

**Title:** Exploring changing attitudes to non-invasive liver fibrosis tests in secondary care pathways: comparison of two national surveys.

**Authors:** KWM Abeysekera <sup>1,2\*</sup>, A Srivastava <sup>3,9\*</sup>, IA Rowe <sup>4</sup>, H Jarvis <sup>5</sup>, S Ryder <sup>6</sup>, A Yeoman <sup>7</sup>, JF Dillon <sup>8</sup>, W Rosenberg <sup>9</sup>

\*Joint first authors

**Affiliations:**

1. Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK.
2. Department of Liver Medicine, Bristol Royal Infirmary, Bristol, UK
3. Department of Gastroenterology, Southmead Hospital, North Bristol NHS Foundation Trust
4. Leeds Liver Unit, St James's University Hospital, Leeds, UK.
5. Population Health Sciences Institute, Newcastle University, Newcastle upon Tyne, UK
6. NIHR Nottingham Biomedical Research Centre at Nottingham University Hospitals NHS Trust, Nottingham, UK
7. Aneurin Bevan University Health Board, Hepatology, Newport, UK
8. Division of Clinical and Molecular Medicine, University of Dundee, Ninewells Hospital and Medical School, Dundee, UK.
9. UCL Institute for Liver and Digestive Health, Division of Medicine, UCL Medical School

**Author contributions (CRediT Statement):**

KWMA: conceptualization, methodology, validation, formal analysis, data curation, writing – original draft, review & editing; AS: conceptualization, methodology, validation, writing – review & editing; IAR: writing – review & editing; HJ: writing –review & editing; SR: writing – review & editing; AY: writing –review & editing; JFD: writing –review & editing; WR: conceptualization, methodology, writing – review & editing, supervision.

**Keywords:** non-invasive liver tests, fibrosis assessment, FIB-4, enhanced liver fibrosis test, transient elastography

**Supplementary material:  
Figure S.1 Survey 1**

**Non invasive tests National Survey**

**Q1: What is your primary speciality?**

- Hepatology                       Gastroenterology                       Primary Care  
 General/ Internal Medicine       Other (please specify)

If you have chosen "other", please specify:

**Q2: What is your role?**

- Consultant/ General Practitioner       Specialist Registrar Trainee                       Nurse specialist  
 Other (please specify)

If you have chosen "other", please specify:

**Q3: Please name the hospital or the NHS foundation trust that you currently work for? (please leave blank if you prefer not to specify)**

**Q4: In what proportion of your patients with liver disease do you assess the fibrosis stage? (please select one)**

- Never (0%)                                       Up to a quarter of cases (1-25%)  
 Up to half of cases (26-50%)                       Up to three quarters of cases (51-75%)  
 Nearly all cases (76-99%)                       All cases (100%)

**Q5: What are the clinical reasons for liver biopsy in your clinical practice? (please tick all that apply)**

	Indication for liver biopsy
Assessment of fibrosis stage as 'standard of care'	<input type="checkbox"/>
To allow prognosis assessment	<input type="checkbox"/>

To guide treatment decisions	<input type="checkbox"/>
To assess response to treatment	<input type="checkbox"/>
To diagnose aetiology of liver disease (acute or chronic)	<input type="checkbox"/>
Other (please specify)	<input type="checkbox"/>

Any additional comments:

**Q6: Do you think non-invasive liver fibrosis tests are a suitable alternative to liver biopsy in the following scenarios?**  
(please select one option per row)

	Non invasive tests a suitable alternative to biopsy	Non invasive tests useful only as an adjunct to biopsy	Non-invasive tests not useful
Assessment of fibrosis stage as 'standard of care'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To allow prognosis assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To guide treatment decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To assess response to treatment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To diagnose aetiology of liver disease (acute or chronic)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Any additional comments:

**Q7: In patients with chronic liver disease, which methods to accurately stage liver fibrosis are you aware of and/ or use in clinical practice? (please select one option per row)**

	Never heard of test	Not useful for liver fibrosis assessment	Useful for liver fibrosis assessment but do not use in clinical practice	Use in Clinical Practice for fibrosis assessment
Clinical Examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Standard Liver Function Tests (LFT's)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liver synthetic function tests (i.e. INR, albumin)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AST to Platelet Ratio (APRI)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fibrosis 4 score (FIB-4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NAFLD fibrosis score	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced Liver Fibrosis Panel (ELF)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fibroscan	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ultrasound Liver	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computed Tomography (i.e. CT Liver)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magnetic Resonance Imaging (i.e. MRI Liver)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Liver Biopsy

Any additional comments including other tests of liver fibrosis that you use or are aware of:

**Q8: Do you use a primary or secondary care pathway using non-invasive tests of liver fibrosis to guide management of patients with, or at risk of, liver disease?**

Yes  No

If yes, please can you provide a brief description of the pathway and also provide your contact email if you are happy to be contacted to discuss further.

