

WEBVTT

00:00:00.000 --> 00:00:02.540 Funding for Yale Cancer Answers

NOTE Confidence: 0.850972071428571

00:00:02.540 --> 00:00:05.080 is provided by Smilow Cancer

NOTE Confidence: 0.850972071428571

00:00:05.167 --> 00:00:07.367 Hospital and AstraZeneca.

NOTE Confidence: 0.850972071428571

00:00:07.370 --> 00:00:09.404 Welcome to Yale Cancer Answers with

NOTE Confidence: 0.850972071428571

00:00:09.404 --> 00:00:11.818 your host doctor Anees Chagpar.

NOTE Confidence: 0.850972071428571

00:00:11.820 --> 00:00:13.690 Yale Cancer Answers features the

NOTE Confidence: 0.850972071428571

00:00:13.690 --> 00:00:15.985 latest information on cancer care by

NOTE Confidence: 0.850972071428571

00:00:15.985 --> 00:00:17.457 welcoming oncologists and specialists

NOTE Confidence: 0.850972071428571

00:00:17.457 --> 00:00:19.903 who are on the forefront of the

NOTE Confidence: 0.850972071428571

00:00:19.903 --> 00:00:21.682 battle to fight cancer. This week,

NOTE Confidence: 0.850972071428571

00:00:21.682 --> 00:00:23.387 it's a conversation about the

NOTE Confidence: 0.850972071428571

00:00:23.387 --> 00:00:25.217 role of pathology and cancer

NOTE Confidence: 0.850972071428571

00:00:25.217 --> 00:00:26.705 with Doctor Angelique Levi.

NOTE Confidence: 0.850972071428571

00:00:26.710 --> 00:00:28.873 Dr. Levi is an associate professor of

NOTE Confidence: 0.850972071428571

00:00:28.873 --> 00:00:31.260 pathology at the Yale School of Medicine,

NOTE Confidence: 0.850972071428571

00:00:31.260 --> 00:00:33.270 where Doctor Chagpar is a
NOTE Confidence: 0.850972071428571

00:00:33.270 --> 00:00:34.610 professor of surgical oncology.
NOTE Confidence: 0.865584364761905

00:00:36.000 --> 00:00:37.614 Angelique, maybe we can start off
NOTE Confidence: 0.865584364761905

00:00:37.614 --> 00:00:39.720 by you telling us a little bit about
NOTE Confidence: 0.865584364761905

00:00:39.720 --> 00:00:41.390 yourself and what it is you do.
NOTE Confidence: 0.855299977272727

00:00:41.820 --> 00:00:44.865 So as a pathologist I am anatomic
NOTE Confidence: 0.855299977272727

00:00:44.865 --> 00:00:46.720 and clinical pathology trained
NOTE Confidence: 0.855299977272727

00:00:46.720 --> 00:00:50.196 so a PCP for short and
NOTE Confidence: 0.855299977272727

00:00:50.196 --> 00:00:52.048 have received fellowship training
NOTE Confidence: 0.855299977272727

00:00:52.048 --> 00:00:54.740 and in Cytopathology,
NOTE Confidence: 0.855299977272727

00:00:54.740 --> 00:00:57.900 a subspecialty of the discipline.
NOTE Confidence: 0.855299977272727

00:00:57.900 --> 00:01:00.810 I have also received some extra
NOTE Confidence: 0.855299977272727

00:01:00.810 --> 00:01:04.030 training and expertise in GU pathology,
NOTE Confidence: 0.855299977272727

00:01:04.030 --> 00:01:06.020 all of which I did
NOTE Confidence: 0.855299977272727

00:01:06.020 --> 00:01:09.540 way back at Hopkins and
NOTE Confidence: 0.855299977272727

00:01:09.540 --> 00:01:12.620 it's a combined program.

NOTE Confidence: 0.855299977272727
00:01:12.620 --> 00:01:14.500 If you do both anatomic
NOTE Confidence: 0.855299977272727
00:01:14.500 --> 00:01:15.628 and clinical pathology
NOTE Confidence: 0.855299977272727
00:01:15.630 --> 00:01:17.750 it used to be five years and now is
NOTE Confidence: 0.855299977272727
00:01:17.750 --> 00:01:20.394 4 but you can do one of the two
NOTE Confidence: 0.855299977272727
00:01:20.394 --> 00:01:22.770 disciplines for a little less time now.
NOTE Confidence: 0.855299977272727
00:01:22.770 --> 00:01:26.508 And the anatomic focuses
NOTE Confidence: 0.855299977272727
00:01:26.508 --> 00:01:29.544 mostly on the study of tissue
NOTE Confidence: 0.855299977272727
00:01:29.544 --> 00:01:31.484 and working with a microscope,
NOTE Confidence: 0.855299977272727
00:01:31.490 --> 00:01:33.041 fluids and cells,
NOTE Confidence: 0.855299977272727
00:01:33.041 --> 00:01:35.626 whereas the clinical pathology focuses
NOTE Confidence: 0.855299977272727
00:01:35.626 --> 00:01:38.748 a bit more on laboratory testing,
NOTE Confidence: 0.855299977272727
00:01:38.750 --> 00:01:41.000 blood tests for example.
NOTE Confidence: 0.925490912222222
00:01:41.270 --> 00:01:43.682 So let's dive a little bit more into that.
NOTE Confidence: 0.925490912222222
00:01:43.690 --> 00:01:46.712 I mean, when we think about the role
NOTE Confidence: 0.925490912222222
00:01:46.712 --> 00:01:49.067 of pathology and cancer automatically,
NOTE Confidence: 0.925490912222222

00:01:49.070 --> 00:01:51.778 our brain kind of goes to, Oh yeah,
NOTE Confidence: 0.925490912222222

00:01:51.778 --> 00:01:53.198 it's the pathologists who kind
NOTE Confidence: 0.925490912222222

00:01:53.198 --> 00:01:55.112 of look at the biopsy and tell
NOTE Confidence: 0.925490912222222

00:01:55.112 --> 00:01:57.070 me whether or not I have cancer.
NOTE Confidence: 0.925490912222222

00:01:57.070 --> 00:01:59.016 Can you flesh out a little bit
NOTE Confidence: 0.925490912222222

00:01:59.016 --> 00:02:01.039 more about what it is you do and
NOTE Confidence: 0.925490912222222

00:02:01.039 --> 00:02:02.949 how you come up with that answer?
NOTE Confidence: 0.925490912222222

00:02:02.950 --> 00:02:06.846 I mean everything hinges on what you say,
NOTE Confidence: 0.925490912222222

00:02:06.850 --> 00:02:08.510 how much pressure is that,
NOTE Confidence: 0.925490912222222

00:02:08.510 --> 00:02:09.842 and how do you actually come
NOTE Confidence: 0.925490912222222

00:02:09.842 --> 00:02:11.240 up with the correct diagnosis?
NOTE Confidence: 0.816203723333333

00:02:12.510 --> 00:02:14.740 It's certainly a team
NOTE Confidence: 0.816203723333333

00:02:14.740 --> 00:02:16.524 from the very beginning,
NOTE Confidence: 0.816203723333333

00:02:16.530 --> 00:02:19.490 patients will go to either a hospital
NOTE Confidence: 0.816203723333333

00:02:19.490 --> 00:02:22.587 or a physician office and will have
NOTE Confidence: 0.816203723333333

00:02:22.587 --> 00:02:25.428 a procedure done so the procedure

NOTE Confidence: 0.816203723333333
00:02:25.428 --> 00:02:28.572 could be either a Pap test,
NOTE Confidence: 0.816203723333333
00:02:28.572 --> 00:02:30.687 screening test for cervical cancer,
NOTE Confidence: 0.816203723333333
00:02:30.690 --> 00:02:32.574 it could be a fine needle
NOTE Confidence: 0.816203723333333
00:02:32.574 --> 00:02:33.830 aspiration of a breast mass,
NOTE Confidence: 0.816203723333333
00:02:33.830 --> 00:02:36.742 or it could be a surgical procedure
NOTE Confidence: 0.816203723333333
00:02:36.742 --> 00:02:39.414 in the operating room where
NOTE Confidence: 0.816203723333333
00:02:39.414 --> 00:02:42.597 a tumor or an organ is removed, so
NOTE Confidence: 0.816203723333333
00:02:42.597 --> 00:02:46.674 all of those tissues come to the lab from
NOTE Confidence: 0.816203723333333
00:02:46.674 --> 00:02:50.540 those scenarios and in the lab, the
NOTE Confidence: 0.816203723333333
00:02:50.540 --> 00:02:54.700 histology component is where that
NOTE Confidence: 0.816203723333333
00:02:54.700 --> 00:02:58.060 tissue is transformed into a medium
NOTE Confidence: 0.816203723333333
00:02:58.060 --> 00:03:03.024 where it is put onto a glass slide and
NOTE Confidence: 0.816203723333333
00:03:03.024 --> 00:03:06.032 that process itself is quite intense.
NOTE Confidence: 0.816203723333333
00:03:06.032 --> 00:03:08.708 We have pathology assistants who help
NOTE Confidence: 0.816203723333333
00:03:08.708 --> 00:03:11.374 in the gross examination of these
NOTE Confidence: 0.816203723333333

00:03:11.374 --> 00:03:14.300 tissues when they come to the lab,
NOTE Confidence: 0.8162037233333333

00:03:14.300 --> 00:03:17.264 especially the larger ones where they
NOTE Confidence: 0.8162037233333333

00:03:17.264 --> 00:03:21.489 may note sizes of lesions they may sample.
NOTE Confidence: 0.8162037233333333

00:03:21.490 --> 00:03:23.058 Areas that are critical,
NOTE Confidence: 0.8162037233333333

00:03:23.058 --> 00:03:24.744 close to margins, etc.
NOTE Confidence: 0.8162037233333333

00:03:24.744 --> 00:03:27.264 And those sections are then
NOTE Confidence: 0.8162037233333333

00:03:27.264 --> 00:03:30.230 submitted in cassettes and processed,
NOTE Confidence: 0.8162037233333333

00:03:30.230 --> 00:03:33.206 in an automated lab in a way that
NOTE Confidence: 0.8162037233333333

00:03:33.206 --> 00:03:36.660 they are sliced and stained and put
NOTE Confidence: 0.8162037233333333

00:03:36.660 --> 00:03:39.275 on glass slides for pathologists
NOTE Confidence: 0.8162037233333333

00:03:39.368 --> 00:03:42.980 to then review at the time of a
NOTE Confidence: 0.8162037233333333

00:03:42.980 --> 00:03:45.350 case review and in community practice,
NOTE Confidence: 0.8162037233333333

00:03:45.350 --> 00:03:47.387 often it is just a pathologist,
NOTE Confidence: 0.8162037233333333

00:03:47.390 --> 00:03:50.738 but here at academic centers we
NOTE Confidence: 0.8162037233333333

00:03:50.738 --> 00:03:52.412 have trainees, residents,
NOTE Confidence: 0.8162037233333333

00:03:52.420 --> 00:03:54.238 who are involved in that process.

