National Pathology Week - A day in the lab
4 November 2026,

Rav Sodi
Good evening, wherever you are, and welcome to today's webinar, which is entitled A Day in the Lab. My name is Rav Sodi. I'm a consultant clinical biochemist at Mid and South Essex NHS Trust. I'm also the director of communications and publications of the Association for Laboratory Medicine. This is your session this evening. I know you're all eager to learn how you can get into this profession. So we're here to try and help you. But before we start, just a few things. Can you please all make sure you're on mute? I believe you are. And make sure your video is all turned off. You can contribute to the conversation and ask questions by typing in the chat function. After the speakers have all done their presentations, we'll endeavour to answer as many questions as possible and get back to you.

Now, if you have a specific question, you will notice in the chat, we've got an inquiry e-mail. So you can pose your question there. Okay, so just a little bit about the association. The Association for Laboratory Medicine, also known as LabMed for short, is a professional organisation for members, and it also acts as a trade union. And we're dedicated to the practice and promotion of clinical science. So if you have any questions, you need any more details, please visit the website at labmed.org.uk for details regarding what we do and how you can pursue a career in laboratory medicine if you're interested. You can also find details at the Royal College of Pathologists website. And importantly, if you're looking to start a career in the clinical sciences, please make sure you visit the website, National School of Healthcare Science. All the details regarding applications, regarding eligibility criteria are all there.

And just for information, for those of you who are looking to apply, the application is open sometime in January 2027. Without much further ado, I want to introduce our four speakers today. First of all, we've got Georgia Pretlove-Smith, who's a senior clinical scientist at Mid and South Essex NHS Trust. And Georgia, we'll be eager to hear what you can tell us today. Over to you.

Georgia Pretlove-Smith
Summarising biochemistry in a sort of 10 to 15 minute talk is almost impossible, but I will attempt to do so now. I'll begin my talk with a brief summary of my journey and how I came to be part of the profession. I will briefly cover some of the many

disciplines that encompass biochemistry and then take you through a day as a duty biochemist. So my journey, I did an undergraduate degree in biomedical science and it was actually only in the third year that I attended a talk about the scientist training programme. So before that talk, I didn't really have much awareness of the role of a clinical scientist, but that talk encouraged me to apply for the role. The next step in my journey involved deciding exactly which discipline to apply for.

I was also interested in genetics and haematology, but I eventually decided to apply for biochemistry because I particularly enjoyed those tutorials that involved playing clinical detective with a vague set of clinical symptoms and a set of laboratory results. I also enjoyed the toxicology aspect of my undergraduate degree. So I applied for the STP, was fortunate enough to be accepted and then undertook training at Nottingham and Derby before becoming a senior clinical scientist at Mid and South Essex Trust. So in reality, my journey is a little bit boring compared to those of my colleagues. I have worked with many colleagues that have had a lot of different alternative routes into the industry. Some haven't worked in clinical laboratories before, some may have a background as biomedical scientists or medical laboratory assistants, and then some pursued a career in academia before deciding to switch and become clinical scientists.

So no two journeys are the same and that does seem to be a recurring theme throughout this National Pathology Week. So why should you choose biochemistry? And what is biochemistry? So a definition for clinical biochemistry would be helping to aid in the diagnosis and management of disease through the analysis of blood, urine and other bodily fluids. This would be done by producing and validating the results of chemical and biochemical analyses. Essentially, a clinical biochemist operates as a liaison between the biochemical and biomedical teams and requesting doctors and clinicians, and they ensure a safe and effective service for patients. I found it that it's a particularly interesting discipline for the following reasons.

So this isn't an exhaustive list, but this is just some of the reasons why I particularly like biochemistry. It's such a broad discipline. It exposes you to the breadth of clinical conditions. It's actually not typically patient facing, but that doesn't necessarily mean that there aren't patient facing opportunities. And it is still very clinical and service driven. You are provided with the opportunity to liaise with other disciplinary teams such as haematology and endocrinology on a daily basis. It's also a well-established clinical scientist role with clear progression pathways and it's a discipline that advocates for professional development. If you are also interested, there are sort of benefits. It's a routine discipline. It operates on Monday to Friday, 9 to 5 service.

So for work-life balance, that can also be a benefit. And there are some flexibility between sort of the bench work and the hands-on laboratory side of things and sort of office and computer and data handling work. So next, I'm going to take you through some of the many specialties that form biochemistry. Now, once again, this isn't an exhaustive list, but it does range from the routine to the highly specialist and esoteric laboratories. So routine departments would typically appear in most hospital laboratories. And they form like the automation service, which will perform major organ function monitoring. They will support endocrinology and cancer pathways. An interesting and rapidly expanding section within biochemistry includes the point of care testing service.

