Dr. Emily Volk ([00:04](https://www.rev.com/transcript-editor/shared/RnYS8vZNzoMD92DOZ2xuutNY3Vmw2U0tgeuRO1DKK1pW92X_t2rY8nr5OzE6xETKKEtIObMr1Cx3QzYT__eG2Iu4xXY?loadFrom=DocumentDeeplink&ts=4.17)):

Hello and welcome to the College of American Pathologists Media Briefing, which is also live-streaming on YouTube. Thank you for joining us today. My name is Dr. Emily Volk. I am the president of the College of American Pathologists. I'm also the vice president of Pathology and Clinical Laboratories for the University of Louisville Health System, and an associate professor of pathology at the University of Louisville School of Medicine.

([00:31](https://www.rev.com/transcript-editor/shared/Acaeftzfy1nT9xL1sFI5Y1emHFTyR-dv-h23teydA9tT5zrpr_s3E6gz5IS-U2vOqx8xH9-eFYgxw5ldQmYGRrLEdb8?loadFrom=DocumentDeeplink&ts=31.469999)):

This morning, we are joined by a learned panel of CAP members to discuss artificial intelligence and its role in pathology. Joining us this morning for this very important discussion, are Doctors Patricia Raciti, Matthew Hanna, and Eric Glassy. Will all of you please tell our audience a little bit about yourselves, starting with Dr. Raciti?

Dr. Patricia Raciti ([00:55](https://www.rev.com/transcript-editor/shared/DFkj0cXuSTvw24lVfj0Z_x6buau_bsYShLQ6X7FOrqGiRudRs2YqH4e5nL9r1RWuYXCf7xLaj0HJwknLnAgVMBypxi4?loadFrom=DocumentDeeplink&ts=55.98)):

Thank you, Dr. Volk, and thank you for inviting me for this important discussion. My name is Patricia Raciti. I am a board-certified pathologist, and I'm a member of the College of American Pathologists Digital and Computational Pathology Committee.

([01:13](https://www.rev.com/transcript-editor/shared/Yr2iJ9fOUgIbyeQd_XJAFF7aIr_wu0E0neStXhS_fE6s-2I0TyPqtbtNP7C8dTtoFPOER_B1Qpy1dvjU-E-7E2nSL8g?loadFrom=DocumentDeeplink&ts=73.98)):

While practicing pathology for a number of years, I was also involved in the design and development and extensive testing of numerous computer vision algorithms applied to digitized histopathology images.

([01:29](https://www.rev.com/transcript-editor/shared/vMsdK1CuHZJmN2IcDkvX71hu5F5b83GBuEY0_t2OhAxusNYdCUXzfupDz-jv9LHrkfdSAVWdQcskG5I9-CKpjgjSVps?loadFrom=DocumentDeeplink&ts=89.43)):

Since then, I've transitioned to the pharmaceutical industry, where one of my roles also involves the vetting of these computer vision algorithms.

Dr. Emily Volk ([01:38](https://www.rev.com/transcript-editor/shared/NGOUJeeVZ8PoNvps8mULTx2ueWDoFMXYgWoFVP59GKWd1EOs5QVhd7fCLxtubKBeLCZnqPq5-NZqO75SEFP1sMIpIXI?loadFrom=DocumentDeeplink&ts=98.22)):

Thank you. Dr. Hanna?

Dr. Matthew Hanna ([01:42](https://www.rev.com/transcript-editor/shared/DnGpzytYLQbqTpSfBf3jig5S86Ct4DIAoELg4xQepHIgKQuTZVLEfm_p3OcemZZrnHuKRiNDR3fWG6MEc1lNZQLJR_o?loadFrom=DocumentDeeplink&ts=102.059999)):

It's a pleasure to be here. Thank you. My name is Matthew Hanna. I am a pathologist at Memorial Sloan Kettering Cancer Center. My predominant focus is in breast cancer, as well as being the director of our Digital Pathology Informatics Group.

([01:57](https://www.rev.com/transcript-editor/shared/ldw9Ep4WnjMi019ztpOm6UNwJldKn82b1yv_mCwwREPwYKskahiPo3NnXNj_L5jSXC43xWTWCFu2B9kwaEjb2_z80vg?loadFrom=DocumentDeeplink&ts=117.54)):

I sign out breast cases, which is effectively reading patient's tissue and specimen, and we're reporting on those as my clinical service. Then leading the other clinical informatics initiatives within the department.

Dr. Emily Volk ([02:11](https://www.rev.com/transcript-editor/shared/iEwrkQugaBtsABksoCPEu0kVunBAF8lUlujpcMar6QrTsZHdB9iROXmS8eISupEN1U8WayPdstoq1ULh1bzo-fm5QTw?loadFrom=DocumentDeeplink&ts=131.04)):

Thank you, and Dr. Glassy?

Dr. Eric Glassy ([02:13](https://www.rev.com/transcript-editor/shared/rh35UH21NNNS3NEcYMq6MmlC3Wy2zkTdcpvNKGjaD4s5MNxvtKh2OHgcF6pvE3EzZlKUYC-G04XSlrRDEWRev4Czzrg?loadFrom=DocumentDeeplink&ts=133.95)):

Hey. Thank you, Dr. Volk. It really is a pleasure to be here. I am a community pathologist. I am part of a larger independent pathology medical group called Affiliated Pathologists Medical Group. We are primarily located in Southern California. There's 40 of us, but we also cover in Oregon and Arizona.

([02:35](https://www.rev.com/transcript-editor/shared/OFKSWkAwFtVtdgzJa_XmWJMoaKyjC8DcdT_8UsrZtkRRNNH_Y85PddoU2awtpQRatiRTUy-NLBcvw6qrbUWzRAz9lvM?loadFrom=DocumentDeeplink&ts=155.52)):

In terms of the CAP, I'm a past governor of the college. I've been involved in many councils and committees over the years. Currently, I chair the Information and Technology Leadership Committee, and a subgroup of that committee is involved with generative AI.

Dr. Emily Volk ([02:55](https://www.rev.com/transcript-editor/shared/7tXSWgC_vogqY64d2jmroSiGOrgPLEcJDxbOM_pzAKn9xkXSxMg6FZtV9hCtbOX-MP1Bg9uRAUm9DW3_iaYP4b5mhPM?loadFrom=DocumentDeeplink&ts=175.559999)):

Well, I thank you all for being here. The term AI, it's everywhere today. I want to take just a few moments to explain the terms artificial intelligence and machine learning.

([03:09](https://www.rev.com/transcript-editor/shared/_gn5HabeJMauM_UfeBNvt1_xll6fvXp8zJIgHPvaslX1cQtz7tpnwld7WZkC7rDShVoMbPLcw4bopA-HRYa-rJzkAQU?loadFrom=DocumentDeeplink&ts=189.389999)):

The American Medical Association has suggested the use of the term augmented intelligence. Dr. Hanna, can you talk about the importance of this term? Is it perhaps a much more realistic phrase when talking about AI in the care of patients?

Dr. Matthew Hanna ([03:25](https://www.rev.com/transcript-editor/shared/1lwXmA9KYFmk8y5XrhqB5tB3fEeptu4q2QTViEZFjxWVDLC3QpSjrjRlPJZTInnQWYv4nDd-QzyF19W48QacZYAYUSE?loadFrom=DocumentDeeplink&ts=205.62)):

I think it's exactly the right term that should be perpetuated when talking about AI and using AI as augmented intelligence, as opposed to artificial intelligence. Artificial intelligence seems to indicate that there is a seamless decision automatically happening by a machine or robot.

([03:47](https://www.rev.com/transcript-editor/shared/ptI4WC6Up16h5-Ixpb99234x4bbTU4zK7hj86Ks-ZPk1BTmosBfHjHNXFFePJpd_NmOQYKTIGsBoocvixeODpiqklMM?loadFrom=DocumentDeeplink&ts=227.52)):

Whereas a lot of these assistive workflows that are being developed as part of these decision support tools, these machine learning-based systems, are being used in an assistive fashion in augmenting the role of the physician, the role of the pathologist, in their day-to-day tasks.

([04:03](https://www.rev.com/transcript-editor/shared/VmmcCGRx3HVrSGS6tZX1rPcsFz9CHqV3AEwiC_XVX2mhHx0ITSgfEovbHj-BFDlq-fn45OpA65GGwH2zD24oMYbNJ-Q?loadFrom=DocumentDeeplink&ts=243.99)):

I think using AI as augmented intelligence, is a much more descriptive and accurate use of the technology and how it's being developed today.

Dr. Emily Volk ([04:13](https://www.rev.com/transcript-editor/shared/DeC9JfC_2pgcBy9VEUQfH2PKvSgy5c2ttyVJ_5DPVyyw4szztHQuJSsMDj9ktnD0bicXOX3pM7fG2pBSeb19wIBdikU?loadFrom=DocumentDeeplink&ts=253.35)):

We really need to be thinking of this as a tool that a physician uses. Just like pathologists use microscopes, we're now incorporating this additional tool into our workflows.

Dr. Matthew Hanna ([04:27](https://www.rev.com/transcript-editor/shared/9KQyat5U5--RW9LLTNJbDHbWXIiNxL9bjSAinG90-0W5b9P8BXldO4uT00TH_UnRhJzvfN0aMjMpYHyKmfon0f1F4Xs?loadFrom=DocumentDeeplink&ts=267.15)):

Exactly.

Dr. Emily Volk ([04:27](https://www.rev.com/transcript-editor/shared/_pMA0i6lgS6LVb0_aQLdkrI68PqnUX0psduKQHcd6A7NjUUU2hqRspdl1ZweyyT_oF7zWHTPlkFBTjWs6pqA2uA0htA?loadFrom=DocumentDeeplink&ts=267.45)):

Dr. Glassy? Go ahead, Dr. Hanna.