NOTE Confidence: 0.8162037233333333
00:03:54.240 --> 00:03:57.607 We have many sets of eyes that
NOTE Confidence: 0.8162037233333333
00:03:57.610 --> 00:03:59.782 we call preview slides and then
NOTE Confidence: 0.8162037233333333
00:03:59.782 --> 00:04:01.874 the pathologist sits down at a
NOTE Confidence: 0.8162037233333333
00:04:01.874 --> 00:04:03.432 microscope to sign out.
NOTE Confidence: 0.8162037233333333
00:04:03.432 --> 00:04:05.080 And that's actually transforming as well.
NOTE Confidence: 0.8162037233333333
00:04:05.080 --> 00:04:06.837 Soon we might say we don't sit
NOTE Confidence: 0.8162037233333333
00:04:06.837 --> 00:04:09.099 down at a microscope to sign out,
NOTE Confidence: 0.8162037233333333
00:04:09.100 --> 00:04:12.636 but we may sit at a computer screen
NOTE Confidence: 0.8162037233333333
00:04:12.636 --> 00:04:16.032 if we transform into the digital era,
NOTE Confidence: 0.8162037233333333
00:04:16.032 --> 00:04:18.180 but we're not quite there yet.
NOTE Confidence: 0.8162037233333333
00:04:22.460 --> 00:04:26.160 Then with a microscope is where we
NOTE Confidence: 0.8162037233333333
00:04:26.160 --> 00:04:28.220 really do what we were trained to do,
NOTE Confidence: 0.8162037233333333
00:04:28.220 --> 00:04:31.972 and you use your trained eye to look
NOTE Confidence: 0.8162037233333333
00:04:31.972 --> 00:04:34.856 at the morphology of the tissue and
NOTE Confidence: 0.8162037233333333
00:04:34.856 --> 00:04:37.784 see where it differs from what you
NOTE Confidence: 0.8162037233333333

00:04:37.784 --> 00:04:40.990 have trained yourself to know what's normal.
NOTE Confidence: 0.8162037233333333

00:04:40.990 --> 00:04:43.186 So identifying what's abnormal
NOTE Confidence: 0.8162037233333333

00:04:43.186 --> 00:04:46.480 disease and in that then deciding
NOTE Confidence: 0.8162037233333333

00:04:46.572 --> 00:04:48.887 whether it's cancer or not.
NOTE Confidence: 0.8162037233333333

00:04:48.890 --> 00:04:50.816 So not every disease is cancer,
NOTE Confidence: 0.8162037233333333

00:04:50.820 --> 00:04:52.758 and it's important in some cases
NOTE Confidence: 0.8162037233333333

00:04:52.760 --> 00:04:54.044 where the presumption clinically
NOTE Confidence: 0.8162037233333333

00:04:54.044 --> 00:04:56.410 might be a mass because of cancer,
NOTE Confidence: 0.8162037233333333

00:04:56.410 --> 00:04:58.702 it's a really important piece to
NOTE Confidence: 0.8162037233333333

00:04:58.702 --> 00:05:01.337 be able to say this isn't cancer,
NOTE Confidence: 0.8162037233333333

00:05:01.337 --> 00:05:03.920 and so therefore no treatment is necessary.
NOTE Confidence: 0.8162037233333333

00:05:03.920 --> 00:05:05.680 But at a Cancer Center,
NOTE Confidence: 0.8162037233333333

00:05:05.680 --> 00:05:10.160 many of the referrals that come here often
NOTE Confidence: 0.8162037233333333

00:05:10.160 --> 00:05:12.415 perhaps already with a preliminary
NOTE Confidence: 0.8162037233333333

00:05:12.415 --> 00:05:15.130 diagnosis on a small biopsy of
NOTE Confidence: 0.8162037233333333

00:05:15.130 --> 00:05:17.434 cancer and then our job sometimes,

NOTE Confidence: 0.816203723333333
00:05:17.440 --> 00:05:19.948 as pathologists, in a larger procedure, or a
NOTE Confidence: 0.816203723333333
00:05:19.950 --> 00:05:24.360 resection is to then go ahead and stage that,
NOTE Confidence: 0.816203723333333
00:05:24.360 --> 00:05:26.765 which means assign some more
NOTE Confidence: 0.816203723333333
00:05:26.765 --> 00:05:28.689 parameters around that diagnosis.
NOTE Confidence: 0.816203723333333
00:05:28.690 --> 00:05:31.122 So not only is it cancer,
NOTE Confidence: 0.816203723333333
00:05:31.122 --> 00:05:33.866 but it's a type of cancer that
NOTE Confidence: 0.816203723333333
00:05:33.866 --> 00:05:36.868 you want to kind of classify.
NOTE Confidence: 0.816203723333333
00:05:36.870 --> 00:05:40.206 It's given a grade as we call it,
NOTE Confidence: 0.816203723333333
00:05:40.210 --> 00:05:42.694 well differentiated, poorly differentiated.
NOTE Confidence: 0.816203723333333
00:05:42.694 --> 00:05:45.799 It might be given certain
NOTE Confidence: 0.816203723333333
00:05:45.800 --> 00:05:49.370 other parameters regarding size or margin.
NOTE Confidence: 0.816203723333333
00:05:49.370 --> 00:05:50.778 Different cancers have different
NOTE Confidence: 0.816203723333333
00:05:50.778 --> 00:05:52.186 parameters that are important,
NOTE Confidence: 0.96434554
00:05:52.190 --> 00:05:55.928 and all of those details are important
NOTE Confidence: 0.96434554
00:05:55.928 --> 00:05:58.400 in prognosis prediction and then
NOTE Confidence: 0.96434554

00:05:58.400 --> 00:06:00.065 treatment and usually
NOTE Confidence: 0.96434554

00:06:00.065 --> 00:06:02.285 associated then with outcome.
NOTE Confidence: 0.915541574285714

00:06:03.430 --> 00:06:05.149 So I want to pick up on a few
NOTE Confidence: 0.915541574285714

00:06:05.149 --> 00:06:06.457 things that you said there.
NOTE Confidence: 0.915541574285714

00:06:06.460 --> 00:06:09.412 So one was this whole process
NOTE Confidence: 0.915541574285714

00:06:09.412 --> 00:06:11.990 that really goes on that
NOTE Confidence: 0.915541574285714

00:06:11.990 --> 00:06:14.654 many people who have never stepped into a
NOTE Confidence: 0.915541574285714

00:06:14.654 --> 00:06:17.207 pathology lab might not know about which is
NOTE Confidence: 0.915541574285714

00:06:17.210 --> 00:06:20.034 when you have a biopsy done
NOTE Confidence: 0.915541574285714

00:06:20.040 --> 00:06:23.360 and your surgeon, your radiologist,
NOTE Confidence: 0.915541574285714

00:06:23.360 --> 00:06:25.330 whoever has done the biopsy,
NOTE Confidence: 0.915541574285714

00:06:25.330 --> 00:06:27.706 sends that specimen away.
NOTE Confidence: 0.915541574285714

00:06:27.706 --> 00:06:29.476 Oftentimes, it's the greatest
NOTE Confidence: 0.915541574285714

00:06:29.476 --> 00:06:31.436 amount of patient anxiety waiting
NOTE Confidence: 0.915541574285714

00:06:31.436 --> 00:06:33.599 for that result to come back.
NOTE Confidence: 0.915541574285714

