



VOLUME 2 — ISSUE 6: TRANSCRIPT

Featured Cases: Treating Youth and Young Adults with HIV Infection

Our guest author is Allison Agwu, ScM, FAAP, FIDSA, Associate Professor of Pediatrics and Infectious Diseases, at the Johns Hopkins University School of Medicine.

After participating in this of this activity, the participant will demonstrate the ability to:

- Describe the HIV epidemic among adolescents and young adults in the US.
- Recognize the management challenges in caring for HIV-infected adolescents and young adults, including engagement and retention, and treatment.
- Discuss emerging data on clinical implications of HIV infection in adolescents and young adults.

This discussion, offered as a downloadable audio file and companion transcript, covers the important topic of treating youth and young adults with HIV infection in the format of case-study scenarios for the clinical practice. This program is a follow up to the Volume 1, Issue 5 eHIV Review newsletter — [Treating Youth and Young Adults with HIV Infection](#).

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MEET THE AUTHOR



Allison Agwu, ScM, FAAP, FIDSA

Associate Professor of Pediatrics and Infectious Diseases
Johns Hopkins University School of Medicine
Baltimore, Maryland

Faculty Disclosure

Dr. Agwu has indicated that she has no financial interests or relationships with a commercial entity whose products or services are relevant to the content of her presentation.

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PROGRAM DIRECTORS

Richard Moore, MD, MHS

Professor of Medicine
Director, Moore Clinic for HIV Care
Divisions of Infectious Diseases and
Clinical Pharmacology
Johns Hopkins University School of
Medicine
Baltimore, Maryland

Michael Melia, MD

Assistant Professor of Medicine
Associate Fellowship Program Director
Division of Infectious Diseases
Johns Hopkins University School of
Medicine
Baltimore, Maryland

Jeanne Keruly, MS, CRNP

Assistant Professor of Medicine
Department of Medicine, Division of
Infectious Diseases
Director, Ryan White Ambulatory Services
Johns Hopkins University School of
Medicine
Baltimore, Maryland

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The target audience (clinicians) for this initiative includes infectious disease (ID) specialists, primary care physicians (PCPs), nurse practitioners (NPs), physician assistants (PAs), and other health care practitioners whose work/practice includes treating patients with HIV.

STATEMENT OF NEED

- As the demographics of HIV have shifted to include many older adults, clinicians require education regarding the treatment of common comorbidities.
- Clinicians may be unclear about issues specific to the diagnosis and treatment of women with HIV.
- Many clinicians require education regarding current treatment and new emerging hepatitis C medications in patients coinfecting with HIV/HCV who require antiretroviral therapy.
- Clinicians may need an update on current recommendations for the treatment of HIV with HAART.

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Johns Hopkins University School of Medicine
Office of Continuing Medical Education
Turner 20/720 Rutland Avenue
Baltimore, Maryland 21205-2195

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MR. BOB BUSKER: Welcome to this eHIV Review Podcast.

Today's program is a follow-up to our newsletter topic "Treating Youth and Young Adults with HIV Infection." Our guest today is that issue's author, Dr. Allison Agwu, Associate Professor of Pediatrics and Medicine in the Division of Infectious Diseases at the Johns Hopkins University School of Medicine in Baltimore.

eHIV Review is jointly presented by the Johns Hopkins University School of Medicine and the Institute for Johns Hopkins Nursing. This program is supported by educational grants from AbbVie, Inc., Merck & Co., and ViiV Healthcare Company.

Learning objectives for this audio program include:

- Describe the HIV epidemic among adolescents and young adults in the US.
- Recognize the management challenges in caring for HIV-infected adolescents and young adults, including engagement, treatment, and retention.
- Discuss emerging data on the clinical implications of HIV infection in adolescents and young adults.

Dr. Agwu has indicated that she has no financial interests or relationships with a commercial entity whose products or services are relevant to the content of her presentation.

She has further indicated that her presentation today will not include any reference to unlabeled or unapproved uses of drugs or devices.

I'm Bob Busker, managing editor of eHIV Review. Dr. Agwu, thank you for joining us today.

