Publications

In each edition, we shine a spotlight on one of the most recent PathLAKE publications and interview some of the authors involved in creating these papers. Here we talk to Dr Lisa Browning about a recent survey of Prostate Cancer UK supporters.

The Use of Digital Pathology and Artificial Intelligence in Histopathological Diagnostic Assessment of Prostate Cancer: A Survey of Prostate Cancer UK Supporters

What prompted the survey with Prostate Cancer UK?

There have been significant advances in the practice of histopathology in the last few years which have the potential to impact hugely on how we work and on the diagnostic process itself, with knock-on effects on patient care. Such advances include the roll-out of digital pathology (DP) for diagnosis, and the consequent facilitation of the development and future deployment of artificial intelligence (AI) to assist diagnosis and potentially to provide novel insights into the biology of human disease. These are exciting and promising times; however, the wider acceptance of these developments and their perceived impact on the patient population are relatively unknown. With the recent clinical approval of AI-assisted diagnostic systems in prostate biopsy reporting and therefore the real potential for AI to be used within the diagnostic setting, there was a clear need to investigate the attitudes and opinions of the prostate patient cohort to these advances, which we addressed in this survey.

What did the survey show?

Of the responses from the 1276 men who had had a prostate biopsy in the past five years, 87% were positive or very positive about the digitisation of histopathological slides, with positive comments around potential for improved efficiency, permanence of records, ease of sharing of information (between clinicians and with patients), facilitation of research (including the development of AI), and education. Data protection was the main issue of concern amongst those with reservations about digital pathology. In relation to the introduction of AI in the reporting of histopathology, due to the early stage of the approval of such systems in prostate biopsy reporting, the survey focussed on the testing of such systems rather than their routine utility. 83% saw the testing of the technology in the setting of prostate cancer as a positive advance, with only 1% not in favour. There was a divide as to whether the patients wanted to learn more about the use of AI in this setting, with 41% not wishing to learn more, and 39% in favour of additional learning, preferably in a website format.

Although most men surveyed were supportive of AI assisted diagnosis, some had concerns. What kind of concerns were raised?

The main themes were in relation to the technical performance (reliability) of the AI and potential for misdiagnosis, and about the need for a 'human review' by a trained professional. Interestingly this reflects the results of a survey of public perceptions of AI in health and social care presented in the NHS AI Lab and Health Education England report [1], which suggests that trustworthiness in AI is positively impacted by having a 'human in the loop', 'open and honest information', and 'proof of the impact' (of the technology).

What are the next steps?

Our survey has indicated that whilst acceptance amongst patients of AI tools in a diagnostic setting is likely to be high, there are concerns that should be addressed at this early stage to improve understanding of their utility. Patient and clinician education and communication will be key in this respect. The next steps will be to consider these issues further as part of the Articulate PRO study investigating the deployment of AI in the prostate cancer pathway (ARTICULATE PRO — Nuffield Department of Surgical Sciences (ox.ac.uk)), with the aim of developing educational resources to build improved public trust in AI.

1. Digital-transformation.hee.nhs.uk/binaries/content/assets/digital-transformation/dart-ed/understandingconfidenceinai-may22.pdf. Accessed 7th September 2022.

Please follow the link here to find a list of our most recent PathLAKE publications

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Events and News

Continuing Professional Development

PathLAKE events, masterclasses and training modules have been accredited by professional bodies such as the Royal College of Pathologists. Attendees earn CPD points for their participation. Here are some examples.

CPD Points Issued for PathLAKE and Partner Events:

- **May 2021** - AI for Pathologists online masterclass, University of Warwick = 8 CPD points
- **Sept 2021** - 'Benchside to Bedside: the implementation of digital pathology into routine practice' online PathLAKE conference = 4 CPD points
- **March 2022**: University of Nottingham Breast Pathology online masterclass: 'Addressing Challenges in Diagnostic Breast Pathology' = 7 CPD credits
- **June 2022** - live PathLAKE Showcase conference = 7 points x 107 attendees
- **June 2022**– live Nottingham Breast Pathology masterclass = 6 CPD credits

CPD points from PathLAKE Education Tutor:

CPD Points		
Course	**Points**	**Certificates Issued**
Breast	4	40
PDL1	2	16
Prostate	4	21

The PathLAKE Pathology Education Tutor platform is open to all. Find out more **here.**

Warwick Seminar Series

The TIA Centre Seminar Series welcomes external speakers to give presentations on Computational Pathology and aims to stimulate thought provoking discussions among participants.

