In Demand Specialties
Managing Medical-Education Loan Debt

Exploring repayment options, accessing all available resources are key

By Bonnie Darves

For many residents, their excitement about starting training is tempered by an economic reality: it’s time to reckon with the education debt they’ve incurred during medical school and start repaying those loans.

Although medical school remains a good investment and the associated loan debt is ultimately manageable — most physicians will earn incomes substantial enough to repay their loans, and loan-default rates are extremely low — looking at the loan tab can be unnerving. The median loan debt for graduation medical students is $200,000, and while that figure has changed little in recent years, it’s still a staggering sum.

“What we’ve seen in the past few years is that indebtedness has remained relatively stable, if you control for inflation. It’s not increasing at the same high rate we were seeing in the past,” said Julie Fresne, senior director of student financial and career advisory services at the Association of American Medical Colleges (AAMC). Fully three-quarters of physicians enter training with loan debt, according to recent AAMC data, so those who fret about paying off their loans have plenty of company.

Ms. Fresne also noted that interest rates on federal direct loans have varied little over the last decade, which helps physicians to predict how much in interest they’ll pay over the life of their loans. The current interest rate for graduate or professional loans is 6.08%.

The good news is that repayment options are more plentiful and flexible than ever, giving physicians some control in identifying a payment strategy that works for them. Further, if physicians encounter financial circumstances that prevent them from repaying loans temporarily, there are ways to adjust or postpone payments.

Exploring repayment options

Traditional repayment structures are predicated on either a 10-year (Standard, or Default) or 25-year (Extended) repayment plan, in which payments are fixed over the loan period. The 10-year default plan might be manageable for physicians in training who’ve incurred a relatively small amount of debt but likely won’t work as well for physicians carrying six-figure debt. 

Exploring repayment options

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loads: monthly payments for $200,000 of loan debt would exceed $2,000 a month. And while the 25-year plan is more manageable, such extended repayment is far more costly in terms of the interest charges. A third traditional option is the graduated 10-year repayment plan, in which payments are initially smaller and then increase after two years.

Because the traditional repayment options are somewhat rigid, many physicians today opt for income-driven repayment (IDR) plans. In those plans, available with 12- or 25-year terms, payments are set based on the physician's income by using formulas that take into account discretionary income, adjusted gross income, and family size. Physicians must reapply annually to remain in the plans, which include the income-contingent repayment (ICR) plan and the newer income-based repayment (IBR) plan, introduced in 2014. For IBR, which has a 25-year repayment term, payments are capped at 15 percent of discretionary income.

The most popular income-based repayment plans introduced over the last decade include the Pay As You Earn (PAYE) and the new Revised Pay As You Earn (REPAYE) plans. Both are applicable only to federal Direct Loans, and REPAYE, the newest addition, is structured to accommodate long residencies. Here is how the two plans compare:

- **PAYE.** The PAYE plan has a 20-year repayment term, and payments are based on 10 percent of discretionary income. Payments are capped at the 10-year Standard rate and cannot exceed 10 percent of the principal loan amount. Any debt remaining after 20 years is forgiven, but that sum is taxable.

- **REPAYE.** In the REPAYE plan, introduced in 2015, payments are also based on 10 percent of discretionary income. However, the repayment period is 25 years and there is no payment cap. Any debt remaining at 25 years is forgiven, and as with the PAYE plan, the remainder is taxable.

In all income-based plans, spousal income is taken into account if the couple files jointly. Spousal income is not factored into loan payment amounts if the couple files separate tax returns.

Paul Garrard, MBA, founder and president of PG Presents, LLC, which counsels medical professionals on education-loan management, notes that today, most graduating physicians are essentially channeled into income-based repayment plans. “Residents are pretty much pushed into one of these plans today,” said Mr. Garrard, who frequently makes presentations to medical students and residents.

Although IBR is inherently flexible and makes it easier to manage loan debt because payments are based on their income in any given year, residents with high debt loads should keep in mind that their lower payments might not cover the interest due. As such, that unpaid interest will increase. “For residents who owe $200,000 and are using an income-based repayment plan, those lower payments, by the time they finish training, will not have covered the interest on that debt,” Mr. Garrard said.

Despite that downside, residents are increasingly choosing income-based repayment plans rather than traditional plans, according to Ms. Fresne. “Our data shows that physicians are showing more interest in income-driven plans today,” she said.

**Demystifying Public Service Loan Forgiveness**

Although the Public Service Loan Forgiveness (PSLF) program has been in place for many years, misconceptions about how it works and, moreover, who is eligible for it, persist. The program is designed to help physicians and health professionals, and other qualified borrowers, have a portion pay of their education debt forgiven by working for qualified non-profit entities or government agencies. The other key benefit is that any loan amount forgiven is not taxable — a key difference between PSLF and many loan-repayment plans.

For physicians who have federal Direct Loans and who work (train and/or practice) in qualifying employer organizations, any education debt remaining after they have made 120 (10 years’ worth) of qualifying payments is forgiven. To be eligible for PSLF, physician borrowers must be enrolled in an income-driven repayment plan.

The requirements and eligibility criteria for PSLF are somewhat complex, but the option is worth exploring, and many physicians who think they might be ineligible may indeed qualify, Ms. Fresne points out. “It really affords any [qualifying] physician borrower to repay any level of debt, regardless of the specialty they’re in. And it can help borrowers make their payments more manageable from the tracking standpoint,” she said. That’s because once borrowers qualify for enrollment in the program, the government tracks their employment history and their payments.