DR. ALLISON AGWU: I'm happy to be here, Bob, thank you.

MR. BUSKER: Adolescents and young adults — those would be individuals between 12 and 24 years of age. And here, unlike in other populations, the incidence of HIV infection has actually been increasing. Your newsletter issue reviewed some of the key publications describing the management challenges clinicians face in treating these younger patients. I'd like to discuss how some of that information can translate into clinical practice change. So please start us out by describing a patient.

DR. AGWU: Sure, a 17 year old female who presents to the emergency department in Baltimore for an evaluation of vaginal discharge. She is sexually active with males and "usually" uses condoms, and I put usually in quotation marks, and she has had three lifetime partners and one partner for the past six months whom she is faithful to. She undergoes testing for a sexually transmitted infection; however, she declines testing for HIV as she does not feel she is at risk.

MR. BUSKER: She does not feel that she's at risk, this 17 year old. Do you agree with her?

DR. AGWU: No, I don't. I think a problem with young people is often that they are often incorrect about their risk perception, and she definitely is. And that given she's in Baltimore, which is a locale where the prevalence of HIV is definitely greater than 1%, which in itself puts her at increased risk of acquisition of HIV. She has had multiple sex partners and does not always use condoms. You know, the fact that she reports usually using condoms definitely means she does not always use condoms, there's an overestimation of her condom use more than likely, and again, youths often underestimate their risk perception. And while she may be faithful to her current partner, however, that increases the likelihood of her not using condoms with that partner and we actually don't know what her partners' risk factors and risk behaviors are. Additionally, in the setting of her having a sexually transmitted infection or an STI, her risk of HIV acquisition is even higher as it sort of breaks down the normal barriers to infection acquisition and is definitely known to increase the risk of HIV acquisition.

MR. BUSKER: As you described, she's declined testing for HIV. What are the recommendations for testing youth and young adults?

DR. AGWU: That's a good question. In youth and young adults, significant increases have been seen in incidence of infection. An estimated 60% of youths are unaware of their status, so many youth who have infection are unaware of their status. The US Preventive Task Force recommends universal HIV testing for youth and young adults above the age of 15; the Centers for Disease Control recommends universal opt-out testing for youth 13 and above, and definitely

HIV screening is recommended for patients in all health care settings after the patient is notified that testing will be performed unless the patient declines; this is opt-out screening. And persons at high risk for HIV infection should be screened for HIV at least annually and more frequently depending on risk. For example, if this young woman had been tested earlier in the year, coming back in the setting of an STI would definitely prompt additional testing because of the possibility of additional exposure.

MR. BUSKER: So doctor, you're recommending testing for this young woman. Let me ask you: would your recommendation for testing be different if this were a 17 year old male who reported only having sex with females?

DR. AGWU: That's a question I get a lot actually, how do I stratify risk depending on gender, depending on HIV acquisition risk. If this were a heterosexual male who reported only having sex with females, the testing recommendations actually would not change; while heterosexual males make up only around 10% of those with HIV infection, they still are at risk. And I should say males that are youths with HIV infection are still at risk. Depending on how the question is asked, comfort level, concern for stigma, individuals may actually not report other activities that may increase their risk of HIV acquisition. For example, a male may come in and report that he's heterosexual when he actually may have sex with males and females, he may overreport his use of condoms, et cetera. So taking the stance that universal testing is recommended, the recommendation actually does not change.

MR. BUSKER: To continue along those lines: if this was a 17 year-old male who reported having sex with other males — MSM — would the recommendation for testing change?

DR. AGWU: The recommendations remain the same. What underscores the importance of tests in a male who reports having sex with men is that risk of HIV acquisition is even higher in that demographic. From 2006 to 2009, we know young men between the ages of 13 and 24 who had sex with males had the greatest percentage increase in diagnosed HIV infections of all groups. And the recommendation would definitely be for testing now and then guidance for continued routine testing, as well as strong counseling for all, regardless of gender or sexual orientation, on risk reduction, condoms, preexposure and postexposure

prophylaxis. But the recommendations again are the same but even enhanced in that demographic, given the high incidence of infection.