So far, we have had **17** speakers from various countries, who have discussed their recent work in the field.

Recorded sessions are available on YouTube and further information on upcoming seminars can be found on our webpage.

Follow the links below:

- https://youtube.com/playlist?list=PL33zG-SM6CfFCN3gbUFfZ5S0R1HrnMQS7

- https://warwick.ac.uk/TIA/seminars

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PathLAKE
Computational Pathology Excellence

> The E in PathLAKE stands for Education, aimed at training the next generation of pathologists and data scientists and upskilling the current one. As part of the PathLAKE project, we have recruited a total of over 20 research staff (both trainee pathologists and data scientists) located at the various partner sites. As part of our education programme, we organised several training and learning events, including a week-long series of masterclasses on "Data Science for Computational Pathology" (35 CPD points) at the Royal College of Pathologists' Head Office in London in January, introducing data science concepts to pathologists and that culminated in participating pathologists and data scientists coming together for a 48-hour long hackathon. The PathLAKE Pathology Education Tutor platform enables trainees and pathologists to access videos, modules, events and masterclasses to develop skills in histopathology, immunochemistry and digital pathology, and this is being used internationally.
>
> Looking back at the last three years, the most rewarding aspect of PathLAKE is witnessing first-hand the professional growth and development of all the amazing young talent who started their journey on PathLAKE with us over the last three years. Seeing the confidence and exuberance with which some of our young staff carried themselves at the PathLAKE showcase conference at the RCPath Head Office in early June (nearly two and a half years after the 2020 edition of masterclasses) makes the whole journey more than worthwhile. The testimonials in this newsletter make a statement that the future of digital and computational pathology in the UK is bright.

Prof. Nasir Rajpoot

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Meet the next generation of pathologists and data scientists

Mahmoud Ali,
University Hospitals Coventry and Warwickshire NHS Trust

Joining PathLAKE at UHCW, the first centre in the UK to use digital pathology, has been more than a job; it is a turning point in my career as this put me many steps closer to achieving my dream of becoming a well-trained pathologist.

I consider myself fortunate to have had the opportunity to work alongside top-tier professionals on an exciting project involving the use of artificial intelligence to improve patient care. Furthermore, this opportunity has given me a solid foundation for experiencing the benefits of digital pathology which is on the verge of becoming a mainstream option for routine diagnostics.

Joining PathLAKE has not only greatly helped me in obtaining a training number in histopathology but the experience gained in cellular pathology, digital pathology, and artificial intelligence has made me eagerly and confidently look forward to starting my ST1 training in Cambridge this August.

Mahmoud Ali
Cellular Pathology Research Fellow, PathLAKE,
University Hospitals Coventry and Warwickshire NHS Trust

Emily Hero,
University Hospitals Coventry and Warwickshire NHS Trust

As a ST2 Histopathology trainee I am passionate about early cancer diagnosis. Involvement with the PathLAKE team during the development of the Large Bowel Biopsy Screening Tool (CoBi) has been an exciting experience.

Working within a large team including pathologists and computer scientists has developed my knowledge of gastrointestinal pathology and highlighted the future of digital and computational pathology.

Annotating digital images of large bowel biopsy slides, has enhanced my ability to recognise normal biopsies along with the different and sometimes subtle microscopic appearances of cancer and inflammatory conditions.

This continues to help me as a Histopathology trainee at both University Hospitals Coventry & Warwickshire and in the East Midland's south deanery at the University Hospitals of Leicester.

Emily Hero
Trainee Histopathologist, PathLAKE,
University Hospitals Coventry and Warwickshire NHS Trust

Islam Abdelaziz,
University of Nottingham

My name is Islam Abdelaziz, a qualified medical doctor and a pathologist. I started my career in the UK as a PhD student under the supervision of Professor Emad Rakha, who has had a magnificent role in reshaping my career.