Dr. Matthew Hanna ([04:31](https://www.rev.com/transcript-editor/shared/ySyg8umCVcpCAddFZzctXSQ5NQeuDQl_uAVHDstvOqbyDNVFMZNBioUe5Ja2zm-ZHEEPXaFWuWaOLUtPnNI3ykiS6hA?loadFrom=DocumentDeeplink&ts=271.98)):

The pathologist has an armamentarium of tools that are available to them, like immunohistochemical studies that look at the protein expression of the cells. These are assistive workflows.

([04:43](https://www.rev.com/transcript-editor/shared/3jzo6YwThFb2Q41Lx99fVOrSk-wwxaz4vqEkiDJ9nRgGnM_gHsX6GiabJwZtqQRG-3B9tRatiSC2K57pJaZpWaShUJA?loadFrom=DocumentDeeplink&ts=283.5299999)):

These are yet another tool that the pathologist has access to them, to actually review patient tissue and help write their patient reports and give them to their downstream, patient-facing clinicians.

Dr. Emily Volk ([04:56](https://www.rev.com/transcript-editor/shared/8Nrd2dcs-P7PYSOYiaLXZO0ztpKizGjtcrUozDESiNiJpUs6w8cJX8Cs99lj5sDtm5ynpE2Igfh_nlt3vuItvnM7fz8?loadFrom=DocumentDeeplink&ts=296.25)):

Thank you so much. Dr. Glassy, let's talk about machine learning and what does that mean for pathologists and what could it mean for our patients?

Dr. Eric Glassy ([05:08](https://www.rev.com/transcript-editor/shared/0kW_R5CYuEQlXICmsr_6iYGQgilzGttf7bCQyVjy6zzPEPlZUR2r1CoXB0BX92tEVvNFM678Q_GQ3bUltSUu3UT-rbY?loadFrom=DocumentDeeplink&ts=308.55)):

Machine learning is a type or a subgroup of artificial or augmented intelligence. It's teaching machines, computers about a particular topic. The computer learns on its own, and comes up with a diagnosis or a procedure or a task that's completed. In pathology, we can use machine learning or a more computer intensive operation called deep learning, to come up with an analysis of some very complex topics like the molecular basis of cancer.

([06:00](https://www.rev.com/transcript-editor/shared/RrqPW4ux26KoMyygYBYCfPsP8dvrjc5z0Sj1O1h8qdJ5G00k5T0dpXtzhscrlNattHjYe27UHAUXt2bdZpGWrmUz96A?loadFrom=DocumentDeeplink&ts=360.0299989)):

These help pathologists better give precision diagnoses about a patient's particular disease, and tailor the diagnosis to the individual as opposed to the group. The combination of machine learning, which is like a video game, in which you get better and better as you play it. The computer learns from itself and gets better and better at what it does. Then there's a subgroup of more computational, intensive type of machine learning, which is deep learning.

([06:35](https://www.rev.com/transcript-editor/shared/vCEXj0i5lZKqPerut9sG_5P0HIL_efk5grvXq_yoTG4iKEf2UTuEDvIm4LYwp4qxoIcYIrB_DSndNYBS1iBcfh0R6MM?loadFrom=DocumentDeeplink&ts=395.67)):

That's where much of the activity in medicine and in this case pathology is being focused on. There's so many opportunities here for us to help our patients.

Dr. Emily Volk ([06:49](https://www.rev.com/transcript-editor/shared/4FRF4eS3-gDYV0mmHZZSDv-mluqJvEmFIR1hzErgdfqXQq8JhIFZ1g2-VRNRAhoJDBi9BOJx-2684Ox-qUOsMQMFzTA?loadFrom=DocumentDeeplink&ts=409.349999)):

As we talk about these technologies, how do we think they will affect us as pathologists, our specialty, and more importantly our patients? Dr. Raciti, you work in the pharmaceutical industry. Can you share how as a pathologist, you are using AI?

Dr. Patricia Raciti ([07:10](https://www.rev.com/transcript-editor/shared/2hgE7HqLPSxUDVzkLY1GtF1JJJ39vYu1A6DoUXUfN0s-n7aJowyJ7qhEGHJBNyGPMjBIhf1uT3OHJQ0_fJ3Ww7d0IVU?loadFrom=DocumentDeeplink&ts=430.23)):

Absolutely. Machine learning algorithms applied to computer vision can touch many aspects of the drug development process and pipeline. Most simply, we can use computer vision algorithms to characterize and quantify the immune cells in and around the tumor. Potentially gain a lot of biological insights into the disease mechanisms themselves or the efficacy of treatments that we're developing.

([07:42](https://www.rev.com/transcript-editor/shared/_Z1cPwGalbiYRX-IGkTptEBGBWs8lJiMN8WGN8WNjjf--97rOj0BlbW5Wy6VbydPVR1N6cupvLtaB-WdkvEmMQc07A4?loadFrom=DocumentDeeplink&ts=462.9)):

On the more sophisticated side, machine learning algorithms can now be used to screen for genetic alterations that are found in the tumor tissue on a digitized histopathology slide. Potentially offering a more efficacious, less time-consuming, and less complex determination of the genetic alterations in the patient's tumor.

([08:13](https://www.rev.com/transcript-editor/shared/5GZvooEqIEqRVqnbUFKCKeq3P36ItW8TCZzEz6eplYhaw19rBuYOS9ZSBD-t1C-3v-YQF0a0vBZPBP39RRwQv0tsWrE?loadFrom=DocumentDeeplink&ts=493.92)):

This can help us guide which treatments might be more efficacious because they're targeted for that specific mutation or genetic alteration, to which clinical trials might be most appropriate for patients. Again, it's really become a bedrock for us to be able to provide the most effective therapeutics, especially in the world of cancer treatment.

Dr. Emily Volk ([08:41](https://www.rev.com/transcript-editor/shared/1l_-z2SJl7X_oK-VgC6xsVKUip4CyHYsOepIG5dhKTVaxyUbTgDRksN220n5jeSDpwOn5U8E-ZNTA3fFSaoFnrpwCbE?loadFrom=DocumentDeeplink&ts=521.73)):

That's incredible. Dr. Glassy, from your perspective as a community pathologist, what does AI mean for your practice? In what ways have these technologies been helping you and your patients?

Dr. Eric Glassy ([08:55](https://www.rev.com/transcript-editor/shared/WlX5h6dlb9sZ22Nld4h6d_BrfeS8enMSSVWHpRAvnY_RIbpAtsoFYAw_4fJhFX2WPzyJ00q9HfjrtNRUNqVqNHgx3Z0?loadFrom=DocumentDeeplink&ts=535.77)):

Well, I think the bottom line is pathologists need to make the most accurate and correct diagnosis they possibly can, and I use whatever tools are available to allow me to do that. I use image analysis every day in my practice, and that entails looking at a digitized image on a computer screen. It is a number of, let's say, breast cancer cells and we've applied a particular stain to those cells, estrogen or progesterone or HER2/neu.

([09:30](https://www.rev.com/transcript-editor/shared/aYIP1LNDEtbCeKaNcKyx1CaXJQuxGChQczGz9LCvBVkf8oLwnBmDal1SYJgtNZ0jn9a7wJilKWmwT-cQPjsUMf0L0mQ?loadFrom=DocumentDeeplink&ts=570.15)):

Then in the past, we used to count the number of cells that are positive in their staining characteristics manually. But with the assistance of artificial intelligence, with the assistance of image analysis computational algorithms, I can be much more accurate and provide clinicians a much better picture of what treatment is best to start a patient on their journey.

Dr. Emily Volk ([10:00](https://www.rev.com/transcript-editor/shared/F19t84eTl3y3PUB9piMJN7r7sM-V30ZNs2lKm30zMJuQl94xJZoPldr5KswgkR7-H7daL9igiN8cenvfSKEFSeMG-aU?loadFrom=DocumentDeeplink&ts=600.84)):

Thank you, Dr. Glassy. Dr. Hanna, you work in a major cancer center. How does AI inform what you do in your practice?

Dr. Matthew Hanna ([10:11](https://www.rev.com/transcript-editor/shared/OHVf1WBNHjscRYvswVJMp6YzZEkxTBRAbr_wwjmpogXbCr_IZnHf46LLg2g5jLS-FHg-6Xj1zF1wqUXnRBzuA3AcKxE?loadFrom=DocumentDeeplink&ts=611.31)):

It's a great question. I think all of these assistive workflows can be taken one step further to now be trained and validated to actually assist pathologists to detect tumor in itself. There are cancer detection models available, whether it's prostate cancer detection, breast cancer detection, metastatic cancer to a lymph node. All of these assistive, supportive workflows can help screen or be used as a second read.

([10:43](https://www.rev.com/transcript-editor/shared/ZQq7BVN48XXbBKU12ShNXmW_ffIM7z6W3kjQQpFGc9zlovEeEoDf9WupRuc-ZZvwPOdNNaI5ye1dCJDh6q2kL1leguk?loadFrom=DocumentDeeplink&ts=643.349999)):

Like having a virtual consultant where these machine learning models effectively can highlight or wherever they predict actually where these tumor cells might be present. That way the pathologist is able to use these to determine, "Are these actually tumor cells? Are they false positives?" But at least the pathologist has a way to have a virtual consultant pre-screen or be used as a secondary reader, to actually detect where these tumor tissue might be present.

([11:14](https://www.rev.com/transcript-editor/shared/ill4flBFfMdB5FrOe_c2uWPbtuFaWtx7K9jTP3IBGNwpdJxSPl1ptCQLbvrmGJPuUsZTYgDZ7XLUbN3dOS4UPaA6Sv4?loadFrom=DocumentDeeplink&ts=674.76)):

This can help the pathologist triage their cases accordingly, so that way they can actually look at the patients who have cancer more affront, and perform and order those ancillary studies so that they can be processed in the lab sooner. That those patient reports can be finalized much sooner than if they were waiting until the last case of the day, before they actually found in their analog workflow, when they did not have that assistive or supportive work from the machine learning models.