00:06:33.600 --> 00:06:36.280 And sometimes it can take a few days,

NOTE Confidence: 0.915541574285714
00:06:36.280 --> 00:06:38.926 but there is all of this
NOTE Confidence: 0.915541574285714
00:06:38.926 --> 00:06:41.289 preprocessing that needs to go on.
NOTE Confidence: 0.915541574285714
00:06:41.290 --> 00:06:44.878 Can you give us a sense of how long
NOTE Confidence: 0.915541574285714
00:06:44.878 --> 00:06:47.854 these biopsy results can sometimes take,
NOTE Confidence: 0.915541574285714
00:06:47.860 --> 00:06:50.537 and why it's important to really be
NOTE Confidence: 0.915541574285714
00:06:50.537 --> 00:06:52.499 patient and wait for your pathologist
NOTE Confidence: 0.915541574285714
00:06:52.499 --> 00:06:54.857 to give you the right answer because
NOTE Confidence: 0.915541574285714
00:06:54.857 --> 00:06:57.553 as you say so much of treatment really
NOTE Confidence: 0.915541574285714
00:06:57.553 --> 00:06:59.770 rests on what the pathologist says.
NOTE Confidence: 0.906448178333333
00:07:00.520 --> 00:07:02.232 Absolutely, that pre-analytical phase
NOTE Confidence: 0.906448178333333
00:07:02.232 --> 00:07:05.483 that you're talking about is a big part
NOTE Confidence: 0.906448178333333
00:07:05.483 --> 00:07:07.923 of our processing in the lab and
NOTE Confidence: 0.906448178333333
00:07:07.992 --> 00:07:10.404 that's kind of a traditional laboratory
NOTE Confidence: 0.906448178333333
00:07:10.404 --> 00:07:12.568 setting where you know pathologists when
NOTE Confidence: 0.906448178333333
00:07:12.568 --> 00:07:14.760 we talk about where do you work,
NOTE Confidence: 0.906448178333333

00:07:14.760 --> 00:07:16.084 you work in the lab, well no,
NOTE Confidence: 0.9064481783333333

00:07:16.084 --> 00:07:17.708 we actually work mostly in our offices,
NOTE Confidence: 0.9064481783333333

00:07:17.710 --> 00:07:19.090 but much of what's happening
NOTE Confidence: 0.9064481783333333

00:07:19.090 --> 00:07:20.850 before we even see that glass slide.
00:07:29.425 --> 00:07:32.050 An Accessioner is the first person in the
NOTE Confidence: 0.9064481783333333

00:07:32.050 --> 00:07:34.358 laboratory that basically does the
NOTE Confidence: 0.9064481783333333

00:07:34.358 --> 00:07:38.170 patient registration that assigns that
NOTE Confidence: 0.9064481783333333

00:07:38.170 --> 00:07:39.658 specimen a unique number.
NOTE Confidence: 0.9064481783333333

00:07:39.658 --> 00:07:42.246 Every specimen in pathology is assigned a
NOTE Confidence: 0.9064481783333333

00:07:42.246 --> 00:07:44.590 unique number and that's how we identify it.
00:07:45.046 --> 00:07:46.414 The patient information,
NOTE Confidence: 0.9064481783333333

00:07:46.414 --> 00:07:48.694 clinical identifiers are then entered,
NOTE Confidence: 0.9064481783333333

00:07:48.700 --> 00:07:51.535 and that's a really important step in
NOTE Confidence: 0.9064481783333333

00:07:51.535 --> 00:07:53.771 terms of specimens being identified
NOTE Confidence: 0.9064481783333333

00:07:53.771 --> 00:07:57.089 properly and assigned to the right person.
NOTE Confidence: 0.9064481783333333

00:07:57.090 --> 00:08:00.219 That is the first thing that happens and
NOTE Confidence: 0.9064481783333333

00:08:00.220 --> 00:08:04.532 the next step is it goes to the gross

NOTE Confidence: 0.906448178333333
00:08:04.532 --> 00:08:08.517 Histology bench and so for small biopsies
NOTE Confidence: 0.906448178333333
00:08:08.520 --> 00:08:11.256 that are cores or maybe liquid,
NOTE Confidence: 0.906448178333333
00:08:11.260 --> 00:08:12.756 or a pap smear,
NOTE Confidence: 0.906448178333333
00:08:12.756 --> 00:08:13.878 just single cells,
NOTE Confidence: 0.906448178333333
00:08:13.880 --> 00:08:15.760 fixation is something that
NOTE Confidence: 0.906448178333333
00:08:15.760 --> 00:08:17.640 doesn't take as long,
NOTE Confidence: 0.906448178333333
00:08:17.640 --> 00:08:20.065 so fixation is something that
NOTE Confidence: 0.906448178333333
00:08:20.065 --> 00:08:23.058 happens in different chemicals,
NOTE Confidence: 0.906448178333333
00:08:23.058 --> 00:08:26.193 alcohol and or formalin.
NOTE Confidence: 0.906448178333333
00:08:26.200 --> 00:08:28.606 Now when these tissues are larger,
NOTE Confidence: 0.906448178333333
00:08:28.610 --> 00:08:31.306 as in the case of a large tumor
NOTE Confidence: 0.906448178333333
00:08:31.306 --> 00:08:33.369 or resection or a large organ,
NOTE Confidence: 0.906448178333333
00:08:33.370 --> 00:08:36.618 that fixation process can
NOTE Confidence: 0.906448178333333
00:08:36.618 --> 00:08:39.010 happen over a 12 hour period.
NOTE Confidence: 0.906448178333333
00:08:39.010 --> 00:08:39.754 Sometimes overnight,
NOTE Confidence: 0.906448178333333

00:08:39.754 --> 00:08:40.870 so for example,
NOTE Confidence: 0.9064481783333333

00:08:40.870 --> 00:08:44.206 a prostate that is removed whole
NOTE Confidence: 0.9064481783333333

00:08:44.206 --> 00:08:47.550 or a large breast excision,
NOTE Confidence: 0.9064481783333333

00:08:47.550 --> 00:08:49.488 those are examples of tissues that
NOTE Confidence: 0.9064481783333333

00:08:49.488 --> 00:08:52.050 take a long time to fix in formalin.
NOTE Confidence: 0.9064481783333333

00:08:52.050 --> 00:08:54.458 So before those sections can even be
NOTE Confidence: 0.9064481783333333

00:08:54.458 --> 00:08:57.250 taken to embed in those paraffin blocks,
NOTE Confidence: 0.9064481783333333

00:08:57.250 --> 00:08:59.000 that process has to happen,
NOTE Confidence: 0.9064481783333333

00:08:59.000 --> 00:09:00.755 and it's critically important for
NOTE Confidence: 0.9064481783333333

00:09:00.755 --> 00:09:03.099 that process to happen
NOTE Confidence: 0.9064481783333333

00:09:03.100 --> 00:09:05.656 because these tissues need to be
NOTE Confidence: 0.9064481783333333

00:09:05.660 --> 00:09:07.676 able to be examined in sections
NOTE Confidence: 0.9064481783333333

00:09:07.676 --> 00:09:09.960 in a way where the margins
NOTE Confidence: 0.9064481783333333

00:09:09.960 --> 00:09:12.005 and all of those distinctions
NOTE Confidence: 0.9064481783333333

00:09:12.005 --> 00:09:14.050 between things that are critically
NOTE Confidence: 0.9064481783333333

00:09:14.114 --> 00:09:15.838 important for patient care,

NOTE Confidence: 0.906448178333333
00:09:15.840 --> 00:09:17.855 whether the person gets radiation
NOTE Confidence: 0.906448178333333
00:09:17.855 --> 00:09:20.620 or not is the margin positive.
NOTE Confidence: 0.906448178333333
00:09:20.620 --> 00:09:22.760 Those delineations are critically
NOTE Confidence: 0.906448178333333
00:09:22.760 --> 00:09:25.435 dependent on that fixation step,
NOTE Confidence: 0.906448178333333
00:09:25.440 --> 00:09:28.072 and that step is where we really
NOTE Confidence: 0.906448178333333
00:09:28.072 --> 00:09:30.320 need to wait, and we can't rush it.
NOTE Confidence: 0.906448178333333
00:09:30.320 --> 00:09:33.239 So we have some technologies,
NOTE Confidence: 0.906448178333333
00:09:33.240 --> 00:09:35.180 microwave assistance and other things,
NOTE Confidence: 0.906448178333333
00:09:35.180 --> 00:09:38.558 but in that process there
NOTE Confidence: 0.906448178333333
00:09:38.558 --> 00:09:40.810 are still very manual
NOTE Confidence: 0.906448178333333
00:09:40.810 --> 00:09:43.492 pieces that take time and then
NOTE Confidence: 0.906448178333333
00:09:43.492 --> 00:09:46.898 by the time that slide comes out,
NOTE Confidence: 0.906448178333333
00:09:46.900 --> 00:09:48.664 if the surgery was on a Monday,
NOTE Confidence: 0.906448178333333
00:09:48.670 --> 00:09:51.256 that glass slide may not even
NOTE Confidence: 0.906448178333333
00:09:51.256 --> 00:09:54.253 come to a pathologist's desk until
NOTE Confidence: 0.906448178333333

00:09:54.253 --> 00:09:56.029 the following afternoon.
NOTE Confidence: 0.9064481783333333

00:09:56.030 --> 00:09:57.735 And if that following afternoon
NOTE Confidence: 0.9064481783333333

00:09:57.735 --> 00:09:59.899 is the first time a pathologist
NOTE Confidence: 0.9064481783333333

00:09:59.899 --> 00:10:01.849 is looking at a cancer,
NOTE Confidence: 0.9064481783333333

00:10:01.850 --> 00:10:04.906 whether it's a complicated case or even
00:10:06.040 --> 00:10:08.865 a standard morphologic diagnosis of,
NOTE Confidence: 0.9064481783333333

00:10:08.870 --> 00:10:11.180 let's say, breast cancer, there are still
NOTE Confidence: 0.9064481783333333

00:10:11.180 --> 00:10:13.668 additional tests that will have to get done,
NOTE Confidence: 0.9064481783333333

00:10:13.670 --> 00:10:16.328 and so those tests will include
NOTE Confidence: 0.9064481783333333

00:10:16.328 --> 00:10:18.100 immunostains and other markers
NOTE Confidence: 0.9064481783333333

00:10:18.175 --> 00:10:20.401 that are all very important that
NOTE Confidence: 0.9064481783333333

00:10:20.401 --> 00:10:23.067 need to be included in the report.
00:10:24.540 --> 00:10:27.699 So a lot of those those markers are
NOTE Confidence: 0.9064481783333333

00:10:27.699 --> 00:10:30.380 things that we have to then order,
NOTE Confidence: 0.96036818875

00:10:30.380 --> 00:10:32.540 and again it's another day
NOTE Confidence: 0.96036818875

00:10:32.540 --> 00:10:33.836 or overnight processing,
NOTE Confidence: 0.96036818875

00:10:33.840 --> 00:10:36.612 and so each of these steps

NOTE Confidence: 0.96036818875

00:10:36.612 --> 00:10:39.120 requires kind of another decision

NOTE Confidence: 0.96036818875

00:10:39.120 --> 00:10:41.596 and potentially another test

NOTE Confidence: 0.96036818875

00:10:41.600 --> 00:10:44.510 or stain or molecular marker, for example.