So they move tests to the patient bedside with the aim of reducing a turnaround time for a result for a patient and hopefully improving patient outcomes. And then as you go down the list, it does become more and more specialist. So you've got the inborn errors of metabolism laboratories, toxicology and trace element laboratories, and pharmacogenomics, which is quite an interesting specialty that combines biochemistry with genomics and proteomics to predict things like drug efficacy, to guide dosing and reduce the risk of adverse reactions. And then you have other really, really specialised laboratories that aren't even included on this list, such as stone screening, urine steroid profiling and porphyria services. Okay.

So most of these specialties also have some involvement from the clinical team and the clinical scientist team. But it's not just limited to these roles. So there are other roles and opportunities within clinical biochemistry, including research and development, service harmonisation. Many of my colleagues also work on committees such as the Royal College of Pathologists or the Association for Laboratory Medicine. Many form expert working groups and operate as stakeholders for the formation of clinical guidelines. A lot of my colleagues have also worked or do work in academia and many of them and myself also support staff training internally. And in addition, there are also many, many, many service, governance and management opportunities.

So it's not just the clinical side of biochemistry to consider. So I'm going to briefly introduce you to the department at Broomfield Hospital. So as of October 2026, we actually have formed SimLab Essex, which is a private venture and it comprises of Basildon, Southend and Broomfield Hospital and we serve the population within Mid and South Essex. So the picture at the top is a picture of the automation section. It's a 24-7 service and it currently processes approximately 620,000 individual biochemistry tests a month. It's a very fast-paced environment and you are required to adhere to turnaround times as low as an hour for urgent requests. And we offer

currently around 77 in-house tests across multiple different sample types such as plasma, urine, CSF and other bodily fluids.

So in addition to our automation section, we are lucky enough to also have some specialist sections. So the picture on the bottom left is a picture of our foetal anomaly screening service and the picture on the right is our protein service. So, the foetal anomaly screening service is sort of a collaborative service between ultrasound department and biochemistry. So they take results of an ultrasound, some biomarkers, and they plug this into a very complicated algorithm and produce an individualised risk score that may guide patients with sort of pregnant patients and inform them of their risk or of sort of trisomy conditions such as Down syndrome, Edwards or Patau. And then the protein service that aids in the identification and quantitation of monoclonal paraproteins, which is particularly important for diagnosis and treatment monitoring of myeloma patients.

We also have a FIT testing service and a HPLC platform. So, I'm going to attempt to take you through a rather reductive but maybe slightly melodramatic day as a biochemist for a district hospital. Now, if you're wondering what the role of a duty biochemist is, it's to act, firstly to act as a final reviewer for abnormal results. Obviously, we produce a lot of reports. Some of these results may be critical and we may consider adding further tests and advisory comments as required. We also operate as a point of contact for clinicians within the hospital and GPs offering advice. So typically, we'd start the day by attending a morning huddle with our biomedical scientist colleagues in the department.

So in this huddle, we discuss any major occurrences within the laboratory, any analyser issues, any events that may impact service delivery. As we're a district hospital, we do send away some of our work. So we also provide a vetting service. So we vet consultant requests to just ensure that they're clinically appropriate before sending, followed by report authorization. So we will go through queues. So these queues will comprise of results from GP populations all the way up to any urgent patient populations. We'll then review patterns of results, we may add comments, further tests and then confirm that any critical results have been actioned, typically by phoning. It's not uncommon for clinicians to telephone you to ask for advice on services, so an example would be a ward nurse phoning to ask for some advice on how to perform a short Synacthen test for a patient with a suspected cortisol insufficiency.

So you would advise on the sample handling requirements, any sort of known drug interferences. This may be followed by notification from the protein section to tell you

of a significant monoclonal paraprotein in a patient. So our role as duty biochemists would be to verify that this result is valid to ensure that an appropriate clinical comment has been appended to the report and then make sure that it's been actioned to the requesting clinicians so that patient can have a timely referral to haematology for further investigation. So, typically, you would have lunch at some point and then return to the lab. As a duty biochemist, you work very closely with the lab, so you check in on them before continuing to authorise reports. A massive part of the duty biochemist role is to notice unusual patterns of results and results that definitely don't fit the clinical picture for that patient or don't necessarily follow the history for that patient. This may be due to things such as sample contamination or maybe sample mislabeling, but it can also be your role to investigate further, liaise with the laboratory and maybe work out whether a medical report is required and whether any of these results may require communication to requesting clinicians for patient safety purposes. It's very common to also receive email enquiries, typically, and you may also notice, as operating as a duty biochemist, you may notice an abnormally high prolactin result for a patient under GP. It would be your responsibility to consider causes of hyperprolactinaemia, maybe investigate further into the patient's notes, see whether the patient may be prescribed any medication that could cause hyperprolactinaemia. You may also consider adding a clinical comment or adding on further tests as required. This is a slightly dramatic example, but it can happen.