MR. BUSKER: Thank you, doctor. And we'll return, with Dr. Allison Agwu from Johns Hopkins, in just a moment.

JEANNE KERULY: Hello. I'm Jeanne Keruly, assistant professor of medicine in the Division of Infectious Diseases at the Johns Hopkins University School of Medicine. I'm one of the program directors of eHIV Review.

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MR. BUSKER: Welcome back to this eHIV Review podcast. I'm Bob Busker, managing editor of the program. Our guest is Dr. Allison Agwu, from the Division of Infectious Diseases at the Johns Hopkins University School of Medicine. And our topic is: "Treating Youth and Young Adults with HIV Infection."

Dr. Agwu has been explaining how some of the information presented in her newsletter issue can be applied in clinical practice. So to continue, doctor — let me ask you to bring us another patient now, if you would, please.

DR. AGWU: So the next patient is a 21 year-old male whose HIV infection is diagnosed at the Health Department. He reports initially that his last negative test was six months ago. He's had eight lifetime male partners and engages in both receptive and insertive anal intercourse, otherwise known as being versatile. He's given his test results and referred to care at a local HIV clinic. Eight months later, he's seen at the

clinic where his CD4 count is 375 cells/mm³, and his viral load is somewhat elevated, 400,000 copies/mL. He has no health insurance because he is “never sick.” He spends most nights at different friends’ houses. He is currently unemployed but is looking for a job. On receiving his results he is adamant that he wants to start HIV medicine today. This is a very common scenario of kids that we see.

MR. BUSKER: Young adult males who report MSM activity — what can you tell us about the epidemiology of HIV infection among this group?

DR. AGWU: About two-thirds of infections among youth or young adults occur in young MSM. This has really been the same for many years and is different from the adult demographic, where MSM make up a significant component, but injection drug use contributes a higher component of males who are infected with HIV.

The highest among those young men who have sex with men are among racial and ethnic minorities, and many studies are trying to determine why that is, whether it’s stigma, community acceptance, rejection, et cetera. There are multiple reasons. Black young men who have sex with men. While approximately 15% of 13 to 24 year olds in the US are black, nearly two-thirds of all young MSM with HIV infection in that age group are black or African-American, then followed by white, 18%, and Hispanic-Latino about 16%. Black and young MSM also experience the largest increase of all racial and ethnic minorities of new HIV infections diagnosed in that period of time. So it’s a real epidemic, and pockets of these young men are most at risk.

MR. BUSKER: This individual you described for us: he got his diagnosis, he waited eight months to go to clinic, and now he’s adamant about wanting treatment right away. Why do you think he waited those eight months?

DR. AGWU: This is also a question I am asked a lot, and I think it is multifactorial. An estimated 40% of youth who are infected engage in care, meaning about 60% of youth who are infected don’t engage in care. So whether they are unaware of the diagnosis or what have you, they are not in care. Reasons for the low engagement rate may be related to a number of factors, and some are highlighted by this case here. Lack of knowledge of infection status is not the case

for this young man, but one of the articles I reviewed in the newsletter reported a high percentage of men with HIV who have sex with men do not know they are infected, especially young men of color. This is particularly concerning, as those who do not know they are infected may be less likely to take measures to keep from spreading the virus to others and exposure has definitely been linked to decreased transmission risk behaviors. So it’s very important to know that you’re infected, and many do not.

I think there’s fear of the unknown, so it’s a coping strategy to sort of “just deal,” because you’re afraid of what it might mean to actually present to care and to start on therapy. There’s also a lot of stigma about sexual orientation and then also stigma about HIV status. Particularly for young men who have sex with men who are just either coming out or have not come out, there’s a fear that walking into a setting where they are now going to be judged for their orientation as well as judged for their HIV status, it’s a very fearful thing for them to deal with.

Fear of disclosure. Many are concerned that walking into again a clinic or facility that takes care of patients with HIV infection, particularly in some communities where people know everybody — and Baltimore is one of them — that walking in you’ve essentially disclosed your status and then it will be known in the community when you’re not ready to disclose that.

