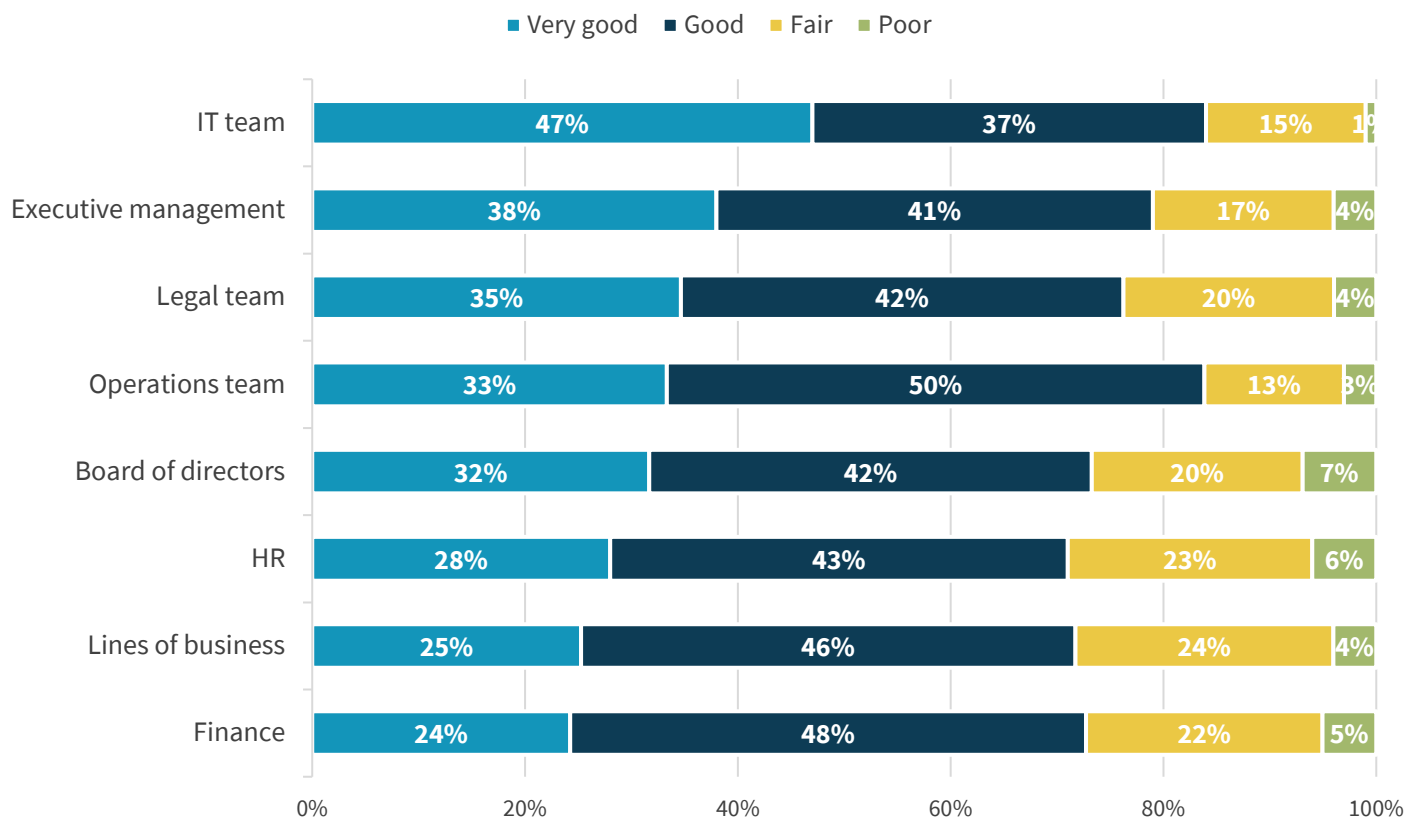

Source: Enterprise Strategy Group

It is often said that cybersecurity is a "team sport." In other words, an organization's cybersecurity program success goes beyond the information security team alone and depends upon commitment and cooperation across the entire organization. With this collaborative ideal in mind, survey respondents were asked to characterize the working relationship between their organization's cybersecurity team and other departments (see Figure 10). The data indicates that the best relationships are with IT, executives, legal, and operations teams, but ESG and ISSA believe a few points are noteworthy:

- 16% of respondents said the relationship between security and IT teams is fair or poor. This is somewhat alarming since these teams must work together constantly on tasks like technology deployment, configuration management, and risk mitigation.

- 21% of respondents said the relationship between security and executives was fair or poor. Similarly, 27% said the relationship between security and the board of directors was fair or poor. These are likely organizations that still believe that security is related to technology and not the business. It's likely that these firms still equate security with regulatory compliance.

- 29% of respondents said the relationship between security and HR was fair or poor. This is of concern since the two groups work together on projects like security awareness training, recruitment, and hiring. These tasks are probably managed sub-optimally at organizations with fair or poor security/HR working relationships.

Figure 10. Relationship Status between Cybersecurity and Other Functional Organizations

How would you characterize the working relationship (i.e., communications, collaboration, common goals and objectives, etc.) between your organization's cybersecurity department and each of these others? (Percent of respondents, N=489)

Legend: ■ Very good   ■ Good   ■ Fair   ■ Poor

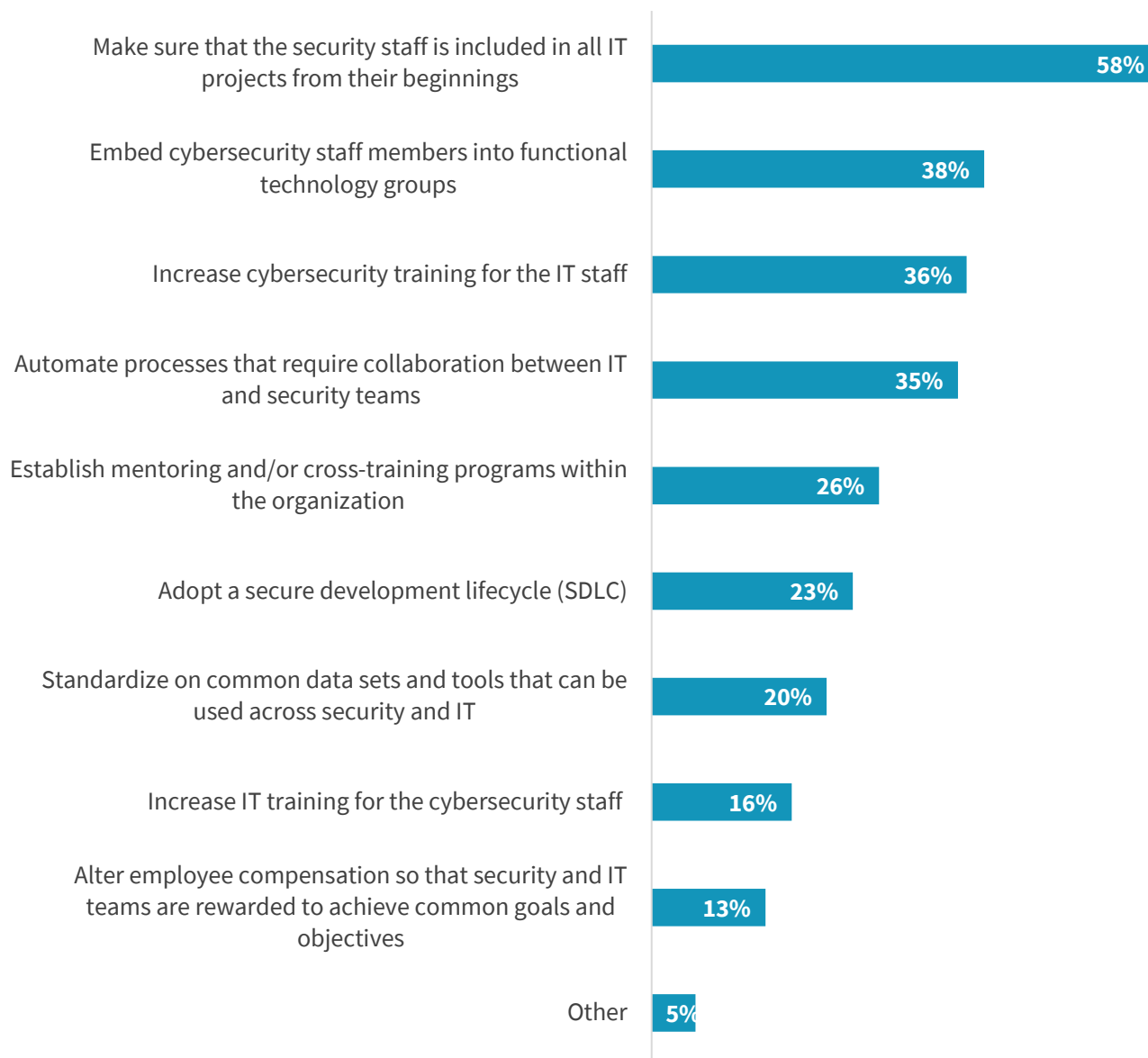| Organization	Very good	Good	Fair	Poor
IT team	47%	37%	15%	1%
Executive management	38%	41%	17%	4%
Legal team	35%	42%	20%	4%
Operations team	33%	50%	13%	3%
Board of directors	32%	42%	20%	7%
HR	28%	43%	23%	6%
Lines of business	25%	46%	24%	4%
Finance	24%	48%	22%	5%

Source: Enterprise Strategy Group

What can organizations do to improve some of these relationships? Survey respondents were asked this question directly about the relationships between security, IT, and business management teams. With regard to improving the security/IT relationship, security professionals suggest making sure security staff is included in all IT projects from the beginning, embedding cybersecurity staff within functional technology groups, and increasing cybersecurity training for all IT staff (see Figure 11).

These suggestions are especially interesting. Recall that the most stressful aspect of a security job identified previously relates to IT projects/initiatives lacking security oversight. Alleviating this issue will not only decrease employee stress but also improve the working relationship between security and IT as well as overall security protection. Embedding cybersecurity staff members into functional technology groups is happening with activities such as DevSecOps focused on cloud-native application development. Along with additional security training (especially for software developers), organizations are fusing security into more aspects of IT people, processes, and technologies.