So you may receive a telephone call from the intensive care unit requesting sample handling requirements for a patient that they have with suspected ethylene glycol poisoning. Now this is quite a rarely requested test. And it's actually something that most departments don't perform in-house. So it's actually performed on maybe one or two different laboratories across the country. So this would require you, your average duty biochemist, to liaise with your consultant colleague, the intensive care unit and the referral laboratory to make sure that that patient's sample arrives in a timely manner and so that those results would be clinically valuable for the patient's care. And then this will be followed typically by home time at 5pm.

So in conclusion, I do hope that that's given you a very brief oversight of the very varied discipline that biochemistry is, offering some opportunities for growth, research and collaboration with other specialties. I particularly like biochemistry because it has the flexibility to explore and develop, or you can choose to stay a generalist. As an undergraduate deciding how to progress through my career, being forced to choose one specific discipline felt a little bit constricting. So biochemistry offers you that flexibility, offers you that freedom to really go where your heart desires. It also offers many vast research opportunities and I do believe that's

something that my colleague Francesca will be talking a little bit more about. So, with that, I'm going to stop sharing and hand you back to Rav.

Rav Sodi
Thank you so much, Georgia. That was a brilliant presentation. Your slides say it all. So our next speaker is Eleanor Finnie. Eleanor is a clinical scientist at the UKHSA at Heartlands Hospital and she'll introduce herself and she's going to share her presentation. Eleanor, over to you.

Eleanor Finnie
Hi everyone. I am a clinical scientist currently in microbiology department and I'm just basically going to go through what the department is, how I got here and kind of things that you would do in microbiology. So I think you're going to hear a lot about this, but what is a clinical scientist? And I'm kind of going to do it in a microbiology kind of stance. So I've got a couple of pictures here, and this is kind of representative of what my day-to-day job kind of looks like. So microbiology is basically the study of anything that causes infection that you kind of need to look at in a microscope for. Parasites are maybe a little bit of an exception. So what we're looking at is any infection caused by parasites, viruses, bacteria, and also fungi.

So in order to do that, we obviously take, we get a sample from a patient, that could be a urine sample, it could be a skin swab, it could be a sputum sample, and that gets sent to the lab and we will perform appropriate diagnostic testing on it. And my role as a clinical scientist would be to basically look at these results or even to develop the tests in the first place. So what you can see in the third picture where you see these little discs on a plate with this kind of like hazy growth around it. So this is called antibiotic susceptibility testing and that is something that I am involved in quite a lot. The amount of quality control and development to get these rings that you can see around these discs to be reported accurately so that they can actually be used to suggest to a clinician what antibiotics would work for this patient. It takes a lot of research and quite a lot of development.

So that's a big thing that I currently do. We also do a lot of advice for medical staff. So if you look at the bottom left of the picture, you can see something that is an example of a lab report that we would give out to our, again, to our clinicians. And you can see there's quite a lot of information on there. There's a lot of different sources of, that's an enteric panel. So there's a lot of bacteria and viruses on there that could cause, you know, enteric upset. And you can see there that it's all done by

a test called a PCR, or polymerase chain reaction. And sometimes those reports are actually quite difficult to interpret. So as a clinical scientist, as part of my role is to decipher it, put it out in simple terms so that again, the clinicians can be like, okay, this is what the patient has and this would be the most appropriate treatment for them.

So as Georgia also mentioned, training and teaching of junior staff members is really important. You know, without making sure that we have trainees, you know, the profession wouldn't continue and it's something that I'm quite passionate about. And then at the end of the day as well, we put in a lot of work into, you know, making sure our tests are up to standard. We are at the cutting edge a lot of the time for development of these tests and showcasing that at conferences, you know, sharing knowledge with other labs is also really important and a big part of what I do in day-to-day. So moving on. So how did I get here? So I kind of wanted to start off by just kind of saying, I didn't intend to end up as a clinical scientist. It wasn't something that I'd heard about in school or heard about at university.

So kind of coming into it a little bit of a sidestep way, which I think you'll find that, like Georgia said again, it's like there's no one path to becoming a clinical scientist. So I actually initially did a biochemistry degree, despite now working in microbiology. And the pure reason is that I wanted to do a science degree and I just wanted to kind of get my degree and get a job in science. So I ended up after that working for a company called Thermo Fisher Scientific. However, I quickly realised after that, that working in industry wasn't for me. And I actually wanted to work kind of in some capacity in a hospital. So that led me to then having a look at doing a biomedical degree. And from there, I ended up working in the NHS.