Throughout my PhD, I had the opportunity to develop myself as an academic pathologist working in the field of cancer research. I gained experience in a variety of aspects including student supervision, teaching, research methodology, statistical analysis, grant writing and translating scientific research into manuscripts for high impact factor journals.

I gained more confidence and my teamworking skills started to flourish. This enabled me to further pursue my career following the successful completion of my PhD. I was successful in my application to work as a Research Fellow at the University of Nottingham where my ambition began to grow. I was inspired by digital pathology and how machines can help pathologists in their day-to-day practice.

I joined the digital pathology team funded by PathLake, with the main aim to develop a robust algorithm to help identify which ER+/HER2- breast cancer patients would most benefit from adjuvant chemotherapy. My experience as a pathologist, and the skills I have developed, have created a rich recipe for a successful team leader. I now lead a team of pathologists and PhD students who are annotating thousands of digitised images. These annotations, through supervised machine learning, go on to identify hundreds of thousands of regions and cells. Over the past few years, we were successful in providing the data required for machine learning, in collaboration with the computer scientists at Warwick, and have produced high quality research articles.

Islam Abdelaziz
Research Fellow, PathLAKE,
University of Nottingham

Mostafa Jahanifar, University of Warwick

To do research in computational pathology (CPath), two important arms should co-exist. These are an abundance of well-curated data and access to high-performance computing. Coming from a developing country with a background of working in the CPath industry, I deeply understand the importance of these two principles.

When I first joined PathLAKE, I could not believe the greatness of the resources that I had been gifted with.

Furthermore, the privilege of working with a smart group of researchers and pathologists (and the learning opportunities that they bring) make PathLAKE the best working place that any researcher in computational pathology could wish for.

Mostafa Jahanifar
PhD student, Tissue Image Analytics Centre/Research Assistant, PathLAKE,
University of Warwick

PathLAKE Showcase Conference

In June, the PathLAKE team were delighted to host a free face to face Showcase Conference at the Royal College of Pathologists in London to demonstrate the achievements and impact of the project – and look ahead to what's next.

We were delighted to have Professor Jo Martin open the conference. Following an excellent presentation on AI in Pathology from Professor Nasir Rajpoot, the morning sessions provided an insight into the delivery and results of the consortium's exemplar projects. These projects reflect the demand for AI-driven diagnostics to increase efficiency in pathology reporting and improve patient outcomes, through advanced diagnostics and personalised medicine.

The afternoon kicked off with a fantastic keynote talk by Dr Claire Bloomfield, followed by Professor Andy Hardy (CEO of UHCW NHS Trust) who spoke on a Digital and Data driven NHS. The challenges and opportunities in developing data repository systems, the ethics around data sharing and a panel Q&A completed the afternoon.

Networking breaks throughout the day allowed delegates to connect and to attend demonstrations from industry exhibitors. Over 100 delegates from a mix of NHS, Industry, academia and national health agencies attended which led to rich panel discussions, knowledge sharing and a lively buzz to the day. Thank you to all who attended and contributed to making it such a valuable and interactive conference.

Thanks also to Innovate UK and our sponsors – Aiforia, Indica Labs, Glencoe Software, Visiopharm, DeepMed, FujiFilm and Ibex - for supporting the conference.

Professor David Snead: This was an important event for PathLAKE and allowed us to showcase some of the work we've been engaged in over the project. We reached a wide range of key stakeholders in the audience that attended on the day. We've had overwhelmingly positive feedback which has generated follow up meetings. The Royal College of Pathologists was a good venue and lent itself very well to this style of workshop.

Professor Jason Swedlow:
"The whole team enjoyed the meeting and the chance to interact with the PathLAKE community. Beyond putting names to faces, seeing examples of digital pathology data challenges and solutions was very valuable, especially for some of our newer team members. We really appreciate the opportunity to present and participate. Thanks again from all of us at Glencoe to the whole PathLAKE team."