Figure 11. Suggestions for Improving the Relationship between Security and IT

Regardless of the status, which of the following actions could be most impactful for improving the working relationship between the security and IT teams at your organization? (Percent of respondents, N=489, three responses accepted)

Make sure that the security staff is included in all IT projects from their beginnings — **58%**

Embed cybersecurity staff members into functional technology groups — **38%**

Increase cybersecurity training for the IT staff — **36%**

Automate processes that require collaboration between IT and security teams — **35%**

Establish mentoring and/or cross-training programs within the organization — **26%**

Adopt a secure development lifecycle (SDLC) — **23%**

Standardize on common data sets and tools that can be used across security and IT — **20%**

Increase IT training for the cybersecurity staff — **16%**

Alter employee compensation so that security and IT teams are rewarded to achieve common goals and objectives — **13%**
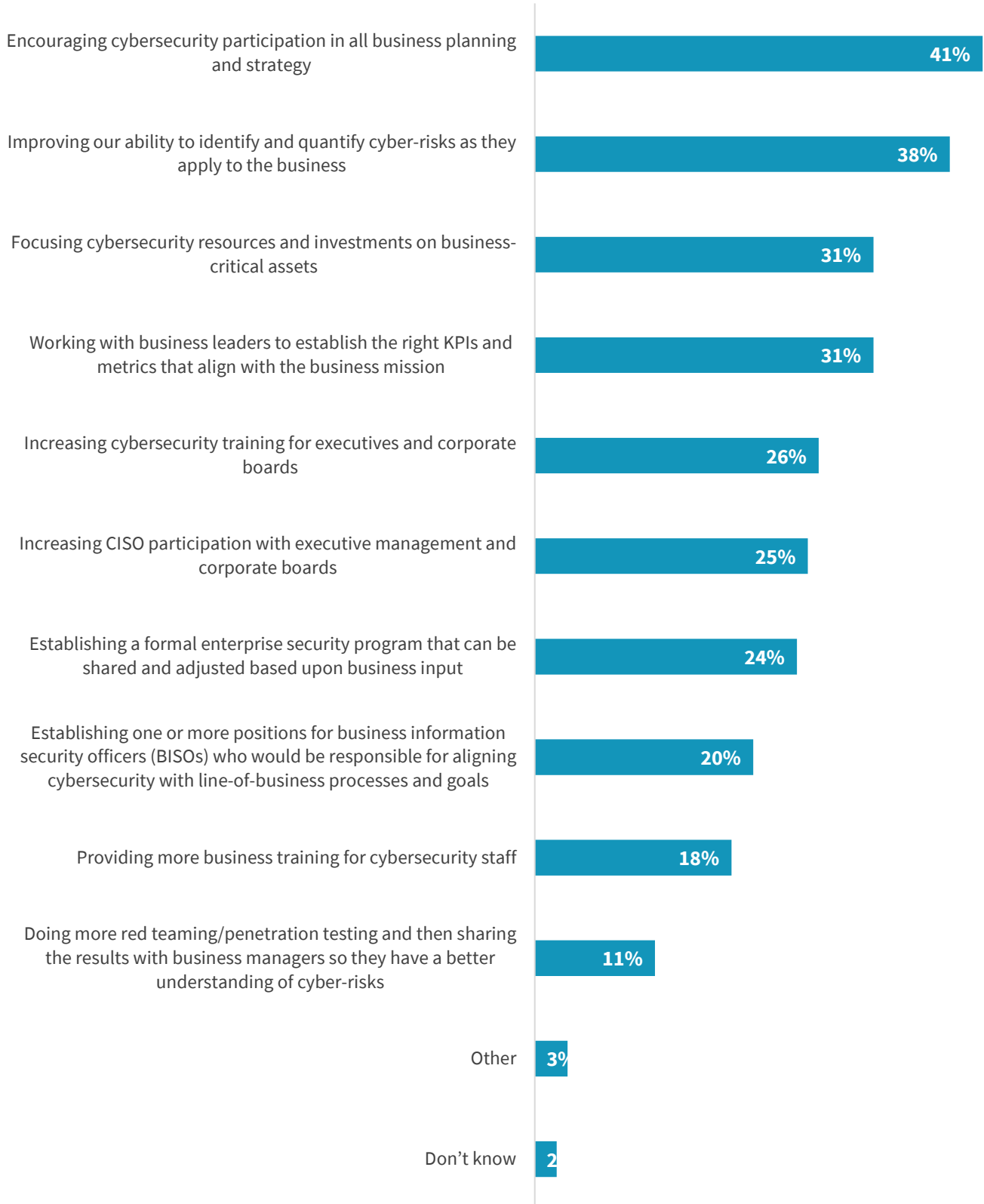
Other — **5%**

Source: Enterprise Strategy Group

In terms of the relationship between security and business management, survey respondents suggest encouraging cybersecurity participation in business planning and strategy, improving cyber-risk identification/quantification, and focusing cybersecurity resources and investments on business-critical assets (see Figure 12). Like the IT relationship, cybersecurity pros believe that working closer and earlier with business teams can be beneficial. As this happens, security teams must be prepared with the right communications, reports, and metrics that present cybersecurity in a business context.

Figure 12. Suggestions for Improving the Relationship between Security and Business Management

Regardless of the status, which of the following actions could be most impactful for improving the working relationship between the security team and business management at your organization? (Percent of respondents, N=489, three responses accepted)

Encouraging cybersecurity participation in all business planning and strategy	41%
Improving our ability to identify and quantify cyber-risks as they apply to the business	38%
Focusing cybersecurity resources and investments on business-critical assets	31%
Working with business leaders to establish the right KPIs and metrics that align with the business mission	31%
Increasing cybersecurity training for executives and corporate boards	26%
Increasing CISO participation with executive management and corporate boards	25%
Establishing a formal enterprise security program that can be shared and adjusted based upon business input	24%
Establishing one or more positions for business information security officers (BISOs) who would be responsible for aligning cybersecurity with line-of-business processes and goals	20%
Providing more business training for cybersecurity staff	18%
Doing more red teaming/penetration testing and then sharing the results with business managers so they have a better understanding of cyber-risks	11%
Other	3%
Don't know	2

Source: Enterprise Strategy Group

The Cybersecurity Skills Shortage Persists, and in Many Cases, Continues to Worsen

ESG and ISSA believe the cybersecurity skills shortage has two major implications. The most obvious is a shortage of talented cybersecurity professionals, with simply more cybersecurity job openings than qualified candidates to fill them. The other implication isn't as widely discussed but is at least as important: Many members of the current cybersecurity workforce lack the advanced skills necessary to safeguard critical business assets or counteract sophisticated cyber-adversaries.

After researching the cybersecurity skills shortage for five years, ESG and ISSA are convinced that it is real and impactful, yet each report on the subject receives a fair amount of negative feedback, questioning its existence. Comments include theories that there are plenty of cybersecurity professionals to go around, if only organizations knew how and where to recruit them.

Based on this feedback, ESG and ISSA asked survey respondents a basic question in the 2021 survey: Has the cybersecurity skills shortage been overstated? As it turns out, one-third of respondents share the opinion that the skills shortage has been greatly or somewhat overstated, but the highest percentage of cybersecurity professionals (44%) believe it has received the right amount of attention, while 23% claim it has been understated (see Figure 13).

Figure 13. Opinions on Industry Discussions of the Cybersecurity Skills Shortage

Regardless of what's happening at your organization, in your opinion, do you believe that industry discussions about the cybersecurity skills shortage have been: (Percent of respondents, N=489)

Greatly understated, 5%

Greatly overstated, 7%

Somewhat understated, 18%

Somewhat overstated, 26%

About right, 44%
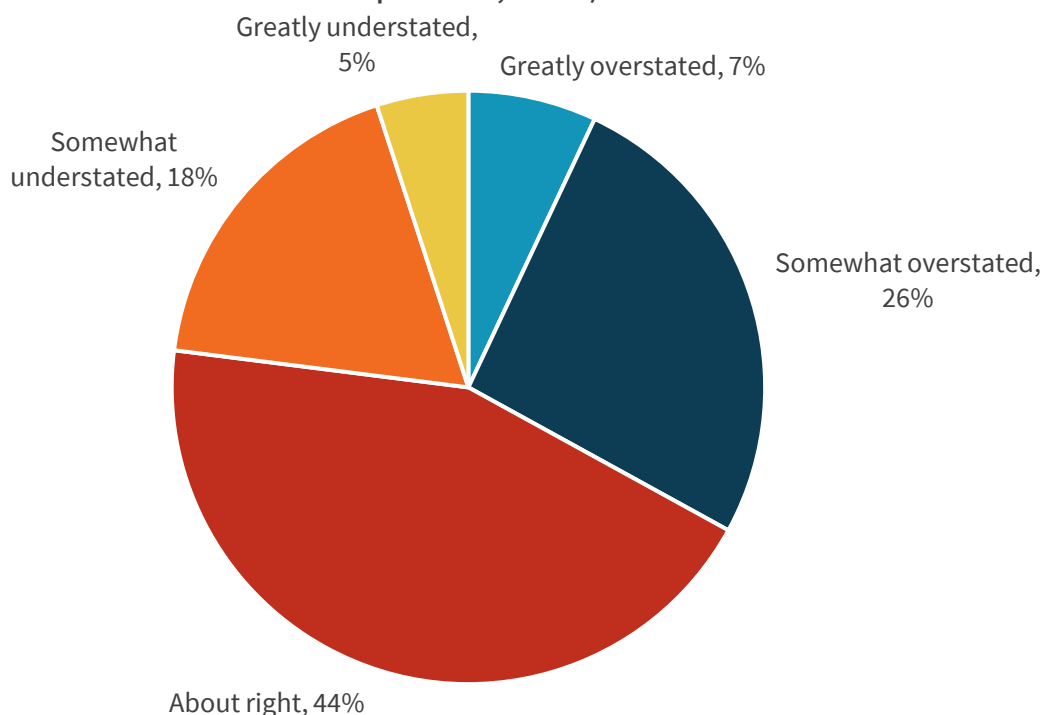
Source: Enterprise Strategy Group

As further research clearly indicates, the cybersecurity skills shortage is real, leading to lots of problems for organizations. At the same time however, the research points to the fact that some organizations may be experiencing self-inflicted wounds and truly don't recruit well, provide the right level of training, or address the skills shortage with the right strategies. In essence, both groups are right: The skills shortage is real, but organizations could and should be doing more.

As in past years, ESG and ISSA wanted to understand the implications of the global cybersecurity skills shortage and how it is affecting organizations. For the first time, the data improved slightly. This year, 57% of organizations claim they've been impacted by the cybersecurity skills shortage, compared to 70% in 2020 and 73% in 2019 (see Figure 14).

