ULTRASOUND SCREENING FOR HEPATOCELLULAR CARCINOMA: AN UPDATE

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BACKGROUND

- NHSE targeted HCC surveillance.
- Started in June 2023

- Collaboration between:
  - NHSE
  - BMUS
  - BSGAR
  - RCR
  - SCoR
  - BSG
  - BLNA
  - HCC UK
  - BASL
  - BLT

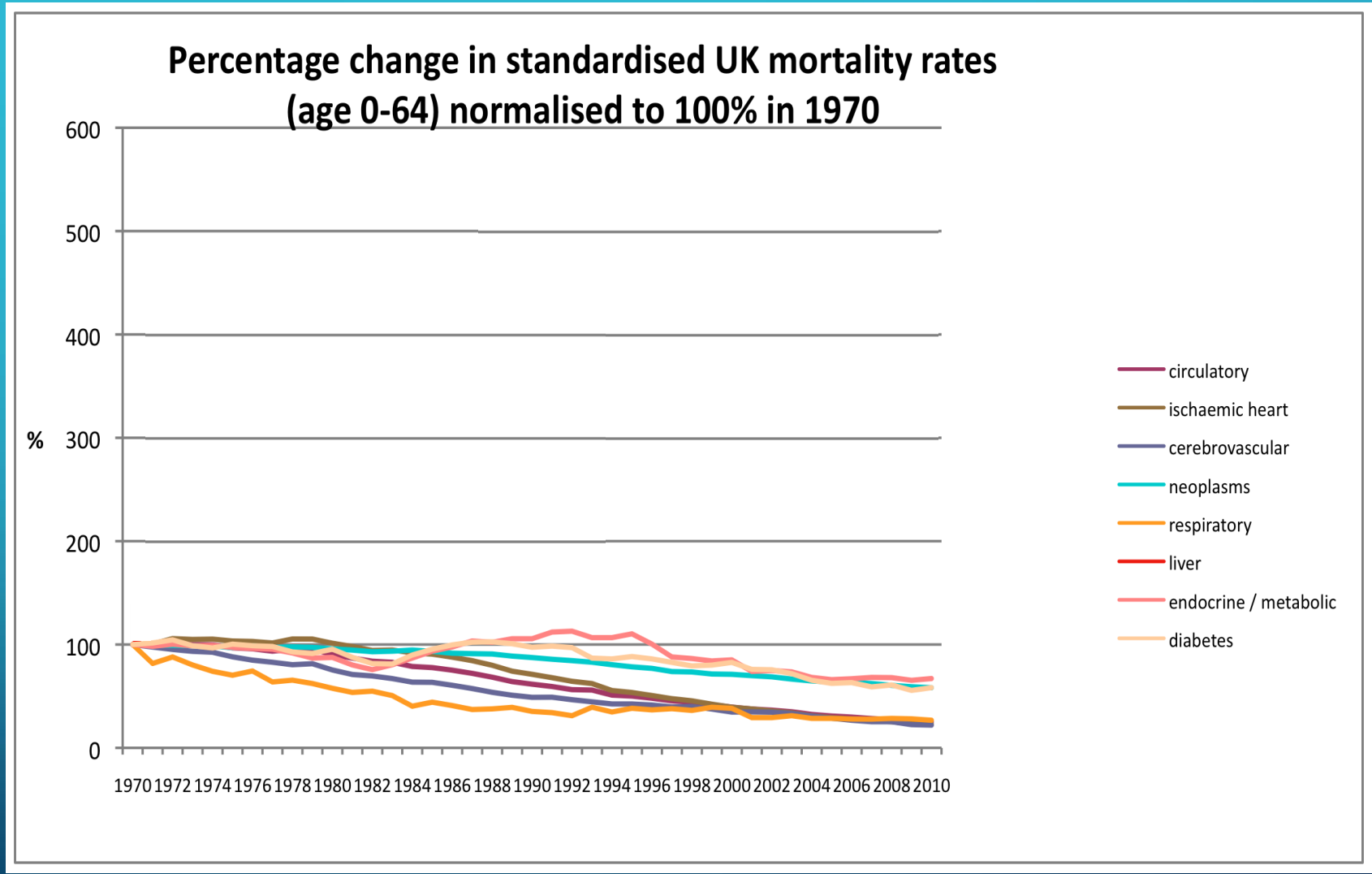
DRIVERS

- Liver cancer is the fastest-rising cause of cancer related deaths in the UK.
- The most common primary liver cancer is hepatocellular carcinoma (HCC), (85% of all liver cancers).
- 6,200 people are diagnosed with liver cancer each year. Incidence of HCC has increased by 50% over the past decade and is expected to continue to rise.
- Only around 20% of HCCs are currently diagnosed at an early stage (stages 1 or 2).

DRIVERS

- Research by the British Liver Trust suggests only 13% of people will survive 5 years or more following a liver cancer diagnosis, and only 40% will survive for 1 year or more.
- Survival and patient outcomes from HCC are significantly improved when the cancer is diagnosed earlier.
- The biggest risk factor for HCC is pre-existing liver disease, with liver cirrhosis being present in 80-90% of people with HCC.
- Fewer than half of patients who should receive surveillance actually do.

