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# Career Guide

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**INSIDE**



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The NEW ENGLAND JOURNAL of MEDICINE

November 10, 2023

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As an additional resource for you, a reprint of the September 14, 2023, Clinical Practice article, "Asthma in Adults," is enclosed in this special booklet. These popular Clinical Practice articles offer evidence-based reviews of topics relevant to practicing physicians.

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On behalf of the entire *New England Journal of Medicine* staff, please accept my wishes for a rewarding career.

Sincerely,

Eric J. Rubin, MD, PhD

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NEJM GROUP



# Preparing for the Virtual Physician-Job Interview

**The interview has become a new world, for now, with the pandemic, and both prospective employers and physician candidates are adjusting**

By Bonnie Darves, a Seattle-based freelance health care writer

Physicians and other health care professionals know well that functioning — and practicing medicine — in a pandemic is a very different and much altered experience from a year ago. Even though physicians and residents are often providing care in fraught and challenging environments, when it comes to looking for a new practice opportunity, they're not likely to find themselves at the point of care but rather in their living rooms. Interviews have gone virtual in a big way as the risks and logistics of the traditional site interview have prompted employers and even candidates to forgo site visits.

What this means is that both parties are having to adjust. Employers are increasingly vetting candidates without ever shaking hands or watching physicians interact in live group settings. Physicians are trying to figure out how to put their best face forward over video platforms such as Zoom, Skype, GoToMeeting, or Cisco Webex, to name a few, and how to make the most of what can be an awkward exchange.

The good news, for physicians, is that this is a new and evolving experience for all involved. As such, it's important to keep in mind that many people, including employers and senior physicians on the call, might find the virtual-video interview challenging. It's not a technology-proficiency test, after all. However, on the technology front, physicians who find themselves in job-search mode during the coronavirus pandemic should do their best to prepare themselves, their environment, and their computers or devices for a successful meeting. The means "attending" the session as professionally as possible and ensuring that extraneous factors or technology don't get in the way of a productive conversation.

Some of the prerequisites for virtual interviews are no different than they would be for a formal site-visit interview. First and foremost, look the part and dress professionally. It might feel awkward to don a suit or, for women, other formal business attire, but that's a must. Physicians should be well dressed, well groomed, and reasonably refreshed when going to a video interview. In other words, treat the experience as if it were a formal site interview that you traveled to and prepared for in advance. Leave the casual demeanor behind, or at least in the other room.

It's key to know exactly who will be on the video call and what their roles are, so that candidates can read bios and prepare accordingly. It's also appropriate to ask about the length of the interview and to request an agenda, if one will be prepared.

Following are some of the most important considerations in preparing for a video interview:

**Prepare and "professionalize" the immediate environment. For starters, the room should be well and brightly lit and the background clean and free of clutter.** That means ensuring that there isn't an unsightly stove or a television or even a stack of books or laundered T-shirts in view. As a background, a blank wall, an unembellished window, or a background cabinet with a non-distracting tasteful décor item all work well. Alternatively, many video platforms enable use of green-screen effects, which replace the actual background with a digital or virtual background. A word of caution is in order here: Candidates whose home environments are unsuitable and who want to use a background should opt for something clean and simple, not a potentially distracting image of a tropical beach, an old-growth forest, or a fake wine cellar. Finally, make sure that the lighting in the room is unobtrusive and doesn't interfere or produce visible glare.



**Do a trial run and then take the time to record a hypothetical session with a friend or family member.** In advance of a virtual interview, candidates should receive specific instructions on the technology that will be used, as well as a link for getting into the session. For those who haven't used the technology that will host the meeting, it's important to get a trial subscription and ensure they're familiar with the way it works and any features that might be used. Many physicians in primary care and internal medicine subspecialties have already had their trial by fire conducting patient virtual visits, but for others, video-meeting platforms might be new turf.

**Get rid of noise and potential distractions.** The interview setting should be quiet and calm. That means ensuring that background noises, including pets and family members, aren't a factor. Ideally, opt for a completely quiet room — and house or apartment — if possible, and close windows to minimize street noise. Even minor background sounds, such as someone starting a washing machine two rooms away, can be bothersome enough to be overheard or, worse, distract the interviewee. Of course, it goes without saying that cell phones should be silenced and that all computer notifications that might chime during the session are turned off.

**Ensure optimal body and face positioning.** Even virtual-meeting veterans have likely found out the hard way that having the face positioned too far up or down, and the computer screen below eye level, can affect the experience. The interviewee's head should be looking straight ahead, not down toward a keyboard, which could be very distracting to the interviewer(s). If a candidate is hunched over, for example, that will be visible to interviewers.

Having the computer or device properly elevated before the interview begins is key, so that the physician doesn't need to make adjustments during the session. And once the session is underway, it's important to maintain focus by not moving the head too much or looking off to the side. Even if that feels somewhat stiff, it won't come across that way to the interviewer. It's OK to use some body language, when appropriate, but that should be kept to a minimum because there's not a large room to "absorb" it. Finally, physicians who aren't sure how best to position their devices should ask for help from someone with virtual-meeting experience before the interview. In any event, the interviewee and the equipment should be positioned to enable natural-seeming eye contact between all parties.

**Get the technology in order.** First and foremost, ensure that the Internet connection is solid, and that the computer or device is fully charged and updated, so that it's not likely to interject with an "update-needed"

message. It's also a good idea to close out any applications and websites that might be running in the background, not only because of potential distraction but also to ensure that the call loads efficiently.

Second, although computers and devices have built-in speakers and some have microphones, the quality of that audio experience can vary considerably. Physicians who expect to attend multiple video interviews over a period of a few months should consider purchasing and installing high-quality USB audio technology. One of the frequent complaints that business people make these days about video meetings that involve potentially multiple attendees is that poor-quality audio from an attendee's computer is distracting.

The same goes for the video quality. Most laptops have an integrated web camera, but some might not, and older desktop computers likely don't have one. If the video quality on the computer is poor, it might be worthwhile to purchase a good-quality web camera. Then, ensure that it's optimally positioned — ideally above the screen, and look at the camera, not the screen, while speaking.

Finally, if the physician candidate might be asked to share a document or other item onscreen, preparing in advance is crucially important. Spending a fretful minute or two trying to get the requested item in view can be nerve-wracking for the physician and possibly annoying for the interviewer.