**Q9: What are the limiting factors that prevent use of non-invasive liver fibrosis tests in your practice? (please tick all that apply)**

- Not applicable - have suitable access to non-invasive liver fibrosis tests
- Availability of Test
- Cost of Test
- Diagnostic accuracy of current tests
- Lack of need of non-invasive tests in current clinical practice
- Other (please specify)

If you have chosen "other", please specify:

**Q10: Which method of fibrosis assessment do you use primarily in the following liver diseases (please select one option for each row)?**

	Serum fibrosis tests	Imaging fibrosis tests i.e. fibroscan	Liver Biopsy	No fibrosis assessment	Not Applicable
Hepatitis B	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hepatitis C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alcoholic Liver Disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non alcoholic fatty liver disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haemochromatosis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autoimmune Liver Disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Primary Sclerosing Cholangitis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Primary Biliary Cirrhosis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If any additional comments, please specify:

**Q11: Please document any additional comments you have regarding the use of non-invasive tests of liver fibrosis in clinical practice, including their advantages and disadvantages. Thank you.**

## Figure S.2 Survey 2

Q1: What is your primary speciality

Hepatology

Gastroenterology

General/Internal Medicine

Other: \_\_\_\_\_

Q2: What is your role?

Consultant/General Practitioner

Specialist Registrar Trainee

Nurse specialist

Other: \_\_\_\_\_

Q3: Please name the hospital or the NHS foundation trust that you currently work for? (please leave blank if you prefer not to specify)

Your answer \_\_\_\_\_

Q4: In what proportion of your patients with liver disease do you assess the fibrosis stage?

Never (0%)

Up to a quarter of cases (1-25%)

Up to half of cases (26-50%)

Up to three quarters of cases (51-75%)

Nearly all cases (76-99%)

All cases (100%)

Q5: What are the clinical reasons for liver biopsy in your clinical practice?

Assessment of fibrosis stage as 'standard of care'

To allow prognosis assessment

To guide treatment decisions

To assess response to treatment

To diagnose aetiology of liver disease (acute or chronic)

Other: \_\_\_\_\_

Q6: Do you think non-invasive liver fibrosis tests are a suitable alternative to liver biopsy in the following scenarios? (please select one option per row)

	Non invasive tests a suitable alternative to biopsy	Non invasive tests useful only as an adjunct to biopsy	Non invasive tests not useful
Assessment of fibrosis stage as 'standard of care'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To allow prognosis assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To guide treatment decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To assess response to treatment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To diagnose aetiology of liver disease (acute or chronic)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (please specify in box below)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6: Any additional comments?

Your answer \_\_\_\_\_

Q7: In patients with chronic liver disease, which methods to accurately stage liver fibrosis are you aware of and/or use in clinical practice? (please select one option per row)

	Never heard of test	Not useful for liver fibrosis assessment	Useful for liver fibrosis assessment but do not use in clinical practice	Use in clinical practice for fibrosis assessment
Clinical examination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Standard Liver Function Tests (LFTs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liver synthetic function tests (i.e. INR, albumin)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AST to Platelet Ratio (APRI)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fibrosis 4 score (FIB-4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
NAFLD fibrosis score	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enhanced Liver Fibrosis (ELF) panel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transient elastography	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ARFI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liver ultrasound	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Computed tomography (i.e.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magnetic resonance imaging (i.e. MRI Liver)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Liver biopsy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7: Any additional comments including other tests of liver fibrosis that you use or are aware of?

Your answer \_\_\_\_\_

Q8: Do you use a primary or secondary care pathway using non-invasive tests of liver fibrosis to guide management of patients with, or at risk of, liver disease?

- Yes
- No

Q8: If yes, please could you provide a brief description of the pathway and also provide your contact email if you are happy to be contacted to discuss further?

Your answer \_\_\_\_\_

Q9: What are the limiting factors that prevent use of non-invasive liver fibrosis tests in your practice? (please tick all that apply)

- Not applicable - have suitable access to non-invasive liver fibrosis tests
- Availability of test
- Cost of test
- Diagnostic accuracy of current tests
- Lack of need of non-invasive tests in current clinical practice

Q10: Which method of fibrosis assessment do you use primarily for the following liver diseases (please select one option for each row)?