Dr. Emily Volk ([11:48](https://www.rev.com/transcript-editor/shared/b9PyYHQe3_Snl__F_vUPH-XL23869ShTsu1XGpDIT2ZW6ExlLgs775PDWgx3hxS4p_srCr7BeJBBxmlRfWKqOdzTYfI?loadFrom=DocumentDeeplink&ts=708.15)):

Thank you, Dr. Hanna. You've mentioned already a little bit about how pathologists are using some forms of AI. I would like to talk a little bit more about some of the FDA approved AI tools for anatomic pathology for making primary diagnosis.

([12:06](https://www.rev.com/transcript-editor/shared/tmqM0jstQKjfI8l80vX93ZvTDvmsTOLkrlwgHoKesp7kjfiP70lZjY1nLb2oqmgWxTLTez_H8aZqTy8FHGTVgfvqD0k?loadFrom=DocumentDeeplink&ts=726.6)):

Aren't they meant to be more quality assurance tools to use after a pathologist has reviewed and studied these slides and images, Dr. Hanna?

Dr. Matthew Hanna ([12:16](https://www.rev.com/transcript-editor/shared/1YI4UdRHX7XZFsrICXsLyKiZv4SBpU6Fn_OaP_7394a5-ZYcDcYhQWD1MWQxVDzPICNweK94WFic8s2_uA0V3j1wOfE?loadFrom=DocumentDeeplink&ts=736.4999989)):

There are several FDA authorized tools that are available to pathologists today. Originally, as Dr. Glassy was mentioning, those are those image and analysis tools that are predominantly for breast biomarkers or hormone receptors like estrogen receptor, progestin receptor, HER2, KI-67, et cetera. These are protein stains that will really help that pathologists need to order on every breast cancer case.

([12:45](https://www.rev.com/transcript-editor/shared/wANVJCM0s748K8KOI70e8ASFbSH4SvN227mRBYCcNqDl5ZaH2QRozTlkAFN_JBLSjT-jRmV0dpiloUMWHzKK1jqs3M8?loadFrom=DocumentDeeplink&ts=765.12)):

Report the number of cells that actually have that protein expression, so that their medical oncologists or other patient-facing clinicians can start management and treatment of those patients depending on their biomarker profile. One of the earliest examples of a FDA authorized image analysis, were exactly those. Those have been around for some time and many pathology labs have access to those today.

([13:08](https://www.rev.com/transcript-editor/shared/EldNrCYEUnGkJ-cDa9_rd9OB7PIvpuwqhrOO-tHCyKqGRGvQmhdYYWo-2cTmvnXwld9GfTcigqJVPpXsmElHW8Yuk1U?loadFrom=DocumentDeeplink&ts=788.94)):

Taking it one step further, moving towards detection, there are, in the cytology world, the ability for pre-screening of cervical cytology. As women go to their gynecologists and have their pap smears, there are tools that actually allow the cytology preparations that come from those, the cellular preparations, to actually be pre-screened by a machine learning-based model.

([13:36](https://www.rev.com/transcript-editor/shared/_RncTdKMPkg_QRIVozD22epkfMFXBb3XvrcLuITle9sweU5wJEGvPQ1C8m6k-FrvOdCam3Nh_7mPgyT5RnHQe0kP8-o?loadFrom=DocumentDeeplink&ts=816.45)):

Then the cytotechnologist or pathologist is able to review those areas that the machine learning model thinks are suspicious, to ultimately make a decision on. Again, as I was mentioning before, there are now more newer tools or recent tools that have been available as FDA have authorized them as software as a medical device, to ultimately help detect areas of tumor in a histopathology image for routine stains for prostate biopsies to help detect prostate cancer.

([14:09](https://www.rev.com/transcript-editor/shared/lsA9_BV464-XKKSmuNBSMEADu1pNYreCjeUmiIjbVQSO6Wvs9I32d1q1McnG2p7x53tjDiSOfjemm1ySijtaKOVjGNU?loadFrom=DocumentDeeplink&ts=849.39)):

These are, again, all tools that pathologists have access to to use in an assistive workflow, again, for reporting of those to ultimately provide the most accurate, best patient care they can possible.

Dr. Emily Volk ([14:23](https://www.rev.com/transcript-editor/shared/p4wHUQWIQbm8hcdIy1ndG_Uf3sZljGA52rU23yWbhCiiRCpw3kB7JTNRBlS96HKLXx5OoHKDxZNjuOx3qROc57Jhp-w?loadFrom=DocumentDeeplink&ts=863.97)):

I think it's important to highlight the theme of what I'm hearing you say, Dr. Hanna, which is the pathologist has access to these marvelous technologies. But ultimately, it is the pathologist as the physician practicing anatomic pathology and laboratory medicine, making the diagnosis.

([14:45](https://www.rev.com/transcript-editor/shared/XzZsU3g2pxap6HiM4GE5xES-roZlCODZcufw9Z-qK1hMd-T-Axd1nPQovfE7OY-c-BouG1RiDdsBPWfXPtoly-CCqBQ?loadFrom=DocumentDeeplink&ts=885.12)):

That these instruments are not making the diagnosis. That is physician work, and these are just tools that augment that ability. Dr. Raciti, you have been on the development side of these tools. Can you explain a little bit about why working with an actual pathologist is such an important part of informing AI development?

Dr. Patricia Raciti ([15:13](https://www.rev.com/transcript-editor/shared/nnrJ9HwITpbb5P-2kh0pcr0lEn6ilHSc1Ml6rfQBCueCRqpkHpykQeqHn2ZABH1sbPDjmSUXUH7EmXLO5IDFiiUQSrM?loadFrom=DocumentDeeplink&ts=913.11)):

Absolutely. Needless to say, it's absolutely crucial. If we take a step back out of medicine, even the development of a tool or a product, often the developer has in mind the end user. If we think of most industries, the autonomous vehicle industry, for instance. Developer of that tool and software is typically also a driver, him or herself.

([15:39](https://www.rev.com/transcript-editor/shared/DR_3kVtE28nVA0oAleaoBKIege4Hqm_eog-xO0_O6vdwJ3oVTOGcB3yC0_CuEFvOAluNyrt49XrftwNke-L6Po7Wf0M?loadFrom=DocumentDeeplink&ts=939.78)):

That's not the case with medical in the medical field, especially in the field of pathology, which can be highly complex and extremely sub-specialized. It is crucial for the developer and the subject-matter expert, the pathologist, who will also be the end user, to work hand in hand from the beginning of the development process, starting with the intended use of that algorithm. Does it make sense?

([16:09](https://www.rev.com/transcript-editor/shared/NyOOqyQeFtmqUYseapTy43gevkiprDyWlC-os_Ghq87PPA8itVtuYDH0hQcM5c6mmIS28wlu1lDkpAOqV8kHsJ6tS7s?loadFrom=DocumentDeeplink&ts=969.63)):

Is there a need to the curation and potentially interpretation of the correct data set to train that algorithm? To ultimately, the use of and the vetting of that algorithm, not only on a standalone basis to test how performant it is. But importantly, how it is used in the hands of the pathologist, the end user, so that it can be the most positively impactful on the patient. This is a crucial step in ensuring that the tools that are created are not only efficacious, but also safe.

Dr. Emily Volk ([16:50](https://www.rev.com/transcript-editor/shared/g1y3ZaSKMD153MN9UZDQqK4cckuJsZ9ZnUoKV8QixiFoiBGMn0szhIvM-e7tin_E3EvrD5ffYMtR_lsHIGAnKj-MxGY?loadFrom=DocumentDeeplink&ts=1010.88)):

Absolutely important. That really brings me to the next question. I've heard this over and over, and that's will AI replace pathologists?

([17:02](https://www.rev.com/transcript-editor/shared/EYGqS6EKJR7Y9qDCr9IebZNTt_rJJLZxPK2oMTmpw_BiCtomaCEFVDcBQ7Au5t5UnZV2h3LEQjrxyI7AEj9A7N_aJ54?loadFrom=DocumentDeeplink&ts=1022.67)):

I can tell you from my perspective, I think we can sum it up by saying that AI won't necessarily replace pathologists. But pathologists who use AI and use it well, will replace pathologists who don't. But Dr. Glassy, what's your perspective on this?

Dr. Eric Glassy ([17:25](https://www.rev.com/transcript-editor/shared/MLsro7G5dGI86zJ6rZ2PqnBhBN-e5i4uIfQyyBjLkzCsetjfaKiarXM92VTYjfCXcyQ6FcSqQbC9Xc2_TUe4BrFLfpA?loadFrom=DocumentDeeplink&ts=1045.77)):

Well, artificial intelligence is a powerful tool, but it is just a tool. It is not human. As a pathologist, I have access to many different types of techniques and stains, and laboratory studies that all can be focused down on exactly what a patient needs to make their treatment journey begin. The diagnosis is a centerpiece of medicine, in terms of how patients are eventually treated.

([17:59](https://www.rev.com/transcript-editor/shared/u5X7hjhoeriWXX6ixxGChoXzoIYk3crtxXHHJpygAkOzKpJVxMPsICOi8zq1s5V5iDx28FfH4kuRn1l6PeTKbkeBD_g?loadFrom=DocumentDeeplink&ts=1079.52)):

As a pathologist who creates that diagnosis, I want to be sure I'm using the most available and appropriate tool as I can. An artificial intelligence algorithm is going to be just that, just a tool and not replacing me. I can see it can replace some mundane tasks. I think it can replace some activities that a pathologist finds more challenging or grueling, and that it can allow us the time to properly analyze and think through the diagnosis.

([18:36](https://www.rev.com/transcript-editor/shared/mxzp4PgQScFmH2AeW5x0JjsL86eGCacLuKQzN52m_HHNsYkzdMedtUKRhBq1paVVh1Cytl8OHGuOcmTu3pY0AjU0AUY?loadFrom=DocumentDeeplink&ts=1116.690001)):

But at the end of the day, the pathologist is the one that makes the decision. You need a human to be able to initiate this treatment journey. Pathology is going to see a revolution when artificial intelligence, augmented intelligence becomes more and more inculcated into what we do. It will transform our practice, but it will not replace the human aspect of what we do, the human aspect of medicine.