And there’s denial: I feel great, I never get sick, they must have got this diagnosis wrong, I’m not HIV infected, I’m fine. And some of that’s denial.

I think it’s important to talk about the logistical barriers to entering care. One is time. If this young man is unemployed and is looking for a job, he’s trying to do things, and going to the clinic when he may have all the other barriers such as stigma, disclosure, et cetera, takes time, and it’s easier to not do that. He doesn’t have insurance, so many in this age group are not being seen by their pediatric providers at this point and many have not transitioned to care from an adult provider. And many may not even be insured. Because he doesn’t have insurance, he doesn’t have a place to go, and he doesn’t know where to go.

That also ties into a lack of an understanding of how to navigate the health system. The case noted that he was referred to a health center. If he called and went

to voicemail or any kind of delay, many youth have limited understanding of how to how to navigate that, and then it falls off the radar or they just are unable to do it, which again throws us a barrier.

This young man is unstably housed. Often I think there is such a focus on homelessness. Yes, he may have a place to stay every night, but it's clear he's spending most nights at different friends' houses. So he may not come out and say he's homeless, but he doesn't necessarily have a steady place to go, so there's some lack of stability that again presents a barrier to his pursuing care and following up.

Poor health literacy. I talked about how young people are in that transition stage from the pediatric providers to their adult providers, some don't have providers at all, and not knowing how to navigate the health system is a huge thing.

And then what I call the feeling fine phenomenon: I feel great, so I must be great, and move on; he definitely has some of that. Oftentimes for young people, not necessarily in this case for this young man, but there's a lot of substance abuse, whether it's marijuana, which many youth don't necessarily consider a substance, but does impact motivation and engagement of care and a significant component of our young individuals engage in marijuana and other drugs. And so that also can serve as a barrier and may be why he also delayed his care.

Finally, there are the mental health consequences, stigma, discrimination, coming out, and dealing with a lot of the issues surrounding that may lead to anxiety and depression, which have definitely been associated with decreased engagement in care and adherence to care.

So again, multifactorial, some that are elicited from the case, itself, and some that would need to be uncovered as the young man engages in care by case managers, social workers and the like.

MR. BUSKER: Let's talk about his numbers, doctor. This patient has a CD4 count of 375, he's got a viral load of 400,000 — with those numbers, does he qualify for treatment according to the current guidelines?

DR. AGWU: Youth and young adults are treated according to the adult treatment guidelines, most recently updated in May 2014. The trajectory of their

disease is thought to more closely mirror that of adults than of children or youth who were infected, which we'll discuss later. He definitely meets treatment guidelines with a CD4 less than 500 cells/mm³. Of course, we should always repeat a CD4 to confirm the actual level, but if it is confirmed he definitely meets treatment guidelines.

Viral load is not what the basis of treatment is made on, though his viral load impacts what regimens you may choose. Specifically, for example, he would not be able to initiate rilpivirine, which is a component of one of the single pill treatment regimens as his viral load is greater than 100,000, where failure was seen more frequently and clinical studies have led to its approval.

MR. BUSKER: Talk to us, if you would, about medications that could be recommended for this patient. What would those medications be? And would they be different than those prescribed for older adults?

DR. AGWU: He would qualify for most of the first-line regimens in the adult treatment guidelines, including protease inhibitor-based regimens and the nonnucleoside reverse transcriptase inhibitor-based regimens, as well as the integrase inhibitor-based regimens. Now we would need to consider resistance testing very carefully in this young man, as there have been studies that show that around 10 to 18 percent of youth and young adults entering care already have some major drug resistance mutations. Barring no resistance, any of the first line regimens I mentioned will be potential options, again with the exception of rilpivirine-based regimens given his increased viral load. The actual medicines, again, would not be different than what are started or initiated for adults; however, there really does need to be more of a thought about the barrier to resistance. That would be critical as some of the regimens are not as forgiving as others — meaning if they're not taken the way they should be, they are more likely to develop resistance and that could be problematic for someone starting on therapy so young.