	Serum fibrosis tests	Imaging fibrosis tests e.g. transient elastography	Liver biopsy	No fibrosis assessment	Not applicable
Hepatitis B	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hepatitis C	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alcohol-related liver disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Non-alcoholic fatty liver disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Haemochromatosis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Autoimmune hepatitis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Primary sclerosing cholangitis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Primary biliary cholangitis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q10: If any additional comments, please specify:

Your answer \_\_\_\_\_

Q11: If using transient elastography for fibrosis assessment, have you had to reduce capacity to accommodate social distancing measures?

- No - service running at full capacity
- Yes - reduced to 75-99% capacity
- Yes - reduced to 50-74% capacity
- Yes - reduced to 25-49% capacity
- Yes - reduced to <25%
- Yes - we have changed our fibrosis assessment strategy
- N/A - do not have access to transient elastography (or equivalent)

Q11: Please provide any additional comments about access to transient elastography and how this may have impacted waiting times?

Your answer

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Q12: Please document any additional comments you have regarding the use of non-invasive tests of liver fibrosis in clinical practice, including their advantages and disadvantages. Thank you

Your answer

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Submit

Clear form

**Table S.1** UK Trusts represented amongst respondents to Survey 1

Abertawe Bro Morgannwg University Health Board	North Middlesex University Hospital NHS Trust
Airedale Foundation NHS Trust	North Tees and Hartlepool NHS Foundation Trust
Ayrshire & Arran NHS Trust	Northumbria Healthcare NHS Foundation Trust
Barking, Havering and Redbridge University Hospitals NHS Trust	Nottingham University Hospitals NHS Trust
Barnet General Hospital	Portsmouth Hospitals NHS Trust
Barts Health NHS Foundation Trust	Rotherham general Hospital NHSFT
Bassetlaw Hospital, Worksop DBHFT	Royal Free London Foundation Trust
Belfast Health and Social Care Trust	Royal Liverpool
Berkshire Healthcare NHS Foundation Trust	Royal United Hospital
Betsi Cadwaladr University Health Board, Wrexham Maelor Hospital	Salford Royal NHS Foundation Trust
Blackpool Teaching Hospitals NHS Foundation Trust	Sheffield teaching hospitals
Central and North West London NHS Foundation Trust	South Tees Hospitals NHS Foundation Trust
Chelsea and Westminster Hospital NHS Foundation Trust	South Warwickshire NHS Foundation Trust
County Durham & Darlington NHS Foundation Trust	St George's University Hospitals NHS Foundation Trust
East and North Hertfordshire NHS Trust	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
East Lancashire NHS Trust	The North West Anglia NHS Foundation Trust
East Suffolk and North Essex NHS Foundation Trust	The Princess Alexandra Hospital NHS Trust
Frimley Health Foundation Trust	UH Bristol NHS Foundation Trust
Gateshead Health NHS Foundation Trust	United Lincolnshire Hospitals NHS Trust
Gloucestershire Hospitals NHS Foundation Trust	United Lincolnshire NHS trust
Great Western Hospitals NHS Foundation Trust	University College London Hospitals NHS Foundation Trust
Guy's and St Thomas' NHS Foundation Trust	University Hospital Birmingham
Hull and East Yorkshire NHS Hospitals Trust	University Hospital of North Midlands NHS trust
Imperial College Healthcare NHS Trust	University Hospital Southampton NHS Foundation Trust
Kettering General Hospital NHS Foundation Trust	University Hospitals Coventry & Warwickshire
Kings Healthcare NHS Foundation Trust	University Hospitals Dorset NHS Foundation Trust
Leeds Teaching Hospitals NHS Trust	University Hospitals Of Leicester NHS Trust
London North West University Healthcare NHS Trust	University Hospitals Plymouth NHS Trust
Luton and Dunstable University Hospital NHS Foundation Trust	West Hertfordshire Hospitals NHS Trust
Maidstone and Tunbridge Wells NHS Trust	West Suffolk NHS Foundation Trust
Manchester University NHS Foundation Trust	Western Sussex Hospitals NHS Foundation Trust
Mid and South Essex NHS Foundation Trust	Weston General Hospital
Morrison Hospital	Worcestershire Royal Hospital
NHS Greater Glasgow AND Clyde	Yeovil District Hospital
NHS Lothian	
Norfolk and Norwich University Hospital NHS Trust	
North Bristol NHS Trust	
North Cumbria Integrated Care NHS Foundation Trust	