Dr. Emily Volk ([19:11](https://www.rev.com/transcript-editor/shared/IjSJhQgZMjtbE9BNNEU3lVkBovbLhxY1nIZ6KtUhThjxjAhXFQC8tkkAxk8FWvq-FfEjGMWTH-4eMGE9q3V0wZWf6cw?loadFrom=DocumentDeeplink&ts=1151.309999)):

Dr. Hanna and Dr. Raciti, what are your thoughts? I'll start with Dr. Hanna.

Dr. Matthew Hanna ([19:16](https://www.rev.com/transcript-editor/shared/cfWUT6BxVitZTbYgtm0b1Xkev3jaLLiq55-gFeVvu2Au_RHNyW_y6NfSKmWusk03bIJ5keffWIzwfQJeNSY3WOcI1OU?loadFrom=DocumentDeeplink&ts=1156.98)):

I completely agree with Dr. Glassy. I think these machine learning, artificial intelligence-based tools are really focused on very narrow, specific tasks. They've been trained to do one thing quite well or to the best of its ability. But at the end of the day, these are just one of many, many tasks the pathologist actually reports as part of their review of all the patient tissue.

([19:40](https://www.rev.com/transcript-editor/shared/De8uC08y41q0NpB1_6aZMh-n_KMS895NRlgXFP0CpUMvFJm61Ck9L-D207PNQIQeYFNzWTmyMYOL53DCaIEq7uBscBU?loadFrom=DocumentDeeplink&ts=1180.02)):

And of all the things they end up putting in the patient's report for the surgeon or radiologist or other patient-facing clinician to then go and interpret. All of these very narrow, specific tasks that these models have been trained on can again, just do one or a few things that the pathologist is reporting. I think we are still needing pathologists, as there will be potential shortages of pathologists in the future, even today, that they are helping pathologists do those tasks very well.

([20:11](https://www.rev.com/transcript-editor/shared/wm4-MKwq35SUSpymcZMwPl75s_BdOmMdpO81p1Po_5Js-hsXUoe7uapM6PW-E0ZtWhn7aBnRVl1nEdt5OUAIJOfARUE?loadFrom=DocumentDeeplink&ts=1211.1)):

But the pathologist is still needed to make a definitive decision and diagnosis based on what those machine learning model is predicting. But then also for all the other tasks that they have not been established yet in the machine learning world, where the pathologist is still doing all of their other routine tasks without support as they would normally do that today.

Dr. Emily Volk ([20:35](https://www.rev.com/transcript-editor/shared/GxCICD9RgF8J6bdX5wx8TAaKOGEWFfs-f_80I084MUxWCZ9sPipVLgN-Rdx5AXI8L1Rd1bXw3hwY6SnKoGQXwXjG7So?loadFrom=DocumentDeeplink&ts=1235.34)):

Thank you. Dr. Raciti, your thoughts?

Dr. Patricia Raciti ([20:39](https://www.rev.com/transcript-editor/shared/xhEnOSzvpzoSbyoArSHPRvmrKPNaJCnOm1gowCL3htxsjEe3gLYYAKMhnSPuJUxT8bPMRrjZx-rxCNrnbw9K4j4AV8c?loadFrom=DocumentDeeplink&ts=1239.24)):

I also agree with what's said. I think pathologists remain and will remain the center of that pathologist diagnosis process. Pathology is a vast and complex field. I'm thinking of just cancer diagnostics alone, which is just a subset of what a pathologist does. It is a generic name for, dare I say, hundreds of diseases that look very distinctly different under the microscope.

([21:11](https://www.rev.com/transcript-editor/shared/8zBP9NroV6zoHfc7GclCZux2NnZUQEmHGyCNEpV-HLzNpfYjfQtATBrSDaLEwaYGSUFGa58PEyB5XsSVX_BV4IeR3hk?loadFrom=DocumentDeeplink&ts=1271.73)):

Not only does a pathologist have to detect and properly classify cancer, but that's just the first in a series of tasks that a pathologist has to do, from cancer quantification, to localization, to assessment of severity. That's just to assess what is on the slide. More often than not, pathologists are looking in the patient medical record, having discussions with radiologists on radiographic findings.

([21:42](https://www.rev.com/transcript-editor/shared/werm0_nYaVFQx2ho6Jthd34to2OPFPAgud_-ZaiGdpgAtZpa-GjRMb_j9JTLERODQu4pKTeGSrQwZLZpljzRLctsAsk?loadFrom=DocumentDeeplink&ts=1302.6)):

Having discussions with oncologists, surgeons on the state of the patient. Integrating all of that information, along with what they see on the glass slide, to render the most accurate, definitive diagnosis for that patient. As Dr. Hanna said, there are robust algorithms that can do a thin slice of this process and they can be used.

([22:11](https://www.rev.com/transcript-editor/shared/rXm2xRD8I6ihEf9GHsN6LHmz3bY4eCbwxp2CbNoqJuwQbS59J1yZ9B2ipXh-sR9ltCxaLSPQ3ybmnL8w4RQUGroeRpk?loadFrom=DocumentDeeplink&ts=1331.969999)):

But ultimately at this stage, the process is so nuanced and complex, that to provide the best care from the patient, the pathologist is still the central figure. Pathologists are here to stay.

Dr. Emily Volk ([22:27](https://www.rev.com/transcript-editor/shared/4ZRVtMf8AlQTdBKp49o309ro-cTY2mbi-IgPOUtSL0uhcxytdY6nzVeeCyGIF_nd_24_iG_8dlswBRvI9eJp9QIAFvU?loadFrom=DocumentDeeplink&ts=1347.78)):

Yeah, I couldn't agree with you more. Ultimately, we're still physicians and we're still taking care of patients. How will AI help pathologists, especially in rural areas here in the United States, well, and around the world?

([22:44](https://www.rev.com/transcript-editor/shared/Ksb8s5slhrSQgSZvejZvuAF7wpJ2rI2ZnrATEl83uffqVPCSOdzRhjSqn8Btdr8lzzXTL8FWeKp7o0tykhWcYaV_klE?loadFrom=DocumentDeeplink&ts=1364.309999)):

Doesn't this help foster better diagnoses and sharing of expertise among other pathologists, which may, of course, benefit patients? Dr. Hanna?

Dr. Matthew Hanna ([22:55](https://www.rev.com/transcript-editor/shared/hAHzfDe75x8rN0VhkKd0O1wFLf8igLnCSYr4apWQGamh6j0N-g2ZCQQHss_0-Mr8mPWyxv6teeuaRtYE6GflYXZarEo?loadFrom=DocumentDeeplink&ts=1375.29)):

I think this is one of the great promises of artificial intelligence, where there will be a democratization of expert-level pathology knowledge. A lot of these machine learning-based tools have been built on, at least the high performing ones, have been built on high-quality data from expert institutions where there's experts subspecialists. All of the data that they have to train these data, are really the best quality they can be.

([23:24](https://www.rev.com/transcript-editor/shared/9-fzb38-ndTTZw-ag024XNuiAGtS6uyHdapsewM7Nq2KzUz8H1eIczCThS2JVoNNjpbn20jGGjKi2MyOayHrGbTOOPM?loadFrom=DocumentDeeplink&ts=1404.84)):

As these machine learning models learn from all of this expert-level data, they're inherently learning that expertise. That expertise is now a piece of software that can be deployed in resource restricted countries, rural areas, underserved areas. All of these learnings now can be used for those pathologists who already have a shortage and also be a virtual consultant.

([23:50](https://www.rev.com/transcript-editor/shared/4cEKTyBsFW3iVBZ1dNndDz5fZIf_QbZXxXSrSeMxKxJjRkSVpI3VvWJFajYwTeCbigw4B9nMxYn-JoANzTvu9fE4_yI?loadFrom=DocumentDeeplink&ts=1430.16)):

Have an expert consult for them as a piece of software, so to speak, that they can use just like they would have an expert pathologist in the room with them as they're looking at the glass slide. This democratization of pathology expertise is really, I think, one of the big promises and advantages to deploying these sorts of software across the world.

Dr. Emily Volk ([24:13](https://www.rev.com/transcript-editor/shared/zems0y4GXVBzTuXdQJHzaGcnIap-ASLfxm33gkIkmsABRCTvnFjYuWrleX4Rk86PctPQY4DHrYI8SwT50VuC2WdzoGc?loadFrom=DocumentDeeplink&ts=1453.259999)):

Now, I appreciate you mentioning that. I think it's easy to forget the role that pathologists can play from the laboratory and contributing to bridging gaps in health equity. This is one of those opportunities. Dr. Glassy, tell us your perspective from the community pathologist's seat.

Dr. Eric Glassy ([24:36](https://www.rev.com/transcript-editor/shared/TLMDV_YP6SLREMu04hRp5XyjfB5gOs2-PdLHaWkKPjImQT-dZjD6lnYst5e5DaDxbrv_Tif2EmFYMEPK9KqyU_CkAIQ?loadFrom=DocumentDeeplink&ts=1476.54)):

Well, when I first started in practice, I was at a very small hospital, just 100 beds. It was granted in a suburb of Los Angeles, but the nearest larger medical center was 10 miles away. When I had a challenging case, I had to either drive over and share the case with colleagues, or ship the case out to an expert consultant like Dr. Hanna, who's an expert in breast pathology. If I had a complex breast case, I would have to FedEx or UPS the case out to him, and there would be a delay in getting a diagnosis.