Despite these benefits, some physicians fail to investigate their PSLF eligibility precisely because of the myths that have persisted. The key one is that physicians’ income will be too high to qualify. That’s not the case,
at least during training. According to the Medscape 2019 Residents Salary and Debt Report, the mean salary for residents in 2019 was $61,200. As such, many physicians who have long residencies will likely qualify for PLSF throughout training at least, and possibly longer. That’s because PSLF eligibility is predicated on income relative to the balance of education loans, not just on income alone. “Some physicians have the impression that it’s very difficult to qualify for PSLF, but that’s not the case,” Mr. Garrard.

Two other misconceptions about PSLF:

1. **My employer or institution won’t qualify for PSLF.** That might be the case, but the odds are somewhat against it, particularly for physicians in training who do their residencies at hospitals or health systems. Of the approximately 5,000 U.S. hospitals, more than 2,800 are nonprofit community hospitals and nearly 1,000 are state or local government community hospitals. In addition, there are also 209 federal government hospitals. All three types of institutions meet the PSLF qualifications, which means that approximately three-quarters of those facilities would be eligible employers.

2. **The program will be discontinued.** That’s possible, based on statements coming out of the current administration, but no decisions have been made and for now it’s still operating. Further, any status change is unlikely to affect borrowers who are already enrolled in the PSLF program.

There’s yet another myth that continues to circulate, according to Mr. Garrard: Many physicians think that by enrolling in PSLF, they must continue working in public service for a long time. “If borrowers enroll in PSLF, they’re not committing to anything. Basically, they’re just having the government track their payments,” he said. “And if they’re training or working in a qualifying 501(c)(3) hospital, the qualified loan payments they make go toward PLSF.” The benefit of the arrangement is that, regardless of where enrollees work, the government will track whether the loan payments being made qualify toward PSLF, saving physicians considerable paperwork and possible guesswork.

To apply for the program, borrowers must complete the PSLF Employment Certification Form to start the process. The form must be completed annually or whenever borrowers change employers.

“The point is that by enrolling in PSLF, physicians preserve the option to use public service to require their debt tax free,” Mr. Garrard said. “There’s really no downside to enrolling.” He cited the example of a pediatrics resident in a teaching hospital who decides to subspecialize, thereby spending an additional three years in training and accruing six years toward possible loan forgiveness. If that physician were to work at a qualifying entity after training, she or he might be able to obtain loan forgiveness after four more years.

It’s important to keep in mind, Ms. Fresne and Mr. Garrard advised, that to have loan debt ultimately forgiven under the PSLF program, borrowers must have met all requirements during the period when they made their 120 payments. For example, to have payments qualify toward loan forgiveness, borrowers must work full time (at least 30 hours a week), make the full scheduled payment on time, and remain in a qualified repayment plan (PAYE, REPAYE, IBR, and ICR) during the period before they request forgiveness. However, neither the qualifying payments nor the employer need to be consecutive, so a physician who worked in the private sector and returned to a qualifying public-sector employer might still be eligible for loan forgiveness.

Numerous individual agencies and entities also offer special loan-forgiveness service options for physicians, including the National Institutes of Health (NIH), the National Health Service Corps (NHSC), the Indian Health Service (IHS), and all branches of the U.S. military.

**Consolidation and refinancing: understand the risks**

Physicians who hold numerous loans, including some private loans, might want to consider consolidating or refinancing their debt — if they’re in a solid financial position and it makes economic sense to do so. However, it’s worth noting that consolidation is unnecessary for borrowers who hold only federal loans; government-contracted loan servicers manage the individual loans as a package and borrowers make a single payment. That payment is apportioned among the loans.

Refinancing is a different matter. Physicians who hold private loans with high interest rates or whose solid financial circumstances permit them to exit an income-based repayment program, and the relative safety that confers, might be good candidates for refinancing. And that option may be especially appealing in a low-interest-rate environment, for physicians who are working in the private sector. The primary caveat is that in leaving the federal loan program, physician borrowers may lose the ability to overpay on their loans and thereby reduce total interest costs over the life of those
loans. Such loans also don’t qualify for loan federal loan forgiveness through PSLF.

Mr. Garrard reminds physicians considering refinancing to keep in mind that refinancing eligibility requirements vary, sometimes significantly, from lender to lender. However, all lenders will look at key factors that indicate the borrower’s ability to repay.

“Physicians who are doing well financially and decide they don’t like the 6.5% interest rate on their loans might start exploring refinancing options,” he said. “But they must have good credit, a solid employment history, and a favorable debt-to-income ratio.” The latter simply means the amount of debt compared to their current income. It’s also worth noting that refinancing is usually available only to U.S. citizens or permanent residents. International medical graduates might, however, be able to secure new financing if they have a creditworthy cosigner who is a U.S. citizen or permanent resident.

Mr. Garrard suggested that physicians evaluating refinancing options — for all or part of their loan portfolio debt — should ask the following questions:

• What fixed and variable interest rates would I qualify for? Some lenders might offer a hybrid.

• With variable rates, what are the maximum and minimum rates that can be charged? Variable rates are usually based on an index, such as the Prime Rate or the London Inter-bank Offered Rate (LIBOR) that changes over time.