NOTE Confidence: 0.901288364736842

00:10:45.120 --> 00:10:47.633 So important for people not

NOTE Confidence: 0.901288364736842

00:10:47.633 --> 00:10:49.955 to rush the pathologist because as

NOTE Confidence: 0.901288364736842

00:10:49.955 --> 00:10:53.080 I tell my patients,

NOTE Confidence: 0.901288364736842

00:10:53.080 --> 00:10:55.810 everything rests on what they say.

NOTE Confidence: 0.901288364736842

00:10:55.810 --> 00:10:57.810 But having said that,

NOTE Confidence: 0.901288364736842

00:10:57.810 --> 00:11:00.722 many people nowadays are

NOTE Confidence: 0.901288364736842

00:11:00.722 --> 00:11:02.634 talking about second opinions,

NOTE Confidence: 0.901288364736842

00:11:02.640 --> 00:11:04.232 either a second opinion

NOTE Confidence: 0.901288364736842

00:11:04.232 --> 00:11:05.426 from their clinician,

NOTE Confidence: 0.901288364736842

00:11:05.430 --> 00:11:07.548 but also getting their pathology that

NOTE Confidence: 0.901288364736842

00:11:07.548 --> 00:11:10.220 may have been reviewed at one institution

NOTE Confidence: 0.901288364736842

00:11:10.220 --> 00:11:12.210 re-reviewed at another institution.

NOTE Confidence: 0.901288364736842

00:11:12.210 --> 00:11:13.122 So for example,
NOTE Confidence: 0.901288364736842

00:11:13.122 --> 00:11:14.946 if they get a second opinion,
NOTE Confidence: 0.901288364736842

00:11:14.950 --> 00:11:18.968 their outside pathology is often re reviewed.
NOTE Confidence: 0.901288364736842

00:11:18.970 --> 00:11:21.426 So can you talk about the importance of
NOTE Confidence: 0.901288364736842

00:11:21.426 --> 00:11:24.348 that and how often do pathologists disagree?
NOTE Confidence: 0.901288364736842

00:11:24.350 --> 00:11:25.955 I mean, are these diagnoses
NOTE Confidence: 0.901288364736842

00:11:25.955 --> 00:11:27.990 things that are black and white?
NOTE Confidence: 0.901288364736842

00:11:27.990 --> 00:11:29.580 That is pretty crystal clear when
NOTE Confidence: 0.901288364736842

00:11:29.580 --> 00:11:31.708 you see a cancer that it's a cancer.
NOTE Confidence: 0.901288364736842

00:11:31.710 --> 00:11:34.188 Or are there some nuances that
NOTE Confidence: 0.901288364736842

00:11:34.188 --> 00:11:36.370 allow for some variability in
NOTE Confidence: 0.901288364736842

00:11:36.370 --> 00:11:38.170 terms of pathologic opinion?
00:11:38.410 --> 00:11:42.323 I'll start by saying second opinions within
NOTE Confidence: 0.833860231428572

00:11:42.323 --> 00:11:45.987 any scenario are always a good thing.
NOTE Confidence: 0.833860231428572

00:11:45.990 --> 00:11:48.118 I think for another set of eyes to
NOTE Confidence: 0.833860231428572

00:11:48.118 --> 00:11:53.820 take a look at a cancer case is
NOTE Confidence: 0.833860231428572

00:11:53.820 --> 00:11:57.096 always good and in the vast majority of
NOTE Confidence: 0.833860231428572

00:11:57.096 --> 00:12:00.136 cases a confirmation is what you'll find.
NOTE Confidence: 0.833860231428572

00:12:00.140 --> 00:12:03.698 The confirmation of the original diagnosis.
NOTE Confidence: 0.833860231428572

00:12:03.700 --> 00:12:06.526 It becomes more important in certain
NOTE Confidence: 0.833860231428572

00:12:06.526 --> 00:12:10.078 scenarios, so certain cancers
NOTE Confidence: 0.833860231428572

00:12:10.080 --> 00:12:12.672 have required subspecialty training
NOTE Confidence: 0.833860231428572

00:12:12.672 --> 00:12:15.912 that not all pathologists have,
NOTE Confidence: 0.833860231428572

00:12:15.920 --> 00:12:18.356 where you practice,
NOTE Confidence: 0.833860231428572

00:12:18.360 --> 00:12:19.503 where you've trained,
NOTE Confidence: 0.833860231428572

00:12:19.503 --> 00:12:21.789 and what you've become an expert
NOTE Confidence: 0.833860231428572

00:12:21.789 --> 00:12:24.483 in really does matter and standards
NOTE Confidence: 0.833860231428572

00:12:24.483 --> 00:12:26.723 are different for different places.
NOTE Confidence: 0.833860231428572

00:12:26.796 --> 00:12:28.468 In the community setting,
NOTE Confidence: 0.833860231428572

00:12:28.470 --> 00:12:30.205 while there's very high
NOTE Confidence: 0.833860231428572

00:12:30.205 --> 00:12:31.593 standards of care there,
NOTE Confidence: 0.833860231428572

00:12:31.600 --> 00:12:35.704 they may not always see all of the unique

NOTE Confidence: 0.833860231428572
00:12:35.704 --> 00:12:40.492 rare tumors that we might have in a tertiary
NOTE Confidence: 0.833860231428572
00:12:40.492 --> 00:12:41.660 academic center.
NOTE Confidence: 0.833860231428572
00:12:41.660 --> 00:12:44.600 Whereas in an academic center like Yale
NOTE Confidence: 0.833860231428572
00:12:44.600 --> 00:12:48.420 we would be able to kind of explain a bit
NOTE Confidence: 0.833860231428572
00:12:48.420 --> 00:12:51.456 more if there are nuances to a tumor.
NOTE Confidence: 0.833860231428572
00:12:51.460 --> 00:12:52.724 So black and white,
NOTE Confidence: 0.833860231428572
00:12:52.724 --> 00:12:54.066 yes cancer or not,
NOTE Confidence: 0.833860231428572
00:12:54.066 --> 00:12:56.118 in the vast majority of cases.
NOTE Confidence: 0.833860231428572
00:12:56.120 --> 00:12:58.260 But for challenging cases,
NOTE Confidence: 0.833860231428572
00:12:58.260 --> 00:13:01.470 I think second opinions are definitely
NOTE Confidence: 0.833860231428572
00:13:01.554 --> 00:13:04.926 helpful with expert review and consensus.
NOTE Confidence: 0.833860231428572
00:13:04.930 --> 00:13:06.826 Daily Conference is something
NOTE Confidence: 0.833860231428572
00:13:06.826 --> 00:13:09.670 that is part of our routine,
NOTE Confidence: 0.833860231428572
00:13:09.670 --> 00:13:11.330 not always in all practices.
NOTE Confidence: 0.930813815
00:13:11.640 --> 00:13:14.496 So it's important to kind of
NOTE Confidence: 0.930813815

00:13:14.496 --> 00:13:16.759 understand the nuances of pathology.
NOTE Confidence: 0.930813815

00:13:16.760 --> 00:13:18.506 We're going to pick up this
NOTE Confidence: 0.930813815

00:13:18.506 --> 00:13:20.251 conversation right after we take a
NOTE Confidence: 0.930813815

00:13:20.251 --> 00:13:21.835 short break for a medical minute.
NOTE Confidence: 0.930813815

00:13:21.840 --> 00:13:23.856 Please stay tuned to learn more about
NOTE Confidence: 0.930813815

00:13:23.856 --> 00:13:25.806 the role of pathology in cancer
NOTE Confidence: 0.930813815

00:13:25.806 --> 00:13:27.846 with my guest Dr. Angelique Levi.
NOTE Confidence: 0.853743798

00:13:28.300 --> 00:13:30.290 Support for Yale Cancer Answers
NOTE Confidence: 0.853743798

00:13:30.290 --> 00:13:32.280 comes from Smilow Cancer Hospital,
NOTE Confidence: 0.853743798

00:13:32.280 --> 00:13:33.995 where a dedicated team approach
NOTE Confidence: 0.853743798

00:13:33.995 --> 00:13:36.144 is used to diagnose liver cancer
NOTE Confidence: 0.853743798

00:13:36.144 --> 00:13:38.346 early when treatment is optimal and
NOTE Confidence: 0.853743798

00:13:38.346 --> 00:13:40.283 new, more effective treatments are
NOTE Confidence: 0.853743798

00:13:40.283 --> 00:13:42.587 being developed. To learn more visit
NOTE Confidence: 0.56859666

00:13:44.690 --> 00:13:47.934 Yalecancercenter.org/liver
NOTE Confidence: 0.56859666

00:13:47.934 --> 00:13:50.526 Over 230,000 Americans will be diagnosed with lung

NOTE Confidence: 0.56859666

00:13:50.526 --> 00:13:52.957 cancer this year and in Connecticut

NOTE Confidence: 0.56859666

00:13:52.957 --> 00:13:56.392 alone there will be over 2700 new cases.