CIRRHOSIS- THE PROBLEM



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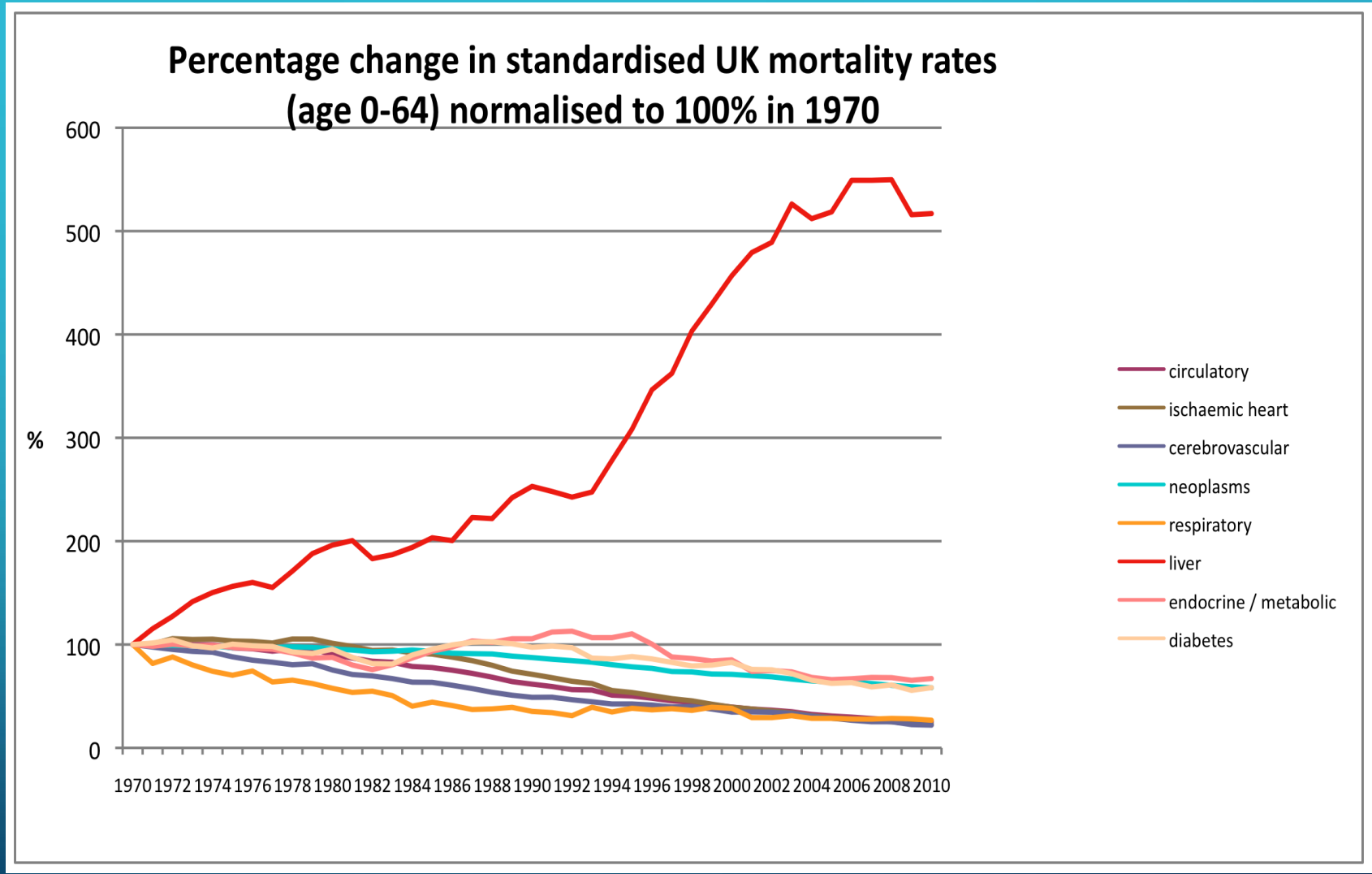
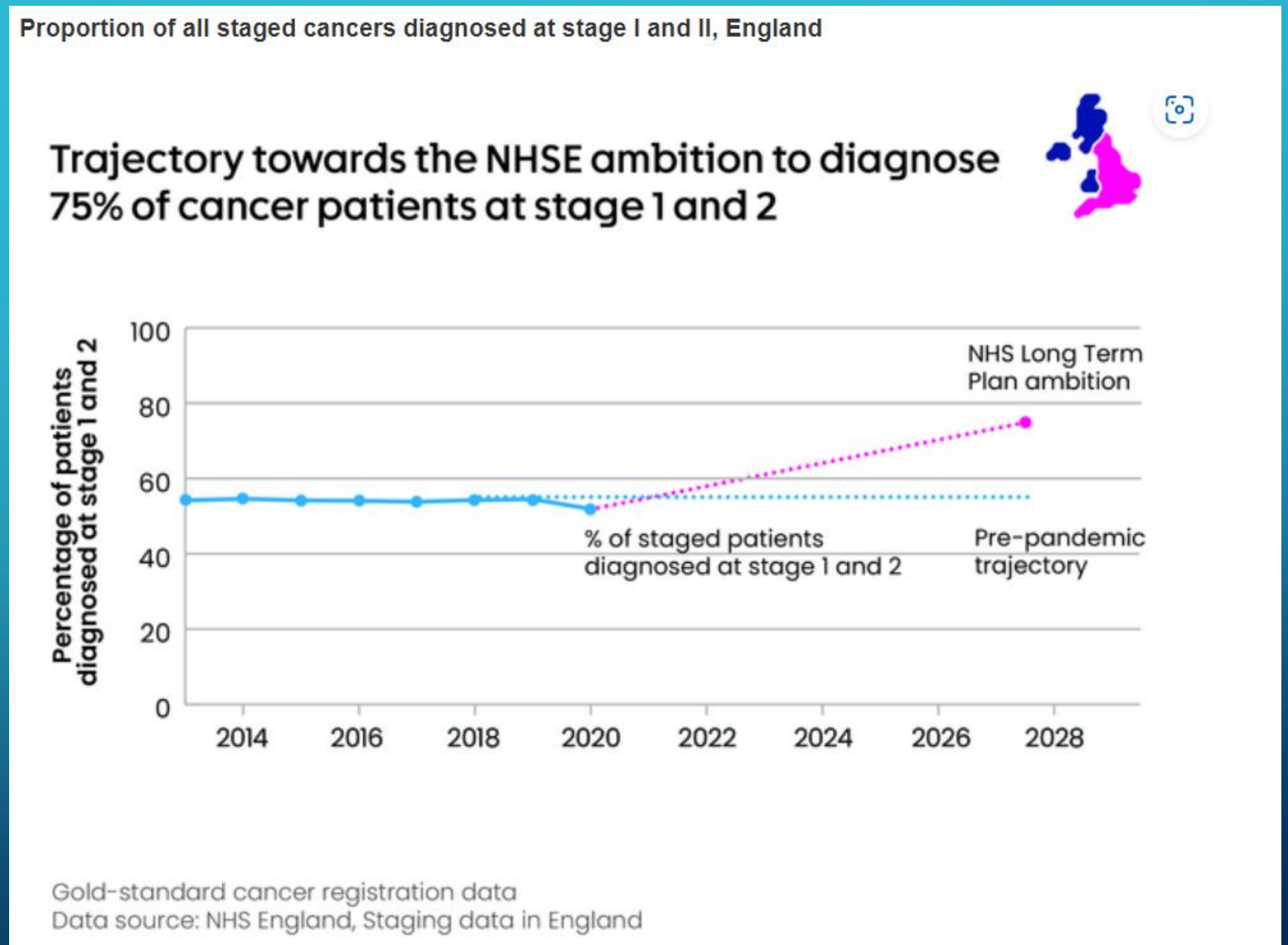