• How often can the interest rate change, and how much notice would I receive before that happens? Mr. Garrard said that this can occur as frequently as monthly or quarterly, so it’s key information for borrowers for budgeting purposes, especially if they’re paying via automatic debit.

Finally, borrowers should be fully aware of how long they have to repay the loan. The range might be five years to 15 years or longer.

Regardless of whether physicians keep their federal loans or seek refinancing, the main thing to remember is that because physicians can expect to earn good income, they’ll find a workable way to repay their loans. “Physician borrowers have options — even if their debt load is high. That’s the important thing,” Mr. Garrard said.

Resources

Association of American Medical Colleges. The AAMC offers numerous resources about education loans on its website, www.aamc.org. In addition, the AAMC FIRST program provides a wide range of overall guidance on personal finance matters such as budgeting and goal setting. It’s accessible at https://aamcfinancialwellness.com/index.cfm.

PG Presents. The company focuses primarily on counseling physicians and medical students, and its website includes numerous up-to-date resources on loan-debt management. The website is www.pgpresents.com

Public Service Loan Forgiveness (PSLF). For a basic overview of how this option works and the types of loans and employer organizations that qualify, go to the federal Student Aid web page at https://studentaid.gov/app/pslfFlow.action#!/pslf/launch.
Identifying a Cultural Fit in Physician Job Opportunities

Self-assessment, up-front research, and ample time for interactions are key

By Bonnie Darves

Practicing medicine in an organization that has established a strong, positive culture can make all the difference in terms of physician satisfaction, studies and surveys have found, just as a toxic culture can create a miserable experience for all practice staff. In fact, a negative or unsupportive culture is consistently among the leading reasons physicians cite when they leave a job.

So, how can job-seeking physicians, particularly residents and fellows eyeing a first job, ensure that they’re not heading into a bad situation when they explore practice opportunities? It’s not always easy to spot a “problem practice,” but by doing some advance research and asking the right questions, physicians might be able to avoid this pitfall. This is not to suggest that undesirable culture is rampant among practices and physician organizations, but rather that young physicians generally aren’t proactive enough about looking into a practice’s culture before accepting opportunities, according to recruiters.

One of the first steps physicians should take when looking for a good cultural fit is to identify what’s important — or possibly even nonnegotiable — in the practice’s cultural environment. Ideally, this self-assessment should occur before starting the job search. Patrice Streicher, senior operations manager for Vista Staffing Solutions, recommends that physicians create a list of “absolute must-haves” and “would be nice to have” to guide their discussions with recruiters and, later, with the prospective employers’ hiring team. These categories, Ms. Streicher said, can be very helpful overall in evaluating practice opportunities and gauging potential cultural fit.

Ms. Streicher also stresses the importance of physicians being honest with themselves (and recruiters) about what they’ll need to practice successfully in any cultural environment. “Physicians should be realistic about their abilities, their competency level, and their confidence in their own autonomy. These answers will inform the degree of collegial support they’ll need in a new position,” she said.

Physicians who have identified their preferred practice location should start their culture research even before they start scheduling site interviews, advises Louis Caligiuri, director of physician services for North Shore Medical Center, in Peabody, Massachusetts. “It’s important to connect with other physicians in the area — physicians in your field in several practices and people you trained with, in addition prospective colleagues, if possible — to get a sense of the cultural environment in area practices,” Mr. Caligiuri said. “Those connections can be very meaningful and informative.”

Self-assessment key in determining cultural fit

In the early stages of a job search, physicians should also tap their recruiter’s expertise and experience to help identify a potentially positive match. And that means vetting the recruiter to determine how well she or he knows the opportunities under consideration, according to Michelle Baker, a recruitment director for Merritt Hawkins & Associates. “Once candidates do that, they should let the recruiter know their specific needs and concerns about cultural fit, and what their priorities are for themselves and their families,” she said.

A well-informed recruiter should be able to provide ready answers to the following: Why there’s an opening, when the other physicians joined the practice, and what the physician turnover rate is. Candidates should also ask about physician satisfaction scores and for a view of the “day or week in the life” of prospective physician colleagues (or the physicians who left). The responses to such questions are often good indicators of the organization’s culture, Ms. Baker said.

Brigitta Glick, founder and chief executive officer of the staffing firm Provenir Healthcare in San Antonio, Texas, advises physicians to get into the nitty-gritty with the recruiter about the working environment, which is often predictive of both culture and physician-satisfaction levels. “Physicians should ask about the makeup of the team and the logistics of the working environment,” she said. For example, physicians should find out if they would essentially be working “on an island” or with dedicated, accessible staff in close proximity. “You want to know if you’ll be essentially in a pod or on your own, and whether you’d be working with your own support staff rather than ‘borrowed’ extenders,” she said.

Ms. Baker reminds candidates that the organization’s scheduling practices and financial priorities might also be helpful cultural barometers. For example, if there’s a focus on schedule flexibility, structured hours, and
minimal call, the opportunity will “fall on the quality-of-life end of the [culture] spectrum,” she said. Conversely, an opportunity that entails aggressive production goals and a more intensive schedule “reflects a more entrepreneurially, financially driven culture,” Ms. Baker said.

Finally, the recruiter can also play a vital “messenger” role in assessing cultural fit in the early job-search stages, according to Katie Cole, president of Harlequin Recruiting in Denver. “The recruiter can ask the uncomfortable questions of the prospective employer, and that won't be held against the candidate personally,” said Ms. Cole, whose firm focuses on surgeon recruitment. “If there's a specific aspect of culture that the physician wants to avoid, the recruiter can determine the related situation before an engagement or scheduling a site visit.”