NOTE Confidence: 0.56859666

00:13:56.392 --> 00:13:58.912 More than 85% of lung cancer

NOTE Confidence: 0.56859666

00:13:58.912 --> 00:14:01.120 diagnosis are related to smoking and

NOTE Confidence: 0.56859666

00:14:01.193 --> 00:14:03.761 quitting even after decades of use

NOTE Confidence: 0.56859666

00:14:03.761 --> 00:14:05.951 can significantly reduce your risk

NOTE Confidence: 0.56859666

00:14:05.951 --> 00:14:08.250 of developing lung cancer. Each day,

NOTE Confidence: 0.56859666

00:14:08.250 --> 00:14:10.320 patients with lung cancer are surviving

NOTE Confidence: 0.56859666

00:14:10.320 --> 00:14:12.822 thanks to increased access to advanced

NOTE Confidence: 0.56859666

00:14:12.822 --> 00:14:14.574 therapies and specialized care,

NOTE Confidence: 0.56859666

00:14:14.580 --> 00:14:16.265 new treatment options and surgical

NOTE Confidence: 0.56859666

00:14:16.265 --> 00:14:17.950 techniques are giving lung cancer

NOTE Confidence: 0.56859666

00:14:17.950 --> 00:14:19.630 survivors more hope than they

NOTE Confidence: 0.56859666

00:14:19.630 --> 00:14:20.974 have ever had before.

NOTE Confidence: 0.56859666

00:14:20.980 --> 00:14:22.896 Clinical trials are currently
NOTE Confidence: 0.56859666

00:14:22.896 --> 00:14:24.812 underway at federally designated
NOTE Confidence: 0.56859666

00:14:24.812 --> 00:14:26.290 Comprehensive cancer centers,
NOTE Confidence: 0.56859666

00:14:26.290 --> 00:14:28.502 such as the battle two trial at
NOTE Confidence: 0.56859666

00:14:28.502 --> 00:14:30.129 Yale Cancer Center and Smilow
NOTE Confidence: 0.56859666

00:14:30.129 --> 00:14:32.257 Cancer Hospital to learn if a drug
NOTE Confidence: 0.56859666

00:14:32.257 --> 00:14:34.555 or combination of drugs based on
NOTE Confidence: 0.56859666

00:14:34.555 --> 00:14:36.485 personal biomarkers can help to
NOTE Confidence: 0.56859666

00:14:36.490 --> 00:14:39.220 control non small cell lung cancer.
NOTE Confidence: 0.56859666

00:14:39.220 --> 00:14:42.210 More information is available at
NOTE Confidence: 0.56859666

00:14:42.210 --> 00:14:43.980 yalecancercenter.org. You're listening
NOTE Confidence: 0.56859666

00:14:43.980 --> 00:14:46.340 to Connecticut Public Radio.
NOTE Confidence: 0.56859666

00:14:46.840 --> 00:14:48.560 Welcome back to Yale Cancer Answers.
NOTE Confidence: 0.861854458

00:14:48.560 --> 00:14:50.387 This is doctor Anees Chagpar
NOTE Confidence: 0.861854458

00:14:50.387 --> 00:14:52.255 and I'm joined tonight by my
NOTE Confidence: 0.861854458

00:14:52.255 --> 00:14:53.619 guest doctor Angelique Levi.

NOTE Confidence: 0.861854458

00:14:53.620 --> 00:14:56.050 We're talking about the role of

NOTE Confidence: 0.861854458

00:14:56.050 --> 00:14:58.480 pathology in cancer and Angelique,

NOTE Confidence: 0.861854458

00:14:58.480 --> 00:15:00.440 you know one of the things that you

NOTE Confidence: 0.861854458

00:15:00.440 --> 00:15:01.843 mentioned before the break that I

NOTE Confidence: 0.861854458

00:15:01.843 --> 00:15:03.430 was interested in is that you said

NOTE Confidence: 0.861854458

00:15:03.430 --> 00:15:05.886 we are getting close to a

NOTE Confidence: 0.861854458

00:15:05.886 --> 00:15:08.500 time when pathologists might not be

NOTE Confidence: 0.861854458

00:15:08.500 --> 00:15:10.905 looking down the microscope anymore.

NOTE Confidence: 0.861854458

00:15:10.910 --> 00:15:13.297 They might be looking at a computer

NOTE Confidence: 0.861854458

00:15:13.297 --> 00:15:15.585 screen and that brought to mind

NOTE Confidence: 0.861854458

00:15:15.585 --> 00:15:17.530 this whole concept of digital

NOTE Confidence: 0.861854458

00:15:17.606 --> 00:15:20.201 pathology and potentially the role

NOTE Confidence: 0.861854458

00:15:20.201 --> 00:15:22.796 of artificial intelligence in helping

NOTE Confidence: 0.861854458

00:15:22.870 --> 00:15:25.250 pathologists make that diagnosis.

NOTE Confidence: 0.861854458

00:15:25.250 --> 00:15:27.350 You talked a little bit before the

NOTE Confidence: 0.861854458

00:15:27.350 --> 00:15:29.198 break about some of the nuances.
NOTE Confidence: 0.861854458

00:15:29.200 --> 00:15:31.664 Can you talk a little bit about
NOTE Confidence: 0.861854458

00:15:31.670 --> 00:15:34.856 where you see digital pathology and
NOTE Confidence: 0.861854458

00:15:34.860 --> 00:15:37.079 the role of AI kind of playing
NOTE Confidence: 0.861854458

00:15:37.079 --> 00:15:39.089 into pathology as we move forward?
NOTE Confidence: 0.87030574125

00:15:39.440 --> 00:15:44.389 Absolutely, the landscape is already
NOTE Confidence: 0.87030574125

00:15:44.389 --> 00:15:50.476 changing and the field is rapidly evolving.
NOTE Confidence: 0.87030574125

00:15:50.480 --> 00:15:53.780 And pathologists, I think are
NOTE Confidence: 0.87030574125

00:15:53.780 --> 00:15:57.868 definitely stepping up and wanting to
NOTE Confidence: 0.87030574125

00:15:57.868 --> 00:16:03.378 not just join this era of digital and
NOTE Confidence: 0.87030574125

00:16:03.378 --> 00:16:05.318 artificial intelligence as you say,
NOTE Confidence: 0.87030574125

00:16:05.320 --> 00:16:07.685 machine learning, but hopefully
NOTE Confidence: 0.87030574125

00:16:07.685 --> 00:16:11.200 also take a role in leading that
NOTE Confidence: 0.87030574125

00:16:11.200 --> 00:16:13.840 charge and for pathology there are
NOTE Confidence: 0.87030574125

00:16:13.840 --> 00:16:16.246 so many potential applications as
NOTE Confidence: 0.87030574125

00:16:16.246 --> 00:16:19.258 with everything AI is everywhere.

NOTE Confidence: 0.87030574125

00:16:19.260 --> 00:16:20.692 We don't necessarily appreciate

NOTE Confidence: 0.87030574125

00:16:20.692 --> 00:16:23.220 it from our phones and our apps,

NOTE Confidence: 0.87030574125

00:16:23.220 --> 00:16:26.640 or for many the interfaces we do each day,

NOTE Confidence: 0.87030574125

00:16:26.640 --> 00:16:29.706 but it's a tool no different

NOTE Confidence: 0.87030574125

00:16:29.706 --> 00:16:31.948 than for pathology,

NOTE Confidence: 0.87030574125

00:16:31.948 --> 00:16:33.676 maybe an immunostain and

NOTE Confidence: 0.87030574125

00:16:33.676 --> 00:16:35.339 molecular marker or genetic

NOTE Confidence: 0.87030574125

00:16:35.340 --> 00:16:38.706 profile and how we use that tool

NOTE Confidence: 0.87030574125

00:16:38.706 --> 00:16:42.135 is largely dependent on

NOTE Confidence: 0.87030574125

00:16:42.140 --> 00:16:44.780 what help or guidance a particular

NOTE Confidence: 0.87030574125

00:16:44.780 --> 00:16:47.654 practice might be looking for.

NOTE Confidence: 0.87030574125

00:16:47.654 --> 00:16:50.510 One example of AI and pathology as

NOTE Confidence: 0.87030574125

00:16:50.510 --> 00:16:53.079 you mentioned or alluded to would be,

NOTE Confidence: 0.87030574125

00:16:53.080 --> 00:16:55.838 helping to make a diagnosis

NOTE Confidence: 0.87030574125

00:16:55.838 --> 00:16:59.060 or grading a tumor.

NOTE Confidence: 0.87030574125

00:16:59.060 --> 00:17:03.391 So an area of study that I
NOTE Confidence: 0.87030574125

00:17:03.391 --> 00:17:06.076 have pursued in GU pathology
NOTE Confidence: 0.87030574125

00:17:06.080 --> 00:17:07.481 and in prostate cancer
NOTE Confidence: 0.87030574125

00:17:07.481 --> 00:17:10.992 this is a common application now
NOTE Confidence: 0.87030574125

00:17:10.992 --> 00:17:15.097 and there are already software
NOTE Confidence: 0.87030574125

00:17:15.097 --> 00:17:18.960 companies that are promoting
NOTE Confidence: 0.87030574125

00:17:18.960 --> 00:17:22.596 AI programs and software that can
NOTE Confidence: 0.87030574125

00:17:22.596 --> 00:17:25.742 reliably help predict grades or
NOTE Confidence: 0.87030574125

00:17:25.742 --> 00:17:28.837 Gleason scoring of prostate cancer.
NOTE Confidence: 0.87030574125

00:17:28.840 --> 00:17:33.570 But it's not that simple.
NOTE Confidence: 0.87030574125

00:17:33.570 --> 00:17:38.085 Depending on the cancers that might be
NOTE Confidence: 0.87030574125

00:17:38.090 --> 00:17:40.430 seen in a given institution,
NOTE Confidence: 0.87030574125

00:17:40.430 --> 00:17:42.728 whether it's more common,
NOTE Confidence: 0.87030574125

00:17:42.730 --> 00:17:46.178 lower grade, or in a tertiary care center,
NOTE Confidence: 0.87030574125

00:17:46.180 --> 00:17:47.506 much more complicated,
NOTE Confidence: 0.87030574125

00:17:47.506 --> 00:17:49.304 higher grade,

NOTE Confidence: 0.87030574125

00:17:49.304 --> 00:17:52.470 algorithms are kind of taught to

NOTE Confidence: 0.87030574125

00:17:52.470 --> 00:17:55.110 answer a specific question or grade.