I mean, I had a stop gap as a science technician at a college, again, just purely because that was the job that I could get after my degree. But I very quickly then jumped into being a biomedical support worker. From there, I worked my way up. I became a biomedical scientist and then a specialist biomedical scientist. And all the while, this was done in microbiology. So while not like a clinical scientist role, this really allowed me to understand what it was like to perform the routine testing, to do kind of what you consider the day testing, the day job routine in a microbiology lab. So that was actually doing the processing of the samples and seeing firsthand, you know, like the quality, the governance of like what it took to get those samples through a process and then as a result at the end. But after a while, I decided that I wanted to do a little bit more of the clinical aspect of the job.

And that's when I then learned about becoming a clinical scientist. So after I was a specialist biomedical scientist, I applied to a role as a clinical scientist. Now, you'll hear from my colleagues that they'll talk about things like STP, which is maybe your more traditional route, your scientist training programme. But because I had the background already as a biomedical scientist, when I applied for the clinical scientist role, they allowed me to do something called equivalence. So equivalence is basically another type of portfolio that you can do while in a full-time post as a clinical scientist. And it's basically, again, showing evidence and showing that you can perform the role as a clinical scientist without having to do the traditional scientist training programme.

I will say though that the STP does include a masters as part of the training programme. So prior to me joining as a clinical scientist at the UKHSA, I had already done my masters as part of being a specialist biomedical scientist. And I also just kind of wanted to point out that, again, clinical scientists mainly go into the NHS, but I currently work for the UK Health Security Agency, so we are slightly different to the NHS. Just coming on to, so we used to be called Public Health England. And then we got rebranded into the UKHSA. So think of UKHSA as the UK wide microbiology lab. So anything that a local general hospital can't do, talking about like specialised tests, they will get sent to instead UK Health Security Agency.

And we do a lot of tests that you wouldn't see normally within the NHS. And there's a lot of, I say like big data. So things like when you're looking at epidemiology, so I hate to bring it up, but for example, during COVID, all the things where you know about the different variants, you know, where the hotspots were, how many tests, rolling out that brand new test to all of the NHS labs, that was all done from UKHSA regional labs, one of which is in Birmingham, where I work. And basically, the difference is that the UKHSA, or at least the regional labs, kind of acts as like a halfway house between the big picture, the big epidemiology factor of microbiology, and also like the routine testing.

So that allows me to do, you know, unique or specialised testing while being able to keep my skills in, I guess, the more routine kind of sample testing. Yeah, that's it. Very short, very sweet. But again, like if you've got any questions specifically, then I'm happy to answer any of those.

Rav Sodi

Thank you very much, Eleanor. That was a brilliant tour de force. Our next speaker is Francesca Ryan-Beswick. Francesca is a principal clinical scientist at the Royal Stoke University Hospital, and she's going to talk to us now. Francesca, over to you.

Francesca Ryan-Beswick
So I am the second person today talking to you about biochemistry. So Georgia did a great introduction to it. So I'm not going to dwell too much on what is biochemistry, but just to reinforce that we, it's a branch of pathology that aids the diagnosis and management of disease through the analysis of bodily fluids. So we do testing on most commonly on blood, but we also look at urine, CSF, stool samples, sweat and saliva. A lot of our tests are, as Georgia said, performed on automated equipment. So I've just got a couple of pictures at the top there showing you some of the automated equipment that we have in the labs. We receive in Stoke approximately 4,000 samples a day. So we have a big automated track system, which is basically like a conveyor belt that the samples are loaded onto and they go around the conveyor belt and then they're delivered to the automated equipment to do the required testing.

We also have some specialist testing. So we have some mass spectrometers, which is shown below, and we still do some manual sort of ELISA testing as well. So the tests we cover cover all major organs in the endocrine systems. And just to really hammer home that there's a lot of different roles of staff working within the lab to make sure that the results are produced in a timely manner and that they're accurate and reliable. So the majority of staff who are performing the testing are the biomedical scientists. Now they are the staff that are based fully in the lab. They're running the equipment. They are working shifts to ensure that the lab is up and running 24-7 and their job is to ensure that the equipment is performing correctly and that the results are being produced, that they're accurate and reliable and they are assisted by medical lab assistants and associate practitioners.