Ms. Streicher adds a further recommendation regarding the tough questions: Don't relegate such important discussions to informal electronic exchanges. “I advise against written discussions over email or via text messages,” she said. “Sensitive disclosure about cultural aspects or practice preferences should take place during a telephone conversation with a professional recruiter.” Such formal discussions, she added, also help the physician evaluate the recruiter’s credibility, working knowledge, and communication professionalism.

All recruiters interviewed for this article concurred that physicians tend to avoid asking the sensitive questions or delving into the organization’s culture, before they agree to site visits. The sources also agreed that relatively few young physicians, in their experience, ask very direct questions in the site-interview setting, about matters that would be key in ensuring a good cultural and professional fit.

“When assessing culture, expect answers to challenging questions,” Ms. Glick said, because that’s an indication of how seriously they’re considering the opportunity. “Physicians should be prepared to show up as they are and be very clear about what they’re seeking and what they hope to avoid.” She offers the following as examples of questions whose responses provide insight into the practice culture:

- How are decisions made in the practice, and how are physicians involved in that process?
- What causes conflict here, and when that happens, how is conflict resolved?
- Who has the power to get things done in the practice?
- What do you celebrate here — and how do you celebrate?
- How does the organization support professional growth?

Ms. Glick said that even tangential questions, such as how much physician PTO (personal time off) is left on the table at the end of the year, can provide a good sense of culture and expectations, and how well the practice is structured to permit the promised time off.
The point, Ms. Baker said, is that candidates have to raise the issues that are important to them, from not only a professional standpoint but also a personal one. For example, she thinks it’s appropriate to ask questions about topics such as gender diversity and neutrality, and whether internal medical graduates are accepted by colleagues and patients. “Physicians should also ask about practice or hospital leaders — do they value physician input or is it our way or the highway?” she said.

When inquiring about the reason for the job opening and physician turnover, physicians should ask detailed questions and expect honest, detailed answers, Mr. Caligiuri said. “If the interviewers say that they don’t know the [turnover] data or aren’t candid about why there’s an opening, that’s not a good sign,” he said.

Don’t skimp on social time with potential colleagues

In preparing for the onsite interview, physicians should request time outside of the interview to meet with prospective colleagues, ideally outside the workday and the practice setting, Mr. Caligiuri suggests. “It’s best to schedule a dinner or lunch meeting offsite, when physicians won’t be running off to see the next patient,” he said.

Job-seeking physicians often don’t set aside enough time for such interactions, as important as those encounters are, according to Ms. Glick. “In my experience, residents and fellows often do themselves a big disservice by trying to cut the visit short,” Ms. Glick said, or by trying to fit in too many site interviews in a short period of time.

“You really need two days to get a good feel for a practice,” she said. “It’s not beneficial to try to fit in eight site visits in a few months; do your research and due diligence to narrow the list, and then pursue three or four opportunities.”

Ms. Glick and Ms. Caligiuri both recommend that candidates request a few hours to shadow a prospective colleague, to observe a typical workday and to thoroughly assess the level of physician support and the cultural environment. If a practice is reluctant to allow for offsite social opportunities or a shadowing experience, that might indicate problems or issues that the practice is trying to hide.

“It’s a red flag if the practice doesn't facilitate those interactions or if the head of the practice doesn’t make the time to meet with the candidate,” Mr. Caligiuri said. He also stressed the importance of candidates visiting all practice locations where they might work. In his organization, candidates are encouraged to come back for a second visit if the initial schedule doesn't accommodate requested social and worksite activities.

“The social setting may provide the best opportunity to gauge whether you fit culturally,” Ms. Baker pointed out. Such opportunities enable candidates to find out whether the potential partners share your sense of humor, your values, or even your attitude toward raising children, she added. “That social gathering can tell you a lot about the ‘feel’ of the practice,” she said, “that you might not get during the interview.”

Mr. Caligiuri adds another important reminder for job-searching physicians: practices are also looking for a good match, and the social gathering gives prospective colleagues an opportunity to gauge whether the candidate will fit in. “It gives them a chance to ascertain the candidate's suitability — and that’s obviously important for everyone involved,” he said.

Although being well informed and proactive and asking the important questions can go a long way toward finding a good cultural fit, at a certain point the candidate also needs to just trust his or her instincts, Ms. Streicher said, because those are telling, too. “If you have concerns that there is a misalignment of your beliefs with the core values or practice culture with an opportunity, I suggest keep looking,” she said, “because the right practice culture match is out there.”

Did you find this article helpful? What other topics would you like to see covered? Please send us an email to let us know what you thought at resourcecenter@nejm.org.
A 73-year-old man with hypertension and chronic obstructive pulmonary disease calls to report that he has had a fever (maximal temperature, 38.3°C) and a dry cough for the past 2 days. He notes that his shortness of breath has worsened. His medications include losartan and inhaled glucocorticoids. He lives alone. How should he be evaluated? If he has coronavirus disease 2019 (Covid-19), the disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), then how should he be treated?