([25:14](https://www.rev.com/transcript-editor/shared/yPYO2tDsYtzLH4GR31MipLggAiRnecl8eLyFNIU4nd7eRT7rTK1LR1l17uwl9gse2wXHnCZUIdNNoe24OLTyKpvudCk?loadFrom=DocumentDeeplink&ts=1514.88)):

These tools in pathology have just dramatically improved how I can practice in that small setting. I have access to digital pathology, in which the glass slide is then digitized and shared over the internet securely. I can have Dr. Hanna at the other end review the complex slide and help render a diagnosis or sort through the specific details. In a rural center where I don't have even the luxury of a 10-mile drive, I can see a huge advantage to having both digital pathology, as well as augmented intelligence, help me practice at the highest level of my expertise.

([25:57](https://www.rev.com/transcript-editor/shared/fiFJv0oiUiBN3FM_7ritm101urqtyO1kO6YG9KpJO3rRVcm0HWOSbuYHVGNpys3CHZDnl2XYzKqcuqEHoptsaFX0--g?loadFrom=DocumentDeeplink&ts=1557.9)):

I'm a general pathologist, I do everything that comes out of surgery. Neuropathology, GYN, breast pathology, I do a little of everything, and I'm not an expert in everything. I need experts to share their knowledge with me. I have an additional expert besides Dr. Hanna, Dr. Raciti, or other subject-matter experts in the field, in terms of artificial intelligence that can help me narrow down my differential diagnosis. And suggest perhaps additional studies that can nail the diagnosis perfectly.

([26:34](https://www.rev.com/transcript-editor/shared/6im59CWSrWmvnOGwMXTkMLZTYjrPaxCSFvKXOwxTd1AKzKJj9KLhQHJstajaiUR8jGUhicq0edKxBtlYmu7LYYdJ8zo?loadFrom=DocumentDeeplink&ts=1594.139999)):

I see someone in a rural setting who is overwhelmed with complex cases or has to interpret a lot of laboratory data. This software is going to just help tremendously revolutionize what we do. For patients, it means you're going to get an accurate diagnosis much more quickly, than have to wait for something to be shipped out and an answer returned by a letter.

Dr. Emily Volk ([27:02](https://www.rev.com/transcript-editor/shared/yk1WpQNRnB1O3222TzEPqps_SMO05A-x2comrgxRVc6b4Az6nVDGtHPVPX4RRuP1tQlYFHnYPm5BQcXzbyiREiJjMO8?loadFrom=DocumentDeeplink&ts=1622.25)):

Yes, those are such great points. My experience also reflects what you're describing. As pathologists, we certainly don't want to blindly use any of these technologies. Verifying and validating these technologies is very important. As pathologists, we're very much used to validating and verifying testing now, so it really shouldn't be any different when it comes to AI.

([27:32](https://www.rev.com/transcript-editor/shared/2usEgLzsbhrr-VwWN1XU7G5zDBN72sqc7Hh1FADbZ3iJNOMLzK-dNqqsFXGKqTqoxED5xUJTM4U2kbXpuNVsYQQSZQI?loadFrom=DocumentDeeplink&ts=1652.7)):

Let's talk about what is the inflection point? ChatGPT, this technology is exploding. Many of our members are testing this technology by asking for answers on what stains or tests to use to make a diagnosis. We pulled this question here on your screen from ChatGPT. The topic, what stains to use when diagnosing a testicular tumor. Three suggestions were given.

([28:04](https://www.rev.com/transcript-editor/shared/75FNCH3D5NA3Vx4xkdDRkQUV6hYuR5WGtxUg8z7-Co0p_zb-rF1yWxBLTiEg9p2gv1FDBNUQ9NuIM6WBxZwO-mrrzdQ?loadFrom=DocumentDeeplink&ts=1684.2)):

If you notice, at the bottom of the page after the answers and highlighted in yellow, is a suggestion that staining patterns can vary. It's always best to consult with a pathologist for a definitive diagnosis. We're certainly happy to see that. I'm curious to hear what all of you think about ChatGPT, some of the pros, the cons and concerns. I'll start with Dr. Raciti.

Dr. Patricia Raciti ([28:34](https://www.rev.com/transcript-editor/shared/7YkPyP5O5BNAbLR2_-ehllX93mkxj1uOlxxI3GcMCDUVCFlSYbCZgtdOU60FLIiBa_YHZYJ92Cr1JvSW3YecYfyk2Ls?loadFrom=DocumentDeeplink&ts=1714.59)):

Sure. Yeah, I think this technology is not going away. It's here to stay. It's incumbent upon us to figure out how to use it, how to work with it effectively, and how to really get the most out of it. In my experience, developing and working on the development of computer vision algorithms specifically, that process always involves a test set.

([29:00](https://www.rev.com/transcript-editor/shared/qESrcDNH-2Oa6CaMp27Fx3ee1pwJLqBlk4hscppHZSqdyu8Uobbvw0ya_HO0tiGqIS7ChNSrvATsorVoE_2gQc3Qz8I?loadFrom=DocumentDeeplink&ts=1740.09)):

Testing the algorithm with a set of images on which it was not trained, to assess the performance characteristics, as you alluded to, to verify and validate that algorithm. I really know when it works best and when it is not at its strongest. For ChatGPT and many other large language models, I personally don't have that information. I don't know the performance characteristics of those tools yet.

([29:28](https://www.rev.com/transcript-editor/shared/b4ZDgGEhyLbTQi6-d9twthiKoejEpxGt2UGh3cfGewBkAkNu8KUl2YWQDIJpW3tizNtDzTLJOTC1YlzmB5_OnALdD_o?loadFrom=DocumentDeeplink&ts=1768.47)):

I've used it in a nonmedical way, but I envision if I were to use it for any medical information. For the foreseeable future, I imagine always cross-referencing the results it outputs with a trusted source of mine, either a pathology textbook, a peer-reviewed manuscript, or an experienced colleague of mine. I'm still very much in this phase of trying to best figure out how to work with these tools before I blindly trust them.

Dr. Emily Volk ([30:10](https://www.rev.com/transcript-editor/shared/0cLKYEGTJKLRsWGdgbYCVqk66Svwdt9LE-GuNEfJYRKiZ5fNs2pezXZeG_v1L0I9M9-6fT8t8gdm4X4xC_qHuzkp1tE?loadFrom=DocumentDeeplink&ts=1810.02)):

Well said. Dr. Hanna, your thoughts?

Dr. Matthew Hanna ([30:13](https://www.rev.com/transcript-editor/shared/18lrQmjLhd2JM-70Z5GSjyOatayCfV3Q08BSvKL2AmjYybD-Fq85Uid8PMzyn9_2-dypHNOMJVPz6bxpnc0G5yJXZBU?loadFrom=DocumentDeeplink&ts=1813.71)):

Yeah. I think these language learning models, such as ChatGPT, have really been an inflection point, as you said, and have been able to provide the public and pathologists access to these sorts of technology, and have really boomed in the sense that they are publicly available. The pathologists don't have to work very hard to be able to access these technologies. You effectively just sign up and have access to them.

([30:41](https://www.rev.com/transcript-editor/shared/xgBGPkWGWGs8ce7k-ufFRGpzj_NmCESHFzwjw8X8BzAnrwgMwpCec0EPDH8qSzjBjoWpGWFhstvq75_a-Hm8j2yzJR4?loadFrom=DocumentDeeplink&ts=1841.7)):

But what I think it's done, is it's really allowed for them to play in this open sandbox and test the technology, become familiar with it and evaluate it. Just like you said, pathologists are not afraid or know very much how to verify and validate all the tests that they use, especially that's required before using on patient testing.

([31:03](https://www.rev.com/transcript-editor/shared/L6-WDhhB3F3CuTNQfqhf_o_qk5XYsGgpA4_E-x_5ZdbXu4oIb61Xx78Sfhyn-GfyBkcfkh0xcoNSE90MV3k-m3xrMIE?loadFrom=DocumentDeeplink&ts=1863.3)):

Now, just asking a question and getting a response really requires that we don't just blindly use these technologies, because we don't know the accuracy or performance of all of the outputs that these language learning models such as ChatGPT put out. I completely agree with needing to really read the results as they are, but not blindly trust them because we don't know the accuracy of the results that it's putting out.

([31:35](https://www.rev.com/transcript-editor/shared/SajZjwIlL1mIzZiv10DT1lGAttbMnPbMBrJeM4OGnwgvyAErGnHEvurOF7-SIvZ-LNT9MhfK1s-59j6opNcNWzIlSIM?loadFrom=DocumentDeeplink&ts=1895.34)):

Just like they used to say don't trust everything you read on the internet, definitely don't trust everything that ChatGPT puts out blindly. Because pathology is really intended for patient care, where we are providing results and diagnoses for these patients. These are affecting their lives. While these may be interesting to read the outputs of these learning models, ultimately, they have not been incorporated into patient care today.

Dr. Emily Volk ([32:04](https://www.rev.com/transcript-editor/shared/P_Ziq0no6IJ5kDWqDir20mj9mBBnz2415WYgy4m6y14QYIgCSpJ0nAHGvM3I17dBW57h2LhaKC-SuCgwbeKZGwlmLBA?loadFrom=DocumentDeeplink&ts=1924.379999)):

Yeah, great points. Dr. Glassy, your thoughts?

Dr. Eric Glassy ([32:09](https://www.rev.com/transcript-editor/shared/5DgFRoKSwgt_5pdLvu73nTQBmGsFiJUHyTiSBjVQFzMZgbWqojhv8Jz61QUFOFVt4372n3ArE6YA65Ri3GKlKafxWgU?loadFrom=DocumentDeeplink&ts=1929.96)):

Well, I have to confess, I'm a ChatGPT advocate with some caveats. ChatGPT definitely hallucinates, it makes things up. It needs to be verified, as Dr. Raciti and Dr. Hanna said. I understand the importance, particularly when you're giving advice that it's medically sound. But I see a lot of other opportunities for ChatGPT to be used personally as well as in medicine and by pathologists.