Proportion of all staged cancers diagnosed at stage I and II, England

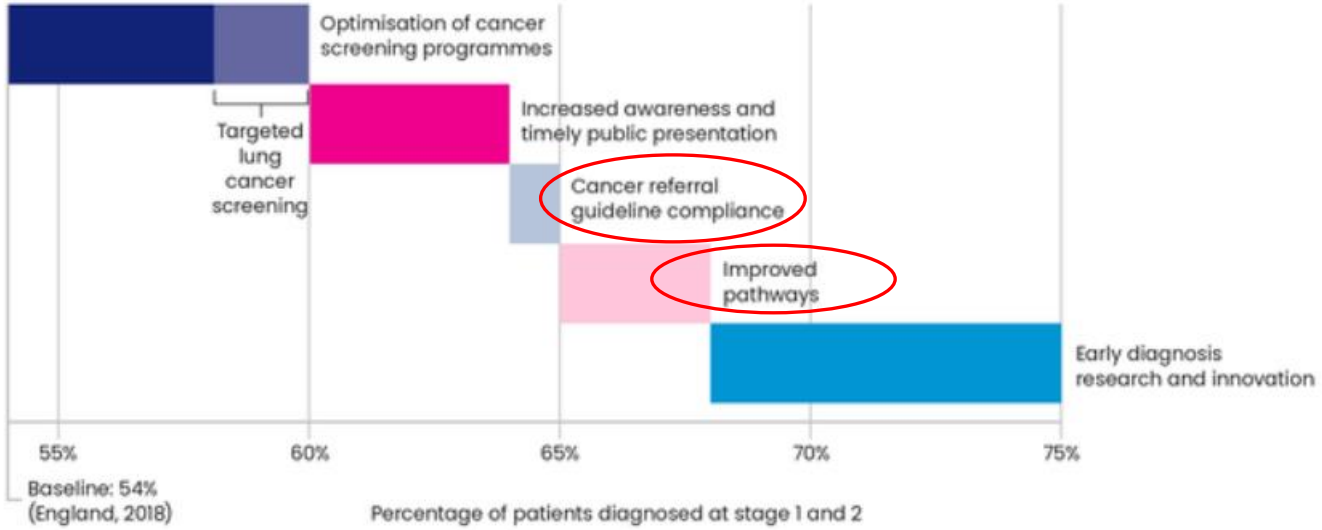


Improving Early Diagnosis of Cancer 'Waterfall' Infographic (England Scotland and Wales Edition, 2023)

Action needed to diagnose 75% of cancer patients at an early stage

Action is needed on all fronts to address early-stage cancer diagnosis.