**The Clinical Problem**

Coronaviruses typically cause common cold symptoms, but two betacoronaviruses — SARS-CoV-1 and Middle East respiratory syndrome coronavirus (MERS-CoV) — can cause severe pneumonia, respiratory failure, and death. In late 2019, infection with a novel betacoronavirus, subsequently named SARS-CoV-2, was reported in people who had been exposed to a seafood market in Wuhan, China, where live animals were sold. Since then, there has been rapid spread of the virus, leading to a global pandemic of Covid-19. Here, we discuss the presentation and management of Covid-19 in patients with mild or moderate illness, as well as prevention and control of the infection. Discussion of Covid-19 that occurs in children and during pregnancy and of severe disease is beyond the scope of this article.

**Strategies and Evidence**

Coronaviruses are RNA viruses that are divided into four genera; alphacoronaviruses and betacoronaviruses are known to infect humans.1 SARS-CoV-2 is related to bat coronaviruses and to SARS-CoV-1, the virus that causes severe acute respiratory syndrome (SARS).2 Similar to SARS-CoV-1, SARS-CoV-2 enters human cells through the angiotensin-converting-enzyme 2 (ACE2) receptor.3 SARS-CoV-2 has RNA-dependent RNA polymerase and proteases, which are targets of drugs under investigation.

**Transmission**

SARS-CoV-2 is primarily spread from person to person through respiratory droplets, which are typically released when an infected person coughs or sneezes. Because droplets usually fall within a few meters, the likelihood of transmission is decreased if people remain at least 2 m apart. Transmission is thought not to normally occur through the inhalation of aerosols (virions suspended in air), but there are concerns that the virus may be aerosolized during certain activities (e.g., singing)4 or pro-

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**CLINICAL PRACTICE**

Caren G. Solomon, M.D., M.P.H., Editor

**Mild or Moderate Covid-19**

Rajesh T. Gandhi, M.D., John B. Lynch, M.D., M.P.H., and Carlos del Rio, M.D.

This Journal feature begins with a case vignette highlighting a common clinical problem. Evidence supporting various strategies is then presented, followed by a review of formal guidelines, when they exist. The article ends with the authors’ clinical recommendations.

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Mild or Moderate COVID-19

COVID-19 (the illness caused by SARS-CoV-2) has a range of clinical manifestations, including cough, fever, malaise, myalgias, gastrointestinal symptoms, and anosmia. Diagnosis of COVID-19 is usually based on detection of SARS-CoV-2 by PCR testing of a nasopharyngeal swab or other specimen. Evaluation and management of COVID-19 depends on the severity of the disease; patients with mild disease typically recover at home. Patients with moderate or severe COVID-19 are usually hospitalized for observation and supportive care. There are no proven therapies for COVID-19; thus, referral of patients to clinical trials is critical. Infection control and prevention efforts center on personal protective equipment for health care workers, social distancing, and testing.

A major challenge to containing the spread of SARS-CoV-2 is that symptomatic people are infectious. Recent reports suggest that patients may be infectious 1 to 3 days before symptom onset and that up to 40 to 50% of cases may be attributable to transmission from asymptomatic or presymptomatic people. Just before or soon after symptom onset, patients have high nasopharyngeal viral loads, which then fall over the course of approximately 1 week. Patients with severe disease may shed the virus for longer periods, although the duration of infectious viral shedding is unclear.

Clinical Manifestations

The median incubation period, from exposure to symptom onset, is approximately 4 to 5 days, and 97.5% of patients who are symptomatic will have symptoms within 11.5 days after infection. Symptoms may include fever, cough, sore throat, malaise, myalgias, fatigue, and headache. Some patients have nonrespiratory symptoms, including anosmia, nausea, and diarrhea. Anosmia and aguesia have also been reported. In some series of hospitalized patients, shortness of breath developed a median of 5 to 8 days after initial symptom onset; its occurrence is suggestive of worsening disease. Risk factors for complications of COVID-19 include older age (e.g., >65 years), cardiovascular disease, chronic lung disease, hypertension, diabetes, and obesity. It is unclear whether certain other conditions (kidney disease, immunosuppression, cancer, and uncontrolled diabetes, immunodeficiency virus [HIV] infection) confer an increased risk of complications, but these conditions may be associated with worse outcomes after infection with other respiratory pathogens, close monitoring of patients with COVID-19 who have these conditions is warranted. Laboratory findings in hospitalized patients may include lymphopenia and elevated levels of D-dimer, lactate dehydrogenase, C-reactive protein, and ferritin. At presentation, the procalcitonin level is typically normal. Findings associated with poor outcomes in some series include an increased white-cell count with lymphopenia, a prolonged prothrombin time, and elevated levels of liver enzymes, lactate dehydrogenase, D-dimer, interleukin-6, C-reactive protein, and procalcitonin. Several tests (e.g., chest radiography) are present imaging, the typical findings are ground-glass opacifications or consolidation.

Diagnosis

The diagnosis of COVID-19 is usually based on the detection of SARS-CoV-2 by means of polymerase-chain-reaction (PCR) test. Soon after symptom onset, the sensitivity of PCR testing of nasopharyngeal swabs appears to be high, although false negatives may occur with uncertain frequency. If a person is suspected to have COVID-19 but has negative testing of a nasopharyngeal swab, repeat testing is prudent, especially if that person lives in an area with active community transmission.