Figure 14. Level of Impact of the Cybersecurity Skills Shortage

There has been a lot written about the global cybersecurity skills shortage. Has this trend impacted the organization for which you work? (Percent of respondents, N=489)
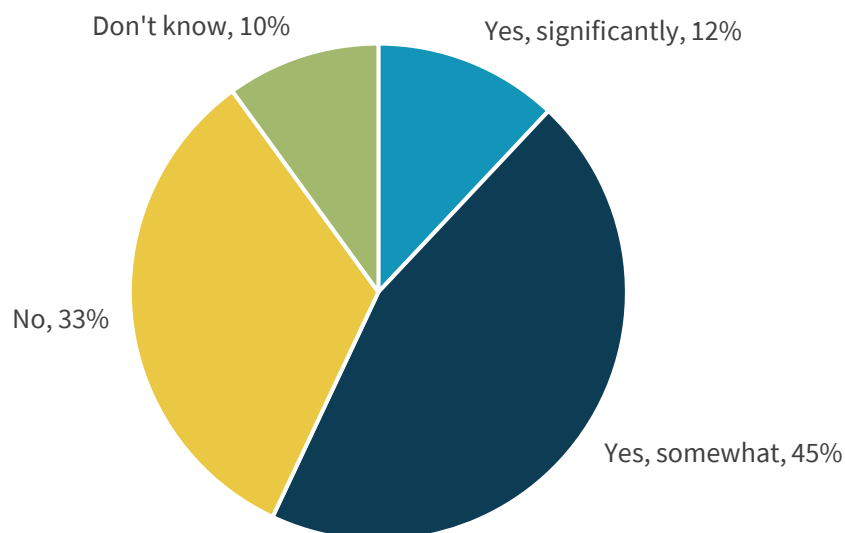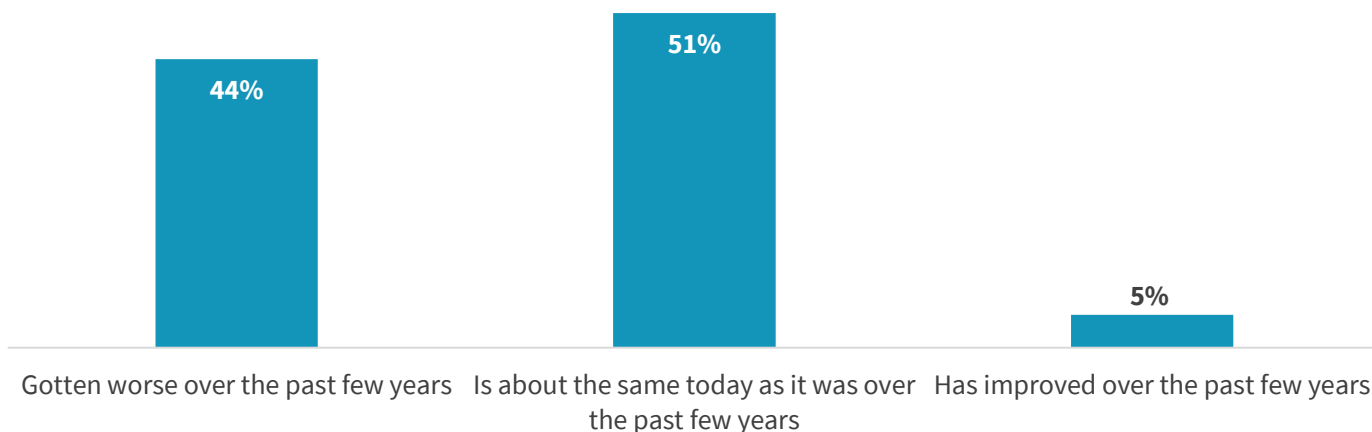

Source: Enterprise Strategy Group

While this data point seems to represent an encouraging trend, additional data paints a different picture. Last year, ESG and ISSA added a question asking cybersecurity professionals whether they believe the cybersecurity skills shortage is improving or getting worse. This year's results are distressing as 44% believe the cybersecurity skills shortage (and its impact) have gotten worse over the past few years while 51% say it's about the same today as it was over the past few years (see Figure 15). Sadly, only 5% believe the situation has gotten better.

Based upon years of research, ESG and ISSA firmly believe that the cybersecurity skills shortage is a long-term reality where the industry has achieved little progress. While education and recruitment programs may be worthwhile, CISOs must craft enterprise security programs that accommodate and plan for perpetual skills shortages.

Figure 15. The Cybersecurity Skills Shortage Is Not Improving

Do you believe the cybersecurity skills shortage and its impact on organizations like yours has: (Percent of respondents, N=282)

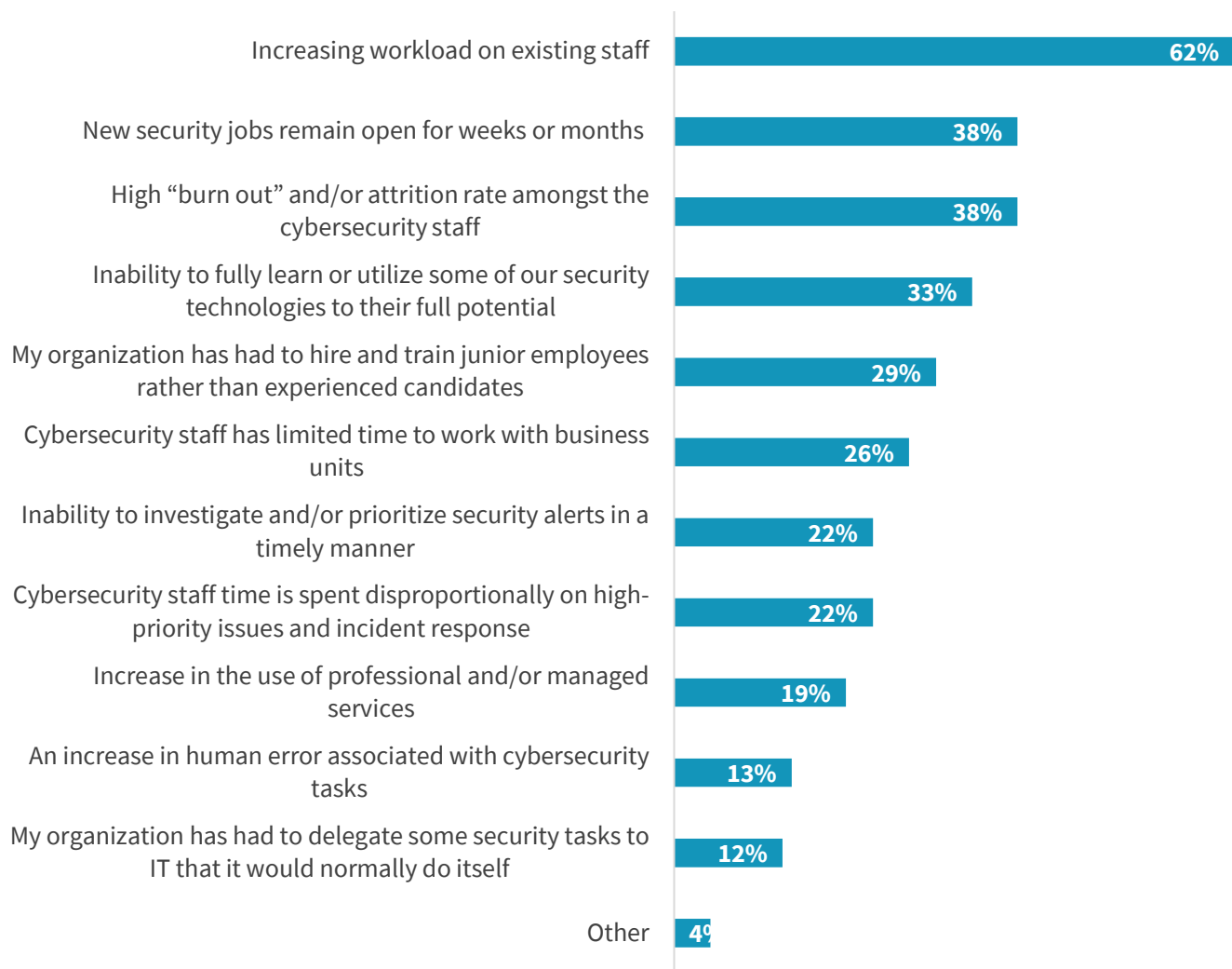
Source: Enterprise Strategy Group

As in the past, survey respondents working at organizations impacted by the cybersecurity skills shortage were asked about the ramifications experienced (see Figure 16). Once again, the top response (62%) was that it has increased the workload on existing staff (similar to last year's results, 58%). This is the biggest consequence of the skills shortage by far. Additionally, 38% of respondents indicated that the skills shortage has led to new security jobs remaining open for weeks or months (this may be one reason why 29% of organizations must hire and train junior employees rather than experienced candidates). Consistent with the mental health theme described previously, 38% of respondents said that the skills shortage has led to employee burnout and employee attrition.

It is also noteworthy that one-third of respondents say that the skills shortage has led to a situation where the cybersecurity team is unable to learn or utilize some security technologies to their full potential. Think about that for a moment: Organizations determine they need some new security technology for threat prevention, detection, or response. They go through the rigor of researching, purchasing, testing, configuring, deploying, and operating the product as well as training staff. After all this work, they still lack the staff or skills to operate the product correctly. Given this situation, CISOs must reassess their priorities, only purchasing technologies that can be used appropriately. In other cases, organizations should consider managed services as an alternative to underutilized security technologies.

Figure 16. How the Cybersecurity Skills Shortage Has Impacted Organizations

You indicated that the organization you work for has been impacted by the global cybersecurity skills shortage. What type of impact has the global cybersecurity skills shortage had on your organization? (Percent of respondents, N=282, check all that apply)