These steps must be supported by the provision of optimal treatment options as well as increases in workforce and diagnostic kit. Additionally, elimination of sociodemographic inequalities could result in a 4% increase in early-stage diagnosis across 10 cancer sites.*



*Barclay, M. E., et al. British Journal of Cancer, 2021

Produced by the Strategic Evidence team, Policy Information and Communications Directorate, Cancer Research UK, 2023

CANCER RESEARCH UK

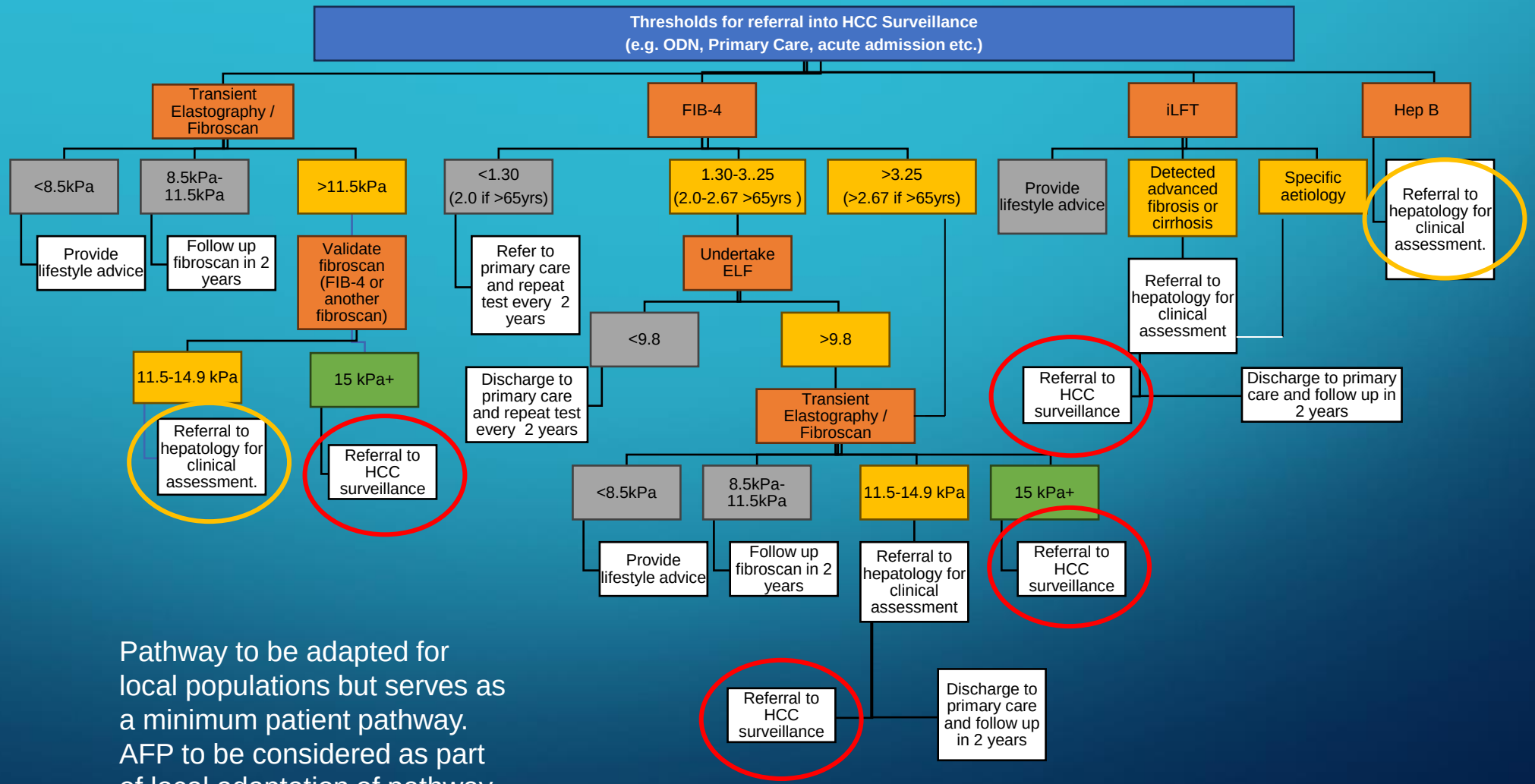
Together we are beating cancer

TARGETING NATIONWIDE IMPROVEMENT IN ESTABLISHED SERVICES

Improving HCC Surveillance

- Ensure a standardised approach is in place for HCC surveillance and that the implications that may arise from an increase in referrals in are fully considered:
  - Agree HCC surveillance patient segmentation- who are the people who will benefit the most (and least) from surveillance
  - Develop minimum standards for HCC surveillance and embed into IQILS
  - Develop guidance on delivering quality HCC ultrasound surveillance
  - Scope the requirements for a national cirrhosis register
  - Other digital solutions (e.g. Eclipse, InfoFlex, EPIC) to liver surveillance, including both data collection and capability to support call/recall of patients
  - Review the workforce implications of surveillance expansion and work with HEE and hepatology services to develop a growth strategy

WHAT IS OUR ENTRY CRITERIA FOR SURVEILLANCE?