## Some aspects of interviews haven't changed

After physicians have prepared their environments and equipment to support a successful interview, they should remember that even with the pandemic, the expectation is that the proceedings will be business focused. Just because there's not a conference room in the mix, it doesn't mean that casual behavior is okay. It isn't. The session likely will be conducted formally and highly professionally. As such, interviewees should avoid chitchat or lengthy discussion about the pandemic unless the interviewer raises the topic and seeks their perspective.

One thing to watch for in the video interview is that people sometimes talk over each other more than they might in a room, when they're anxious to make a point. That's never okay in a face-to-face meeting, and it's potentially more distracting (and apparent) within the confines of a video session. Because there is sometimes a brief lag after someone speaks, depending on the technology in use, it's advisable to wait an extra second or two before speaking.



As with any interview, candidates should ask questions at the end of the interview — about culture, team makeup, and roles and responsibilities — and during proceedings if it's appropriate. Those questions should be prepared ahead of time. Candidate should also spend extra time researching the organization and reviewing any information that's available online about both the practice and the community. Without the benefit of a facility walk-through, the physician candidate might need to elicit important information about the actual working environment, available equipment, and other factors that would affect daily practice. It also helps to keep the names of interview participants handy in any virtual roundtable interview involving more than three participants.

As with any type of interview, timely follow-up is important. Candidates should send an email thank-you note to key interviewers and any recruiter or staff member(s) who arranged the session, ideally within 24 hours. If the candidate is highly interested in the position, it's appropriate to express that in the thank-you note and to inquire about possible next steps.

# Supporting Physician Wellness: Health Care Organizations Seeking — and Piloting — Programs to Help Physicians Manage Their Work-Life Stressors

By Bonnie Darves

Just when organizations were formally recognizing that many of their physicians were seriously struggling with burnout and had started to seek remedies to address the endemic problem, the pandemic hit. The timing could not have been worse, many experts on physician burnout agree, and yet, for the most part, the physician workforce navigated the added stressors of COVID-19 both admirably and competently. Physicians worked in highly functioning teams to save lives, mitigate the virus' impact on patients, and offer the highest standard of care possible under the circumstances. Many physicians also helped their organizations chart a "survival path" to navigate the operational crises the pandemic unleashed.

Organizations that employ physicians, having witnessed the steep toll that the pandemic on top of burnout took, are understandably concerned about the state of their workforce. Many organizations are actively seeking, developing, and trying out wellbeing improvement programs to help bolster physicians and other clinicians. Health care leaders are recognizing, too, that physicians are hardly exempt from "the great resignation" our country is experiencing among workers.





Numerous approaches are being piloted or implemented, with varying degrees of success. These range from informal offerings such as hospital "wellness wagons" delivering a combination of snacks and cheering-up support and wellbeing days off for residents and fellows, to more structured programs. Examples of formal offerings include buddy systems mimicking military-type "battle buddy" practices, mental-health check-in offerings, and physician coaching resources.

The latter, when provided with anonymity guaranteed, appear to be somewhat effective for those who access them, according to Eileen Barrett, MD, MPH, a hospitalist and educator who formerly directed graduate wellness initiatives at the University of New Mexico (UNM). "Many physicians who have received coaching have benefited, and some organizations have been able to demonstrate real outcomes," said Dr. Barrett, who now practices with the Indian Health Service and has published on advocated for national clinician wellbeing improvement strategies. She said that UNM's mental health check-ins, a "renewable" offering, were also relatively well received — 78 of the 109 physicians who booked appointments when the program launched kept those appointments.

Some organizations, such as Intermountain Healthcare in Salt Lake City, Utah, are trying several approaches simultaneously — developing a physician and advanced practice provider (APP) wellbeing center and dedicated portal and scheduling wellness-focused grand rounds and separate leadership rounds to celebrate successes and learn what clinicians are struggling with in their work. Intermountain also provides a range of peer-support forums and options for connecting caregivers, aimed at offering a confidential forum for sharing emotions.

"My task is to develop resources and learn from others around the country — and at Intermountain, we're all working on this together to determine what works and what's not helpful," said Anne Pendo, MD, an internist who is senior medical director of Provider Experience and Wellbeing at Intermountain. "What we all recognize, I think, is that we as a profession weren't well before the pandemic," she said, and that the pandemic further eroded physician resiliency. "Now we have an opportunity to try to discover ways to improve wellbeing and then implement them."

## Peer-support programs taking hold

At Intermountain, of the initiatives piloted to date, the peer-support offerings have been among the most successful in terms of uptake. Peer supporters

have trained nearly 100 physicians to serve in the role and approximately 300 physicians and clinicians have participated. “I think it’s important to position this as ‘I can be a helper’ if you want physicians to get involved, and to ensure you offer a safe space for sharing feelings — something physicians have historically struggled with,” she said, because of fear they’ll be perceived as weak.

Researchers and physicians involved in developing wellness-support programs and resources are finding that although it’s challenging to figure out exactly what physicians do need in support, there’s growing consensus on what physicians don’t want: Tips and recommendations for improving their personal resilience. In other words, Dr. Barrett said, “Physicians don’t want to hear about another yoga class or meditation practice.”

Heather Farley, MD, chief wellness officer at ChristianaCare in Delaware, which rolled out the “wellbeing wagon” described earlier and created a Center for Worklife Wellbeing, concurred with Dr. Barrett. “What doesn’t work is focusing too much on the personal minutiae, such as sleep hygiene. Whatever you offer has to support physicians “in their work environment,” said Dr. Farley, an emergency medicine physician. Like Intermountain, ChristianaCare has seen a gradual but steady utilization uptake of peer-support offerings. “We’re shifting away from the culture of ‘shame and blame’ to one that says, ‘It’s OK not to be OK,’ and to reach out if you need help,” she said.

At the University of Minnesota, which created the buddy system a few months into the pandemic and rolled out the program in a matter of weeks, the model was predicated on the recognition that Dr. Farley cites: everyone needs help sometimes and it’s important to know that someone has your back and is willing to help. In the university’s program, modeled in part on both the military-battlefield scenario and observations an anesthesiologist made in the operating room during the early weeks of the pandemic, when staff members were becoming more nervous, buddies are “paired” somewhat strategically. Ideally, they’re close in age and career length and experience, so that they can both recognize and understand the stressors their buddy is experiencing — and identify when that buddy needs some extra support.

“We decided that the battle-buddy system was a brilliant idea and decided to give it a decent trial,” said Cristina Sophia Albott, MD, who heads the university’s division of adult mental health. “We wrote the protocol in one week, started the program in two weeks, and rolled it out across the entire medical school.” By July 2020, more than 3,000 health care personal, primarily physicians and nurses, had adopted and established the model.