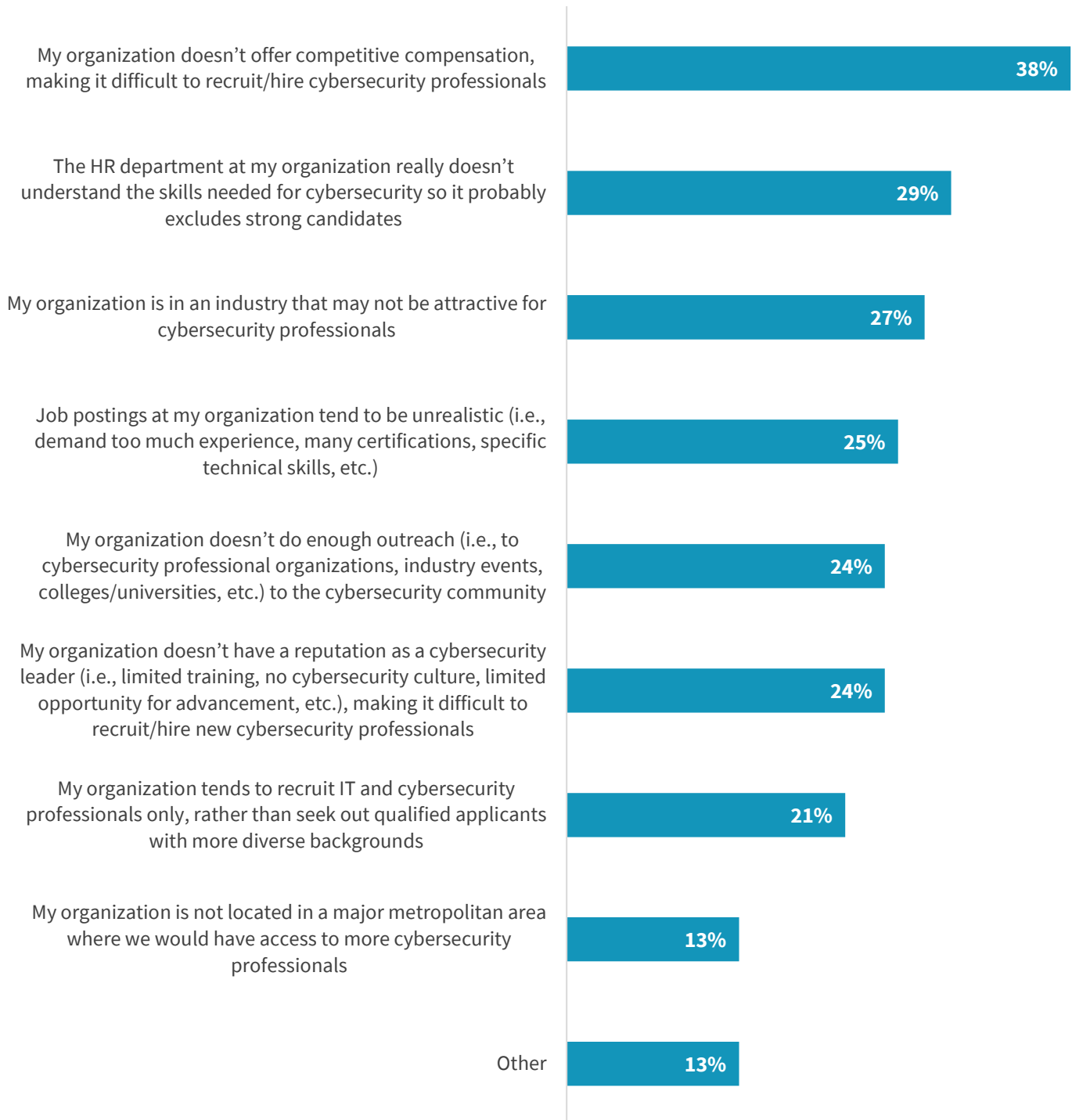| Impact	Percent
Increasing workload on existing staff	62%
New security jobs remain open for weeks or months	38%
High "burn out" and/or attrition rate amongst the cybersecurity staff	38%
Inability to fully learn or utilize some of our security technologies to their full potential	33%
My organization has had to hire and train junior employees rather than experienced candidates	29%
Cybersecurity staff has limited time to work with business units	26%
Inability to investigate and/or prioritize security alerts in a timely manner	22%
Cybersecurity staff time is spent disproportionally on high-priority issues and incident response	22%
Increase in the use of professional and/or managed services	19%
An increase in human error associated with cybersecurity tasks	13%
My organization has had to delegate some security tasks to IT that it would normally do itself	12%
Other	4%

Source: Enterprise Strategy Group

For the first time, organizations claiming to be impacted by the cybersecurity skills shortage were asked to identify contributing factors. The three top responses included issues related to compensation, HR's understanding of cybersecurity skills, and working in an industry that may be unattractive to cybersecurity professionals (see Figure 17). It is also worth noting that 25% pointed to unrealistic job postings (i.e., asking for skills that were not commensurate with compensation offered, real job requirements, etc.). To some extent, this data supports the theory that the cybersecurity skills shortage is related to mismanagement rather than a dearth of qualified candidates or advanced skills.

Compensation is a binary issue—either an organization offers competitive compensation, or it does not. The same could be said of an organization's industry. If compensation or industry is unappealing, the hiring company is at a distinct disadvantage and will only be successful at recruiting if other job attributes are especially attractive (i.e., working hours, training opportunities, benefits, etc.). With regard to compensation, CISOs must lobby HR, finance, and other departments to offer competitive salaries, or they face a perpetual losing battle for staff recruitment and retention. As for other factors

mentioned, CISOs must ensure that HR departments and recruiters are well versed in cybersecurity needs and put together accurate and realistic job postings as part of their recruitment process.

Figure 17. Factors Contributing to How the Cybersecurity Skills Shortage Has Impacted Organizations

Which of the following are the biggest factors contributing to the cybersecurity skills shortage's impact on your organization? (Percent of respondents, N=282, three responses accepted)

Factor	Percent
My organization doesn't offer competitive compensation, making it difficult to recruit/hire cybersecurity professionals	38%
The HR department at my organization really doesn't understand the skills needed for cybersecurity so it probably excludes strong candidates	29%
My organization is in an industry that may not be attractive for cybersecurity professionals	27%
Job postings at my organization tend to be unrealistic (i.e., demand too much experience, many certifications, specific technical skills, etc.)	25%
My organization doesn't do enough outreach (i.e., to cybersecurity professional organizations, industry events, colleges/universities, etc.) to the cybersecurity community	24%
My organization doesn't have a reputation as a cybersecurity leader (i.e., limited training, no cybersecurity culture, limited opportunity for advancement, etc.), making it difficult to recruit/hire new cybersecurity professionals	24%
My organization tends to recruit IT and cybersecurity professionals only, rather than seek out qualified applicants with more diverse backgrounds	21%
My organization is not located in a major metropolitan area where we would have access to more cybersecurity professionals	13%
Other	13%

Source: Enterprise Strategy Group

Additional data from this year's survey results add further evidence to the extent of the cybersecurity skills shortage. According to Figure 18, when asked how difficult it is to recruit cybersecurity professionals, 76% of security professionals say it is either extremely (18%) or somewhat difficult (58%).

Figure 18. Difficulties in Recruiting for Cybersecurity

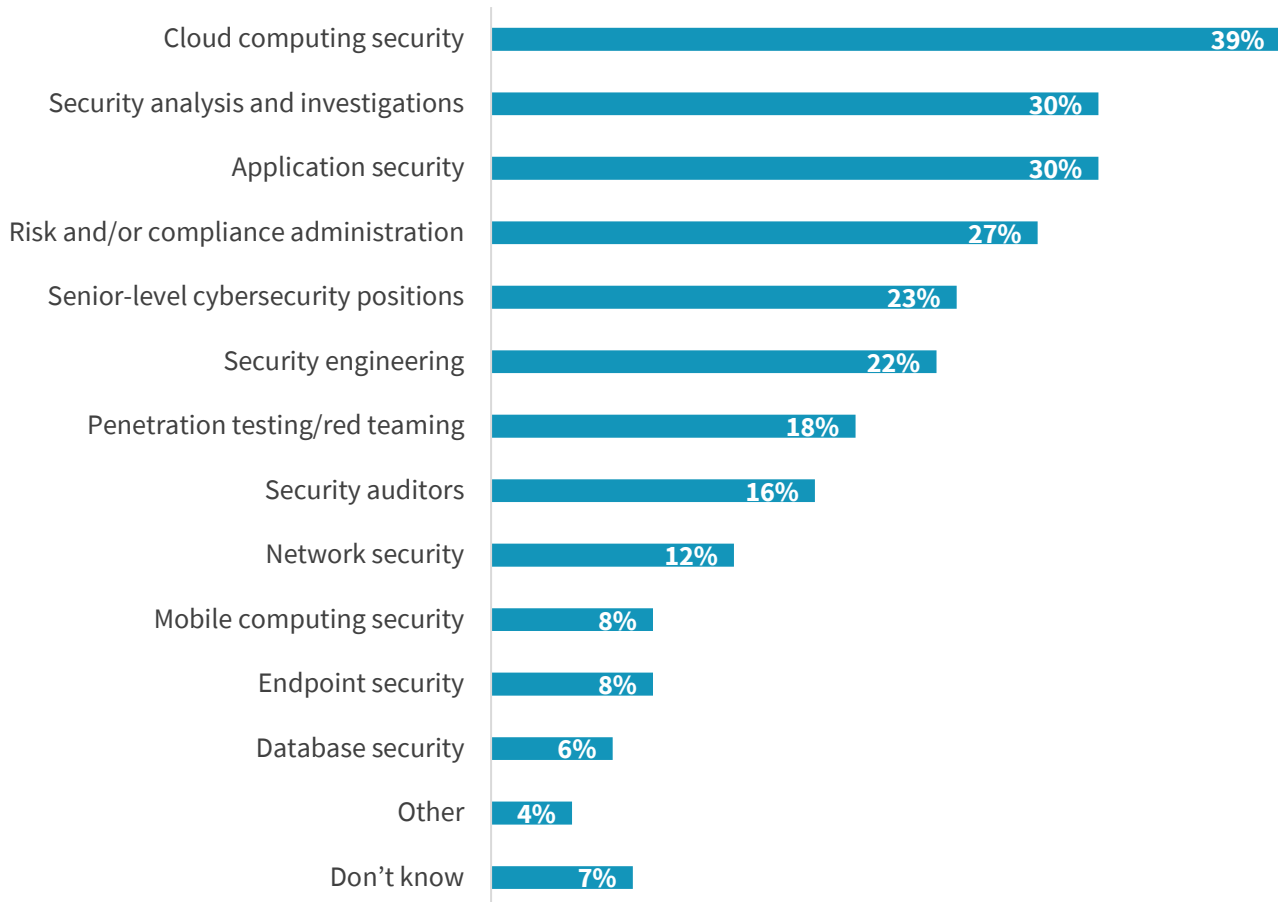**How difficult is it for your organization to recruit and hire cybersecurity professionals? (Percent of respondents, N=489)**
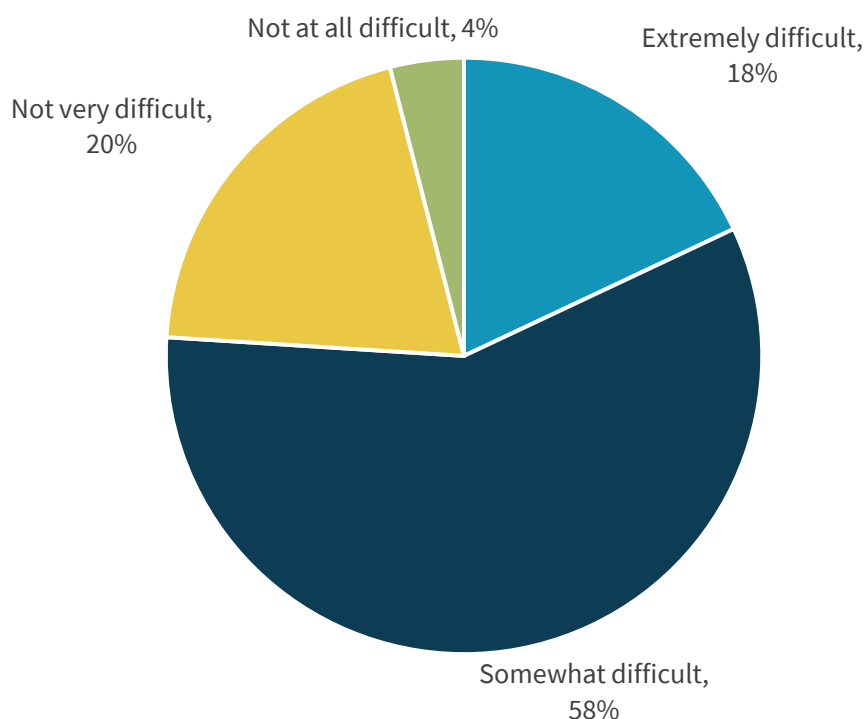
Source: Enterprise Strategy Group

Survey respondents were asked to identify areas with the most acute skills shortages. Nearly four in ten (39%) cite cloud computing security, followed by nearly a third (30%) who identify application security and/or security analysis and investigations as areas of personnel deficiency (see Figure 19).