([32:47](https://www.rev.com/transcript-editor/shared/nXApF9ZUnka5bBv8rWsgeJeL8g3YG5a-E8E4j9yUAEvy9QXd4nbM4AK6k_-hDjXjf0amTquzklOteEeGz3_wsPhAoh4?loadFrom=DocumentDeeplink&ts=1967.16)):

Some of those involve summarizing the medical record, for example. To me, the current use of ChatGPT, it's a generalized model. It learned from the internet and people, and it's good or bad depending on the information it engulfed from the internet. As we all know, there's truth and misinformation within that body of knowledge that ChatGPT has access. It's only as good as what it's been trained on.

([33:27](https://www.rev.com/transcript-editor/shared/s8Jzvvw3kUnCiMEBS9VNdlcUvA2GtfMhRajLzeufz5XT3TYZMHw9QU9AwdBpDs3Jr58psLVwtVQ8_qzreE2oWn0XAOE?loadFrom=DocumentDeeplink&ts=2007.42)):

But there are new ChatGPT applications, which are customized to only securely look at medical data or only securely look at the information in a patient's medical record. Any of you that have looked at medical records, there's just a huge amount of information there. It is difficult to ferret out little pieces of information that might be critical to a patient's care. That's where the summarizing of complex information can be valuable.

([34:03](https://www.rev.com/transcript-editor/shared/0NZUGK109ddwOHS9EyGMxEm7vyanV-dkAFmWkuIO9x1XBtus290aj5XuIRhucVimwbO_J4aYLH_gUgxQEOgtPEKNxHE?loadFrom=DocumentDeeplink&ts=2043)):

Because a large language model like ChatGPT, can do that much better than a physician or health advocate can do. It can pull out trends, it can highlight little bits and pieces in a nurse's note that you might have ignored as a physician. There are trends in terms of the patients' treatment in the past, trends in terms of the laboratory studies that were done. I see these customized ChatGPT models as really enabling physicians to provide the best possible care.

([34:45](https://www.rev.com/transcript-editor/shared/KulF7jRwh8yG3KPtn2QOY9OpLD-8j4LIbNQmdPvZw03Coi0e-sXdmlJ_nRu5gytqMKfCC9ROvFinzvba_BpKYebu5pw?loadFrom=DocumentDeeplink&ts=2085.03)):

Again, I'm a supporter with an asterisk, a little caveat saying, be careful if you're looking at the generalized model. But when you apply that software technology to localized sites or medical, or the chat is trained only on journals or articles that are peer reviewed, then you've got a wonderful opportunity to engage pathologists and improve patient care. Lastly, I'll just say that patients are going to be using this, so it can't be ignored.

([35:23](https://www.rev.com/transcript-editor/shared/UrfI2ye_is9nKmZx7WSEoYLHn6LJrhlCNsjAtUYir93wvb5QlEDQGpUE7xK3H8LnJqTEzY0sbFpXXp5WAe1B2Tef3t8?loadFrom=DocumentDeeplink&ts=2123.1)):

Patients are going to be feeding their own laboratory data into ChatGPT, asking for information, their own anatomic pathology results. We need to prepare for that new future, that new opportunity. Also, patients are going to want to be able to understand their path report. To be honest, ChatGPT has done a very good job at summarizing some complex pathology reports, in language that patients can understand, or even foreign languages.

([35:53](https://www.rev.com/transcript-editor/shared/ALDdc3dJowxt8600ndecmiz9Fy3HTYia4wm5F-ANmlA8flwgF1T98_HV-dVVTuMLCVScQkdxxU-JcqdSBOLq4kjUDig?loadFrom=DocumentDeeplink&ts=2153.01)):

English is not everyone's native language, obviously. Having ChatGPT summarize a Mandarin or Arabic, or French or whatever the family's normal language is, that can be very powerful in allowing the pathologist to better communicate their results to family and the patient.

Dr. Emily Volk ([36:13](https://www.rev.com/transcript-editor/shared/kR6r5GLlzGyFQf9cftWC41O1sSgB-PATIPMYcryk3X82Uzb15AZd7VAnDbDmSFsPrHG6ndkmyY4BOAuqlqF27XrkN6g?loadFrom=DocumentDeeplink&ts=2173.049999)):

Dr. Glassy, you gave us a lot to unpack there. I think the focus on how patients will use ChatGPT is really interesting. If a patient is using ChatGPT without a gate, just the ChatGPT trained on the entire internet.

([36:35](https://www.rev.com/transcript-editor/shared/oGMvxEReVQhVHwS6xb5WIMAsKtPO7-OTRNln-PmIOmRtAYcXBTgbuhj82BocA0bzu7XyBdmA-HjsVbsK14jAIQu4JlY?loadFrom=DocumentDeeplink&ts=2195.309999)):

It seems to me like, although there is some great information out on the internet, we all know there's also some misinformation on the internet. Dr. Hanna, how do you see this playing out for patients, as they use ChatGPT to interpret their pathology reports?

Dr. Matthew Hanna ([36:54](https://www.rev.com/transcript-editor/shared/y2TOSp00mikaf19kv4pn-ztj13njpo_b0aPgejaHXzZ1hKAUtytuKOTAxbjQNvZSpWjjEZHM06mbh1ZfrFwMW8pFaLw?loadFrom=DocumentDeeplink&ts=2214.21)):

Yeah. I think we have to take a step back and see how these models were trained. There are good resources on the internet, and there are resources on the internet that may not necessarily be as accurate. As these language learning models have been scraping the internet across far and wide, there is inherent bias in a lot of the outputs that it may result.

([37:21](https://www.rev.com/transcript-editor/shared/cp1vvVbxJbeLrEVrxbbooefXgx_D8s0xwDSWNUR5ch7yAeB57KKZuuEo3j_Y_82y0uJxhzpaa1JOTXaX8lPfDtl4fHE?loadFrom=DocumentDeeplink&ts=2241.9)):

I remember reading an article about how another model was supposed to predict whether ChatGPT or another language learning model actually was the one who resulted some text. They actually fed the US Constitution through it, and the model actually predicted that ChatGPT wrote the US Constitution. We know that there are some bias and, of course, false positives that might be happening. These language learning models like ChatGPT, effectively need to be fact checked, so to speak.

([38:03](https://www.rev.com/transcript-editor/shared/IIC2nSCOZvjzXse52dhlZWqOfA9CFNjhmTscAgZfmpwycPVGuVUGo025rwZLcMfGNc2NKa5WxvmUcD-2x3tE1Rhojws?loadFrom=DocumentDeeplink&ts=2283.78)):

But have a lot of significant promise because of the ability that they have to summarize vast amounts of information and pull out information from different silos of databases across the internet. While there are plenty of resources that do have accurate information and ChatGPT may be apt to be able to pull that data together, one has to be careful in the misinformation it might include in some of its bias and some of its results.

Dr. Emily Volk ([38:33](https://www.rev.com/transcript-editor/shared/mg9X1CdnCzhH-aAiv7n3eT5lC4yjl0WWinXaTlZqk5EuFcEktmOKmxnTM5cb3b0GISyRNmkoBtsUb4Rs0LDL3zae4ZA?loadFrom=DocumentDeeplink&ts=2313.54)):

Thank you, Dr. Hanna. I think folks are probably very interested in what's next for AI and where is it headed when it comes to pathology.

([38:43](https://www.rev.com/transcript-editor/shared/VkP050JvG6gntCFc0g7eFrRudE6H9INoxfQ-yMFJ1C4EXivS8fAoeBDqzV6Wv9uoRTS7KH72s9Bd9kbgXYTmwfvztv8?loadFrom=DocumentDeeplink&ts=2323.68)):

I know there are more tools that are being developed that pathologists aren't currently using. Dr. Raciti, can you talk a little bit about that?

Dr. Patricia Raciti ([38:52](https://www.rev.com/transcript-editor/shared/q1BDG3gESFyqI6il8yl7TfkJKZWccCxbNB5GvQwAcwj3FFUpQU5fZh08qHz83_dJjwbWP6QD0mV-1-ce8EC398j_M0Y?loadFrom=DocumentDeeplink&ts=2332.92)):

Absolutely. I think a few questions ago, Dr. Hanna touched on a lot of algorithms that are available for the use of pathologists, but it's important to emphasize that we really are on the bleeding edge of this technology and the cutting edge. The number of tools is, in my opinion, relatively limited compared to again, the vast tasks that a pathologist has. That's one limiting factor.

([39:19](https://www.rev.com/transcript-editor/shared/8njHJ_p53IznuaE9heW3rFw8tHuGpNJSWlLstdfhW22CBCEbkXyy3sMk89Y4rcJEmtKxDabWcRBmWSWNIActnsDGKC8?loadFrom=DocumentDeeplink&ts=2359.86)):

I think the other is something that has been said potentially not directly, but that digitization. In other words, the conversion of glass slides to digitized whole slide images, is a very necessary step in order to even be able to use the tools that are out there. This is a significant barrier for a lot of laboratories, and is probably the reason why most laboratories still do use glass and microscopes.

([39:48](https://www.rev.com/transcript-editor/shared/3Xr3mQ-MVnKGZ4TWHiSU2eZisTD-1f3XwjxFDvzdK6TXThchokeqrtJXfeJvui6xEMbMEjYoN4yTLk4I-ms-xe-wSSQ?loadFrom=DocumentDeeplink&ts=2388.87)):

The process itself can be very labor-intensive and time-consuming. It requires expertise, or a significant investment. Some view it as redundant, of course, it is the gateway to allow us to use the tools that exist and also the potential for future tools that can do even more. It is important that we push on this path forward, because one of the takeaways from this discussion is that these tools hold great promise for our patients.

([40:19](https://www.rev.com/transcript-editor/shared/S37VOUlb8m5TCynIj39Bnhg5ARPx15luX4BRVH1MltftYtUzZSdfFkaXPX60p95Ya9Juc6OUiqYAFG47DO6XtZ8gAiQ?loadFrom=DocumentDeeplink&ts=2419.92)):

Future tools will most certainly do the same. Incorporating them more and more into the pathology practice, will be key for pathologists and for patients.