Around the same time, the University of Minnesota implemented “listening groups” and established mental-health consultation services in each clinical department. The latter offering, however, despite the appointments being structured a confidential, wasn’t as well received as the buddy program. “Unfortunately, few physicians availed themselves of that offers,” she said.

On a positive note, even though the worst of the pandemic crises appear to have largely receded at the university, some departments have decided to continue with the buddy program, Dr. Albott reported. Although there’s been considerable variation in how individual departments set up or later retooled their buddy programs, the initiative’s early and ongoing success is a clear indicator of the offering’s value, she added.

## Desperately seeking on-the-ground support and remedies

What physicians do want in the way of support from their organizations, Dr. Barrett and others interviewed for this article agreed, is operational load-lightening, however that can be achieved and institutionalized. Offerings such as onsite childcare and schedule flexibility to address family needs rank high on the wish list for many physicians, and there’s a growing consensus that the electronic health record (EHR) persists as a chief source of physician frustration and stress, despite years of organizations’ attempts to ameliorate the problem.

“What does appear to work is providing physicians protected time for EHR training or having dedicated information technology (IT) support for dealing with EHR-related issues,” Dr. Barrett said, or adding scribes to offload the bulk of EHR-data entry processes. In similar fashion, physicians would appreciate their institutions removing the burden of treatment prior-authorization management. And she noted that the incredibly complex and inordinately inefficient processes related to physician credentialing are ripe for fixing, as they’re unnecessarily burdensome for physicians. “If credentialing were centralized, at least for Medicare, that would go a long way in reducing the burden. Most people think that the system, as it stands, doesn’t really make anyone safer,” Dr. Barrett said.

Health care organizations, concerned about both their physicians’ wellbeing and their facilities’ ability to maintain adequate staffing levels in a time when many physicians are deciding to leave jobs where they don’t feel well

enough supported, are taking note. They're actively trying to figure out what physicians want and need to care for patients with fewer frustrations.

Physician professional organizations are also stepping in to identify what's needed now in institutional supports to help physicians mitigate burnout and regain resiliency. The American College of Physicians' Patients Before Paperwork initiative, for example, has identified the most burdensome tasks and regulatory requirements that internists face and offered policy recommendations for reducing associated workload. The American Medical Association has also developed a multifaceted initiative to provide guidance and targeted solutions to health care organizations for many of the problems that threaten physician wellbeing.

In an article published in the *Annals of Internal Medicine* in September 2021, Dr. Barrett and her co-authors proposed a series of steps that organizations might take to reduce clinician burnout, keep physicians in the workforce as the health system continues to navigate COVID-19, and simply make physicians' practice lives more tolerable. In addition to the COVID-related recommendations for improving physician safety and providing practical support as needed to address system-capacity constraints, the authors urged organizations to do the following:[1]

- Help ensure more flexible scheduling for physicians who are parents or care for aging parents.
- Reduce, eradicate, or reassign administrative tasks and meetings that aren't mission critical and haven't delivered improved patient outcomes.
- Provide no-cost and truly confidential mental-health support services — and also truly encourage physicians to use their available vacation and professional development time to nurture a healthier workplace. At the same time, organizations should update credentialing and employment applications to remove unnecessary questions related to mental and physical health diagnoses, to reduce the associated stigma.

Dr. Barrett offers another recommendation to employer organizations. "If you offer resources that might support or improve physician wellbeing, make sure your physicians know about them. Physicians are so stretched and busy that they might not know what's available," she said.



## Tips for structuring physician-wellness support offerings

All sources who participated in this article offered guidance for organizations trying to provide resources that might help improve physician well-being. Here are a few:

- Understand that each environment is different, which means that the problems and needs might vary widely from one health care organization to another. To develop appropriate solutions and resources, ensure that physicians are directly involved in creating them.
- Avoid focusing resources on individual-physician resilience and instead focus on system approaches that might have the added benefit of helping physicians support one another and reduce unnecessary workload. Keep in mind that some physicians have an innate distrust of "corporate-sponsored" initiatives that appear to be focused on the bottom line.
- Provide a safe forum for physicians to recommend institutional approaches that mitigate the burdens that contribute to burnout and also make their overall work lives more realistically manageable.
- If you try a wellness initiative and it doesn't produce results that are valuable to physicians, be ready and willing to abandon it. Then be prepared pilot something else — quickly.

[1]Barrett E, Hingle ST, Smith CD, Moyer DV. Getting Through COVID-19: Keeping Clinicians in the Workforce. *Ann Intern Med*. 2021 Nov;174(11):1614–1615. doi: 10.7326/M21-3381. Epub 2021 Sep 28. PMID: 34570597; PMCID: PMC8500335.

CLINICAL PRACTICE

Patrick G. O'Malley, M.D., M.P.H., *Editor*

# Asthma in Adults

Giselle Mosnaim, 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 author's clinical recommendations.*

**A 47-year-old woman with a history of asthma, which has been treated with daily low-dose inhaled glucocorticoids and a short-acting $\beta_2$-agonist (SABA) as needed, presents for a follow-up visit. She reports having shortness of breath 4 days per week when she is outdoors watching her daughter's soccer matches. Over the past year, she has had asthma exacerbations resulting in treatment with oral glucocorticoids in the spring and fall. How should this patient be evaluated and her care managed?**

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CME at NEJM.org

## THE CLINICAL PROBLEM

The prevalence of asthma in adults in the United States is approximately 7.7%.[1] It is one of the most common chronic, noncommunicable diseases in the country and worldwide.[1,2] Among U.S. adults, asthma disproportionately affects women, persons who are Black or Puerto Rican, and persons with low household income.[1] Although overall asthma-related mortality in the United States has decreased from 15.1 per million in 2001 to 9.9 per million in 2017,[3] the incidence of death due to asthma in the United States remains consistently higher among Black and Puerto Rican persons than among White persons.[4] In addition, although severe asthma affects 5 to 10% of all patients with asthma, it accounts for over 50% of asthma-related costs.[5,6]

The National Asthma Education and Prevention Program Expert Panel-3 Report defines asthma as "a complex disorder characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation" and notes that "[t]he interaction of these features of asthma determines the clinical manifestations and severity of asthma and the response to treatment."[7] This article focuses on treatment advances for mild-to-moderate asthma.[7-10] The approach to treatment should be decided on the basis of a confirmed diagnosis of asthma that includes findings of variable airflow obstruction on spirometry.