Pathway to be adapted for local populations but serves as a minimum patient pathway. AFP to be considered as part of local adaptation of pathway.

ELIGIBILITY CRITERIA FOR SURVEILLANCE

- With a growing array of effective treatments, all patients with early-stage cirrhosis who would be fit for and benefit from treatment should be offered enrolment into liver surveillance.
- The following patients should be offered enrolment in hepatocellular carcinoma (HCC) surveillance:
  - Child–Pugh stage A
  - Child-Pugh stage B patients based on an individual assessment (for example, controlled ascites)
  - Child–Pugh stage C patients with cirrhosis, awaiting liver transplantation
  - patients with hepatitis B and significant fibrosis or cirrhosis (≥F2-4)
  - patients with hepatitis B without significant fibrosis or cirrhosis with a family history of HCC
  - patients with hepatitis B and hepatitis D coinfection
  - patients with hepatitis C and advanced fibrosis (≥F3)
  - patients with haemochromatosis and advanced fibrosis (≥F3)
  - patients with other liver diseases where the individual has a high risk of HCC.

2 Minute Medicine® **Child-Pugh Score** 2minutemedicine.com

Factor	1 point	2 points	3 points
Total bilirubin (µmol/L)	<34	34-50	>50
Serum albumin (g/L)	>35	28-35	<28
PT INR	<1.7	1.71-2.30	>2.30
Ascites	None	Mild	Moderate to Severe
Hepatic encephalopathy	None	Grade I-II (or suppressed with medication)	Grade III-IV (or refractory)

	Class A	Class B	Class C
Total points	5-6	7-9	10-15
1-year survival	100%	80%	45%

Table I. Child-Pugh score.

EXCLUSION CRITERIA

- Surveillance is not recommended in patients who are not fit for cancer specific therapy.

- Examples include:

  - those with decompensated cirrhosis who would not be candidates for liver transplant if hepatocellular carcinoma was diagnosed (Child-Pugh B8 or worse)

  - those with very impaired performance status (Eastern Co-operative Oncology Group [ECOG] category 2 or World Health Organization Performance Status [WHO PS] or worse).

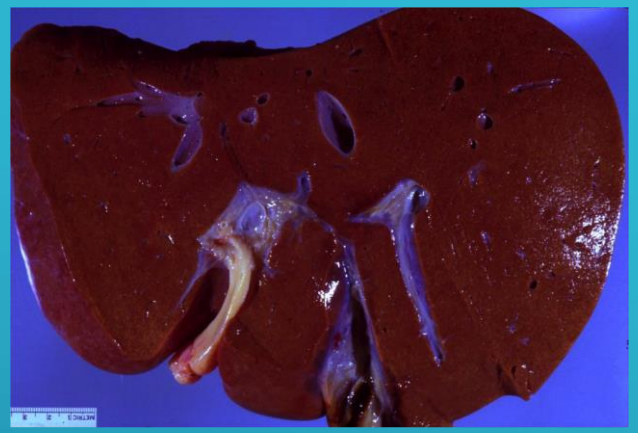
ECOG performance status

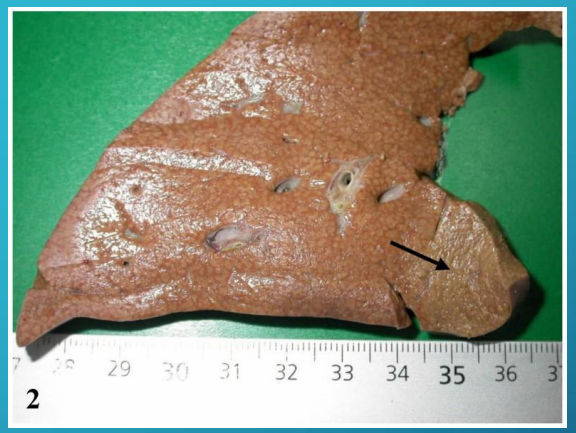
Grade	Description of patient
0	Fully active, able to carry on all predisease performance without restriction
1	Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light housework, office work
2	Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours
3	Capable of only limited self-care; confined to bed or chair more than 50% of waking hours
4	Completely disabled; cannot carry on any self-care; totally confined to bed or chair
5	Dead