CISOs must understand the level of competition for candidates with these skill sets. It may be worthwhile to craft backup plans if recruitment efforts languish or fail completely. Examples include training software developers and DevOps personnel on application security, recruiting and training server virtualization administrators as cloud computing security specialists, and working with experienced managed services providers.

Figure 19. Area(s) with Biggest Shortage of Cybersecurity Skills by Technology Category

In which of the following areas – if any – would you say that your organization has the most significant shortage of cybersecurity skills? (Percent of respondents, N=282, three responses accepted)
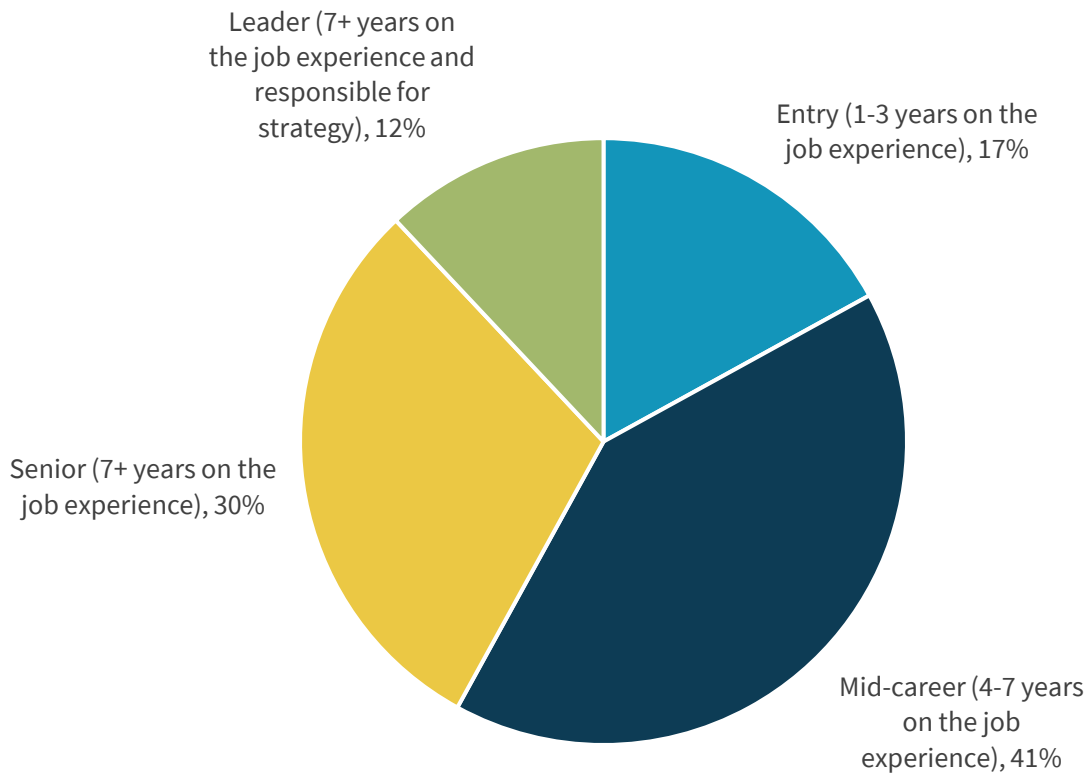
Category	Percent
Cloud computing security	39%
Security analysis and investigations	30%
Application security	30%
Risk and/or compliance administration	27%
Senior-level cybersecurity positions	23%
Security engineering	22%
Penetration testing/red teaming	18%
Security auditors	16%
Network security	12%
Mobile computing security	8%
Endpoint security	8%
Database security	6%
Other	4%
Don't know	7%

Source: Enterprise Strategy Group

The research also points out that it is most difficult to recruit mid-career and senior cybersecurity professionals while fewer organizations have trouble recruiting entry-level security staff or cybersecurity leadership (see Figure 20).

Figure 20. Area(s) with Biggest Shortage of Cybersecurity Skills by Experience Levels

Based on amount of experience, which group of cybersecurity professionals have been most challenging for your organization in terms of recruiting and hiring? (Percent of respondents, N=489)


Leader (7+ years on the job experience and responsible for strategy), 12%

Entry (1-3 years on the job experience), 17%

Senior (7+ years on the job experience), 30%

Mid-career (4-7 years on the job experience), 41%

Source: Enterprise Strategy Group

While organizations find it difficult to recruit and hire cybersecurity staff, security professionals are constantly being recruited for new positions with promises of higher pay, better benefits, and an assortment of perks. In fact, 70% of the cybersecurity professionals surveyed are solicited to consider other job opportunities at least once per month (see Figure 21). Furthermore, 71% of survey respondents believe that the frequency/volume of job solicitations has increased over the past few years. Cybersecurity truly remains a seller's market.

Figure 21. Frequency of Solicitations for Cybersecurity Jobs

About how often are you solicited to consider other cybersecurity jobs by various types of recruiters (i.e., receive emails about opportunities, receive calls from headhunters or corporate recruiters, etc.)? (Percent of respondents, N=489)
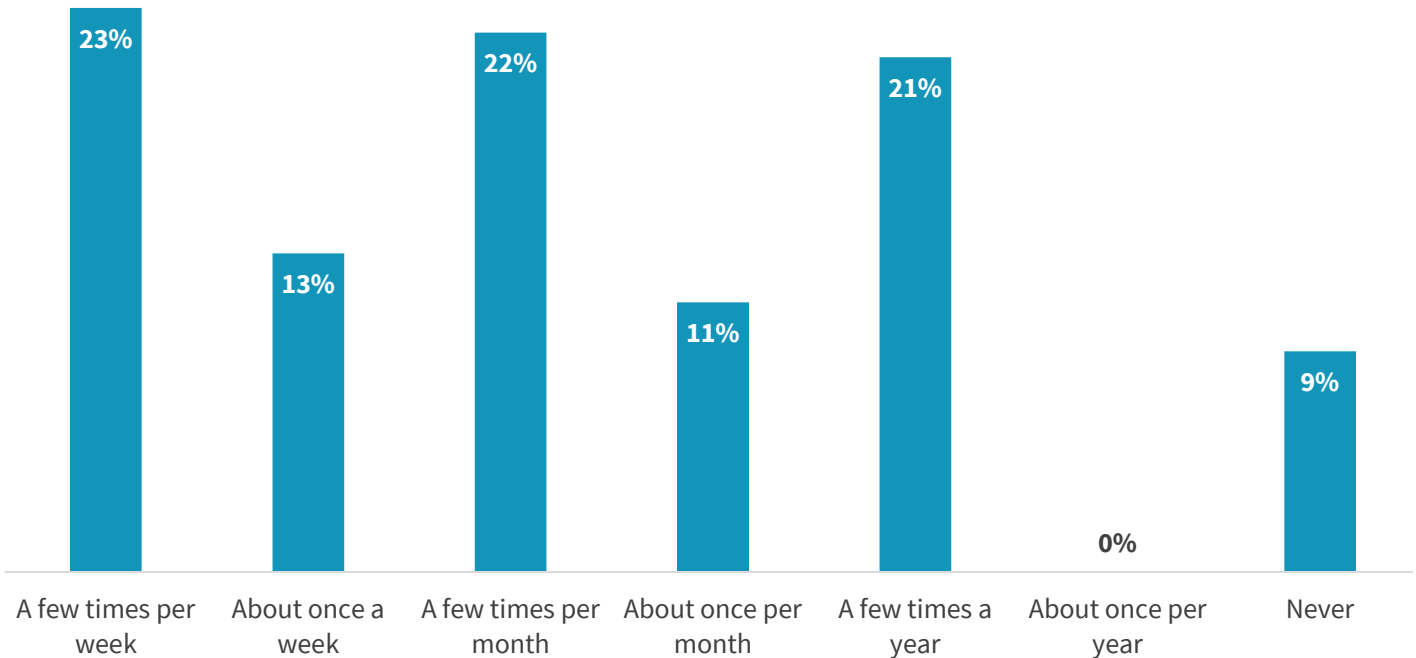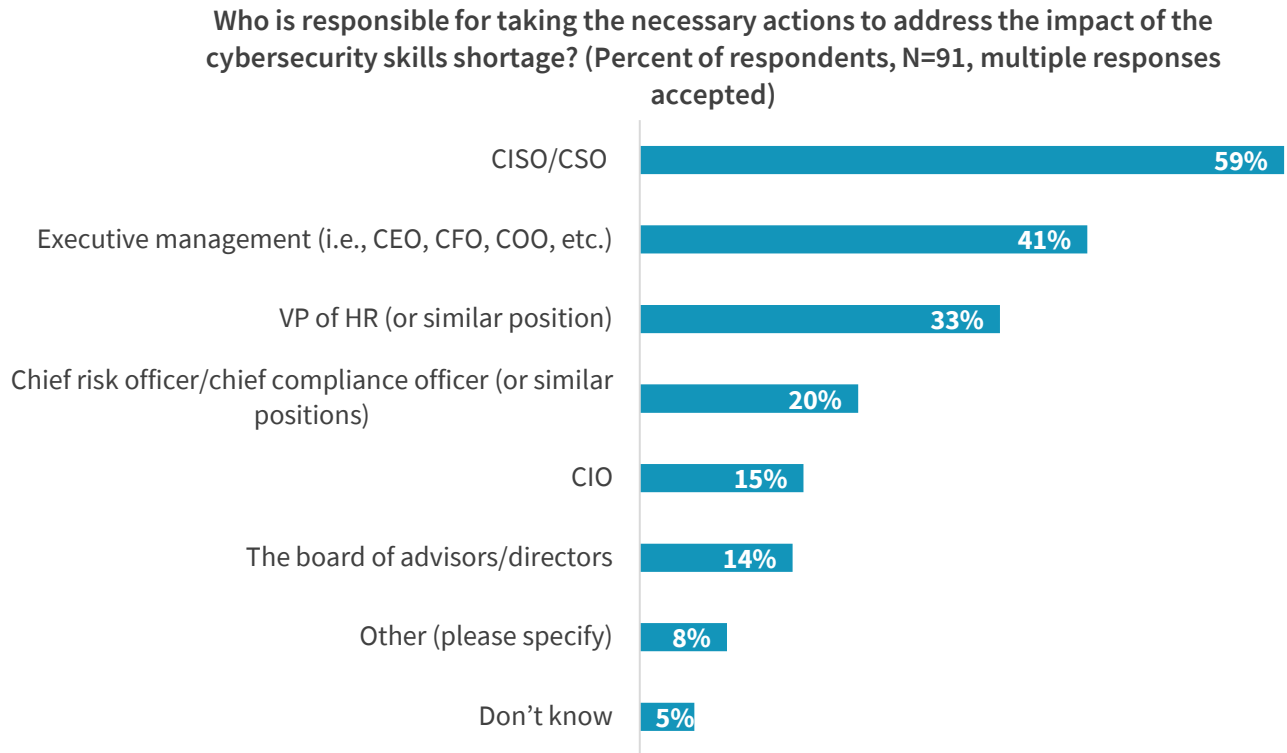

Source: Enterprise Strategy Group

In 2021, survey respondents were once again asked to identify who is responsible for addressing the cybersecurity skills shortage. Respondents indicate that CISOs/CSOs really own this problem (see Figure 22). Are these individuals and the organizations they work for doing enough to address the cybersecurity skills shortage? Not according to survey respondents, as 27% believe their organization could be doing somewhat more to address the skills shortage while nearly one-third (32%) say their organizations could be doing much more here (see Figure 23).