The typical symptoms of asthma are also symptoms of other respiratory and nonrespiratory conditions.[7,8] Chronic cough, in the presence of normal lung function and a normal chest radiograph, should prompt consideration of allergic and nonallergic rhinitis, rhinosinusitis, nasal polyposis, gastroesophageal reflux disease, postviral tussive syndrome, chronic bronchitis, eosinophilic bronchitis, and cough induced by an angiotensin-converting enzyme inhibitor. If a patient presents with chronic wheeze, the differential diagnosis includes vocal-cord dysfunction, bronchiectasis, chronic obstructive pulmonary disease, bronchogenic carcinoma, and foreign-body aspiration. Common causes of shortness of breath that may be con-

**KEY CLINICAL POINTS**

**ASTHMA IN ADULTS**

- Asthma guidelines state that a definitive diagnosis of asthma should be based on the presence of characteristic respiratory symptoms such as wheeze, cough, chest tightness and shortness of breath, and variable expiratory airflow obstruction on spirometry.
- The three main goals of asthma management are control of symptoms, reduction in risk of exacerbations, and minimization of adverse effects of medications.
- Every visit should include a review of inhaler technique, medication adherence, coexisting conditions, ongoing exposures to environmental triggers, and confirmation of a correct diagnosis of asthma.
- In patients with mild asthma, the preferred treatment option is an inhaled glucocorticoid–formoterol combination as needed, and alternative options include the use of combination inhaled glucocorticoid–albuterol as needed or low-dose maintenance inhaled glucocorticoid plus a short-acting $\beta_2$-agonist reliever as needed.
- Combination inhaled glucocorticoid–formoterol maintenance and reliever therapy is the preferred treatment for moderate-to-severe asthma as compared with an inhaled glucocorticoid with long-acting $\beta_2$-agonist maintenance plus as-needed short-acting $\beta_2$-agonist reliever therapy.

fused with asthma are chronic obstructive pulmonary disease, heart failure, pulmonary embolism, and sarcoidosis.[7,8]

A personal history of atopy (e.g., atopic dermatitis or allergic rhinitis) or a strong family history of asthma is suggestive of asthma. Although asthma often presents in childhood, many children have a remission of symptoms in puberty and a recurrence in adulthood.[11] Approximately half of adults who present with what appears to be newly diagnosed asthma instead have had a recurrence of childhood asthma.[12,13]

Typical asthma triggers include exercise, cold air, and inhalant indoor and outdoor allergens.[7] Persons with asthma typically present with variable symptoms that may last from hours to days and resolve without intervention with avoidance of the trigger. Up to 10 to 25% of new-onset adult asthma cases are attributable to work-related exposures (e.g., wood dust, grain dust, and animal dander),[14,15] a correlation that emphasizes the importance of an occupational-history assessment and the identification of contact with known sensitizing agents to determine whether there is a temporal relationship between work exposures and symptoms.[16]

Approximately 7% of adults with asthma also have aspirin-exacerbated respiratory disease, which is characterized by cough, chest tightness, or wheeze within 30 to 120 minutes after ingestion of aspirin or any cyclooxygenase-1 inhibitor.[17] Obesity, anxiety, depression, and obstructive sleep apnea may also contribute to worsening asthma.

## STRATEGIES AND EVIDENCE

### GOALS OF ASTHMA THERAPY

The three main goals of asthma management are control of asthma symptoms, reduction in the risk of asthma exacerbations, and minimization of adverse effects of medications (e.g., side effects of oral glucocorticoid therapy).[7-10] Goals for asthma control are reduction in intensity and frequency of daytime and nighttime cough, chest tightness, wheezing, and shortness of breath; maintenance of normal daily activities without limitation caused by asthma symptoms, including symptoms related to school, work, and exercise; and lung function that is normal or nearly normal. Reduction of asthma risk focuses on prevention of severe exacerbations, which can be defined as deterioration that leads to treatment with oral glucocorticoids for 3 days or longer, an emergency department visit, or hospitalization.[7,8]

Treatment is focused on patient education, asthma trigger control, monitoring of symptoms and lung function, and pharmacologic therapy.[7-10] Empowerment of patients to be active participants in their asthma care is important. Such efforts include educating patients about strategies to identify and mitigate triggers, providing medications to be used for quick relief and those to be used for maintenance of control, encouraging adherence to daily controller therapy to reduce symptoms and minimize risk, and teaching the correct inhaler technique for each prescribed inhaler.[18] Some studies show that such patient education reduces the incidence of asthma exacerbations.[19-22]





A personalized, written asthma action plan is a tool that patients can use to assist in managing asthma at home. For patients whose symptoms occur after exposure to specific indoor allergens (confirmed by history and positive results on specific IgE blood or skin tests), multicomponent allergen-specific mitigation measures are recommended.[9] Symptom monitoring can be supported by the use of brief, patient-administered, validated instruments to assess asthma control, such as the five-item Asthma Control Test (Fig. S1 in the Supplementary Appendix, available with the full text of this article at NEJM.org).[23-25]

### ASTHMA SEVERITY AND CONTROL

Asthma severity and control are categorized on the basis of consideration of daytime and nighttime symptoms that have occurred in the 4 weeks before presentation, the number of exacerbations leading to oral glucocorticoid use in the past year, and lung function.[7,8] Guidelines recommend a step up in therapy for patients with uncontrolled asthma and a step down in therapy after a patient's asthma has been controlled for 3 months with a stable treatment regimen.[7,8]

## GUIDELINES FOR ASTHMA THERAPY

Figure 1 shows the most recent algorithm for asthma management in persons 12 years of age or older, according to the Global Initiative for Asthma (GINA) Science Committee, across categories of mild, moderate, and severe asthma.[8]

### RELIEVER THERAPIES

In patients with occasional asthma symptoms, as-needed treatment with a combination of an inhaled glucocorticoid and a $\beta_2$-agonist is the current treatment of choice; the precise combination of inhaled glucocorticoid and $\beta_2$-agonist that is appropriate depends on availability and affordability. In a multinational, randomized, event-driven trial involving patients with moderate-to-severe asthma who were receiving inhaled glucocorticoid–containing maintenance therapy, the use of combination albuterol–budesonide therapy administered as needed at doses of 180 $\mu$g of albuterol and 160 $\mu$g of budesonide (two inhalations of 90 $\mu$g of albuterol and 80 $\mu$g of budesonide) reduced the occurrence of severe exacerbations by 27% as compared with as-needed albuterol alone.[26] In a pragmatic, open-label, randomized trial involving Black and Latinx adults with moderate-to-severe asthma, participants who were assigned to receive a dose of inhaled glucocorticoid whenever they used their SABA inhaler had 15% fewer severe exacerbations than participants who used the SABA inhaler alone.[27]