So then we also have clinical scientists, which is what I am, and we differ from biomedical scientists because it's our job to interpret the results that are being produced. And as Georgia said, we act as that link between the lab and the rest of the hospital. So just to talk about my career so far. So I started off doing my A-levels. I did biology, chemistry and geography and I loved biology and chemistry and I thought, okay, I'll do a biochemistry degree. That's the best of both worlds. It's got a bit of both. So I went off to Nottingham to do that. And I will say whilst I was at Nottingham, I had a module on clinical biochemistry and I really enjoyed it. And I

heard about the STP, but I heard that it was incredibly competitive and I just didn't have the self-confidence at that point to apply.

And I put it off. So fresh out of uni, I got a job as a band 3 lab tech at the Royal Liverpool Hospital. And this was my first experience of working in the NHS. And I quickly realised that I didn't want to just be assisting, I wanted to be the person performing the testing. However, I then found out that I could not be a biomedical scientist because I did not have an IBMS accredited degree. So I had a little panic and I found a job in a private lab called Randox. They had a clinical lab in Liverpool and I got a job there as a laboratory analyst. And this was performing testing on private blood tests. So basically it introduced me to the role of being a biomedical scientist without the protected title.

So I did that for a bit and I thought, okay, I like producing the results, but now I want to know what they actually mean. And it was at this time that I was doing a bit of Googling and the STP came up again. And I thought, I'm just going to go for it. And I applied. I was successful. And I commenced my three-year work placed training in Sandwell in West Bromwich. After that, I finished in 2022 and I secured a senior clinical scientist position in Manchester. And then in 2024, I secured a promotion to principal clinical scientist in the Royal Stoke, which is where I'm at now. And I've also started onto the higher specialist scientist training programme, which I'll touch on a bit about later. So what does a clinical scientist in biochemistry do? The answer is lots. It's a very varied role and it may be different in different hospital trusts, depending on the test repertoire that they offer.

We work really closely with biomedical scientists and the other lab staff to ensure that we're producing safe, high quality results. And we also work closely with our service users, such as GPs, doctors, nurses to ensure that our service is fit for purpose. So Georgia spent a great presentation taking you through a typical day as a duty biochemist. So I'm not going to dwell on this too much, but typically you do spend one day a week as the duty biochemist. So you are responsible for authorising the results that have been produced over the night or from the end of the day before. And results appear in our laboratory computer system and they appear in different queues, which I've just taken a screenshot of for you there.

And it's our job to work through these queues to clinically review these results and add interpretive comments, add further tests, phone results out to speak to clinicians about if we think it's required. And we provide support to the lab during the core hours, typically 9 to 5. There is also out of hours on-call support, which in my current role, I contribute to this in Stoke. And this is sort of a rota where if there's an urgent

clinical query, out of hours, we are on hand to help. And I will wake up at home, typically in the middle of the night, turn on my laptop and provide the advice and guidance that I can. Another part of this role as duty biochemist is also supporting the lab, investigating any issues that are occurring.

So for example, if we've had an error with one of the analysers in the lab and we think incorrect results might have been released, you would be responsible for the clinical review of this incident, whether we needed to issue amended results out to clinicians and telephoning doctors and requesters to discuss the error. So I'm just going to go through some other examples of work that you might do as a clinical scientist in biochemistry. So typically, one day a week, you would be on what we call the specialist reporting rota. And this is where you interpret and report some of the more specialist tests which require interpretation of chromatograms or gels, and it's not just looking at the numbers.

So first of all, we have an example trace here of CSF xanthochromia analysis, which is used to investigate a subarachnoid haemorrhage. Next, I've just put a picture up of some chromatograms which have been produced by a liquid chromatography mass spectrometer. This is detecting levels of immunosuppressant drugs which are monitored in patients post-transplant. And then the last two I've put up are some interpretive. So this is serum protein electrophoresis, and we interpret this trace when we're looking for abnormalities in the blood, which may indicate myeloma, which is a type of blood cancer. And we're interpreting the trace to try and find abnormalities, which you can see there's a big peak on the right hand side, which would indicate that there is a monoclonal protein in this sample.

And then if we need to do further testing to identify what type of antibody is causing that abnormality, we run it on a gel electrophoresis, immunofixation. So these specialist tests, it's really interesting to be trained and to be able to report this. It's not all just looking about the numbers. We do get to look at other forms of data. So other things you might be involved with are service developments. Quality improvement projects are always ongoing within the department. The guidance is always changing and updating based on recent research. And we have a role in ensuring that we are providing a service that reflects this. So you could be involved in implementing a new test. And for that, you might have to lead a project to ensure that a new test is fit for purpose for its intended clinical use.

