**Introduction** Digitisation and increasing workload presents an opportunity for artificial intelligence (AI) tools in histopathology. In the UK, approximately 580,000 people live infected with hepatitis B or C and an estimated 30,000 liver biopsies are performed annually in the US. We performed a literature review and analysis to determine understanding of interobserver variation in viral hepatitis grading and staging as a foundation for developing a novel AI tool.

**Methods** A literature search for papers examining viral hepatitis, interobserver variation and Ishak/Knodell scoring returned 24 papers. Abstracts were reviewed independently with inclusion and exclusion criteria by two consultants and a registrar, and consensus discussion determined the inclusion of eight papers in the final analysis. Average Cohen’s kappa coefficient scores of interobserver variation for necro-inflammatory activity (NIA) and fibrosis were gathered and these were used to give a range, mean and weighted mean kappa scores.

**Results** Results are summarised in the table 1 below. There is poor interobserver variation amongst pathologists, particularly for grading (NIA) of viral hepatitis with mean kappa score 0.33 and weighted kappa score 0.30. Kappa scores for fibrosis showed moderate to substantial agreement (mean kappa score 0.66 and weighted mean kappa score 0.63). Additional papers noted success with image analysis to improve observer agreement for fibrosis.

**Discussion** To our knowledge, this is the first review examining interobserver variation of the Knodell and Ishak systems. The results demonstrate where AI can be used to improve agreement between pathologists and therefore provide more consistent pathological assessment for patients.

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**P54** IMMUNE-PERFUSION OF LIVER EXTRACELLULAR MATRIX-SCAFFOLDS IN A CUSTOM-MADE BIOREACTOR TO EXPLORE CELL-CATHETER INTERACTIONS IN LIVER DISEASE

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Liver fibrosis is driven by progressive accumulation of extracellular matrix (ECM), coupled with chronic inflammation. Recent evidence shows that ECM changes in liver disease directly and indirectly modulate the immune system. Since traditional cell culture models often lack immune cell and ECM components, bioengineered models of liver disease using decellularised tissues present an appealing alternative. Here, we describe the generation of a bioengineered model which incorporates the dynamic culture of circulating immune cells with decellularised human liver scaffolds, supported in a custom-made bioreactor to explore interactions between the immune system and liver ECM proteins at different stages of fibrosis.

Liver ECM-scaffolds were generated by decellularising liver tissue with/without underlying disease from human liver tissue samples from partial hepatectomy, or by perfusion decellularisation of whole rat liver using established protocols. PBMCs isolated from healthy donor whole-blood were first cultured in the bioreactor under semi-continuous perfusion at high (4.22 Pa) or low shear stress (0.34 Pa) and compared to static conditions. Longitudinal profiling of PBMC phenotype was determined by FACS. ECM-scaffold were then perfused with PBMCs and cultured for 5 days. Immune-perfused tissues were stained for PBMC surface markers (T, B, NK cells and macrophages) to identify cell homing.

We designed a custom-made bioreactor which can house 6 decellularised human liver scaffolds and which supports dynamic culture of PBMCs. We found that shear stress impacts PBMC viability and that PBMCs are better supported under low shear stress conditions. PBMC phenotype profiling by FACS show no significant changes in proportion of T cells between static and dynamic culture, while an increase in proportion of Tregs and a decrease in proportion of NK cells were detected in dynamic culture. Perfusion of PBMCs in decellularised scaffolds without fibrosis show homing of cells in different areas of the scaffold at all time points, with CD3+ T cells representing 50% of cells and with small clusters of monocytes, monocytes and B cells at 3 days of culture. Dynamic perfusion improved cell density and homing in decellularised liver scaffolds compared to static conditions.

Our bioengineered system supports dynamic co-culture of PBMCs and decellularised scaffolds, with varying grades of fibrosis, allowing us to explore the interactions between the ECM and immune cells in liver disease in a dynamic perfusion system. A better understanding of ECM-immune interactions will aid our understanding of the driving factors behind fibrosis and could highlight new disease progression biomarkers and therapeutic targets to treat disease.

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**P55** LOOKING FOR A NEEDLE IN A HAYSTACK: OUTCOMES OF THE SURREY HEPATITIS C/PHE LOOKBACK EXERCISE. RE-ENGAGING PATIENTS IN A LOW PREVALENCE ODN

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The World Health Organisation has published a strategy for eradication of Hepatitis C (HCV) by 2030. This will require active case finding and re-engagement of people previously diagnosed with HCV. In September 2018, Public Health England (PHE) and NHS England shared details of patients with historical HCV-positive results from sentinel surveillance between 1996 and 2017, requesting that local operational delivery networks (ODNs) contact each person to retest and treat as appropriate. Here we present the data for the Surrey ODN.

**Methods** The Surrey ‘Lookback’ cohort included 1162 people. The PHE protocol was utilised with local amendments. Prior to contacting individuals, cases were cross-checked with NHS spine local databases, paper records and laboratory data to exclude deceased patients and those without active viraeemia. The remaining patients received a letter explaining the initiative, followed by up to 3 telephone calls before a final letter.