Data comparing combinations of an inhaled glucocorticoid and a long-acting $\beta_2$-agonist (LABA) or SABA as reliever therapies are limited. Formoterol is unique in that it is a fast-acting LABA and therefore works as a reliever medication, and its combination with an inhaled glucocorticoid has proven efficacy when used as a reliever therapy. However, data from direct comparisons between an inhaled glucocorticoid–formoterol combination reliever and an inhaled glucocorticoid–SABA combination reliever are lacking. In a study involving patients who were assigned to receive maintenance therapy with budesonide–formoterol, there were fewer occurrences of severe asthma exacerbations among patients assigned to receive budesonide–formoterol as the reliever than among those assigned to receive the SABA terbutaline alone as reliever therapy (relative risk, 0.78; confidence interval [CI], 0.67 to 0.91).[28] Inhaled glucocorticoid–formoterol combination therapy has received regulatory approval for use as a reliever therapy in the United Kingdom but not in the European Union or the United States. Overall, the regulatory approvals for combination inhalers as maintenance and reliever therapy are confusing and vary greatly among countries.[29,30]

Budesonide–formoterol and beclomethasone–formoterol are the only two inhaled glucocorticoid–formoterol formulations for which there is clinical evidence supporting their use as relievers in treating all levels of asthma severity.[31,32] Owing to safety concerns with the use of two different classes of LABAs, the use of inhaled glucocorticoid–formoterol combination reliever therapy is not recommended for use concurrently with inhaled glucocorticoid–LABA combination control therapy other than inhaled glucocorticoid–formoterol. Therefore, GINA describes different treatment tracks that are based on the type of LABA used (i.e., fast-onset formoterol or standard-onset LABA). GINA also recommends the use of inhaled glucocorticoid–formoterol as prophylaxis before exercise, given evidence that inhaled glucocorticoid–formoterol

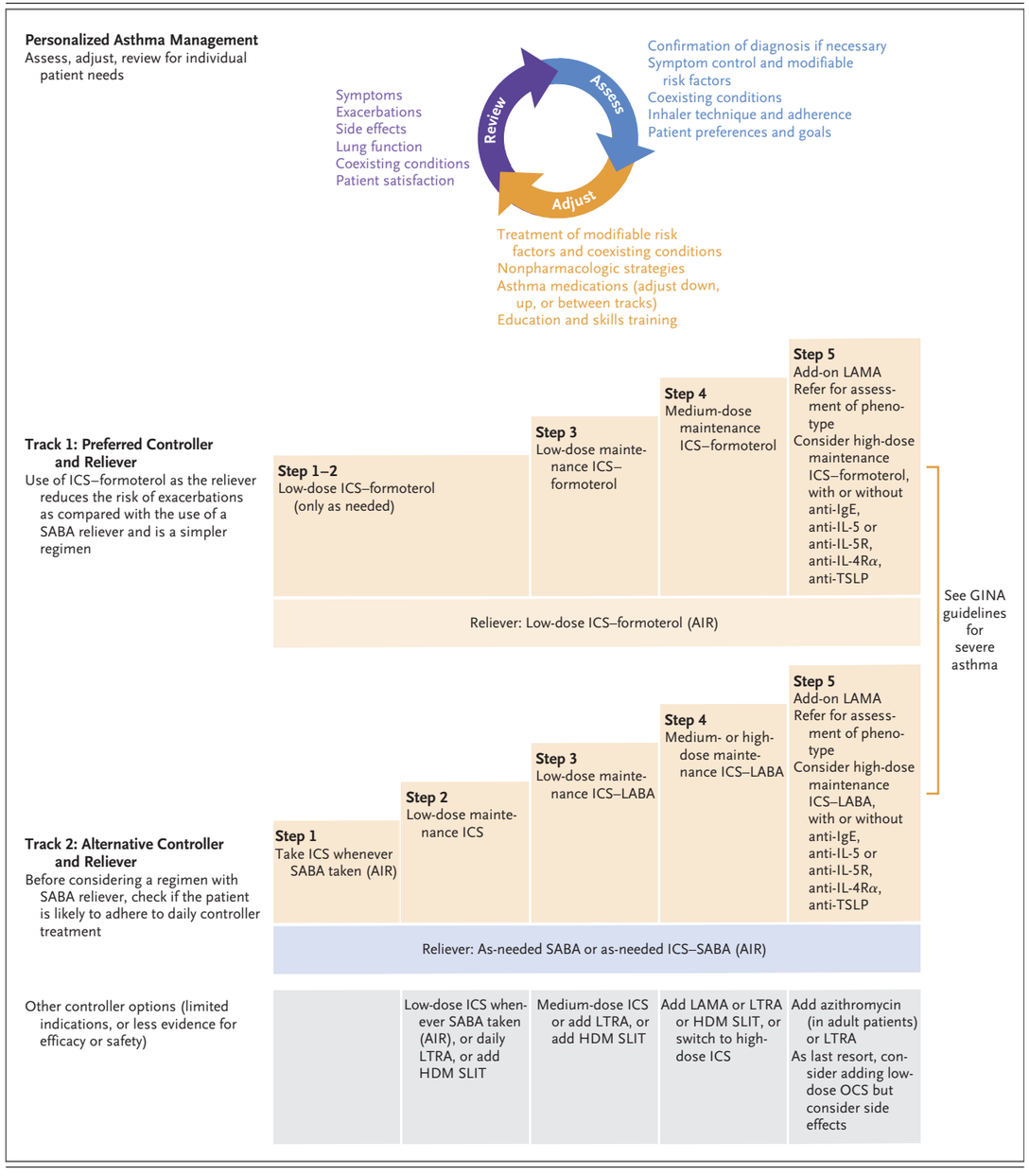


**Figure 1 (facing page). Global Initiative for Asthma 2023 (GINA) Personalized Asthma Management for Adolescents and Adults.**