Particularly for youth I think this issue is not focused on enough, but there really has to be careful consideration of palatability, schedule, food intake, and storage issues. And I say that because, number one, I'm often shocked by the number of young people, late teenagers, early twenties, who can't

swallow pills. They literally cannot swallow pills. And this young man has storage issues. As he is unstably housed, where will he keep his pills? Will they have to be refrigerated or not refrigerated? Has he disclosed his status to the friends he stays with, and will he be able to do things or put them where they need to be that will then allow him to take his medicines? So all those things have to be considered as we're determining a regimen for him.

MR. BUSKER: Engaging a patient like this, and retaining him into care — what strategies might health care providers use?

DR. AGWU: I think as we think about tools that we can use in our armamentarium to engage a young man like him, I think it's really thinking about a multidisciplinary approach to him and youth like him. The one really relying on outreach workers, particularly peers if we can, particularly peers who have some experience of either personal HIV infection or dealing with other peers with HIV infection, a strong, strong advocate can be really helpful at engaging a young man like him. Having a case manager who helps him in terms of navigating a lot of the issues that are challenging for him from health insurance to health literacy.

We've got to be creative about contacting this young man. He doesn't have a land line or a telephone that we can call him, so being creative about how we contact him, such as texting, getting all the numbers and ways we can reach him, through Facebook's personal email feature, instant messaging, and letting him tell us the ways that he finds acceptable for us to reach him, and using them. We would also link him to support resources in clinic or think about other resources available in the city to reach and link this young man to. [Editor's Note: Clinicians are reminded that all attempts to contact patients must always be made in a HIPAA-compliant manner.]

He needs resources for housing. If we do all these things but he has no place to go, the priority for him will still be where he sleeps and how to feed himself. If we can link him to resources that can help him find stable housing, that will increase the likelihood he will engage.

We can encourage him to tell at least one person, a trusted friend, a family member, about his HIV status and even bring that person to his appointment. Getting that support has been a key strategic factor for many young people because when they feel they have

someone they can lean on when they're depressed or upset or when they feel they are unable to go on, that person can provide help and reassurance. Having that support mechanism beyond the clinic staff is important.

Identifying and addressing mental health needs is also a critical piece for him.

So again, the issues are multifactorial, and a multidisciplinary approach is the best way to engage a young man like him into care.

MR. BUSKER: Thank you for sharing your insights, doctor. I think we've got time for one more patient, so, if you would, please.

DR. AGWU: This is a 20 year old young woman with perinatally acquired HIV infection who's recently been transferred to the care of an adult HIV provider. She reports that her HIV was diagnosed when she was around five years old. Her mother died of Pneumocystis pneumonia and she was subsequently raised by her maternal aunt. She's been on many medications in the past and has been responsible for taking her own medicine since she was around 10 years old, around the same time that she was told she had HIV. She's changed medicines many times but she does not remember all of the medicines' names.

In her opinion, she has taken her medicines very well and has never been sick. She's on a cART regimen of darunavir, ritonavir, and the combination pill of tenofovir/emtricitabine. Her most recent CD4 is around 300 cells/mm³ with a viral load of 12,000 copies/mL. She had special education classes in school and although she dropped out of school in 10th, grade she's working on obtaining her general education diploma, or GED, and is currently unemployed.

She does have medical insurance, luckily. She is sexually active with males and has had a total of four lifetime partners. She has one child who is negative for HIV. On her physical exam she's heavysket, and you notice that she has acanthosis nigricans which is a hyperpigmentation often seen in the neck and can be a marker for diabetes or insulin insensitivity.

MR. BUSKER: Her HIV was perinatally acquired — talk to us about the epidemiology of that in the US.

DR. AGWU: The mean age of people with perinatal HIV infection in the US is increasing, currently about 14 to 18 years of age in many cohorts, and some people with perinatal HIV infection are in their 30s. So I'd say in total there are about 6,000 with perinatal infection are currently living in the US. Many are healthy and living completely normal lives, they're employed, they are parents, many are married, and many are in school. Some do, however, have significant comorbidities as a result of their HIV or as a result of their therapy. They have lipodystrophy, which is a loss of fat in certain parts of the body, metabolic disturbance, and many have significant cognitive delay or dysfunction, as this woman may have.