**Table S.2** UK Trusts represented amongst respondents to Survey 2

Belfast Health and Social Care Trust	Royal United Hospitals Bath NHS Foundation Trust
Buckinghamshire Healthcare NHS Trust	Sheffield Teaching Hospitals NHS trust
Aneurin Bevan Health Board	Somerset NHS Foundation Trust
Ashford and St Peter's NHS trust	South Tyneside and Sunderland NHS FT
Barts Health NHS Foundation Trust	South Warwickshire NHS Foundation Trust
Bradford Teaching Hospitals Foundation Trust	St Helens and Knowsley Teaching Hospitals NHS Trust
Chelsea and Westminster Hospital NHS Foundation Trust	Surrey and Sussex Healthcare NHS Trust
Dartford and Gravesham NHS Trust	Torbay and South Devon NHS Foundation Trust
Dudley Group NHS Foundation Trust	UHBW NHS Foundation Trust
East Kent Hospitals University NHS Foundation Trust	United Lincolnshire Hospitals NHS Trust
Frimley Health NHS trust	University Hospital Hairmyres - NHS Lanarkshire
Gateshead NHS Foundation Trust	University Hospital of North Midlands
Glasgow Royal Infirmary - NHSGGC	University Hospital Southampton
Gloucestershire Hospitals NHS Foundation Trust	University Hospitals Birmingham
Great Western Hospital NHS foundation trust	University Hospitals Coventry & Warwickshire
Guy's and St Thomas' NHS Foundation Trust	University Hospitals of Derby and Burton NHS
Hampshire Hospitals NHS Foundation Trust	University Hospitals Plymouth NHS Trust
Heart of England NHS Foundation Trust	University Hospitals Sussex NHS Foundation Trust
Hull University Teaching Hospitals	Wye Valley NHS Trust
King's College Hospital NHS Foundation Trust	Yeovil Hospital NHS Foundation Trust
Lewisham and Greenwich NHS Trust	
London North West University Healthcare NHS Trust	
Maidstone and Tunbridge Wells NHS Trust	
Manchester University NHS Foundation Trust	
Mid and South Essex NHS Foundation Trust	
Newcastle upon Tyne Hospitals NHS Foundation Trust	
NHS Dumfries & Galloway	
NHS Forth Valley	
NHS Lothian	
Norfolk and Norwich University Hospitals NHS Foundation Trust	
North Bristol NHS Trust (Southmead)	
North Cumbria Integrated Care NHS Foundation Trust	
North Tees and Hartlepool NHS Foundation Trust	
Nottingham University hospitals NHS Trust	
Oxford University Hospitals	
Portsmouth Hospitals University NHS Trust	
Royal Berkshire Hospitals NHS Foundation Trust	
Royal Devon and Exeter NHS Foundation Trust	
Royal Free Hospital	
Royal Liverpool and Broadgreen University Hospitals NHS Trust	

**Table S.3** UK Trusts represented amongst respondents to both Survey 1 and 2

<b>Barts Health NHS Foundation Trust</b>
<b>Belfast Health and Social Care Trust</b>
<b>Berkshire Healthcare NHS Foundation Trust</b>
<b>Chelsea and Westminster Hospital NHS Foundation Trust</b>
<b>Frimley Health Foundation Trust</b>
<b>Gateshead Health NHS Foundation Trust</b>
<b>Gloucestershire Hospitals NHS Foundation Trust</b>
<b>Guy's and St Thomas' NHS Foundation Trust</b>
<b>Hull and East Yorkshire NHS Hospitals Trust</b>
<b>Kings Healthcare NHS Foundation Trust</b>
<b>London North West University Healthcare NHS Trust</b>
<b>Maidstone and Tunbridge Wells NHS Trust</b>
<b>Manchester University NHS Foundation Trust</b>
<b>Mid and South Essex NHS Foundation Trust</b>
<b>NHS Greater Glasgow AND Clyde</b>
<b>NHS Lothian</b>
<b>Norfolk and Norwich University Hospital NHS Trust</b>
<b>North Bristol NHS Trust</b>
<b>North Cumbria Integrated Care NHS Foundation Trust</b>
<b>North Tees and Hartlepool NHS Foundation Trust</b>
<b>Nottingham University Hospitals NHS Trust</b>
<b>Portsmouth Hospitals NHS Trust</b>
<b>Royal Free London Foundation Trust</b>
<b>Royal Liverpool</b>
<b>Royal United Hospital</b>
<b>Sheffield teaching hospitals</b>
<b>South Warwickshire NHS Foundation Trust</b>
<b>The Newcastle Upon Tyne Hospitals NHS Foundation Trust</b>
<b>UH Bristol NHS Foundation Trust</b>
<b>United Lincolnshire NHS trust</b>
<b>University Hospital Birmingham</b>
<b>University Hospitals Coventry &amp; Warwickshire</b>
<b>University Hospitals Plymouth NHS Trust</b>
<b>Western Sussex Hospitals NHS Foundation Trust</b>
<b>Weston General Hospital</b>
<b>Yeovil District Hospital</b>