NOTE Confidence: 0.87030574125

00:17:55.110 --> 00:17:58.270 So if you're looking for well differentiated

NOTE Confidence: 0.87030574125

00:17:58.270 --> 00:18:01.385 prostate cancer 3 + 3 Gleason score,

NOTE Confidence: 0.87030574125

00:18:01.390 --> 00:18:03.688 that might be one training set,

NOTE Confidence: 0.87030574125

00:18:03.690 --> 00:18:06.725 whereas if you're looking for

NOTE Confidence: 0.87030574125

00:18:06.725 --> 00:18:09.153 high grade prostate cancer,

NOTE Confidence: 0.87030574125

00:18:09.160 --> 00:18:11.164 that is

NOTE Confidence: 0.87030574125

00:18:11.164 --> 00:18:13.168 amenable not to resection,

NOTE Confidence: 0.87030574125

00:18:13.170 --> 00:18:14.433 but further treatment,

NOTE Confidence: 0.87030574125

00:18:14.433 --> 00:18:16.538 that might be another training

NOTE Confidence: 0.87030574125

00:18:16.538 --> 00:18:18.269 software kind of algorithm,

NOTE Confidence: 0.87030574125

00:18:18.270 --> 00:18:20.502 so much depends on

NOTE Confidence: 0.87030574125

00:18:20.502 --> 00:18:21.990 the question being asked,

NOTE Confidence: 0.87030574125

00:18:21.990 --> 00:18:24.419 and it's not just help in grading,

NOTE Confidence: 0.87030574125

00:18:24.420 --> 00:18:27.768 but it could also just be help in detection,
NOTE Confidence: 0.87030574125

00:18:27.770 --> 00:18:30.630 so different programs can be
NOTE Confidence: 0.87030574125

00:18:30.630 --> 00:18:34.220 taught how to do different tasks,
NOTE Confidence: 0.87030574125

00:18:34.220 --> 00:18:36.518 and another program might be in
NOTE Confidence: 0.87030574125

00:18:36.518 --> 00:18:38.870 a better setting for community
NOTE Confidence: 0.87030574125

00:18:38.870 --> 00:18:41.696 practice not to miss cancer
NOTE Confidence: 0.87030574125

00:18:41.696 --> 00:18:43.896 as much as
NOTE Confidence: 0.87030574125

00:18:43.896 --> 00:18:46.647 focusing on the grade because
NOTE Confidence: 0.87030574125

00:18:46.650 --> 00:18:48.898 detection and preventing false
NOTE Confidence: 0.87030574125

00:18:48.898 --> 00:18:52.270 negatives would really be the key
00:18:52.878 --> 00:18:54.398 perhaps in a Community setting
NOTE Confidence: 0.87030574125

00:18:54.398 --> 00:18:56.070 with a lower cancer rate,
NOTE Confidence: 0.87030574125

00:18:56.070 --> 00:18:58.920 whereas at the tertiary setting something
NOTE Confidence: 0.87030574125

00:18:58.920 --> 00:19:03.050 that would be more helpful is perhaps
NOTE Confidence: 0.87030574125

00:19:03.050 --> 00:19:05.918 an AI software algorithm that not
NOTE Confidence: 0.87030574125

00:19:05.918 --> 00:19:08.639 just helps with detection or grade,
NOTE Confidence: 0.87030574125

00:19:08.640 --> 00:19:10.216 but maybe with prognosis.

NOTE Confidence: 0.87030574125

00:19:10.216 --> 00:19:12.991 And that's really the key,

NOTE Confidence: 0.87030574125

00:19:12.991 --> 00:19:15.639 trying to discern what this AI can help

NOTE Confidence: 0.87030574125

00:19:15.639 --> 00:19:18.158 with and how we'd like to apply it,

00:19:21.010 --> 00:19:22.459 tailoring the solution to the problem.

NOTE Confidence: 0.895610081538461

00:19:22.460 --> 00:19:25.886 But one of the questions is this.

NOTE Confidence: 0.895610081538461

00:19:25.886 --> 00:19:28.184 Are these technologies in use now?

NOTE Confidence: 0.895610081538461

00:19:28.190 --> 00:19:30.710 And is there a way for patients to

NOTE Confidence: 0.895610081538461

00:19:30.710 --> 00:19:32.742 know whether a particular pathology

NOTE Confidence: 0.895610081538461

00:19:32.742 --> 00:19:35.262 department is using that or not?

NOTE Confidence: 0.895610081538461

00:19:35.270 --> 00:19:36.155 For example,

NOTE Confidence: 0.895610081538461

00:19:36.155 --> 00:19:39.242 if I just had a biopsy at my

NOTE Confidence: 0.895610081538461

00:19:39.242 --> 00:19:41.454 Community Hospital and I want to make

NOTE Confidence: 0.895610081538461

00:19:41.528 --> 00:19:44.055 sure that they didn't miss a cancer,

NOTE Confidence: 0.895610081538461

00:19:44.060 --> 00:19:47.750 should I expect that they have that kind of

NOTE Confidence: 0.895610081538461

00:19:47.750 --> 00:19:50.598 technology that can help the pathologists?

NOTE Confidence: 0.895610081538461

00:19:50.600 --> 00:19:52.350 And if I'm not sure,
NOTE Confidence: 0.895610081538461

00:19:52.350 --> 00:19:53.519 is there a way to find out?
NOTE Confidence: 0.9514953568

00:19:53.750 --> 00:19:55.864 There's always a way to find
NOTE Confidence: 0.9514953568

00:19:55.864 --> 00:19:57.886 out and certainly just calling that
NOTE Confidence: 0.9514953568

00:19:57.886 --> 00:19:59.992 pathologist on the bottom of the
NOTE Confidence: 0.9514953568

00:19:59.992 --> 00:20:01.890 report would be the first step.
00:20:04.640 --> 00:20:07.028 Or wherever those procedures are done would
NOTE Confidence: 0.9514953568

00:20:07.028 --> 00:20:09.350 certainly know within the department,
NOTE Confidence: 0.9514953568

00:20:09.350 --> 00:20:12.519 I would say we're still on the cusp.
NOTE Confidence: 0.9514953568

00:20:18.410 --> 00:20:21.834 I think right now in tertiary care centers,
NOTE Confidence: 0.9514953568

00:20:21.840 --> 00:20:25.256 there are many kinds of testing and
NOTE Confidence: 0.9514953568

00:20:25.256 --> 00:20:27.496 research scenarios and these
NOTE Confidence: 0.9514953568

00:20:27.496 --> 00:20:30.392 are all kind of sprouting
NOTE Confidence: 0.9514953568

00:20:30.392 --> 00:20:33.460 up now and it's not to
NOTE Confidence: 0.9514953568

00:20:33.460 --> 00:20:35.800 be expected I would say because
NOTE Confidence: 0.9514953568

00:20:35.800 --> 00:20:39.226 it requires so much investment and
NOTE Confidence: 0.9514953568

00:20:39.226 --> 00:20:43.038 infrastructure.
00:20:46.523 --> 00:20:50.814 Whether it's cloud based
NOTE Confidence: 0.9514953568
00:20:50.814 --> 00:20:54.520 memory or machine or human time,
NOTE Confidence: 0.9514953568
00:20:54.520 --> 00:20:57.861 we can't expect that to all be there.
NOTE Confidence: 0.9514953568
00:20:57.861 --> 00:21:01.298 Now I would say you know,
NOTE Confidence: 0.9514953568
00:21:01.298 --> 00:21:03.496 in the future 5 to 10 years,
NOTE Confidence: 0.9514953568
00:21:03.500 --> 00:21:05.198 10 to 15 years, I think
NOTE Confidence: 0.9514953568
00:21:05.200 --> 00:21:07.208 then we can start
NOTE Confidence: 0.9514953568
00:21:07.208 --> 00:21:09.890 to see where these
NOTE Confidence: 0.9514953568
00:21:09.890 --> 00:21:12.230 applications are best suited,
NOTE Confidence: 0.9514953568
00:21:12.230 --> 00:21:16.579 and imagine with all of this investment
NOTE Confidence: 0.9514953568
00:21:16.579 --> 00:21:21.340 it would probably be helpful as a QC measure.
NOTE Confidence: 0.9514953568
00:21:21.340 --> 00:21:24.322 You know there are always reimbursement
NOTE Confidence: 0.9514953568
00:21:24.322 --> 00:21:26.848 codes for things that are additive,
NOTE Confidence: 0.9514953568
00:21:26.848 --> 00:21:28.758 whether it's a stain or
NOTE Confidence: 0.9514953568
00:21:28.758 --> 00:21:30.279 whether it's AI assisted.
NOTE Confidence: 0.9514953568

00:21:30.280 --> 00:21:33.400 So I imagine in the future it would also be
NOTE Confidence: 0.9514953568