The type of specimen that is collected depends on which specimens have been validated for use with the specific PCR test. Most PCR assays used in the United States can test nasopharyngeal swabs. (A video demonstrating how to obtain a nasopharyngeal swab specimen is available at NEJM.org.) However, laboratories are increasingly able to test sputum and lower respiratory tract specimens. Sputum samples (or endotracheal aspirates) when abnormal is are easier to obtain in some settings, and testing of sputum may be more sensitive than testing of a nasopharyngeal swab. Sputum induction is contraindicated because of concerns about aerosolization. There are limited data regarding the use of oropharyngeal swabs; in one study, testing of these swabs was less sensitive than testing of nasopharyngeal swabs, particularly later in the disease course. If a nasopharyngeal swab cannot be obtained (e.g., because of supply shortages), the Centers for Disease Control and Prevention (CDC) recommends the use of an oropharyngeal swab.

The Food and Drug Administration (FDA) recently recognized on-site self-collection of an anterior nares specimen as an acceptable method of collection; this option may facilitate home-based testing and reduce exposures for health care workers.

Table 1. Established and Potential Risk Factors for Severe COVID-19

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* Data are adapted from the Centers for Disease Control and Prevention (CDC). Some of these risk factors are established. Others (e.g., immunocompromise or human immunodeficiency virus infection with a CD4 cell count of <200 per micrometer or uncontrolled viremia) are conditions that confer an increased risk of complications from infection with other respiratory pathogens, but their effect on coronavirus disease 2019 (COVID-19) is not yet known. Studies indicate that the risk of severe disease increases with age. Male sex is not currently included on the CDC list of risk factors but has been noted in some reports with severe outcomes from COVID-19. Immunocompromise includes human immunodeficiency virus infection with a CD4 cell count of less than 200 per micrometer or uncontrolled viremia, prolonged use of glucocorticoids or other immunomodulating medications, a history of bone marrow or organ transplantation, and a history of smoking.

Evaluation and management of COVID-19 is guided by the severity of the illness. According to initial data from China, 8% of people with COVID-19 had mild or moderate disease (including people with out pneumonia and people with mild pneumo- nia), 14% had severe disease, and 5% had critical illness. Patients who have mild signs and symptoms generally do not need additional evaluation, and depending on the risk profile, they may not even need to undergo COVID-19 testing, since the infection will usually resolve. However, some patients who have mild symptoms initially will subsequently have precipitous clinical deterioration that occurs approximately 1 week after symptom onset. In patients who have risk factors for severe disease (Table 1), close monitoring for clinical progression is warranted, with a low threshold for additional evaluation. If new or worsening symptoms (e.g., dyspnea) develop in patients with initially mild illness, additional evaluation is warranted. A physical examination should be performed to assess for tachypnea, hypoxemia, and abnormal lung findings. In addition, testing for other pathogens (e.g., influenza virus, depending on the season, and other respiratory viruses) should be performed, if available, and chest imaging should be considered.

If findings on the initial assessment are suggestive of moderate or severe illness, hospitalization is generally warranted. Patients with moderate disease may have dyspnea, but the blood oxygen saturation will be >94% while the patient is breathing ambient air. Indicators of severe disease are marked tachypnea (respiratory rate, ≥30 breaths per minute), hypoxemia (oxygen saturation, ≤90%), respiratory acidosis (ratio of arterial oxygen to fraction of inspired oxygen, <300), and lung infiltrates (>50% of the lung field involved within 24 to 48 hours).

Laboratory testing in hospitalized patients also includes complete blood counts, and a comprehensive metabolic panel. In most instances, and especially if a medication that affects the corrected QT (QTc) interval is considered, a baseline electrocardiogram should be obtained.

Chest radiography is usually the initial imaging method. Some centers also use lung ultrasonography. The American College of Radiology recommends against the use of computed tomography (CT) as a screening or initial imaging study for COVID-19.
to diagnose Covid-19, urging that it should be used “sparingly” and only in hospitalized patients when there are specific indications. Additional tests that are sometimes performed include coagulation studies (e.g., platelet count, D-dimer measurement) and tests for inflammatory markers (e.g., C-reactive protein and ferritin), lactate dehydrogenase, creatine kinase, and procalcitonin. The prognostic value and clinical utility of the results of these and other tests remain uncertain.

MANAGEMENT OF MILD OR MODERATE COVID-19

Patients who have mild illness usually recover at home, with supportive care and isolation in accordance with guidelines. It may be useful for people who are at high risk for complications to have a pulse oximeter to self-monitor the oxygen saturation.

Patients who have moderate or severe disease are usually monitored in the hospital. If there is clinical evidence of bacterial pneumonia, empiric antibacterial therapy is a reasonable option but should be stopped as soon as possible. Empirical treatment for influenza may be considered during the period when seasonal influenza transmission is occurring, until results of specific testing are known.

There are no approved treatments for Covid-19; thus, people with Covid-19 should be referred to clinical trials. Several agents have been approved as treatments for Covid-19, but at this point, the data are insufficient to inform a recommendation for or against the use of these agents outside of clinical trials. Well-controlled randomized trials will be critical in determining how Covid-19 should be treated.