Dr. Emily Volk ([40:33](https://www.rev.com/transcript-editor/shared/2jytsqPx4Jc6ynwMZuxqbTnCg-TN7z30M-UVMqhstS2thIqhr73K2HSCn23UaDwTx4psGePzqJRhg-_oNKusC3aypak?loadFrom=DocumentDeeplink&ts=2433.269999)):

Thank you, Dr. Raciti. You brought up something very important about cost. I'll ask Dr. Glassy, how do you see hospitals and academic institutions dealing with the cost for this technology?

Dr. Eric Glassy ([40:47](https://www.rev.com/transcript-editor/shared/in37I9FK4ami9bblPMQtvPYWcnT9liAKLA3zF_Ql-bSyQfH64pw59mF1J7Z3fUmY-vlpYkZsPaG63ogg64-X3I7GaxM?loadFrom=DocumentDeeplink&ts=2447.159999)):

Well, that's quite a hurdle. There are many, many or actually the majority of medical centers in the United States, have an extraordinarily thin margin or have lost money over the last years, much of that driven by issues around COVID and taking care of those patients. Asking hospital administration to add on an additional hundreds of thousands of dollars to add digital imaging and artificial intelligent algorithms, is going to be a challenge. You need to be creative. One opportunity would be to work with the hospital foundation.

([41:27](https://www.rev.com/transcript-editor/shared/bpu99V4DKapW80PgvS2IFp5h6v1ezR1R2hNuKc7gmR_p4rKPyUFnKEtIAFzo66oGz8qVUEWn9XcCpXKGt32HLH1_hVg?loadFrom=DocumentDeeplink&ts=2487.7199999)):

There may be some generous folks there that would like to support this activity. Second, calls back to what you mentioned at the beginning about the importance of pathologists doing this as opposed to pathologists that don't. The patient is the center of what we do. In order to make the right diagnosis, if I need an algorithm, if I need digital pathology, I need to be able to implement that technology to be sure that that patient is taken care of.

([42:02](https://www.rev.com/transcript-editor/shared/1uVlNqR9lhVpKqEQTcNJJPmUOw0zeH2w5rFG7ARdZq7tzJS3qWLXMtNjr8_d0IcgxLKWGDYqUTLLlOJ2Uwj1GYcZTtU?loadFrom=DocumentDeeplink&ts=2522.37)):

In the long run, there will be cost savings, there'll be efficiencies, there'll be the appropriate care given. Precision medicine, we talked about that. Artificial intelligence, augmented intelligence allows patients to receive tailored therapy that works just for them, as opposed to the broad population. I think these tools eventually will absolutely, positively pay for themselves in terms of one, patient satisfaction.

([42:34](https://www.rev.com/transcript-editor/shared/L-rYnBsmWw7vZLFiyu7Fe7NdrrZDfAWjdv3wYx3MQ-1-gwI7wEcrn8718-4ujxy1wewuDwEW4-hbCkBrmxSqlKd_93U?loadFrom=DocumentDeeplink&ts=2554.709999)):

Two, insurance companies realizing that those pathologists that are using this technology, are resulting in fewer tests being performed, unnecessary tests being performed. Three, patients are going to receive their answers more quickly, and then therapy can start more quickly as well. There's many, many reasons for adopting and overcoming that hurdle, that financial hurdle. It's going to be a challenge, but I think we need to be able to advance the profession, advance the health of patients by adopting them.

Dr. Emily Volk ([43:11](https://www.rev.com/transcript-editor/shared/9Ya6ueKPJeEolzeCvpcSFSieWu-IyvXspmZrLZR90rwlImezBXsnVLrpiqNCv8t2OlGUlO3kuxuHZyujRmM0SClpn1Q?loadFrom=DocumentDeeplink&ts=2591.76)):

No, you make a great point. Little is more expensive in medicine than getting the wrong diagnosis, and then going down an incorrect therapeutic rabbit hole. Certainly here at the CAP, we are doing a lot of investigating. Our artificial intelligence committee has formed a practice integration and education for AI project team. This is focused on education and technical issues, particularly related to verification and performance monitoring of these tools.

([43:43](https://www.rev.com/transcript-editor/shared/XfCRegMUXbwxxeC-yO9eBfl9kSm_kQ4656-6UiFmOIIOfmpCuWdkwNaDzLjOeaVoCNi8f1gC0CGtJb-kjp2az7hEsK8?loadFrom=DocumentDeeplink&ts=2623.469999)):

The AI committee is responsible for coordinating and aligning AI and machine learning across the CAP, specifically looking out for our patients. Let's now go to some of our reporter questions. As a reminder, we will answer as many questions as time allows. If we don't get to your question, our media relations team will reach out to you to get an answer. The first question I'm seeing is, are there potential limitations of incorporating AI into pathology practice? Dr. Hanna, would you like to take that question?

Dr. Matthew Hanna ([44:29](https://www.rev.com/transcript-editor/shared/uno3KMkQWA-zzV2hTwLnPZtJIAUf3FkBaMZNdSdp8mSmMEkU69sXLP316J0zLvNOZvdahAB2xVMd84CHAmyK6fYZaks?loadFrom=DocumentDeeplink&ts=2669.91)):

Sure, that's a great question to ask. In fact, the limitations really will stem from not properly validating or verifying or monitoring the performance of these tools over time. Used in isolation, before they're actually used on patient tests or if used as part of patient testing, these tools should and have to be verified or validated, which effectively means seeing the performance of those tools and how a pathologist would be using them in clinical practice.

([45:05](https://www.rev.com/transcript-editor/shared/ucmxiYBO5_cBDEZ210BmnhgluOiZqrQ-2MD-eoqWpBvByaUvc-dA65vOHGGz5YkHspqNTABSDHhOojR4uEoHu80GFEo?loadFrom=DocumentDeeplink&ts=2705.55)):

With proper verification or validation, you'll uncover where those models may have more false positives or false negatives. Where it's miscalled something that's benign as tumor, or where it's called something tumor that was benign. Understanding the performance characteristics of the models before actually using it in patient testing, is a common practice that pathologists have to do and are required to do.

([45:33](https://www.rev.com/transcript-editor/shared/ldtzsToZ4JcoJMMH867vo9uWhtUBMgyr9B2IKdJr7FS-sYU31UhfGth72D-WBm52JdSE9rliF5tqbWGqt6jz6oGXqac?loadFrom=DocumentDeeplink&ts=2733.809999)):

The limitations with a proper validation are still possible, even after a model's been properly validated. If the patient population shifts, as we saw with the public health emergency, there are times in medicine where medicine changes and it may shift suddenly. Looking at how the model may shift or drift slowly over time, is really important as an ongoing monitoring of any properly verified or validated machine learning test as part of a clinical patient test that's used in pathology.

([46:08](https://www.rev.com/transcript-editor/shared/0Sz1P6tQDxZA85m8f3b61HJe4ACuxuEXRsO-hZjUU473jE_PIZtrvqUlsh9jGLrkWkHvY3vV3ipaIguLaKrVUEtZwM0?loadFrom=DocumentDeeplink&ts=2768.73)):

The only other small caveat is we are still learning the human computer interaction as pathologists are using these tools. Will say a pathologist who doesn't necessarily have expertise in one area, be tricked up by a machine learning model that's pointing a big red arrow at a benign area, but calling it tumor? Will that affect the pathologists who should be expert trained in their area? We're learning how that human computer interaction is.

([46:42](https://www.rev.com/transcript-editor/shared/VqvAOZLUd5coDOn-zYiEWBNyaqHv72hdglrme1l4NQCpwlTazBbeP8fuFgVf8BOGmrJcJVMlT6lPe9yFEsRloF-NoI8?loadFrom=DocumentDeeplink&ts=2802.179999)):

With proper, of course, pathology training, the pathologist would be able to differentiate what's truly benign and what might be a tumor area. But those are potential limitations in decreasing the specificity of a pathologist, who may not have had access to that because they wouldn't necessarily have had a false positive area be seen as that. I would say those are the potential limitations of incorporating these AI type systems in patient care.

Dr. Emily Volk ([47:12](https://www.rev.com/transcript-editor/shared/lE0uxLA3XGNaSM0MygEmv1-BgtiVxTeR0EKngTV3drilAZ3E-YdZ3h-wXrUTlqI1sgnssEJZCTkXTnjY2-t4e4eJLCQ?loadFrom=DocumentDeeplink&ts=2832)):

Thank you so much, Dr. Hanna. We have one more question, and I think this would be great for Dr. Raciti. How do you envision the pathologist's AI relationship evolving over the coming years?

Dr. Patricia Raciti ([47:27](https://www.rev.com/transcript-editor/shared/duua0imCfyXhBRPwW_jiqBub2F-2581Z2lkipvJJ-Vk390MV2q6XNj-AV-0Er7MsTmVsjKHVvg0jW1C5TRJgwK1k89w?loadFrom=DocumentDeeplink&ts=2847.2399999)):

Yeah, absolutely. I think I love that question because it focuses on the pathologist AI relationship. Again, that's what we have to keep in mind. I think Dr. Hanna touched on it. These tools have to be tested alone, but they must have a second test and they must be studied with the pathologist. I think that with any new technology, the technology changes, but the user's use of it might evolve over time. Typically, pathologists like most folks are suspicious of new tools and it's healthy.

([48:05](https://www.rev.com/transcript-editor/shared/q9BGiiNI_1DKVgmutNv_EwTsGgf14N6nkNuodCun272Q2YhUtMbtw1YvJgrYYlFZB4Bx0m_4xGE4I2DiB6e4HP1F8JE?loadFrom=DocumentDeeplink&ts=2885.25)):

With time, I think pathologists will understand the nuances of these tools, potentially understand their strengths, understand their weaknesses. And really know at what point potentially a pathologist should step in more in the diagnostic process, and at what point a tool like this might be better suited for the task as opposed to a human. That is a process over time that involves education about digital pathology, and the use of AI in that process and also about the specific tool that the pathologist is using.