As previously stated, this data reinforces the need for CISOs/CSOs and the organizations they work for to plan for staff and skills shortages by including plans for additional use of professional/managed services and process automation. Organizations should also research, test, and pilot "smart" security solutions based on advanced analytics. These technologies vary widely in terms of efficacy and should be approached cautiously, but their potential to augment human skills in the future is worth pursuing.
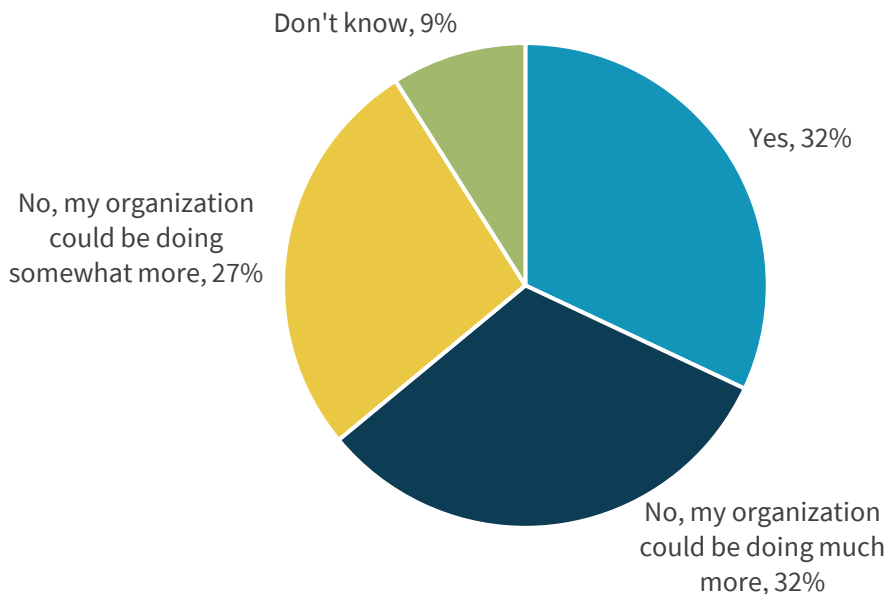
Figure 22. Responsibilities for Addressing the Impact of the Cybersecurity Skills Shortage

Who is responsible for taking the necessary actions to address the impact of the cybersecurity skills shortage? (Percent of respondents, N=91, multiple responses accepted)
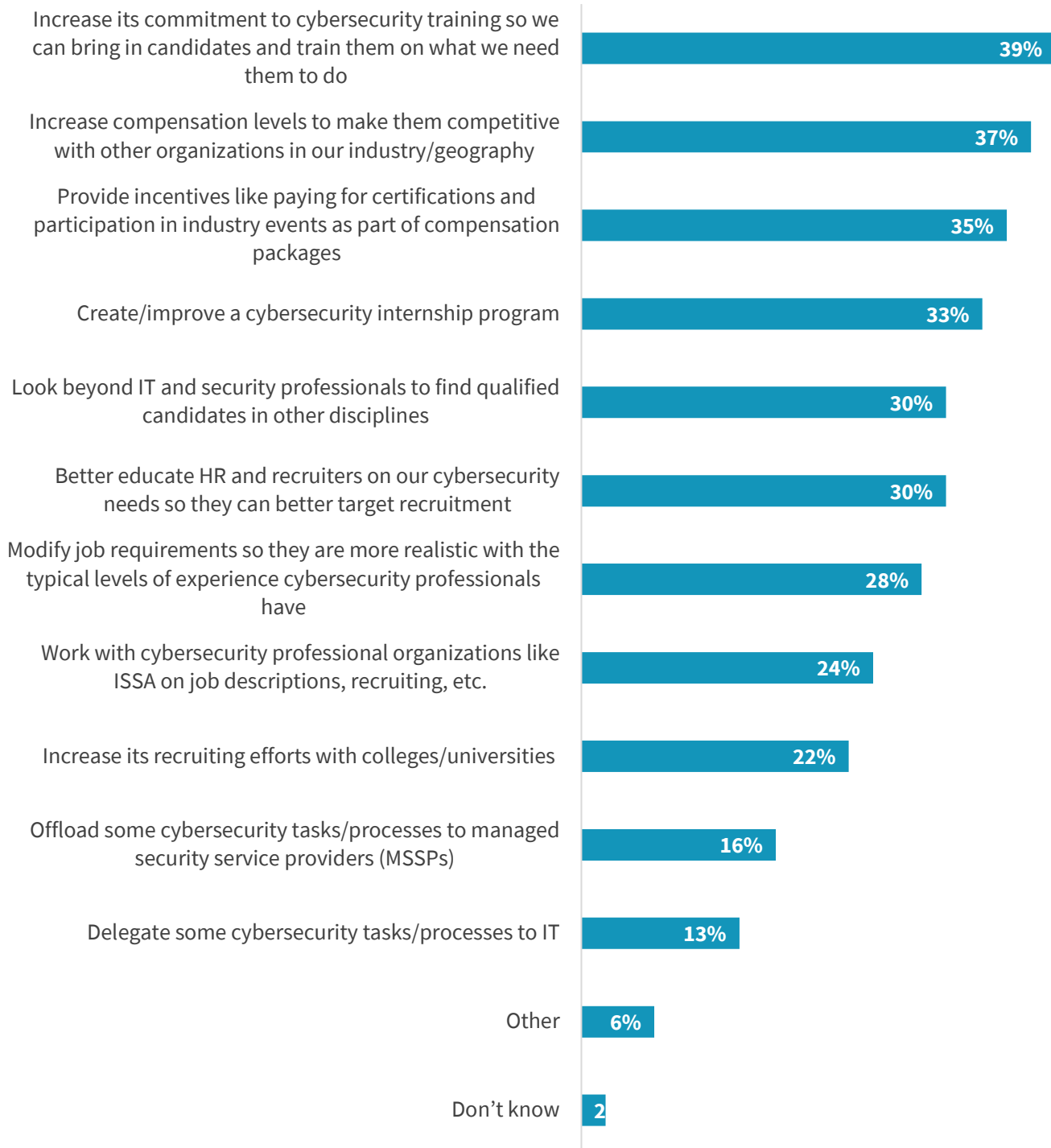
CISO/CSO	59%
Executive management (i.e., CEO, CFO, COO, etc.)	41%
VP of HR (or similar position)	33%
Chief risk officer/chief compliance officer (or similar positions)	20%
CIO	15%
The board of advisors/directors	14%
Other (please specify)	8%
Don't know	5%

Source: Enterprise Strategy Group

Figure 23. Organizational Response to the Cybersecurity Skills Shortage

Do you believe your organization is taking the necessary actions to address the impact of the cybersecurity skills shortage? (Percent of respondents, N=282)

Don't know, 9%

Yes, 32%

No, my organization could be doing somewhat more, 27%

No, my organization could be doing much more, 32%

Source: Enterprise Strategy Group

With most respondents believing that their organizations could do more to address the skills shortage, ESG and ISSA asked them for some specific recommendations (see Figure 24). Cybersecurity professionals suggested actions like increasing the commitment to cybersecurity training, increasing compensation, providing additional perks, and creating or improving a cybersecurity internship program.

The top three recommendations are clear; organizations need to offer competitive compensation, benefits, and training opportunities to attract top cybersecurity talent. Aside from these basics, survey respondents have some additional advice such as looking beyond security and IT for talent, working more closely with cybersecurity professional organizations, and increasing work with local colleges and universities. In summary, successful cybersecurity recruiting requires a bit of experimentation and creativity. Organizations should take chances with the goal of creating programs that are attractive to the cybersecurity community. CISOs should gather further feedback and enlist the HR department's help to create this type of environment.

Figure 24. Actions that Could Be Used to Address the Cybersecurity Skills Shortage

What actions do you believe your organization could take to address the impact of the cybersecurity skills shortage? (Percent of respondents, N=282, multiple responses accepted)

Action	Percent
Increase its commitment to cybersecurity training so we can bring in candidates and train them on what we need them to do	39%
Increase compensation levels to make them competitive with other organizations in our industry/geography	37%
Provide incentives like paying for certifications and participation in industry events as part of compensation packages	35%
Create/improve a cybersecurity internship program	33%
Look beyond IT and security professionals to find qualified candidates in other disciplines	30%
Better educate HR and recruiters on our cybersecurity needs so they can better target recruitment	30%
Modify job requirements so they are more realistic with the typical levels of experience cybersecurity professionals have	28%
Work with cybersecurity professional organizations like ISSA on job descriptions, recruiting, etc.	24%
Increase its recruiting efforts with colleges/universities	22%
Offload some cybersecurity tasks/processes to managed security service providers (MSSPs)	16%
Delegate some cybersecurity tasks/processes to IT	13%
Other	6%
Don't know	2

Source: Enterprise Strategy Group

Conclusion

Cybersecurity professionals continue to manage their careers in a tactical manner with little long-term planning. Many cybersecurity professionals believe that their organizations need to do more to keep up with cybersecurity requirements.

The cybersecurity skills shortage seems to be getting worse, forcing overwhelmed cybersecurity professionals into constant firefighting. While the skills shortage will continue with no end in sight, this year's research suggests that organizations could and should be doing more to address it.