And we do this by performing different experiments and collecting data. And I've just put some example of the spreadsheets that we use to analyse this data to make sure that we're happy with how that test is performing before we go live. Other things you

could work on include the development of new clinical pathways. So we often work with primary and secondary care to help provide guidance to streamline referrals into secondary care to make sure the right patients are getting referred and that GPs aren't referring patients that don't need to be referred. So I have recently produced some guidance for our primary care for GPs to help investigate calcium disorders and what they might look at investigating, what tests they might be doing in patients who have got calcium levels which are too high or too low.

Other things you'd be involved with include quality management. So we do a lot of audits within the department and this is just a picture of the audit cycle. Audits may be based on national audits or they might be locally initiated based on feedback or trends that you've found or incidents. I'm currently doing an audit on the requesting patterns for primary care for women when they're investigating the menopause to see if we, if our primary care GPs are requesting in line with guidance. Quality assurance as well is really important. We have multiple ways of providing assurance that the results we produce within the lab are accurate and that the analysers are working as intended. So an example of this is internal quality control, which is performed daily or more frequently for high volume tests.

And if IQC, internal quality control, is not performing as expected, you might need to help provide guidance to the biomedical scientists on how best to investigate this and troubleshoot the issue. Another way of providing assurance in our results is through external quality assessment. So this is where samples of an unknown concentration are distributed to all sites participating in the scheme. We receive the sample and we book it in and process it as if it was a patient sample and we submit the results back to the company who runs the scheme. We then receive reports which detail how well we are performing in comparison to other labs who are performing that test. So this is just an example of the reports that we get. This is an example for chloride and for creatinine which is a marker of your kidney function.

So you may be within your role be responsible for reviewing some of these reports, for raising investigations into any poor performance and making sure that we are really investigating anything that we think could be a risk to our patients. Another aspect of the role, we're really encouraged to get involved with research and to share our findings with our peers through publication. So these are some examples of publications that I've been involved with and it's really a great way of collaborating with colleagues from different hospitals and departments to improve patient care. Hospital trusts typically have strong links to universities. So this provides a forum for getting involved with research.

So for example, at Stoke, we have strong links to Keele. So as a registered clinical scientist, you are required to undertake CPD activities to ensure that your knowledge is kept up to date. So there are many conferences and events each year. Some are in person and some are virtual. And there's usually bursaries available within the regions to help apply for funding to attend these. And you're really encouraged to get involved with these meetings. So recently, I provided a case presentation at our LabMed national meeting back in the summer. I've also attended and presented posters showcasing my work. As Georgia mentioned, we also provide a lot of teaching and training to staff, lab staff, so the biomedical scientists, but also medics through lunch and learn forums or regional teaching.

And there may be opportunities to provide lectures as part of undergraduate degrees or master's degrees. So I've just got a quick few slides about how to become a clinical scientist. So the route that I took was the traditional route on the scientist training programme, which is a three-year funded postgraduate programme. You get a part-time master's and you combine that with workplace learning and a portfolio. Within the first year, you have rotations in biochemistry, haematology, immunology and genetics. And then in your second and third year, you focus on clinical biochemistry and you rotate through these specialist sections. You also undertake a research project as part of this, as part of your masters.

And at the end, you have a final assessment, which is typically viva based. And if successful, you are then able to apply to the HCPC for registration as a clinical scientist. So there are other routes into being a clinical scientist. And this diagram on the right hand side just shows you some different routes and some different options for getting into healthcare science. So once you become a clinical scientist, you do then have the opportunity for further study. So there is a higher specialist scientist training programme, which I am on at the minute, which is basically a trainee consultant training programme. So it's preparing you with the leadership and management skills and in clinical science, which will enable you to then be on the consultant register and eligible to apply for consultant positions. There's also lots of training programmes within the NHS. There's NHS leadership programmes and lots of CPD opportunities within your trusts to explore. Many people typically also work their way through the Royal College exams to achieve fellowship of the Royal College of Pathologists.

So life as an STP, I really enjoyed it. It was a really good experience, even though COVID hit when I was just starting, it didn't ruin my training. It really is 3 years for you to make of it what you want. You are a supernumerary trainee employed as a band 6 and you have rotations through many different labs and specialties within

clinical biochemistry. You have a dedicated study day once a week to help you upload evidence of your training to your online portfolio and to complete your uni work. You have hands-on lab rotations, you can attend MDTs, clinics, ward rounds, you can attend conferences. And then you can undertake a large research project, which you can then take to conferences to share your work and to network.