The cycle of assessment, adjustment, and review is recommended for each patient visit. First, confirm the diagnosis of asthma (if applicable) and assess symptom control, modifiable risk factors, coexisting conditions, adherence to and technique for inhaler use, and patient preferences and goals. Second, treat modifiable risk factors and coexisting conditions, use nonpharmacologic therapeutic strategies, adjust medications (up, down, and between tracks), and provide education and skills training. Third, review symptoms that occur during the day and at night, exacerbations, treatment side effects, lung function, coexisting conditions, and patient satisfaction. Treatment steps are grouped into tracks: track 1 (preferred) and track 2 (alternative) pharmacologic therapy for asthma that is mild (steps 1 and 2), moderate (steps 3 and 4), or severe (step 5). Orange shading denotes preferred treatment, and blue and gray denote alternative or nonpreferred treatment. AIR denotes antiinflammatory reliever, anti-IL5R anti–interleukin-5 receptor (monoclonal antibody), anti-IgE anti-immunoglobulin E (monoclonal antibody), anti-IL4Rα anti–interleukin-4 receptor alpha (monoclonal antibody), anti-IL5 anti–interleukin 5 (monoclonal antibody), anti-TSLP antithymic stromal lymphopoietin (monoclonal antibody), HDM SLIT house dust mite sublingual immunotherapy, ICS inhaled corticosteroid (i.e., glucocorticoid), LABA long-acting $\beta_2$-agonist, LAMA long-acting muscarinic antagonist, LTRA leukotriene receptor antagonist, OCS oral corticosteroid (i.e., glucocorticoid), and SABA short-acting $\beta_2$-agonist.

is more protective than SABA against exercise-induced asthma.[8,32]

### STEPS ONE AND TWO: THERAPY FOR MILD ASTHMA

At step one, the preferred treatment (GINA track one) for mild asthma is low-dose combination inhaled glucocorticoid–formoterol as needed for symptom relief; controller treatment is no longer recommended as part of step one (Table 1). Alternative treatments (track two) include the use of an inhaled glucocorticoid whenever SABA is taken (step one) and daily low-dose inhaled glucocorticoid plus either as-needed SABA or as-needed inhaled glucocorticoid–SABA (step two). The evidence clearly shows a benefit of adding an inhaled glucocorticoid to a $\beta_2$-agonist for as-needed symptom relief, although comparative data are limited regarding which combinations are best.

Supporting this strategy are two Cochrane meta-analyses of as-needed inhaled glucocorticoid–formoterol combinations as compared with as-needed SABA, along with as-needed inhaled glucocorticoid–formoterol combinations as compared with a daily inhaled glucocorticoid plus SABA.[33,34] Two randomized, controlled trials involving 2997 participants showed with low-certainty evidence that, as compared with as-needed SABA, as-needed inhaled glucocorticoid–formoterol significantly reduced the odds of asthma exacerbations that led to the use of systemic glucocorticoids (odds ratio, 0.45; 95% CI, 0.34 to 0.60) and the odds of an asthma-related hospitalization or visit to an emergency department or urgent care center (odds ratio, 0.35; 95% CI, 0.20 to 0.60).[33] Four randomized, controlled trials involving 8065 participants showed with low-certainty evidence that, as compared with inhaled glucocorticoid for regular maintenance plus as-needed SABA, as-needed inhaled glucocorticoid–formoterol was not associated with lower odds of asthma exacerbations leading to treatment with systemic glucocorticoids (odds ratio, 0.79; 95% CI, 0.59 to 1.07) but did decrease the odds of an asthma-related hospitalization or visit to an emergency department or urgent care center (odds ratio, 0.63; 95% CI, 0.44 to 0.91).[34]

A separate network meta-analysis that included adult patients with mild asthma showed that the use of as-needed inhaled glucocorticoid–formoterol alone was associated with less risk of severe asthma exacerbations than either maintenance inhaled glucocorticoid plus as-needed SABA or as-needed SABA alone.[35] A pooled, post hoc analysis of the Symbicort Given as Needed in Mild Asthma (SYGMA) 1 and 2 trials showed that patients who received as-needed budesonide–formoterol had 26% fewer severe exacerbations than patients who received daily budesonide. In contrast, there was no difference in the occurrence of severe asthma exacerbation with as-needed inhaled glucocorticoid–formoterol as compared with daily inhaled glucocorticoids among patients whose asthma was well controlled with the use of a low-dose daily inhaled glucocorticoid or leukotriene receptor antagonist plus as-needed SABA.[36]

Patient behaviors and preferences, as well as treatment access and cost, should also be considered in the shared decision-making process of treatment selection. Clinical trials that involved the use of electronic medication monitors to track real-time inhaler actuation have shown that patient-reported inhaled glucocorticoid use was greater than the objectively measured use and that patients' use of inhaled glucocorticoids decreased over time.[36,37] In a survey of a subgroup of participants in a randomized, controlled trial that assessed the addition of as-needed budesonide–formoterol to daily budesonide plus as-needed SABA, as-needed budesonide–formoterol was preferred by 90% of the participants who received it, and daily budesonide plus as-needed SABA was preferred by 40% of the participants who received that combination.[38] Some asthma

**Table 1. Medications and Doses for GINA Track 1: Antiinflammatory Reliever–based Therapy.***

| Treatment Step and Age | Medication and Strength | Doses Administered with DPI† |
|---|---|---|
| 1 and 2 (antiinflammatory reliever only) | | |
| 6 to 11 yr | No evidence to date | 1 inhalation as needed |
| 12 to 17 yr | Budesonide 200 μg (delivered dose, 160 μg) and formoterol 6 μg (delivered dose, 4.5 μg) | 1 inhalation as needed |
| ≥18 yr | Budesonide 200 μg (delivered dose, 160 μg) and formoterol 6 μg (delivered dose, 4.5 μg) | 1 inhalation as needed |
| 3 (maintenance-and-reliever therapy) | | |
| 6 to 11 yr | Budesonide 100.0 μg (delivered dose, 80.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg) | 1 inhalation once daily, plus 1 inhalation as needed |
| 12 to 17 yr | Budesonide 200.0 μg (delivered dose, 160.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg) | 1 inhalation once or twice daily, plus 1 inhalation as needed |
| ≥18 yr | One of the following regimens:<br>Budesonide 200.0 μg (delivered dose, 160.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg)<br>Beclomethasone 100.0 μg (delivered dose, 84.6 μg) and formoterol 6.0 μg (delivered dose, 5.0 μg) | 1 inhalation once or twice daily, plus 1 inhalation as needed |
| 4 (maintenance-and-reliever therapy) | | |
| 6 to 11 yr | Budesonide 100.0 μg (delivered dose, 80.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg) | 1 inhalation twice daily, plus 1 inhalation as needed |
| 12 to 17 yr | Budesonide 200.0 μg (delivered dose, 160.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg) | 2 inhalations twice daily, plus 1 inhalation as needed |
| ≥18 yr | One of the following regimens:<br>Budesonide 200.0 μg (delivered dose, 160.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg)<br>Beclomethasone 100.0 μg (delivered dose, 84.6 μg) and formoterol 6.0 μg (delivered dose, 5.0 μg) | 2 inhalations twice daily, plus 1 inhalation as needed |
| 5 (maintenance-and-reliever therapy) | | |
| 6 to 11 yr | Not recommended | |
| 12 to 17 yr | Budesonide 200.0 μg (delivered dose, 160.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg) | 2 inhalations twice daily, plus 1 inhalation as needed |
| ≥18 yr | One of the following regimens:<br>Budesonide 200.0 μg (delivered dose, 160.0 μg) and formoterol 6.0 μg (delivered dose, 4.5 μg)<br>Beclomethasone 100.0 μg (delivered dose, 84.6 μg) and formoterol 6.0 μg (delivered dose, 5.0 μg) | 2 inhalations twice daily, plus 1 inhalation as needed |