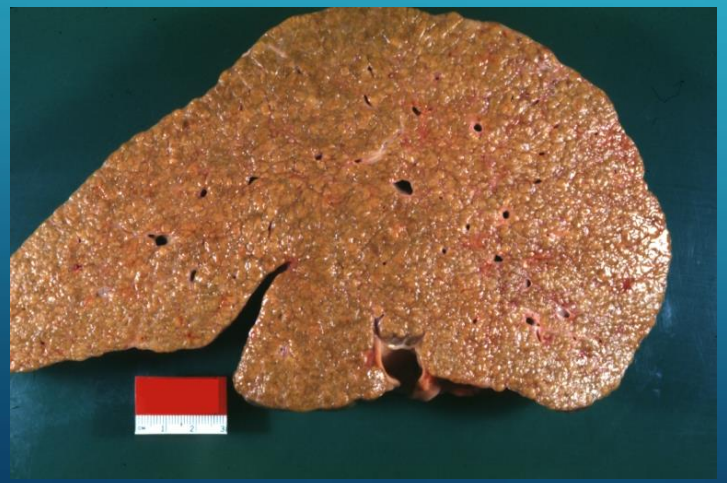
Source: Eastern Clinical Oncology Group

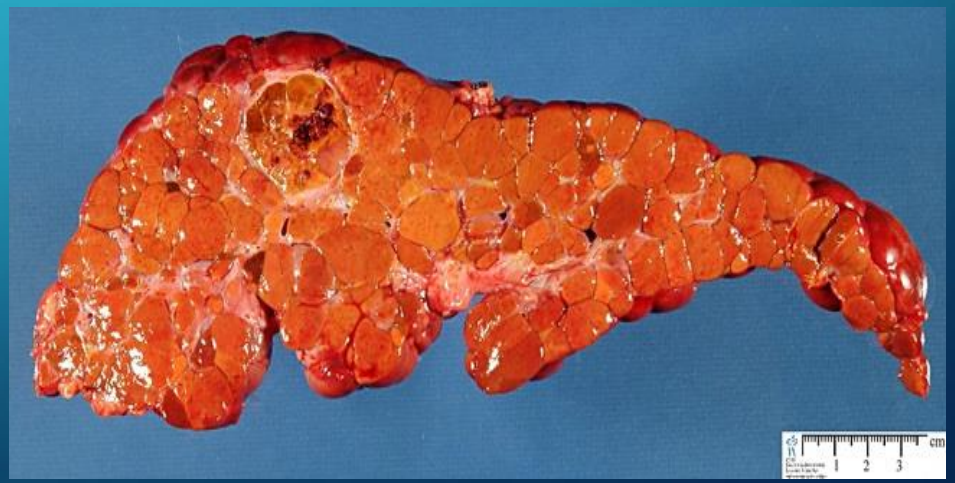
MDedge News

WHAT ABOUT THE PRACTICALITIES OF THE SURVEILLANCE?









NHS England

Date published: 24 June, 2024
Date last updated: 26 July, 2024

Hepatocellular carcinoma: delivering quality ultrasound surveillance

Publication (/publication)

Content

This document has been produced with:

- The British Association for the Study of the Liver
- The British Society of Gastrointestinal and Abdominal Radiology
- The British Society of Gastroenterology
- The Society of Radiographers and The College of Radiographers
- The British Liver Nurses' Association
- Hepatocellular Carcinoma UK
- The British Medical Ultrasound Society
- The British Liver Trust
- The Royal College of Radiologists

SERVICE ORGANISATION

- Statement 1: 6-monthly hepatocellular carcinoma ultrasound (HCC US) surveillance should be offered to eligible patients at risk of developing HCC
- Statement 2: The appropriateness of ongoing surveillance should be reviewed after each HCC US surveillance episode
- Statement 3: Imaging services should be organised to promote adherence to HCC US surveillance
- Statement 4: Gastroenterology/hepatology secondary care teams should be responsible for initiating and acting on HCC US surveillance episodes
- Statement 5: All HCC US surveillance episodes should be requested under a dedicated imaging procedure code for HCC US surveillance [USRLV] US Surveillance liver hepatocellular Ca
- Statement 6: Images obtained during HCC US surveillance examinations should be available for review on the PACS of the requesting healthcare organisation; and they should be available for review at the time of subsequent US examinations
- Statement 7: Providers of HCC US surveillance should engage with healthcare commissioners and cancer alliances to ensure sufficient US delivery capacity and expertise is available to support high quality 6-monthly HCC US surveillance for their local population
- Statement 8: HCC US surveillance services should have a nominated lead radiologist and sonographer responsible for supporting training, service delivery and quality assurance
- Statement 9: US machines used for HCC surveillance should be maintained to established quality standards and their technical set up should be optimised and standardised for HCC detection

PERFORMANCE OF HEPATOCELLULAR CARCINOMA ULTRASOUND SURVEILLANCE

- **Statement 10: hepatocellular carcinoma ultrasound (HCC US) surveillance should be performed by an appropriately trained and experienced sonographer or consultant radiologist**

- **Statement 11: Imaging during HCC US surveillance examinations should focus on identifying HCC and the complications of liver disease**