MR. BUSKER: Now this patient — she's been responsible for self-administering her medications from the age of 10. How typical is that scenario?

DR. AGWU: Disclosure is when someone tells someone of their status, and it also includes when someone is told of their own status, so it can encompass several different things. For children with perinatal infection, the median age of disclosure when they are told about their infection is around 10 years of age in the US, and that is my experience in our clinic. Some can be told at older or younger ages, and that again is very individualized depending on the child's maturity and cognitive capabilities, caregiver scenario, family dynamics, et cetera.

Disclosure has been shown to be a good thing. It has been shown to minimize depression and increase adherence, because kids know why they're taking what they're taking. Disclosure often improves risk-taking behaviors and can promote a better general sense of wellbeing. The age at which the responsibility of medication administration is transferred to the child is variable, depending on the family dynamics. So because we don't always know when parents are going to do that, or where caregivers are going to transfer that care, it is an important factor to assess at all visits for the young kids that we see, and through teenagers and youth as it's an important source of nonadherence when that transfer is made. If we suddenly see the viral load increasing, we need to know how to troubleshoot that.

MR. BUSKER: So the provider who's assuming her care — again, the first time the clinician is evaluating this patient — what's notable about her current antiretroviral treatment regimen?

DR. AGWU: Particularly for someone who is just assuming her care, the major thing is that she has detectable viremia on this regimen. On this regimen, which technically should be a potent regimen, she has a viral load of 12,000 copies/mL. She has significant pretreatment and she is able to tell you some medicines but not every one. So you worry that with someone who has been on so many different medicines, was there intolerance or nonadherence, or was there the possibility of resistance that led to changing the different regimens, potentially with the possibility that resistance to this regimen is causing her viremia. So lots of concerns are raised with the current antiretroviral regimen.

MR. BUSKER: You don't have all of her past records. Is that typical?

DR. AGWU: We rarely get all the records, and that's something I often stress when we talk to the providers who are transitioning care. If I had my wish, I want everything that she's had before, so all prior records, also prior antiviral regimens, her response to those regimens, what was her CD4 viral load response, the severity of her HIV classification, and all prior genotypes, not just the current genotype which may not show everything.

We also want to know whether there were opportunistic infections. She may not be able to tell us that because she may have felt healthy forever and never had an issue, but she could have had opportunistic infections.

We want to know about hospitalizations, adherence, mental health history, et cetera, as well as the team records to understand how she was treated, what the response was, and what else is going on with her.

You need all of those things is because you want to recreate the whole picture to understand why she's in front of you today with a CD4 of "only 300" and an elevated viral load. So all those things are important to evaluate moving forward.

MR. BUSKER: Based on what you do know about this patient — do you have enough information to recommend changing her regimen?

DR. AGWU: I can't make a recommendation just yet because I don't know in particular her resistance profile and what she'd been treated with before, and I don't know the nuances of whether she would prefer

once a day, twice a day, et cetera. So I can't make a recommendation right now. I think based on all those things as well as talking with her, I would craft something that would be potent. Now if it is all nonadherence based on her resistance, I may keep her on what she's on or simplify her regimen or try my best to optimize what she's on. But I couldn't say exactly what I would change her to right away.

MR. BUSKER: Talk a little more about what you see as the potential barriers to her adherence, if you would please.

DR. AGWU: Based on the vignette and what's obvious here, several things pop out. For one, she has some responsibilities. She is a young woman who has a child, so she has child care, and can she get to her appointments, what times does the child need to be where they need to be, and what is the child's health? The patient has cognitive limitations. She is not going to tell me she is cognitively limited, but there's a reason why she was in special education classes and whether that's due to just her underlying protoplasm or whether that's related to HIV.

She may just be tired, and it's hard for young people to tell you that they are tired of taking medication, but there is a significant component of treatment fatigue. If you've been taking pills since you were ten years old, that's eleven years of taking pills, and she may simply be tired and thinking about how to navigate that, so counseling her through that will be important.