([48:42](https://www.rev.com/transcript-editor/shared/KLqsZuWE4Ycx-UWpFFgTT0xqwBeDX0d8BFLIATu_GvATMZ44TxI55HvyIN1PGgcWGSrOTPiE0WXUDdvt_KHasmPM_dI?loadFrom=DocumentDeeplink&ts=2922.2399999)):

It's going to be a process. We can plan as much as we want to study these tools, but we will undoubtedly discover new things as these tools become more and more incorporated into practice. I think the CAP has been central in codifying that knowledge, and really vetting it and spreading it across to its members.

Dr. Emily Volk ([49:04](https://www.rev.com/transcript-editor/shared/RpEV2CHAVWSZUzLnX1ZLCp0ASVQ5Rblb4CjyaqjdFAlwqxQpL9H1danBJf90RvvmtbjNYmpH9k10DhWWWqGfUBPAVtw?loadFrom=DocumentDeeplink&ts=2944.98)):

Thank you so much. Dr. Glassy, I'll give you the last word. Would you like to weigh in on what Dr. Raciti was just commenting on?

Dr. Eric Glassy ([49:11](https://www.rev.com/transcript-editor/shared/XZXO9Hk5ELLayrhXUbzbEcvEL--hrVGgY8aPpdvk0g8mNZGBNOxNHiI3JpL45KV57wcXMDjbgdLtDbj1dgh-_raAdeo?loadFrom=DocumentDeeplink&ts=2951.25)):

The two experts on this panel are Dr. Raciti and Dr. Hanna, and I'm just the end user. I'm the community guy, but I need help, and so I'm looking to these experts to provide me additional support and tools. That's going to be in pharmaceuticals with Dr. Raciti working on new drugs, and using augmented intelligence to help come up with new formulations for patients.

([49:43](https://www.rev.com/transcript-editor/shared/qs_bSFtfDwE4q3LnSzgmAly-mndHXYypY6_jyAwsHJsBEKi7I_b_9yhU7-pKi5OwY74MySid8F6hps2QlSn9rSmVc7I?loadFrom=DocumentDeeplink&ts=2983.02)):

It's going to be Dr. Hanna, who's going to come up with new algorithms that I can apply to my practice and deploy, so that my patients and my community can have the benefit of that expertise. I'm all in on this. I think this is a terrific opportunity. This whole program was put together by the College of American Pathologists, and we're in the business of educating pathologists about how to use these tools. We have new subcommittees involved in this.

([50:12](https://www.rev.com/transcript-editor/shared/JBq_1GdHfIFeu8Ce6YnVPmKGt-_ahCcnqDpjOOSXFctbpeAm__IEI5fTEU03PEygesoZRQwvNX-_LfxDnHkpCCkJRV4?loadFrom=DocumentDeeplink&ts=3012.06)):

We have a new council on informatics with artificial intelligence. All these are going to be opportunities for pathologists. I'll tell you, this is a great opportunity for medical students to be on the cutting edge of technology, benefiting patients and applying informatics tools to make themselves the absolute best pathologist they can be. I think this is just a great time to be a pathologist.

Dr. Emily Volk ([50:39](https://www.rev.com/transcript-editor/shared/b5012Qhv5JOQts70hTeDJZEJkquMWJbciO18YvIwO-m1x2z1IWxRDCJw_iJ7-dht5YpQfRFikkmYDBYHzEouKG8gF5I?loadFrom=DocumentDeeplink&ts=3039.2399999)):

Thank you so much. We've certainly heard a number of different specific applications or use cases. Before we close out, Dr. Raciti, is there another specific use case that you can share with the group that we haven't touched on? Dr. Hanna, I'd love for you to weigh in as well, but I'll start with Dr. Raciti.

Dr. Patricia Raciti ([51:01](https://www.rev.com/transcript-editor/shared/6xz-KE3mhnGSjtudBnBPmcu04JdqQ7IW3rzljkfu93ZjiXqsGFdprmqWDSfoZXbMoc3nQXH2DoqjXlRmfFd_GM4olGg?loadFrom=DocumentDeeplink&ts=3061.7399999)):

Sure. I think that a lot of the focus of these tools has very much been in, as we've touched on, the assistive mode. In a way that the pathologist works with the AI tool because the AI tool is really doing something that a pathologist would also do. A pathologist can evaluate that output, decide to incorporate it into their diagnosis or not. As we've touched on, this can help the diagnostic process in terms of timeliness and in terms of reproducibility, and in terms of accuracy.

([51:37](https://www.rev.com/transcript-editor/shared/jabi9Vi7i8v6z6tfgB656DlO72cWwxMz0JUAAzCWb8eImu9zMA2yjqTnx-vP9FhcOQu_GzqAQ_RGCqLVr8U-FXiOTtA?loadFrom=DocumentDeeplink&ts=3097.8)):

What we haven't touched on, and I'll give you a little preview and I'm sure Dr. Hanna will give us even more. Are the potential for these tools as biomarkers essentially to look at the digitized histopathology image, which is created always for the diagnostic purpose. But perhaps extract a piece of information that a pathologist on their own just by looking at the image, would not be able to do.

([52:03](https://www.rev.com/transcript-editor/shared/bvItWN7v18McdlM3vgAAeH4H2_mBOqxOzoHM5wamyYaFZvKYXgqHepI--H_1gllYtl2W0gpNimh94HtnF1dsUre7lMQ?loadFrom=DocumentDeeplink&ts=3123.3)):

I alluded to it earlier at the very beginning of our discussion, when I talked about artificial intelligence algorithms that can analyze the tumor tissue within a histopathology slide and potentially screen it for genetic mutations that exist in that tissue. That can be done in a laboratory now, but it involves genetic analysis and a very time-consuming, complicated process that can be very costly, but it's highly accurate.

([52:32](https://www.rev.com/transcript-editor/shared/d8ptLaXUJTQi-cb5XgCzdCwtDZJLjQFRzooERHSYiYNw2uJ1tyMUy3LHnX0Sjic-hbWSn4RPgKyjONLqWVg20HpmrhU?loadFrom=DocumentDeeplink&ts=3152.64)):

These tools offer the possibility to do similarly accurate process directly from the histopathology image. That way the patient gets potentially a genetic result much sooner. Treatment targeting that genetic alteration can begin sooner as well. Again, this is in its early infancy, but this is a preview of the potential for these technologies to add more to the pathology process and also help patients.

Dr. Emily Volk ([53:02](https://www.rev.com/transcript-editor/shared/9jh_kV-Pu23yoWWX6zDvsTI9eQHNB5U9TeJ9iu0tyufCtsCF4nHTTumJnULaNKhkyFds-b9yiKDS1LbvT6O7eRmnC7U?loadFrom=DocumentDeeplink&ts=3182.4899999)):

Just like the microscope, this helps. Go ahead, Dr. Hanna.

Dr. Matthew Hanna ([53:08](https://www.rev.com/transcript-editor/shared/-hl4YGBa0ZcOOavtkESHAvunXot_yt8SEBTDzzTv8T7ZrMKSN7QU9HDLr8IRDYE3XEd7-OJ1383hbZFDnhOA7Ey7aTU?loadFrom=DocumentDeeplink&ts=3188.13)):

I completely agree with Dr. Raciti. I think we've talked a lot about how improving accuracy here is possible. But really the discovery of what's out there and what these machine learning models do quite well, is amassed large amounts of information, again, across all of these various silos in medicine and put them all together. There's the early underpinnings of being able to train over a large cohort of patients, their outcomes based on the representation of what's on that patient's tissue.

([53:46](https://www.rev.com/transcript-editor/shared/MhrnD7kPC9E8iiXADnR7TW4emDg8rLx7gds_g8ISfUIR-bBp6tM-5eLWHdYGhh2DWzpa5jw7v_qXc9C4pFJ12X9AAQM?loadFrom=DocumentDeeplink&ts=3226.95)):

If we can or if there can be these machine learning models built that ultimately can predict patient prognosis, predict patient response to treatment. Predict all of these other patient outcomes that we are ultimately trying to do within pathology and in medicine. These machine learning models can take these large, vast data sets and at least try to predict that.

([54:10](https://www.rev.com/transcript-editor/shared/rexRdvgWwtb1jR31SV_1yovxp_mC04w-TuOL29a3jrRRXXcVt6S9nSqgzQdsdB66tQ81IVaFMnveo6NoTwWNaVoIC0k?loadFrom=DocumentDeeplink&ts=3250.41)):

Again, they still need to be properly vetted, validated, verified. But I think this potential promise in the discovery aspect, is a really exciting part of where machine learning might be taken in the medical field and in pathology.

Dr. Emily Volk ([54:26](https://www.rev.com/transcript-editor/shared/6P4JtgxB0H5AzG8Y4vMoauZD9VQ2IhuTO7_1yEYcXRGUi89eHrbn6AaookWasdFAdsQyBbjcaXtYGpwMRZq4XLc9f20?loadFrom=DocumentDeeplink&ts=3266.099999)):

Absolutely. Just like the microscope, these tools will help physicians, in particular pathologists, see beyond what we can see today. Thank you for these great questions. Our time is just about up, but before we go, I would like to thank our panel of doctors, Dr. Raciti, Dr. Hanna and Dr. Glassy, for their expert insights. I want to remind everyone who joined us today, that pathologists are physicians and clinicians who touch all aspects of medicine from testing through diagnosis.

([55:01](https://www.rev.com/transcript-editor/shared/skjI3MafIOdHgXOD0DiWmaH9RFNrd4GzzrZE-t87lm93x0Jvd8PLCZyuqWOakTlMsnsyB2P1PoCmlD6c9TRjih1B6kQ?loadFrom=DocumentDeeplink&ts=3301.83)):

We plan to revisit this topic as the technology continues to advance. Please visit our multimedia newsroom to view this briefing again, and for other information about the clinical practice of pathology and pathologists. As you write and report your stories, please make sure to reach out to the CAP for expert information on laboratory testing and diagnostic medicine. On behalf of the College of American Pathologists, thank you for joining us today.