* As recommended by the Global Initiative for Asthma 2023 (GINA) treatment track 1 (the preferred treatment track), the reliever is low-dose inhaled corticosteroid (i.e., glucocorticoid)–formoterol used as needed, with or without maintenance use of inhaled corticosteroid (i.e., glucocorticoid)–formoterol, depending on whether the patient has asthma that is mild (steps 1 and 2), moderate (steps 3 and 4), or severe (step 5). DPI denotes dry-powder inhaler and pMDI pressurized metered-dose inhaler.

† For delivery of antiinflammatory reliever only or maintenance-and-reliever therapy with budesonide–formoterol by means of a pMDI, patients should use an inhaler with half the strength of that used for the relevant DPI shown and should use double the number of doses shown. For example, at step 4 for a patient 12 years of age or older, budesonide–formoterol pMDI should be administered at a metered dose of 100 μg of budesonide and 3 μg of formoterol per inhalation in 4 inhalations twice daily plus 2 inhalations as needed.

experts have advocated changing the availability of inhaled glucocorticoid–formoterol from prescription to over-the-counter to increase patient access.[39]

#### STEPS THREE AND FOUR: THERAPY FOR MODERATE ASTHMA

Preferred step-three and -four treatment is single maintenance and reliever therapy (SMART) with a low- or medium-dose inhaled glucocorticoid–formoterol combination (either budesonide–formoterol or beclomethasone–formoterol).[7,8] The SMART regimen may reduce cost and simplify treatment for patients, because only one inhaler is needed for both quick-relief and maintenance therapy. Alternative step-three and -four treatment includes either maintenance low- or medium-dose inhaled glucocorticoid–LABA plus as-needed SABA or as-needed combination inhaled glucocorticoid–SABA.[7,8] In a meta-analysis of randomized trials, switching patients with uncontrolled asthma at GINA step three to SMART at either step three or step four was associated with an increased time to the first severe asthma exacerbation, with a 29% reduction in risk as compared with stepping up to a step-four regimen of inhaled glucocorticoid–LABA maintenance plus a SABA reliever (hazard ratio, 0.71; 95% CI, 0.52 to 0.97). In addition, among patients at step three or step four with uncontrolled asthma, switching to SMART was associated with an increased time to the first severe asthma exacerbation and a 30% reduction in risk as compared to continuing therapy at the same treatment step (hazard ratio, 0.70; 95% CI, 0.58 to 0.85).[40]

#### STEP FIVE: THERAPY FOR SEVERE ASTHMA

Severe asthma is defined as a combination of symptoms and impairment in lung function that leads to treatment with a high-dose inhaled glucocorticoid plus a second controller medication (e.g., LABA) or nearly continuous oral glucocorticoid treatment.[41,42] Patients at step five (severe asthma) should be referred for expert evaluation (i.e., to an allergist–immunologist or pulmonologist), phenotyping, and add-on therapy. The severity of the asthma phenotype is determined on the basis of one or more of the following biomarkers: blood eosinophil level of at least 150 per microliter, fractional exhaled nitric oxide (FeNO) of at least 20 parts per billion, sputum eosinophils of at least 2%, sensitization to a perennial aeroallergen on skin-prick testing or blood tests for specific IgE, and a total IgE level of 30 to 700 IU per milliliter. Each patient's unique biomarker profile guides the selection of biologic therapy (e.g., sensitization to a perennial aeroallergen and elevated total IgE levels vs. elevated levels of blood eosinophils may lead to selection of omalizumab vs. other asthma biologic therapies, respectively). A long-acting muscarinic antagonist (LAMA) may be considered as add-on therapy for patients with asthma that is persistently uncontrolled despite treatment with a medium- or high-dose inhaled glucocorticoid–LABA. A meta-analysis showed that the addition of a LAMA to a medium- or high-dose inhaled glucocorticoid–LABA led to a 17% reduction in the risk of severe asthma exacerbation.[43]

Biologic therapies are an additional option, especially with regard to avoiding or minimizing exposure to treatment with high-dose inhaled glucocorticoids and oral glucocorticoids. The six biologic agents for use in the treatment of severe asthma are omalizumab, mepolizumab, reslizumab, benralizumab, dupilumab, and tezepelumab, and the choice of biologic agent should include consideration of a variety of clinical and pragmatic factors, including biomarkers.[44] Although data from head-to-head clinical trials comparing biologics are lacking, each of these agents has shown efficacy as compared with placebo, with a 30 to 70% reduction in the relative risk of severe asthma exacerbations.[44-47]

## AREAS OF UNCERTAINTY

Better strategies are needed for the objective evaluation of patient adherence and inhaler technique preceding a recommendation to step-up therapy. Clinical trials to evaluate the efficacy of digital inhalers and clinician dashboards (which provide the patient and health care professional with real-time data about medication-taking behavior and inhalation quality) regarding clinically important asthma outcomes are warranted. More studies to assess the role of biomarkers, such as blood and sputum eosinophil counts, FeNO levels, and serum total and allergen-specific IgE levels, are needed to better guide the selection of medications.[48,49]

## GUIDELINES

The recommendations in this article are consistent with the guidelines of the National Asthma Education and Prevention Program Expert Panel-3 Report (and its 2020 focused update) as well as GINA (and its 2023 update).[7-9] GINA publishes an annual update to its guidelines, and the recommendations presented here are con-

cordant with the most recent GINA and National Asthma Education and Prevention Program reports and updates.