And you can even get a publication out of your project. It is really three years for you to make of it what you want. So I've just finished off with a slide saying, could this career be right for you? So just a few things. If you are someone who loves attention to detail, has an interest in science behind the medicine, wants to work in a field that provides direct impact on patients whilst being non-patient facing, you are continually learning and developing, you want to use your scientific knowledge day-to-day, and use data to make evidence-based decisions, then this career might be for you. It's mainly office-based as a clinical scientist, but there are opportunities for lab work when you're undertaking projects or undertaking tests on specialist rotas. If you are interested, I would really encourage you to try and visit a hospital lab. The STP is very competitive and you don't want to apply for the programme if it's not right for you, because it is a challenging programme, but it's very rewarding.

And if you can visit a hospital lab, this will provide you with some experience to include in your application. And that is it from me. Thank you for listening.

Rav Sodi
Thank you very much, Francesca. That was very helpful. You've outlined career pathways for STPs and HSSTs. You've made a distinction between biomedical, clinical or healthcare scientist. For our audience, that answers some of the questions that were being asked. And now moving on to our next speaker in a completely different specialty, immunology. We've got Michele Aguiar, who is a trainee clinical scientist at University Hospitals Dorset. Michele, over to you. Thank you.

Michele Aguiar
Oh, thank you, Rav. Good evening, everybody. It's a pleasure to be here. It's a pleasure to share with you my experience in immunology and as well as my career in how did I get here. I just want to touch very briefly because I know we're quite tight in time. My colleagues did an amazing job describing the role of a biomedical scientist as well as a trainee clinical scientist and a clinical scientist. So I don't want to repeat that. I just want to focus on my journey in healthcare science and just talk to you a little bit about immunology. So my name is Michele and I'm a trainee clinical scientist.

So how did I start my journey? So I've done my bachelor's and my master's degree in biomedical science. During my master's degree, I had the great opportunity to do a placement, which then later on turned into a voluntary job.

So I had a unique experience to do my placement at Great Ormond Street Hospital, which is a reference centre for immune deficiencies. So just a quick overview of immune deficiencies. So is when the patient immune system is dysfunctional and the patient then is unable to fight infections. So during my time there, I've been trained in a variety of complex assays, including immunophenotyping, cell stimulation assays, autoimmunity and allergy. But since the hospital is a paediatric hospital, then obviously I wanted to explore a bit more about autoimmunity and allergy. So, and at that point, I finished my registration portfolio to become a registered biomedical scientist. And then I moved to Bournemouth, where I then became a specialist biomedical scientist.

And after that, I decided that I wanted to get to know a bit more of the clinical side. And then I became a trainee clinical scientist. So here I just briefly listed a bit of the skills I gained along the way. My colleagues already, like I said, did an amazing job talking about each of them. So I'm not going to go into more details. So if we're talking about immunology, what's immunology? So I put a couple of lines there just to highlight very, very basic immunology. So immunology, we are concerned about the immune system and how and the structure and how its function. So we know the immune system is constantly working really, really hard and in harmony to make sure it defends our body from threats like bacteria, virus, fungi, parasites.

I think our colleague Eleanor, she did a really, really good job talking about microbiology and the other side of the infection. So one thing that I really enjoy reading about is another function of the immune system. So the immune system is capable of differentiating between self and non-self molecules. I find that fascinating. So doing that, the immune system allows it to target harmful pathogens while then avoiding damage to the healthy tissues. So here I wanted to show you a bit of, I call it the celebrities of immunology and the immune system. So as immunologists, we're interested in the white blood cells. Here you have some neutrophils, mast cell, which is a big actor in terms of allergy. You have T cells, B cells, and you have antibodies produced by B cells. But my very, very favourite, which is a big celebrity for me, is the dendritic cells.

I really love them. So they are called professional antigen-presenting cells. And saying that, I had a really, really great opportunity to be part of optimising a novel flow cytometry assay, so... Patients diagnosed with immunodeficiency, they, as I

said, they are unable to fight infections. So they need a treatment and the treatment is most of the times stem cell transplant, gene therapy. So for patients going through that treatment, what we see a lot is that they normally have their T cells and B cells at normal levels. However, they still, some of them, a small percentage obviously, but some of them still go through and develop infections and recurring infections. So then we had a question.

So could it be the dendritic cells? So we then optimised this assay. And guess what? We found that these patients, they have a low dendritic cells level. So this test is still used to help diagnose patients in terms of if they have any dendritic cells deficiencies as well in UK and abroad. So yeah, I just wanted to tell you a little bit about my very, very favourite cell. So what happens if the immune system doesn't work as we expect. So then we see immunodeficiencies as we mentioned, allergies and autoimmune diseases. So I just made a very quick diagram here just to show how my day in the lab is. So just as an example, so we can talk through a bit more fun. So let's say we have a patient that a clinician on the top left suspects of coeliac disease.