Hydroxychloroquine and Chloroquine with or without Azithromycin

Chloroquine and hydroxychloroquine have in vitro activity against SARS-CoV-2, perhaps by blocking endosomal transport. Hydroxychloroquine also has antinflammatory effects. Chloroquine is recommended in China for the treatment of Covid-19, but high-quality data are lacking to show whether it or hydroxychloroquine is safe and effective for this indication. A small open-label, nonrandomized study from France showed a higher rate of SARS-CoV-2 clearance by day 6 in 14 patients who were treated with hydroxychloroquine than in patients who declined to participate in the study or were at a different clinic. The effects appeared to be greater in the 6 patients who were receiving hydroxychloroquine combined with azithromycin; 6 patients in the hydroxychloroquine group were excluded from the analysis, a factor that potentially biases the results. A case series showed high rates of viral clearance and clinical improvement in patients treated with hydroxychloroquine plus azithromycin. However, both studies had substantial methodologic limitations, including a lack of adequate comparison groups.

A small randomized trial showed no significant difference in SARS-CoV-2 clearance or the disease course between the hydroxychloroquine group and the control group. Results from additional studies are currently available as non-peer-reviewed preprints. One small trial, for which important details are not yet available, showed a modest improvement in the group that received hydroxychloroquine, as compared with a control group, whereas other studies did not show increased viral clearance or clinical benefit with hydroxychloroquine. Study limitations preclude definitive conclusions. Safety concerns with hydroxychloroquine and azithromycin include the potential for QTc prolongation, which is greater when both agents are used together. A study in which patients received high-dose chloroquine was stopped because of a trend toward excessively high mortality.

Determination of the role of hydroxychloroquine with or without azithromycin for the treatment of Covid-19 hinges on the results of well-conducted clinical trials. The FDA has issued an Emergency Use Authorization (EUA) for the use of chloroquine and hydroxychloroquine from the strategic national stockpile for the treatment of hospitalized adults with Covid-19, but this action does not constitute FDA approval of these agents for this indication. The EUA encourages the conduct of and participation in randomized, well-controlled trials to provide evidence for the effectiveness of these drugs for the treatment of Covid-19.

Lopinavir–Ritonavir

Lopinavir–ritonavir, an HIV-1 protease inhibitor, has been proposed as a treatment, but it is not known whether drug levels adequate to inhibit the SARS-CoV-2 protease can be reliably achieved in people with Covid-19 who receive this medication. In an open-label, randomized trial involving 199 hospitalized patients, the addition of lopinavir–ritonavir to standard care did not result in faster clinical improvement or shorter hospital stays. The study concluded that lopinavir–ritonavir “may not be useful for the treatment of Covid-19.”

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Other treatments that are currently being tested include remdesivir, an antiretroviral agent that inhibits the SARS-CoV-2 protease, and tocilizumab, an interleukin-6 receptor blocker, and monoclonal antibodies against SARS-CoV-2. However, it is not known whether drug levels adequate to inhibit the SARS-CoV-2 protease can be reliably achieved in people with Covid-19 who receive this medication. In an open-label, randomized trial involving 199 hospitalized patients, the addition of lopinavir–ritonavir to standard care did not result in faster clinical improvement or shorter hospital stays. The study concluded that lopinavir–ritonavir “may not be useful for the treatment of Covid-19.”

Concerns have also been raised about the use of glucocorticoids, and some guidelines suggest that they should not be used in patients with Covid-19 pneumonia. The use of systemic or inhaled glucocorticoids should not be stopped in patients who are taking them for other indications.

INFECTION CONTROL AND PREVENTION

Health care workers must be protected from acquiring SARS-CoV-2 while they are providing clinical care (Table 2). Using telehealth when possible, reducing the number of health care workers who interact with infected patients, and performing health care environmental cleaning are critical. Personal protective equipment (PPE) should include a minimum, an isolation gown, gloves, a face mask, and eye protection (goggles or a face shield). Although the use of droplet-contact precautions (a gown, gloves, a face mask, and eye protection) for the routine care of patients with Covid-19 is consistent with guidelines from other countries and the World Health Organization (WHO), the CDC prefers the use of a respirator (usually an N95 filtering facepiece respirator, a powered air-purifying respirator [PAPR] unit, or a contained air-purifying respirator [CAPR] unit) instead of a face mask. However, in the case of a severe shortage of respirators, the use of face masks as an acceptable alternative. The CDC and the WHO both recommend the use of enhanced protection for aerosol-generating procedures, including the use of a respirator and an airborne infection isolation room. At sites where enhanced protection is not available, the use of bevalizers and other aerosol-generating procedures should be avoided, if possible. Recent data indicating that transmission occurs before symptom onset may support universal droplet-contact precautions for all initial patient encounters.

Strategies to facilitate infection prevention and control are needed for people with unstable housing and people who live in congregate settings, where physical distancing is inconsistent or impossible (e.g., dormitories, jails, prisons, cruise ships, and nursing homes). The novel coronavirus, SARS-CoV-2, is highly contagious, and health care workers have noted the absence of clinical data to support this concern. Concerns have also been raised about the use of glucocorticoids, and some guidelines suggest that they should not be used in patients with Covid-19 pneumonia. The use of systemic or inhaled glucocorticoids should not be stopped in patients who are taking them for other indications.

INFECTION CONTROL AND PREVENTION

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Numerous uncertainties remain in our understanding of the spread of Covid-19 and its management. The contribution of transmission from asymptomatic and presymptomatic people to the community and nosocomial spread of SARS-CoV-2, and the extent to which fomites and aerosols (those not generated by medical procedures) contribute to transmission, are unclear. Data to inform treatment remain limited. Trials are in progress to assess the effects of various medications — such as hydroxychloroquine with or without azithromycin, remdesivir, and favipiravir (which has anti-influenza activity) — on the disease course in patients with different severities of illness, as well as to evaluate hydroxychloroquine as prophylaxis in high-risk or exposed people. Studies are under way to develop an effective vaccine. It is unknown whether infection confers partial or complete immunity (and, if so, for how long) and whether results of serologic testing can be used to inform when health care workers and others can safely return to work.