- **Statement 12: Documentation of US surveillance examinations should use a standardised, structured report, including LI-RADS US surveillance or equivalent classification**

- **Statement 13: Image capture during US surveillance should include standardised image and video capture to enable retrospective review and support interpretation of subsequent imaging examinations**

ALTERNATIVE IMAGING MODALITIES FOR HEPATOCELLULAR CARCINOMA SURVEILLANCE

- **Statement 14: Clinical and imaging teams should consider alternative imaging modalities for hepatocellular carcinoma (HCC) surveillance in patients where technical factors preclude adequate US image acquisition**

QUALITY ASSURANCE OF ULTRASOUND SURVEILLANCE

- **Statement 15: Hepatocellular carcinoma ultrasound (HCC US) surveillance services should undertake regular service evaluation to ensure compliance with these minimum standards for delivering HCC US surveillance**

- **Statement 16: HCC US surveillance services should undertake regular audit of adherence with US surveillance**

- **Statement 17: HCC US surveillance services should undertake regular quality assurance of US surveillance service delivery**

- **Statement 18: There should be dedicated radiology events and learning meetings (REALMs) for the HCC US surveillance service**

BEFORE THE SCAN

- Try and encourage attendance
  - Just sending out letters is not enough
  - Vulnerable group by nature

- Use the HCC specific code **[USRLV] US Surveillance liver hepatocellular Ca**
  - National audit using the new code (Hepatology's responsibility IMO)

- Have a person who is HCC lead sonographer and a lead radiologist
  - Someone to take lead on adhering to these guidelines, advise about alternate imaging and audit imaging, attend MDT

THE SCAN ITSELF

- Reduce targets
    - With a approx 10 minutes of scan time, is 3 or 4 minutes looking at kidneys, measuring aorta or trying to find a pancreas the best use of time
    - That time is better spent looking at the liver and checking for complications of liver disease portal hypertension.
- We should be doing cine sweeps through each lobe for audit and comparisons sake

AFTER THE SCAN

- Structured report
  - Local one is based on LIRADS with a dash of Bournemouth and Portsmouth
- LIRADS
  - VIS score
  - Lesional score
- Audit, service evaluation and REALM
  - Annual- Every HCC detected in and out of surveillance

Structured report for HCC surveillance - 2024

COMPARISON:

Type: [ultrasound, CT, abbreviated MRI] Date: [ ] Interval from last scan: [ ]

EXAMINATION COMMENTS:

This study was performed for HCC surveillance and as such, kidneys, pancreas and aorta are not routinely assessed.

FINDINGS:

Liver Visualization: [VIS-A, VIS-B, VIS-C]. (If VIS-B or C, state why)

Liver morphology/parenchyma/contour: [Echotexture, echogenicity, smooth, nodular]

Liver lesion(s): [Any focal lesions, including location (seg preferably), size and echogenicity, new / previous characterised]

Liver vasculature: [portal vein (xx cm/s) and hepatic veins direction and waveform]

Bile ducts: [Describe biliary tree] Common duct diameter is [CHD size] at the porta hepatis.

Gallbladder: [gallbladder findings]

Spleen: [Splenomegaly / No splenomegaly xx cm]

Ascites: [No ascites/small volume of ascites/moderate volume of ascites/large volume of ascites]

Other or incidental findings: [Varices, para-umbilical vein, lymph nodes, incidental renal, pancreatic pathology etc.]

