the whole process is time consuming and expensive. The Royal College of Pathologist recently published a workforce census showing that only 3% of NHS histopathology departments have enough staff to meet clinical demand [1] as consequence the reported waiting time for exam results is currently up to 14 weeks. This leaves us in desperate need of a change [2]. DynamX is developing a system that will allow to identify healthy samples within 15 seconds, removing unnecessary histopathological analysis, creating a faster route to treatment, when necessary, together with the possibility of more screening programs.

Methods We combine infrared spectroscopy, biological information, machine learning and artificial intelligence to extract information from a tissue sample. A schematic representation of the process is given in the picture below. Each sample has a its own FTIR fingerprint that once acquired can be used to distinguish between healthy and abnormal cells. Our algorithm has the potential to be coupled with any commercially available hardware.

The biopsy is scanned immediately after resection, no sample preparation is required so the sample can re-enter the routine diagnostic pathway if necessary.

Results A 400 patient multicentre phase 2 IVD clinical trial (ISRCTN 33779, IRAS196045), focused on oesophageal and colon cancer screening has been recently completed. Primary objective of the trial was to evaluate the validity of the algorithm in discriminating among healthy and abnormal cells. Secondary objective consisted in testing and implementing our user interface. Over 1600 biopsies/polyps were analysed and unique spectral differences were identified. The algorithm achieved 96% sample sensitivity and 56% sample specificity. Human Factors analysis of the software was performed following study completion, along with feedback from a focus group with study nurses from the clinical trial, allowing for a rigorous assessment of the common problems.

Conclusions Results of the completed clinical trial were extremely positive. DynamX technology showed the potential to be particularly beneficial to the time and price allocated for each histopathological exam and to assist in the assessment of the disease. The study allowed us to collect a broad variety of samples to build up our internal library. In order to expand our technology to diagnose a larger variety of diseases a clinical trial involving 450 patients on detection of presence of infrared biomarkers for cancer in cheek cells is about to start.

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Posters

PTU-073 ARE GI CANCERS BEING DIAGNOSED FROM OUTSIDE THE 'TWO WEEK WAIT' REFERRAL?

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10.1136/gutjnl-2019-BSGAbstracts.432

Introduction The UK lags behind Europe in the diagnosis, treatment and survival rates of cancer. To improve on this

and diagnose cancer early, patients with alarm symptoms from primary care are referred on a 'Two week wait' (2WW) pathway. Previous data indicates that the majority of cancers diagnosed in the UK are from outside the 2WW pathway. However, demand for upper and lower GI endoscopy via the 2WW has risen dramatically above and beyond the steady increase in overall GI cancer incidence. We aimed to study the diagnostic pathways via which GI cancers are diagnosed.

Methods We reviewed the common luminal upper and lower GI cancers diagnosed at endoscopy at a single centre between February 2017 and September 2018 via Unisoft GI Reporting Tool. Known malignancies and diagnoses made at other Trusts were excluded (n= 72). Retrospective analysis of 317 patients with 332 GI cancers was performed.

Results 332 GI cancers (oesophagus 44 (13.9%), stomach 21 (6.6%), duodenum 6 (1.9%), colon 174 (54.9%), rectum 87 (27.4%)). Mean age 71.1 (range 24 - 97), Female 133 (42.0%).

Median time to diagnosis (i.e. presentation to endoscopy) was 22 days (IQR 14 to 34).

Referral pathways included 202 (63.7%) GP Target 2WW, 45 (14.2%) Inpatient, 30 (9.5%) Urgent 2WW from clinic/hospital discharge, 21 (6.6%) Abnormal imaging, 17 (5.4%) Routine clinic, 2 (0.6%) Surveillance.

Only 48 (15.1%) GI cancer patients went 'Straight To Test' (STT) whereas 198 (62.5%) were seen in clinic first. The mean time to diagnosis in those referred via the GP Target 2WW was 25.4 days (STT) versus 32.2 days (clinic review), (p = 0.05).

Abstract PTU-073 Table 1 Pathways to diagnosis for individual GI cancers (+ STT/clinic/A&E)

	All GI Cancers (n=332)	Oesophagus n=44	Gastric n=21	Colon n=174	Rectum n=87	p value
Age (mean, s.d)	71.1 (13.5)	73.8 (11.6)	71.8 (17.8)	71.5 (13.2)	68.0 (13.7)	0.10
Time to diagnosis (median, IQR)	22 (1-4)	19 (-8)	11 (-8)	24.5 (1-8.75)	23 (1-3)	0.27
GP '2WW' Pathway (%)	202 (63.7)	25 (56.8)	7 (33.3)	109 (62.6)	69 (79.3)	0.0003
STT (%)	48 (15.1)	9 (20.5)	2 (9.5)	24 (13.8)	13 (14.9)	0.63
Curative Treatment (%)	204 (64.4)	13 (29.5)	2 (9.5)	129 (74.1)	65 (74.7)	<0.00001

Conclusions In this study, we conclude that two thirds of GI cancers were diagnosed following referral via the 2WW pathway but only one third of gastric cancers. Of the 2WW patients, two thirds had a clinic review prior to endoscopy which resulted in a 7 day delay in cancer diagnosis compared to STT patients. We conclude that more patients with cancer are diagnosed on the 2WW pathway than previously documented and triaging patients STT speeds up the diagnosis further by 7 days. We recommend that the majority of 2WW patients be triaged STT so that earlier diagnosis of cancer may result in improved survival and reduce the gap compared to our European counterparts.