Takeaways for Cybersecurity Professionals

As with past reports, cybersecurity professionals—especially those in the early stages of a cybersecurity career or individuals seeking to enter the field—should use this research for career planning. Therefore, cybersecurity professionals should:

- **Start networking, keep networking.** Survey respondents recommend that entry-level security professionals join a professional organization as a means for getting their first job. The data also shows that professional organizations act as a catalyst for job hunting, career development, and continuing education. Taken together, the ESG/ISSA research demonstrates that professional organizations can help throughout a cybersecurity career, paying dividends on time and money invested. ISSA itself is a good choice, but the data seems to indicate that cybersecurity professionals will benefit from other regional, industry, and professional organizations.

- **Resist certification loading—it doesn't pay.** After five years of research, it's clear to ESG and ISSA that a CISSP and a few limited other certifications can be valuable building blocks for a cybersecurity career. Others may look good on a resume or business card, but cybersecurity professionals consistently claim to get far more out of hands-on experience like internships, mentoring programs, or staff rotation. Security certifications should be consumed for specific use cases, to meet job requirements, or to augment on-the-job experience period.

- **Make a personal commitment to skills development and training.** On an average year, cybersecurity professionals are expected to get about 40 hours of training. This year's research revealed that 54% of those surveyed reported having more than 40 hours of training in the past year, 24% have had about 40 hours of training, and 21% have had less than 40 hours of training. This data seems positive, but ESG and ISSA also found that many hours of "training" are really used as a means for fulfilling CPE credits rather than real skills development. A cybersecurity professional career is analogous to a physician in that continuing education is critical for each type of profession to keep professionals' skills and knowledge current and relevant. Therefore, cybersecurity professionals must make a commitment to skills development and training even if this means investing their own time/money or pushing back on employers that minimize continuing education. Given the ever-changing nature of cybersecurity, individuals who invest in their own skills should get a strong ROI throughout their careers.

- **Pick a technology or business path to pursue.** Cybersecurity careers lead to two main roads. One aligns security and business operations, culminating in "C-level" jobs like CISO, data privacy officer, etc. The other digs into the technology toward positions like security engineer, cloud security architect, threat analyst, etc. Obviously, each road requires different skills, but the ESG/ISSA research shows that many cybersecurity professionals are managing their careers haphazardly with no end goal in mind. Indeed, it's hard to see five or ten years into the future, but at the very least, cybersecurity professionals should decide whether they see themselves in technical or business roles. Upon making this decision, they should set their sights on the chain of command and what skill sets and experiences they'll need to climb to the next most senior positions.

- **Remember that when considering a new job, relationships matter.** The ESG/ISSA research indicates that cybersecurity professionals get job satisfaction from things like competitive compensation, the ability to work with a strong team and leading technologies, and additional perks for travel, training, industry participation, etc. While these are certainly worthwhile incentives, information security pros should remember that there should be plenty of open jobs offering these benefits. Therefore, ESG and ISSA recommend digging deeper by asking questions like: What's the relationship like between security and IT departments? Do these teams collaborate well or is there friction? Do executives and the board include cybersecurity in strategic planning and decision making? What's the relationship between the security team and HR, legal teams, and lines of business? Since cybersecurity is truly a collaborative effort, these relationships could determine cybersecurity program success. It's worth doing some background research, asking questions, and meeting with non-technical managers as part of the interviewing process.

Takeaways for CISOs and Organizations

This research should be used as a guideline for building a strong and happy cybersecurity team. CISOs and their organizations should heed the following advice:

- **For goodness sakes, pay your people!** Competitive compensation came up several times in this research project and is clearly critical to hiring and retaining security personnel. Given the competition for security talent, organizations that can't meet this threshold won't be successful in hiring and will likely lose key security personnel who are being aggressively pursued by recruiters and other organizations constantly. CISOs must push through archaic personnel models and pay grades and take this issue right to executives and corporate boards in pursuit of near-term changes in compensation structures. Business managers must realize that without an experienced security staff, all security investments and strategies will fail.

- **Drive security further into the business.** Organizations should be alarmed by the fact that 29% of respondents said the security team's relationship with HR is fair or poor, 28% said the relationship with line of business managers is fair or poor, 27% of respondents said that the relationship with the board of directors is fair or poor, and 24% said the relationship with the legal team is fair or poor. This should set off alarm bells to address these organizational problems as soon as possible. CISOs should immediately assess these relationships at their organizations while corporate boards should do the same. Poor relationships will lead to organizational friction, communications issues, human error, and ultimately, increased cyber-risk. The message is clear: Organizations with a cybersecurity culture are in the best position. Certainly, business executives must embrace cybersecurity, but it's also important for CISOs to move their people, processes, and technologies closer to the business. This may take training, extended interdepartmental collaboration, and process reengineering, which are difficult but worthwhile changes.

- **Find time and resources for more cybersecurity training and skills development.** Some CISOs believe that investing in training is a waste of money that serves as a free education for cybersecurity professionals who will ultimately leave the organization for greener pastures. ESG and ISSA believe this belief couldn't be more misguided. Conscientious employees expecting continuing education will simply invest their own time and money while growing to resent the organization. Others will languish with increasingly limited skill sets. Meanwhile, cyber-risks continually rise. With the current state of the cybersecurity skills market, some employees will certainly find more lucrative opportunities, but investing in security training will improve the efficacy of the cybersecurity staff, bolster morale, and help the organizations mitigate cyber-risk. Benefits like these are well worth the investment.

- **Since the cybersecurity skills shortage isn't going away, develop a long-term plan to address it**. As previously mentioned, the cybersecurity skills shortage has created a shortage of qualified cybersecurity professionals as well as

a persistent gap in advanced cybersecurity skills. Few organizations have the resources and appeal to hire all the talent they need, and five years of ESG/ISSA data indicate that nothing is going to change anytime soon. Therefore, CISOs need a realistic strategy that assumes staffing and skills risks. For example, organizations struggling to fully staff the security operations center (SOC) should consider investing in process automation and managed services for staff augmentation. The goal here should be covering all security requirements while making the existing staff as efficient and productive as possible.

- **Consider what's necessary to make your organization an attractive landing spot for cybersecurity pros.** Proactive CISOs want to retain existing personnel while recruiting new employees. The ESG/ISSA research provides a recipe for doing so. First and foremost, the organization must offer competitive compensation, including benefits for continuing education and career development. Internship programs can appeal to entry-level candidates and create a pipeline for new employees, while mentoring and staff rotation programs will help train and acclimate talented individuals. Organizations that create a cybersecurity culture and push cybersecurity into business and IT planning will have a distinct advantage. Finally, CISOs should tap into professional organizations, local threat sharing groups, colleges and universities, etc., to spread the word about the benefits of employment at their organizations. While this strategy won't eliminate attrition, it should create a healthy and attractive work environment.

Research Methodology

To gather data for the main part of this report, ESG conducted an online survey of security and IT professionals from the ISSA member list (and beyond) in North America, Europe, Central/South America, Africa, and Asia, between March 1, 2021, and April 7, 2021.

After filtering out unqualified respondents, removing duplicate responses, and screening the remaining completed responses (on several criteria) for data integrity, we were left with a final total sample of 489 security and IT professionals.

Please see the *Respondent Demographics* section of this report for more information on these respondents.

Note: Totals in figures and tables throughout this report may not add up to 100% due to rounding.

The Enterprise Strategy Group (ESG) and the Information Systems Security Association (ISSA) would like to thank the supporting organizations that participated in this study to provide well-rounded insight and data across the field of cybersecurity. These partners include:

- The Cloud Security Alliance (CSA)

- EC Council

- The International Association of Privacy Professionals (IAPP)

- SANS Institute

Respondent Demographics

The data presented in this report is based on a survey of 489 qualified respondents and cybersecurity professionals. Figure 25 through Figure 30 detail the demographics of the respondent base at an individual and organizational level.

### Figure 25. Respondents by Current Position

Which of the following best describes your current position within your organization?
(Percent of respondents, N=489)

CISO, CSO or similar senior cybersecurity position, 17%

VP-level position in an information security department, 6%

Director-level position in an information security department, 16%

Security administrator, 15%

IT management, 10%

IT staff, 14%

Other, 22%
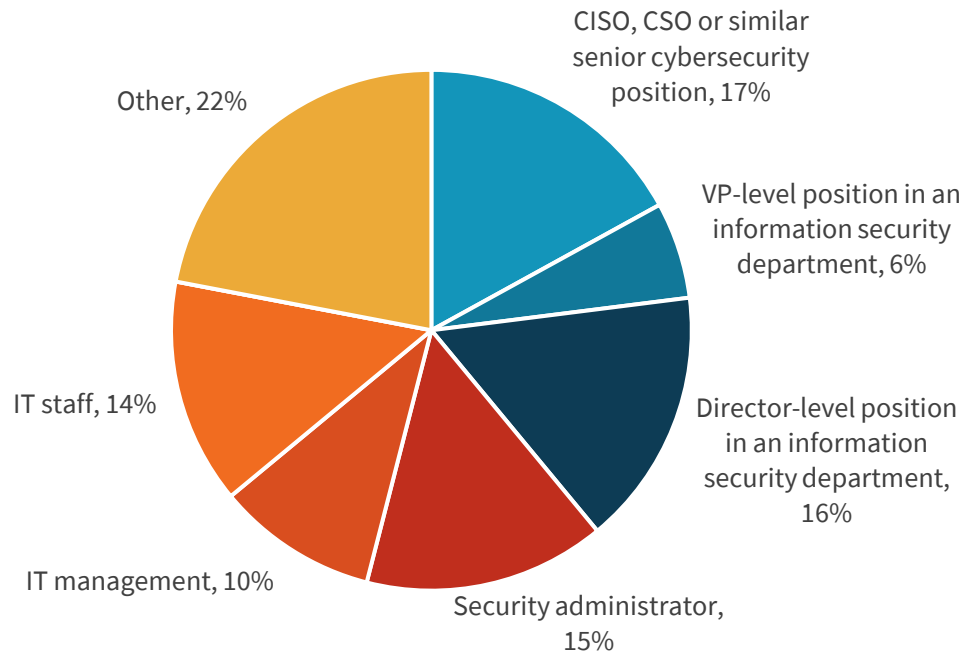
Source: Enterprise Strategy Group

Figure 26. Respondents by Region

Please indicate where you are based (i.e., where you live and work). (Percent of respondents, N=489)