## CONCLUSIONS AND RECOMMENDATIONS

With regard to the 47-year-old woman described in the vignette, her impairment (daytime symptoms) and risk (asthma exacerbations) warrant a step up in therapy. Because of the location of symptoms and timing of exacerbations, I suspect she has allergic asthma and concurrent allergic rhinitis due to pollens, and I would conduct skin testing for aeroallergens and provide education regarding relevant environmental-control measures and medical management. I would advise changing her treatment approach from GINA track 2 (alternative) to track 1 (preferred) therapy and increase treatment from step 2 to step 3 care, including a change to low-dose budesonide–formoterol as maintenance and reliever therapy. As compared with a SABA reliever alone, an inhaled glucocorticoid–formoterol reliever reduces severe exacerbations across treatment steps. The use of an inhaled glucocorticoid–formoterol combination for maintenance and reliever therapy simplifies the treatment regimen and allows for stepping up or stepping down without changing medication. I would also review inhaler technique, work with the patient to develop a written asthma action plan, and plan a follow-up visit in 3 months. (See inhaler technique video at https://www.nejm.org/doi/full/10.1056/NEJMra050380.)[50]

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

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All advertisements for employment must be non-discriminatory and comply with all applicable laws and regulations. Ads that discriminate against applicants based on sex, age, race, religion, marital status or physical handicap will not be accepted. Although the *New England Journal of Medicine* believes the classified advertisements published within these pages to be from reputable sources, NEJM does not investigate the offers made and assumes no responsibility concerning them. NEJM strives for complete accuracy when entering classified advertisements; however, NEJM cannot accept responsibility for typographical errors should they occur.





### Classified Ad Deadlines

| Issue | Closing Date |
|---|---|
| December 14 | November 22 |
| December 21 | December 1 |
| December 28 | December 7 |
| January 4 | December 13 |

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INDIANA UNIVERSITY HEALTH SOUTHERN INDIANA PHYSICIANS, LLC — Seeks Hospitalist in Bloomington, Indiana: Deliver hospitalist medicine services to adult inpatients through the diagnosis, treatment, and prevention of diseases, ailments, and disabilities in an inpatient setting with no restrictions or limitations; Assist with quality insurance programs and with third-party billing. REQs: Medical Degree (MD or DO) or foreign equivalent; Internal Medicine or Family Medicine residency; eligibility for or possession of Indiana state medical license; Board Certified/ Board Eligible (BC/BE) in Internal Medicine or Family Medicine. Send Resume to: cjohnson83@iuhealth.org

### Nephrology

A WELL-ESTABLISHED AND GROWING PRIVATE NEPHROLOGY PRACTICE — In the highly desirable south of Boston suburbs, 30 minutes from Boston, is seeking to hire a new associate within the coming year. A competitive salary, with a three-year partnership track is offered. BC or BE in Nephrology is required. Approximate 10-mile driving radius covering Harvard and Tufts affiliated facilities. To apply please e-mail your CV to: Renalmedical@renalmc.com

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### Neurology

NEUROLOGIST, INDIANA UNIVERSITY HEALTH ARNETT, INC. — Deliver Neurologist Physician services to adult patients through the diagnosis, treatment, and prevention of diseases, ailments, and disabilities in a clinical and inpatient setting with no restrictions or limitations. REQs: Medical Degree (MD) degree or foreign equivalent; Neurology residency; eligibility for or possession of Indiana medical license; (BC/BE) in Neurology. Physician will work at clinics and facilities in Lafayette, Frankfort, and Monticello, Indiana (Position is based in Lafayette, Indiana with occasional, approximately once a week, travel to outreach clinics in Monticello and/or Frankfurt, Indiana, both located in the greater Lafayette area, no overnights). Send Resume to: rwells3@iuhealth.org

### Primary Care

IU HEALTH PHYSICIANS SEEKS PRIMARY CARE PHYSICIAN IN INDIANAPOLIS, INDIANA — Provide direct family practice care for patients and support physician education programs. REQs: MD or foreign equivalent; Family Medicine residency; eligibility for or possession of Indiana state medical license; Board Certified/Board Eligible (BC/BE) in Family Medicine. Send Resume to: koaldon@iuhealth.org

### Surgery, General

DEAN HEALTH SYSTEMS, INC. — Is seeking multiple full-time Physicians (Trauma Surgeons) in Madison, Wisconsin, to perform surgical procedures to prevent or correct injury, disease, deformities, and patient function. Contact: Mike Dahlke, Physician and Advanced Practice Provider Recruiter, SSM Health Dean Medical Group WI, 1808 W. Beltline Hwy, Madison, WI 53713; mike.dahlke@ssmhealth.com

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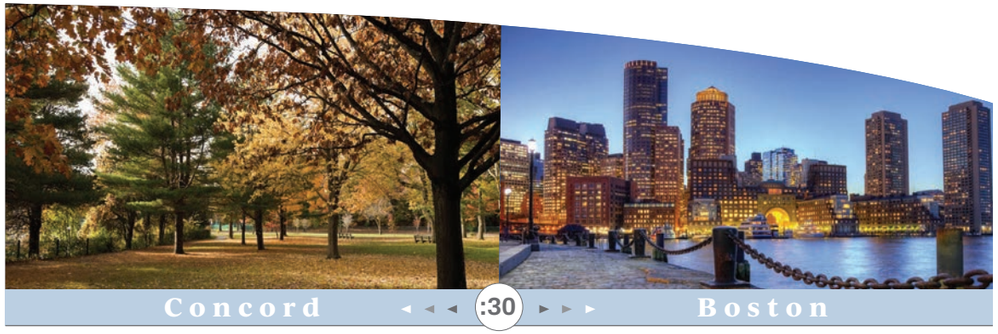


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## If you would like more information please contact:

Diane Forte Willis
dfortewillis@emersonhosp.org
phone: 978-287-3002
fax: 978-287-3600

## About Concord, MA and Emerson Health

Our core mission is to deliver exceptional, patient-centered care that is highly reliable, safe, compassionate, equitable, efficient and coordinated. While we provide most of the services that patients will ever need, the hospital's strong clinical collaborations with Boston's academic medical centers ensures our patients have access to world-class resources for more advanced care.

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