00:21:33.481 --> 00:21:36.601 part of a report and so you know we're not
NOTE Confidence: 0.9514953568

00:21:36.610 --> 00:21:40.010 there yet, but it does take a lot of time,
NOTE Confidence: 0.9514953568

00:21:40.010 --> 00:21:40.462 infrastructure,
NOTE Confidence: 0.9514953568

00:21:40.462 --> 00:21:42.270 and money frankly,
NOTE Confidence: 0.9514953568

00:21:42.270 --> 00:21:44.790 and so until those costs come
NOTE Confidence: 0.9514953568

00:21:44.790 --> 00:21:46.850 down or those partnerships are
NOTE Confidence: 0.9514953568

00:21:46.850 --> 00:21:48.682 established, things
NOTE Confidence: 0.9514953568

00:21:48.682 --> 00:21:50.514 may be commercially available
00:21:53.495 --> 00:21:56.588 at a price that is affordable for you.
00:22:03.976 --> 00:22:07.649 The other thing that is here now
NOTE Confidence: 0.8434569783333333

00:22:07.650 --> 00:22:10.226 more and more in the cancer world is
NOTE Confidence: 0.8434569783333333

00:22:10.226 --> 00:22:12.306 this whole concept of personalized
NOTE Confidence: 0.8434569783333333

00:22:12.306 --> 00:22:15.024 medicine and so many clinicians are
NOTE Confidence: 0.8434569783333333

00:22:15.024 --> 00:22:17.609 really now trying to unlock and
NOTE Confidence: 0.8434569783333333

00:22:17.609 --> 00:22:19.669 understand the genomics of cancers.
NOTE Confidence: 0.8434569783333333

00:22:19.670 --> 00:22:22.316 And we've certainly had guests on this

NOTE Confidence: 0.843456978333333
00:22:22.316 --> 00:22:24.924 show who talk about doing stains that
NOTE Confidence: 0.843456978333333
00:22:24.924 --> 00:22:27.750 look at a number of different
NOTE Confidence: 0.843456978333333
00:22:27.750 --> 00:22:31.155 genetic and genomic mutations that
NOTE Confidence: 0.843456978333333
00:22:31.155 --> 00:22:34.195 actually help in figuring out how
NOTE Confidence: 0.843456978333333
00:22:34.195 --> 00:22:37.400 a particular tumor may be treated.
NOTE Confidence: 0.843456978333333
00:22:37.400 --> 00:22:40.480 Is that done at the local pathology lab?
NOTE Confidence: 0.843456978333333
00:22:40.480 --> 00:22:43.128 What's the role of the pathologist in that?
NOTE Confidence: 0.843456978333333
00:22:43.130 --> 00:22:45.986 How do you decide which of these
NOTE Confidence: 0.843456978333333
00:22:45.986 --> 00:22:48.138 markers really needs to be done?
NOTE Confidence: 0.843456978333333
00:22:48.140 --> 00:22:50.772 What's the cost and is that standard
NOTE Confidence: 0.843456978333333
00:22:50.772 --> 00:22:53.691 of care or is that something that
NOTE Confidence: 0.843456978333333
00:22:53.691 --> 00:22:55.881 patients need to really individualize?
NOTE Confidence: 0.871526649333333
00:22:56.540 --> 00:22:59.852 So at the local level I don't
NOTE Confidence: 0.871526649333333
00:22:59.852 --> 00:23:03.218 think it's necessarily standard of care.
NOTE Confidence: 0.871526649333333
00:23:03.220 --> 00:23:05.611 Certainly immunostains,
00:23:08.800 --> 00:23:11.824 certain markers that are common

NOTE Confidence: 0.871526649333333
00:23:11.824 --> 00:23:14.832 to lay folks would be,
NOTE Confidence: 0.871526649333333
00:23:14.832 --> 00:23:16.668 we talk about estrogen and progesterone
NOTE Confidence: 0.871526649333333
00:23:16.668 --> 00:23:18.020 receptors for breast cancer.
NOTE Confidence: 0.871526649333333
00:23:18.020 --> 00:23:19.571 For example, ER,
NOTE Confidence: 0.871526649333333
00:23:19.571 --> 00:23:22.156 PR and certain molecular markers.
NOTE Confidence: 0.871526649333333
00:23:22.160 --> 00:23:24.900 I think in Community practice
NOTE Confidence: 0.871526649333333
00:23:24.900 --> 00:23:27.092 the idea is
NOTE Confidence: 0.871526649333333
00:23:27.100 --> 00:23:29.112 to partner often with
NOTE Confidence: 0.871526649333333
00:23:29.112 --> 00:23:30.976 another lab.
NOTE Confidence: 0.871526649333333
00:23:30.976 --> 00:23:33.116 Whether it's a tertiary center,
NOTE Confidence: 0.871526649333333
00:23:33.120 --> 00:23:36.054 a commercial lab that offers those
NOTE Confidence: 0.871526649333333
00:23:36.054 --> 00:23:39.177 tests because they are not able to
NOTE Confidence: 0.871526649333333
00:23:39.177 --> 00:23:42.300 have access to all of that in house,
NOTE Confidence: 0.871526649333333
00:23:42.300 --> 00:23:45.324 and so a lab like
NOTE Confidence: 0.871526649333333
00:23:45.324 --> 00:23:47.240 ours comes into play,
NOTE Confidence: 0.871526649333333

00:23:47.240 --> 00:23:50.194 where if we have something to offer,
NOTE Confidence: 0.8715266493333333

00:23:50.200 --> 00:23:53.595 we can partner with other network hospitals,
NOTE Confidence: 0.8715266493333333

00:23:53.600 --> 00:23:54.520 community hospitals,
NOTE Confidence: 0.8715266493333333

00:23:54.520 --> 00:23:57.740 even other labs that might not have
NOTE Confidence: 0.8715266493333333

00:23:57.740 --> 00:24:00.132 the same volume we do in a Cancer
NOTE Confidence: 0.8715266493333333

00:24:00.132 --> 00:24:02.884 Center to provide all of these highly
NOTE Confidence: 0.8715266493333333

00:24:02.884 --> 00:24:05.457 specialized tests that without a certain
NOTE Confidence: 0.8715266493333333

00:24:05.457 --> 00:24:07.959 volume it's not affordable to run.
NOTE Confidence: 0.8715266493333333

00:24:07.960 --> 00:24:12.064 So I think the same thing holds for
NOTE Confidence: 0.8715266493333333

00:24:12.070 --> 00:24:14.566 additional molecular assays.
NOTE Confidence: 0.8715266493333333

00:24:14.566 --> 00:24:19.558 Panel genetic profiling those are highly
NOTE Confidence: 0.8715266493333333

00:24:19.558 --> 00:24:23.154 specialized areas and fields that
NOTE Confidence: 0.8715266493333333

00:24:23.154 --> 00:24:25.739 without partnering with another kind
NOTE Confidence: 0.8715266493333333

00:24:25.739 --> 00:24:29.010 of tertiary care center or larger
NOTE Confidence: 0.8715266493333333

00:24:29.010 --> 00:24:31.735 lab specifically geared towards that,
NOTE Confidence: 0.8715266493333333

00:24:31.740 --> 00:24:33.792 I think it's not

NOTE Confidence: 0.871526649333333
00:24:33.792 --> 00:24:35.710 expected at the local level.
NOTE Confidence: 0.92968826
00:24:36.060 --> 00:24:38.562 So are the decisions about what
NOTE Confidence: 0.92968826
00:24:38.562 --> 00:24:40.900 additional tests need to be done,
NOTE Confidence: 0.92968826
00:24:40.900 --> 00:24:42.112 so additional molecular
NOTE Confidence: 0.92968826
00:24:42.112 --> 00:24:44.770 tests and so on, EGFR VEGF,
NOTE Confidence: 0.92968826
00:24:44.770 --> 00:24:46.330 various mutational panels
NOTE Confidence: 0.92968826
00:24:46.330 --> 00:24:49.600 and so on are those decisions
NOTE Confidence: 0.92968826
00:24:49.600 --> 00:24:53.050 made by the pathologist, by the
NOTE Confidence: 0.92968826
00:24:53.050 --> 00:24:55.619 treating clinician, by a group?
NOTE Confidence: 0.92968826
00:24:55.620 --> 00:24:57.268 How are those decided?
NOTE Confidence: 0.877901952608696
00:24:57.930 --> 00:25:00.762 I think in the Community level
NOTE Confidence: 0.877901952608696
00:25:00.762 --> 00:25:03.517 the oncologist drives a lot of that because
NOTE Confidence: 0.877901952608696
00:25:03.517 --> 00:25:06.060 the oncologist sees on that leading edge
NOTE Confidence: 0.877901952608696
00:25:06.060 --> 00:25:09.756 what the potential drugs that are
NOTE Confidence: 0.877901952608696
00:25:09.756 --> 00:25:13.631 available that are targeted to a
NOTE Confidence: 0.877901952608696

00:25:13.631 --> 00:25:16.746 particular molecular change, and so in
NOTE Confidence: 0.877901952608696

00:25:16.746 --> 00:25:19.420 the Community setting,
NOTE Confidence: 0.877901952608696

00:25:19.420 --> 00:25:21.850 I think the oncologist takes that
NOTE Confidence: 0.877901952608696

00:25:21.850 --> 00:25:25.288 role more so in asking a pathologist,
NOTE Confidence: 0.877901952608696

00:25:25.290 --> 00:25:28.755 hey, there's a new drug and it targets
NOTE Confidence: 0.877901952608696

00:25:28.760 --> 00:25:29.657 this molecular marker.
NOTE Confidence: 0.877901952608696