**DETECTION AND PREVENTION STRATEGIES**


**RECOMMENDATIONS**

Many professional organizations have developed interim guidelines for the management and prevention of Covid-19 (see the Supplementary Appendix, available with the full text of this article at NEJM.org). Guidelines from the Infectious Diseases Society of America and the National Institutes of Health highlight the fact that there are no proven therapies for Covid-19 and that randomized trials are critical.

**AREAS OF UNCERTAINTY**

The patient in the vignette is at high risk for having Covid-19 with potential complications. Given his dyspnea and risk factors for severe illness, we would refer him for PCR testing of a nasopharyngeal swab for SARS-CoV-2, along with an examination and chest radiography. He should be advised to wear a mask en route; after arrival at a health care facility, he would be given a surgical mask and promptly escorted to an examination room. Admission would be warranted for close monitoring given his dyspnea and increased risk. On the basis of the limited available data, we would continue his ARB and inhaled glucocorticoids. In the absence of high-quality data to support any Covid-19–specific therapy, we would recommend enrollment in a randomized clinical trial, if possible. When the patient’s condition improves sufficiently for discharge, he should be advised to remain isolated for a minimum of 7 days after symptom onset and to use additional precautions for at least 3 days after resolution of fever and improvement in respiratory symptoms. There may be additional local guidance regarding the duration of isolation.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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**REFERENCES**


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The University of Arkansas for Medical Sciences Winthrop P. Rockefeller Cancer Institute seeks an outstanding public health research leader to serve as Associate Director for Community Outreach and Engagement (AD COE). This newly created leadership position will have the opportunity to build and lead statewide efforts to better understand the burden of cancer in the state of Arkansas and to impact cancer outcomes by partnering with community stakeholders.

The AD COE is a senior leadership position within the Cancer Institute, reporting directly to the Cancer Institute director. The AD COE works closely with other Cancer Institute leadership and the Cancer Institute Director to implement the strategic goals of the Cancer Institute. This recruiting effort is made possible through significant institutional support and a $10M annual commitment from the state of Arkansas to support the Cancer Institute’s efforts to attain NCI Designation. Some of these resources will be prioritized to be available to the AD COE in the building of a COE program. The activities and strategic goals of the Cancer Institute’s COE program are generally defined by the NCI Cancer Center Support Grant (CCSG), and it is the responsibility of the AD COE to adopt those expectations to impact cancer outcomes in Arkansas.

The ideal candidate will possess a track record of peer-reviewed research and publications focused on cancer control, cancer disparities, or social determinants of health among underserved and underrepresented minorities, rural or other special populations. Specific responsibilities of the AD COE include the following:

- Directs the development and maintenance of community relationships
- Overseas statewide cancer education activities
- Establishes and oversees community advisory board (CAB) activities; Cancer Institute leaders and the CAB must engage in regular bidirectional communication for the purpose of driving research priorities and strategic goals of the Cancer Institute
- Works with community and institutional stakeholders to identify opportunities to impact cancer outcomes across the state
- Engages Cancer Institute members across research programs to target the cancer burden in Arkansas and partners with them to facilitate community-engaged research
- Builds a COE program within the Cancer Institute through their own research, recruitment and collaboration with existing COE researchers within the Cancer Institute and across campus
- Works with the Cancer Institute director to set the strategic mission of the COE program
- Builds a COE office through hiring of staff and oversees its operations to ensure appropriate support of COE program activities and alignment with strategic vision of the Cancer Institute
- Represents COE research and activities in all CCSG-related efforts

The successful candidate will join Arkansas’ premier cancer institute founded more than three decades ago. The Winthrop P. Rockefeller Cancer Institute is the only cancer center in the state of Arkansas with a robust cancer research portfolio and a mission to improve cancer outcomes for all Arkansans. The Cancer Institute treats over 2,500 new cancer patients annually and has an extensive effort focused on delivering cancer care and conducting research in underserved populations. Its 165 members conduct outstanding cancer research in multiple scientific programs. Cancer Institute members receive more than $10 million in extramural cancer research funds annually, including multiple “team science” grants. The Cancer Institute has 5 institutional shared resource facilities. A robust clinical trial infrastructure currently supports nearly 270 cancer clinical trials. With strong investment from the state of Arkansas, UAMS and philanthropy, these research operations are rapidly expanding, and the Cancer Institute is in a period of extraordinary and exciting growth. The University of Arkansas for Medical Sciences is one of 57 institutions with an NCI Cancer and Translational Science Award, which supports translational research and creates a supportive environment that synergizes with the Cancer Institute to promote junior investigators and translational research. Community engagement efforts have been established for many rural and/or impoverished areas of the state including the Delta region and for unique populations, such as the Marshall Islands Pacific Islanders. In addition, a robust implementation and dissemination program exists, with great potential for further expansion into the cancer arena.

Applicants should send their Curriculum Vitae, a letter of interest that includes a vision statement and 3 professional references directly to jamoulton@uams.edu.

We are an equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability or veteran status.

For more information, visit MeetLifePoint.com
Submit your CV for consideration to LPNT_Provider.Recruitment@lnt.net
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