So the patient is showing with abdominal pain, bloating, maybe diarrhoea. If he's a child, maybe delayed growth. So the clinician will request a coeliac screen test and then is sent to the lab. And then my lovely colleagues in specimen reception will double check that we have the correct sample, the correct request. If that is not clear, then my role as a biomedical scientist is to then find out exactly what test, maybe contact the clinicians and clarify that. That happens a lot in allergies. So sometimes they just say, can you test for allergy, but then what is the allergen? So then once we accepted the request, we book into the LIMS, we centrifuge them because we're only interested in the serum. Then we have our analyzer there, which is an automated ELISA that we use to see.

So coeliac disease is an autoimmune condition and we know is a hypersensitivity to gluten. So if the patient then has autoantibodies against the enzyme that is found in the lining of the gut, we should see then a colour change and that is proportional to the concentration of the autoantibody in the patient's serum, in this case is the IgA that we're monitoring. So 2 things now that is a little bit different from other disciplines. So because immunology is quite a small lab, normally there's not many of us and we do a little bit of the interpretation together with our consultant immunologist. So what we do in this case, we take the result. If the patient is negative, then we want to investigate why is it negative? Is it because the patient is deficient in IgA or is it because the patient has been not taking gluten before he actually gave us the blood sample.

So obviously, if the patient has normal IgA levels, then is a true negative sample. However, if we do find autoantibody in the patient's serum, then we have a second line testing, which is, you can see the microscope there. So what happens there? I'm sorry if some people don't really like what I'm going to say now. So we use monkey oesophagus tissue in our immunofluorescence assay. So we have this slice, they have 10 wells each, and each of these wells has a very, very thin tissue, section of the monkey oesophagus tissue. So what we do is we incubate the patient serum there. If there is an autoantibody, it will be detected. And when you expose to UV light, you see this pattern looks like a chicken wire. You see this very green fluorescence staining.

So obviously, then a biomedical scientist will look at the results, we'll make sure the quality checks are done, validate these assays and do a brief reporting to the clinician and then we'll send the result back. So this is a very quick overview of my day in immunology. We only do 9 to 5.30. We don't have any out of hours. We only have two tests that are normally urgent. All of the other tests, they are not as urgent unless requested by the clinicians. We don't normally receive samples from A&E. It's a very, very low level. And we normally just receive from GPs as well as outpatient clinics. So our turnaround times for tests is days rather than minutes or hours as other disciplines. So now just to close off, because I'm conscious about the time.

As a biomedical scientist, my role was focused on producing accurate and reliable results. As a trainee clinical scientist, I'm learning how immunology results can be integrated with the results from other specialties to support diagnosis, treatment and guide patient management. And just something that I find really, really rewarding aspect of my current training is seeing how different specialties build a complete picture of a patient's health. It reinforced the importance of having a patient at the centre of every decision we're making in the laboratory. So I hope you enjoyed a little bit of immunology and thank you for listening.

Rav Sodi
Thank you very much, Michele. That was an excellent overview of immunology, very inspiring. And what an interesting specialty that is. Now, I know there's some questions that have come through in the chat box. Unfortunately, we can't answer all of them as we're running late. One of the questions that keeps recurring is: can we check if a hospital offers IBMS training portfolios? So this is something you'd have to do individually and it varies from hospital to hospital. But if you go on the website, on

the hospital's website, you can have a look and see if they're advertising for a trainee BMS or something like that. The thing that people have found very useful, which you might all find useful, is if you're looking for experience in a laboratory and you haven't got that opportunity to maybe do, you know, work as a biomedical scientist, one way, one route into it is to work as a medical laboratory assistant, what's known as an MLA. In some sites, in some hospitals, they're called, I think they're called technical officers.

So that's a, if you like, a foot in the door to get the experience. I believe Francesca also mentioned that. So a lot of us started as, we didn't know what we wanted to do with our careers. And we all started as biomedical, as lab assistants. We got a foot in the door, got the experience, showcased ourselves, and then progressed from there. That coupled with an appropriate degree will get you onto the journey, if that's your intention. So yeah, thank you so much. I want to thank Georgia and Francesca for giving us a great overview in biochemistry. Thank you to Eleanor for talking about microbiology, and then thank you to Michele for immunology. I hope this evening has been an eye-opener for you, has answered some of your questions, has inspired you as you embark on your careers.

And in closing, I want to say thank you for your attention. I also want to thank Paulina and Tracy in the background, who've organised this session for you. So thank you so much for your attention. Have an amazing evening and all the best and good luck in your journeys. Goodbye.