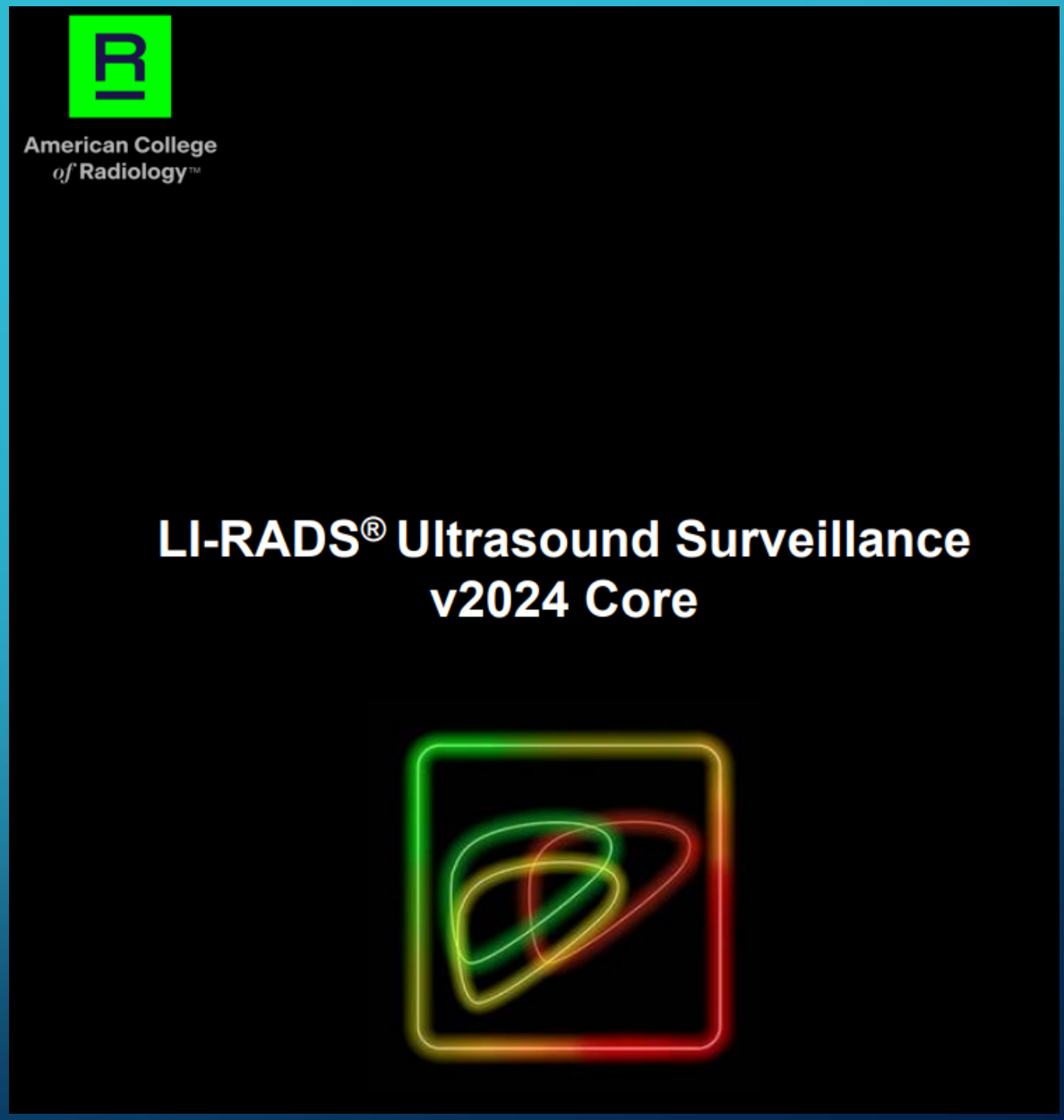
IMPRESSION:

1. [Overall summary of liver and portal hypertension findings]

2. US LI-RADS v2024 ACR: US category: [US-1, US-2, US-3] VIS-Score: [VIS-A, VIS-B, VIS-C]

3. Recommendation: [US-1: Routine 6-month surveillance US exam recommended; US-2: Two short interval 3 to 6-month surveillance US recommended. If observation remains ≤ 1cm after 2 exams or is no longer seen, may recategorise as US-1 Negative; US-3: Further, Contrast-enhanced imaging recommended for further characterization; VIS-C: Recommend repeat ultrasound surveillance exam within 3 months. If exam remains VIS-C, recommend alternative surveillance strategy; Repeat VIS-C: Recommend alternative surveillance strategy]

US LIRADS


American College of Radiology™
LI-RADS® Ultrasound Surveillance
v2024 Core

US LIRADS

US category	
US-1	Negative
US-2	Subthreshold
US-3	Positive

Category	Concept	Definition
US-1 Negative	No US evidence of HCC	No observation **OR** Only definitely benign observation(s)
US-2 Subthreshold	Observation(s) detected that may warrant short-interval US surveillance	Observation(s) < 10 mm in diameter, not definitely benign
US-3 Positive	Observation(s) detected that may warrant multiphase contrast-enhanced imaging	Observation(s) ≥ 10 mm in diameter, not definitely benign, including area(s) of parenchymal distortion **OR** New thrombus in portal or hepatic vein

US LIRADS

US visualization score

VIS-A	No or minimal limitations
VIS-B	Moderate limitations
VIS-C	Severe limitations

Score	Definition	Examples
VIS-A No or minimal limitations	Limitations if any are unlikely to meaningfully affect sensitivity	Liver homogeneous or mildly heterogeneous Minimal beam attenuation or shadowing Liver visualized in near entirety
VIS-B Moderate limitations	Limitations may obscure small (< 10 mm) observations	Parenchymal heterogeneity that may impact detection of small (< 10 mm) observation(s) Moderate beam attenuation or shadowing Some portions of liver or diaphragm not visualized
VIS-C Severe limitations	Limitations significantly lower sensitivity for liver observations	Liver severely heterogeneous Severe beam attenuation or shadowing Majority (> 50%) of right or left lobe not visualized Majority (> 50%) of diaphragm not visualized

IMPRESSION:

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TEETHING TROUBLE

- Applying structured report and LIRADS to wrong patient group
  - E.g. PSC for gallbladder assessment
  - Should be solved by 6 months after instigation
- Using LIRADS 2/3 for lesion that was 2 cm but they weren't overly concerned about
- Lots of discussion around Vis-B vs Vis-C

THANK YOU

- Special thanks to
  - Jamie Franklin
  - Ruth Reeves
  - Hazel Edwards
  - Charlie Rogers