00:25:29.657 --> 00:25:32.030 Is that something you do in your lab?
00:25:33.600 --> 00:25:35.376 Or is it something we can send out for?
NOTE Confidence: 0.877901952608696

00:25:35.380 --> 00:25:36.800 And then you know,
NOTE Confidence: 0.877901952608696

00:25:36.800 --> 00:25:38.220 the pathologist facilitates that.
NOTE Confidence: 0.877901952608696

00:25:38.220 --> 00:25:40.033 And so that I think happens
NOTE Confidence: 0.877901952608696

00:25:40.033 --> 00:25:41.759 more on the Community side,
NOTE Confidence: 0.877901952608696

00:25:41.760 --> 00:25:44.736 whereas I think in the tertiary care setting,
NOTE Confidence: 0.877901952608696

00:25:44.740 --> 00:25:45.412 like here,
NOTE Confidence: 0.877901952608696

00:25:45.412 --> 00:25:48.280 I think it is a bit more of a
NOTE Confidence: 0.877901952608696

00:25:48.280 --> 00:25:50.420 collaborative effort because there
NOTE Confidence: 0.877901952608696

00:25:50.420 --> 00:25:53.630 are there are the pathologists
NOTE Confidence: 0.877901952608696

00:25:53.712 --> 00:25:56.246 here who are doing those genetic tests
NOTE Confidence: 0.877901952608696

00:25:56.246 --> 00:25:59.399 and so we also have our tumor boards
NOTE Confidence: 0.877901952608696

00:25:59.399 --> 00:26:01.376 that while they have been outside
NOTE Confidence: 0.877901952608696

00:26:01.376 --> 00:26:03.140 at the Community level as well,
NOTE Confidence: 0.877901952608696

00:26:03.140 --> 00:26:04.976 I think in a Cancer Center,
NOTE Confidence: 0.877901952608696

00:26:04.980 --> 00:26:06.820 the tumor boards really are
NOTE Confidence: 0.877901952608696

00:26:06.820 --> 00:26:08.660 putting everyone at the table.
NOTE Confidence: 0.877901952608696

00:26:08.660 --> 00:26:11.540 Who has that subspecialty expertise?
NOTE Confidence: 0.877901952608696

00:26:11.540 --> 00:26:13.380 And so I think it's a bit more
NOTE Confidence: 0.877901952608696

00:26:13.380 --> 00:26:15.299 of a collaborative effort.
NOTE Confidence: 0.877901952608696

00:26:15.300 --> 00:26:18.485 And if there's something that is
NOTE Confidence: 0.877901952608696

00:26:18.485 --> 00:26:20.855 clinically warranted or a new drug,
NOTE Confidence: 0.877901952608696

00:26:20.860 --> 00:26:24.885 I think the pathologists here in a
NOTE Confidence: 0.877901952608696

00:26:24.885 --> 00:26:28.320 tertiary center are able to create
NOTE Confidence: 0.877901952608696

00:26:28.320 --> 00:26:30.396 these answers to some of

NOTE Confidence: 0.877901952608696
00:26:30.396 --> 00:26:32.140 those questions or research them,
NOTE Confidence: 0.877901952608696
00:26:32.140 --> 00:26:35.076 or they're already a line of research here
NOTE Confidence: 0.877901952608696
00:26:35.080 --> 00:26:39.385 in the department or collectively.
00:26:40.730 --> 00:26:43.510 Which segues nicely into you,
NOTE Confidence: 0.80476396
00:26:43.510 --> 00:26:44.908 know, one of my last questions,
NOTE Confidence: 0.80476396
00:26:44.910 --> 00:26:47.806 which is what are the exciting areas of
NOTE Confidence: 0.80476396
00:26:47.806 --> 00:26:50.309 research in pathology and cancer?
NOTE Confidence: 0.80476396
00:26:50.310 --> 00:26:52.890 I mean, it seems like pathology
NOTE Confidence: 0.80476396
00:26:52.890 --> 00:26:55.688 is so central to what we do.
NOTE Confidence: 0.80476396
00:26:55.690 --> 00:26:57.735 Are there some exciting developments
NOTE Confidence: 0.80476396
00:26:57.735 --> 00:27:00.389 that you see coming down the Pike
NOTE Confidence: 0.80476396
00:27:00.390 --> 00:27:02.616 in terms of pathology and cancer?
NOTE Confidence: 0.894017883846154
00:27:03.290 --> 00:27:06.398 Well, I definitely think the
NOTE Confidence: 0.894017883846154
00:27:06.398 --> 00:27:08.470 digital pathology component and
NOTE Confidence: 0.894017883846154
00:27:08.558 --> 00:27:10.898 the artificial intelligence piece
NOTE Confidence: 0.894017883846154
00:27:10.900 --> 00:27:12.420 is very exciting.

00:27:13.940 --> 00:27:15.940 It's entirely a new platform
NOTE Confidence: 0.894017883846154

00:27:15.940 --> 00:27:18.035 and revolution, so to speak.
NOTE Confidence: 0.894017883846154

00:27:18.035 --> 00:27:20.225 It's something that can be applied
NOTE Confidence: 0.894017883846154

00:27:20.225 --> 00:27:22.866 to all of the tools that we have
NOTE Confidence: 0.894017883846154

00:27:22.866 --> 00:27:25.199 and then it's a tool on its own.
NOTE Confidence: 0.894017883846154

00:27:25.200 --> 00:27:29.394 So what I mean by that is the
NOTE Confidence: 0.894017883846154

00:27:29.394 --> 00:27:32.786 ability to work with digital images,
NOTE Confidence: 0.894017883846154

00:27:32.786 --> 00:27:35.678 whether it's radiology or
NOTE Confidence: 0.894017883846154

00:27:35.678 --> 00:27:38.570 scanned pathology slide and
NOTE Confidence: 0.894017883846154

00:27:38.570 --> 00:27:44.120 with that scan slide use metrics or
NOTE Confidence: 0.894017883846154

00:27:44.120 --> 00:27:47.284 segmentation to detect changes
NOTE Confidence: 0.894017883846154

00:27:47.284 --> 00:27:50.390 that maybe even the human eye can't.
NOTE Confidence: 0.894017883846154

00:27:50.390 --> 00:27:52.686 And maybe it's not just about morphology,
NOTE Confidence: 0.894017883846154

00:27:52.690 --> 00:27:55.636 it's just a whole other level
NOTE Confidence: 0.894017883846154

00:27:55.636 --> 00:27:58.240 of detection
NOTE Confidence: 0.894017883846154

00:27:58.240 --> 00:28:00.905 in addition to our molecular

NOTE Confidence: 0.894017883846154
00:28:00.905 --> 00:28:03.037 assays and genetic profiles,
NOTE Confidence: 0.894017883846154
00:28:03.040 --> 00:28:05.912 is something that can on its own be
NOTE Confidence: 0.894017883846154
00:28:05.912 --> 00:28:08.800 additive and the exciting pieces when it
NOTE Confidence: 0.894017883846154
00:28:08.800 --> 00:28:12.316 is also its own prognostic indicator,
NOTE Confidence: 0.894017883846154
00:28:12.320 --> 00:28:14.852 and so we're always interested in
NOTE Confidence: 0.894017883846154
00:28:14.852 --> 00:28:17.140 knowing more about the meaning of
NOTE Confidence: 0.894017883846154
00:28:17.140 --> 00:28:19.180 the cancer and what effect
NOTE Confidence: 0.894017883846154
00:28:19.180 --> 00:28:21.558 that has on outcome and prognosis,
NOTE Confidence: 0.894017883846154
00:28:21.560 --> 00:28:23.960 and AI really has the potential
NOTE Confidence: 0.894017883846154
00:28:23.960 --> 00:28:28.390 to help each of these special
NOTE Confidence: 0.894017883846154
00:28:28.390 --> 00:28:30.124 techniques that we use and the
NOTE Confidence: 0.894017883846154
00:28:30.124 --> 00:28:31.810 ability to stand on its own.
NOTE Confidence: 0.834214565333333
00:28:32.490 --> 00:28:34.405 Doctor Angelique Levi is an
NOTE Confidence: 0.834214565333333
00:28:34.405 --> 00:28:35.937 associate professor of pathology
NOTE Confidence: 0.834214565333333
00:28:35.937 --> 00:28:38.086 at the Yale School of Medicine.
NOTE Confidence: 0.834214565333333

00:28:38.090 --> 00:28:39.254 If you have questions,
NOTE Confidence: 0.8342145653333333

00:28:39.254 --> 00:28:40.418 the address is cancer
NOTE Confidence: 0.8342145653333333

00:28:40.420 --> 00:28:43.465 Answers at yale.edu and past editions of
NOTE Confidence: 0.8342145653333333

00:28:43.465 --> 00:28:46.532 the program are available in audio and
NOTE Confidence: 0.8342145653333333

00:28:46.532 --> 00:28:48.112 written form at yalecancercenter.org.
NOTE Confidence: 0.8342145653333333

00:28:48.112 --> 00:28:50.608 We hope you'll join us next week to
NOTE Confidence: 0.8342145653333333

00:28:50.608 --> 00:28:52.511 learn more about the fight against
NOTE Confidence: 0.8342145653333333

00:28:52.511 --> 00:28:54.046 cancer here on Connecticut Public Radio.
NOTE Confidence: 0.8342145653333333

00:28:54.102 --> 00:28:55.562 Funding for Yale Cancer
NOTE Confidence: 0.8342145653333333

00:28:55.562 --> 00:28:57.022 Answers is provided by Smilow
NOTE Confidence: 0.8342145653333333

00:28:57.030 --> 00:29:00.000 Cancer Hospital and AstraZeneca.