North America	Europe	Asia	Africa	Central/South America
82%	8%	5%	3%	2%
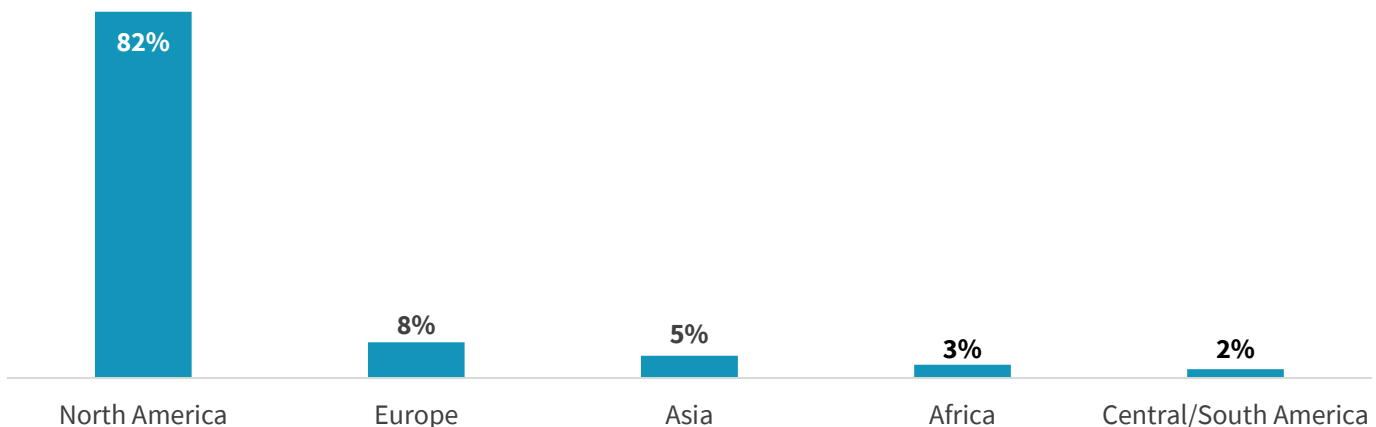
Source: Enterprise Strategy Group

Figure 27. Respondents by Length of Time as a Cybersecurity Professional

Approximately how long have you been employed as a cybersecurity professional? (Percent of respondents, N=489)

- Less than 1 year, 5%
- 1 to 3 years, 11%
- 3.5 to 5 years, 10%
- 5.5 years to 10 years, 20%
- 10.5 years to 15 years, 18%
- 15.5 years to 20 years, 14%
- More than 20 years, 21%
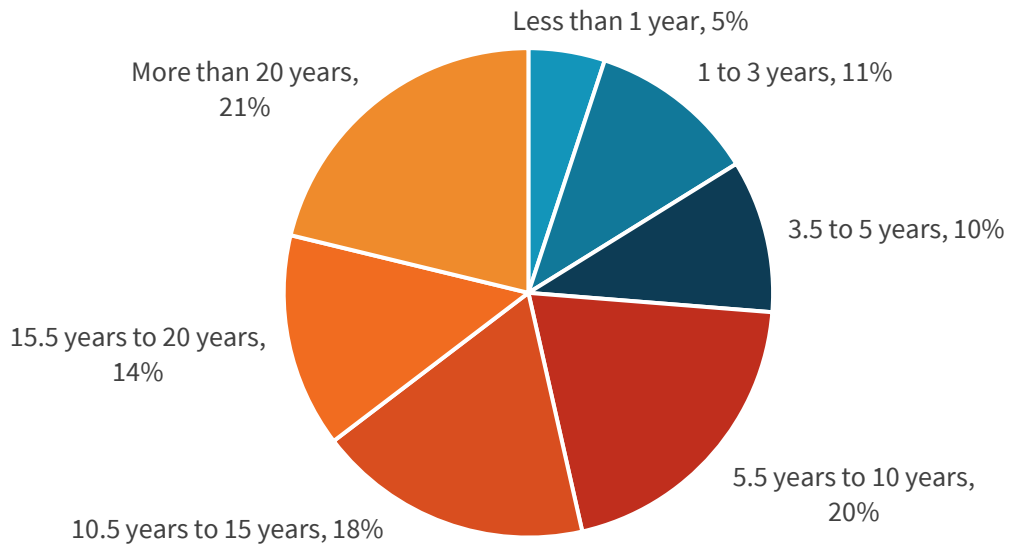
Source: Enterprise Strategy Group

Figure 28. Respondents by Number of Cybersecurity Jobs Held

Approximately how many different organizations have you worked for during the span of your cybersecurity career? (Percent of respondents, N=489)

- More than 15, 2%
- 11 to 15, 3%
- 8 to 10, 6%
- 6 to 7, 9%
- 1, 25%
- 4 to 5, 22%
- 2 to 3, 33%
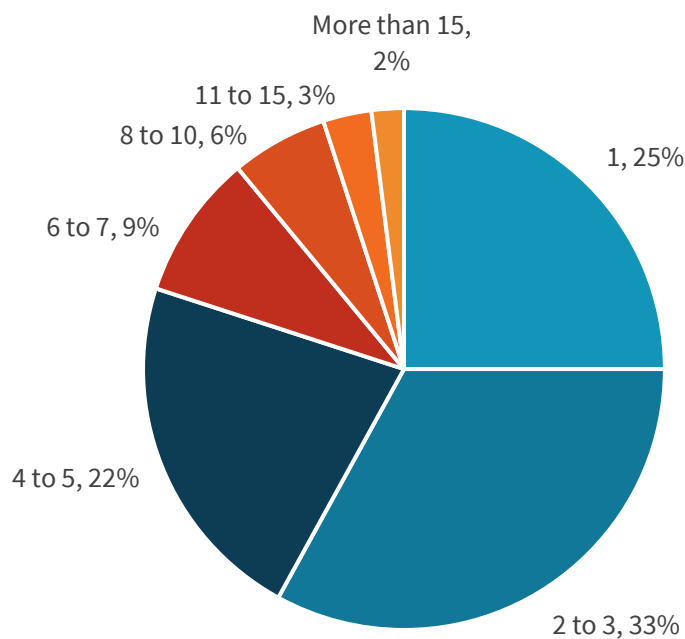
Source: Enterprise Strategy Group

Figure 29. Respondents by Number of Employees

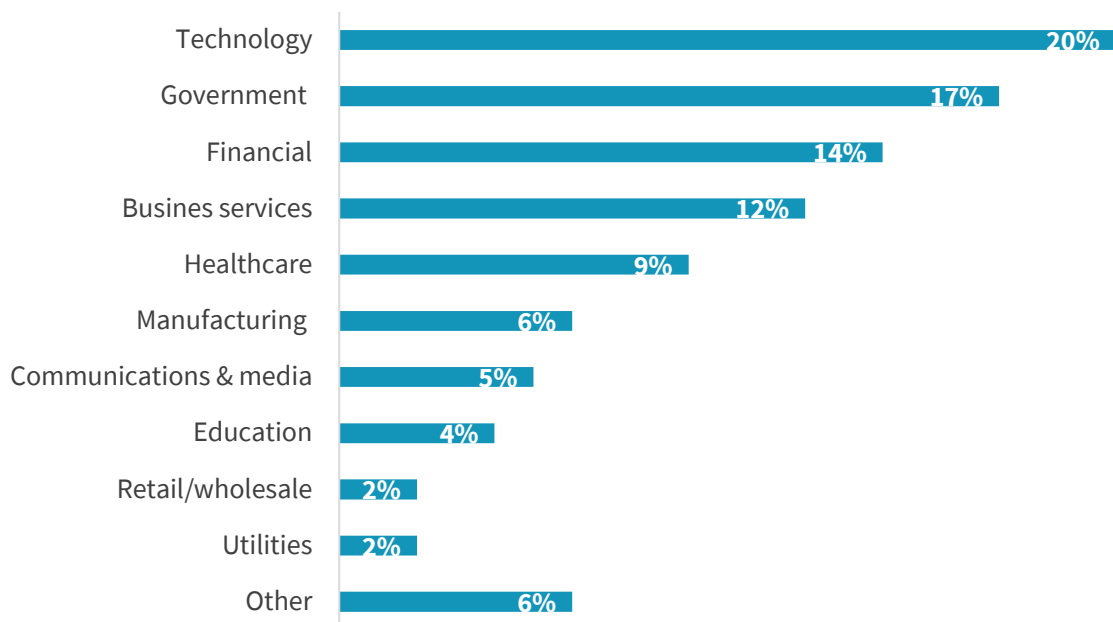**How many total employees does your organization have worldwide? (Percent of respondents, N=489)**

Fewer than 1,000	1,000 to 4,999	5,000 to 19,999	20,000 or more
38%	20%	17%	26%
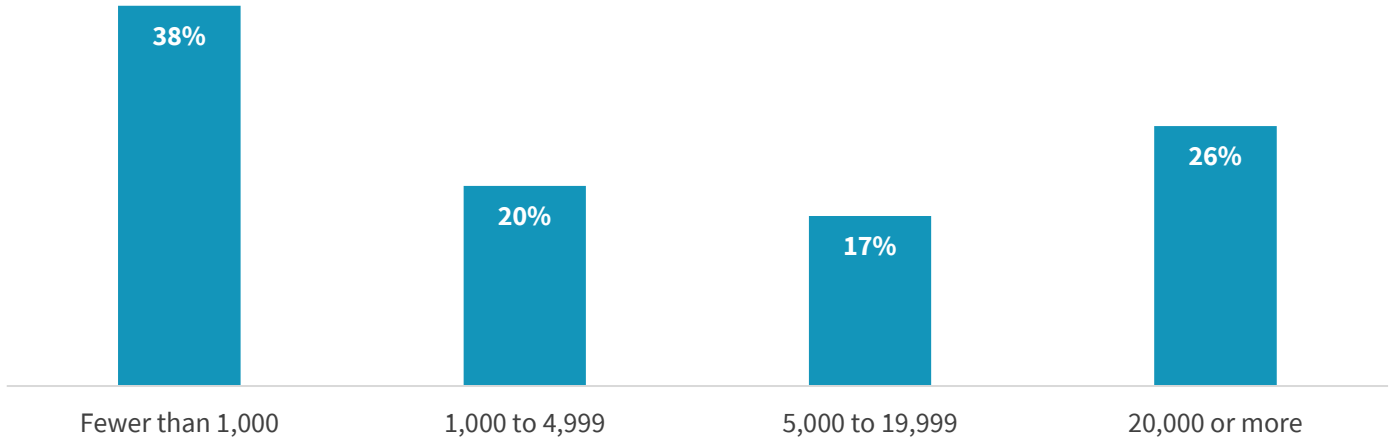
Source: Enterprise Strategy Group

Respondents were asked to identify their organization's primary industry. In total, ESG received completed, qualified respondents from individuals in 20 distinct vertical industries, plus an "Other" category. Respondents were then grouped into the broader categories shown in Figure 30.

Figure 30. Respondents by Industry

What is your organization's primary industry? (Percent of respondents, N=489)

Industry	Percent
Technology	20%
Government	17%
Financial	14%
Busines services	12%
Healthcare	9%
Manufacturing	6%
Communications & media	5%
Education	4%
Retail/wholesale	2%
Utilities	2%
Other	6%

Source: Enterprise Strategy Group

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