She's unemployed. It's not clear from the vignette what her income is based on, whether it's social services or other things that are at play, but she may be somewhat limited for transportation, rent, paying for copays, et cetera. And she likely has limited health literacy, particularly since she is not able to verbalize a lot of past regimens. So just on the surface there are some barriers present.

MR. BUSKER: One last question on this patient, doctor. It's something you mentioned in the case scenario — that she has a marker that may indicate insulin insensitivity or potentially diabetes. Overall, what are the comorbidities she may be at risk for developing?

DR. AGWU: I think what's important for her is she has known risk factors. So even taking HIV out of the picture, she has risk factors for cardiovascular disease.

She has obesity, which definitely has been linked to cardiovascular disease, and that increases her risk of hypertension, it increases her risk of diabetes. Now we add her longstanding HIV infection and the increasing data about inflammation that comes with HIV infection, particularly in the setting of decreased adherence, also increases her risk of these comorbidities.

With her obesity, we don't know for sure, but she probably has hyperlipidemia and would have to be assessed and managed for that. There's some premature aging, which has been associated with HIV. She already has some signs of metabolic derangement with the acanthosis nigricans which we would need to assess and treat if she does have diabetes or issues with her blood sugar.

It's important to address the risk factors we have not assessed. Does she smoke, what's her diet like, what's her exercise like, what's her family history like, and then encouraging lifestyle modifications for the things that we can modify. So several things are inherent within just her HIV diagnosis and some that are not, but they increase her overall risk of comorbidities.

MR. BUSKER: Dr. Agwu, thank you for today's cases and discussion. I'd like to ask you — from a broad-based perspective — what you think needs to happen to improve engagement and retention into care of these adolescents and younger adults with HIV?

DR. AGWU: That's a great question. I think particularly with the increasing incidence of HIV in this population, we have to figure out through studies the best practice for where youth and young adults need to receive care and how we should be giving them that care. We need to examine initiatives to improve engagement and linkage to care, as well as optimized adherence to care and therapy. Those are critical for this group.

I think this population is an ideal target for intervention hopefully in the not too distant future for prevention and treatment of HIV. I am referring to things like depot, or preexposure prophylaxis, shot for combination antiretroviral therapy, or vaccines to prevent or mitigate HIV infection. In this population we need studies that examine the consequences of acquiring HIV in the early decades of life, and potential interventions to mitigate adverse events, particularly inflammation and metabolic

consequences that we are seeing as an outcome of longstanding infection in this population. That's where I see the future for management and care of this population.

MR. BUSKER: Thank you for sharing your thoughts, doctor. To wrap things up, I'd like to take a moment to review what we've talked about today in light of our learning objectives. So to begin: the HIV epidemic among adolescents and young adults in the US.

DR. AGWU: I think the important thing here is that HIV incidence is increasing in population of youth and young adults, particularly within young MSM or young men who have sex with men who have the highest rates.

MR. BUSKER: And our second objective: the management challenges, including engagement, treatment, and retention in caring for HIV infected adolescents and young adults.

DR. AGWU: There are cognitive, developmental, psychosocial, and logistical issues that create major challenges to engagement, treatment, and retention for youth and young adults. Those challenges may have significant implications for treatment and transmission. As providers for this population, we have to think comprehensively about this group to affect their management challenges and ideally optimize their care and outcome.

MR. BUSKER: And finally: the emerging data on the clinical implications of HIV infection in adolescents and young adults.

DR. AGWU: We are increasingly becoming aware of the long-term consequences of HIV infection, particularly in youth, which includes inflammation that may result in neurocognitive and cardiovascular complications later in life. We must focus on this, as we will have to manage and mitigate this in the future.

MR. BUSKER: Dr. Allison Agwu from the Johns Hopkins University School of Medicine, thank you for participating in this eHIV Review Podcast.

DR. AGWU: It has truly been my pleasure, thank you for the opportunity to talk about something that is so near and dear to my heart.

MR. BUSKER: To receive CME credit for this activity, please take the post-test at www.ehivreview.org/test.

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