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# Knowledge of ultrasound LI-RADS for hepatocellular carcinoma surveillance: a comparison between two centres

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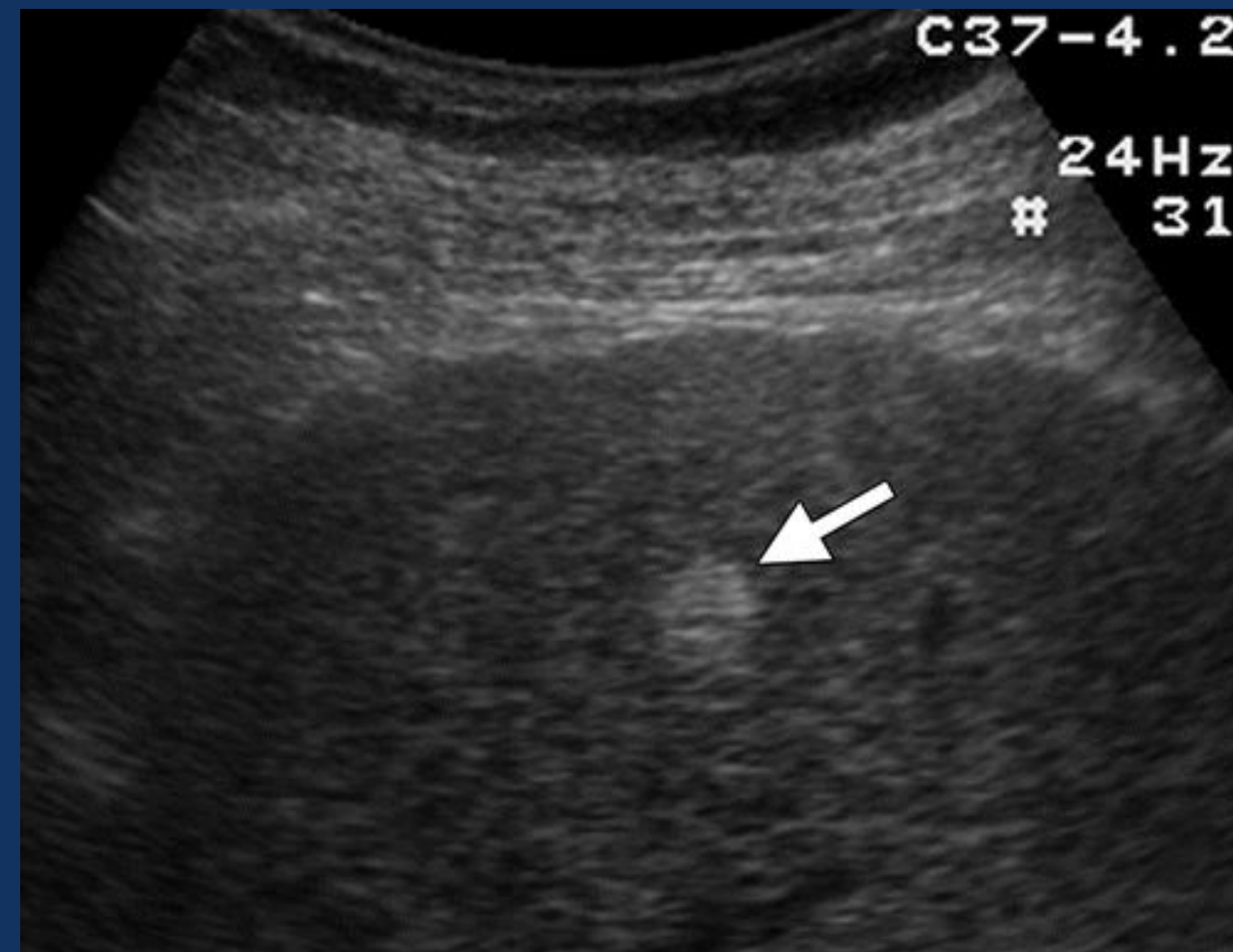
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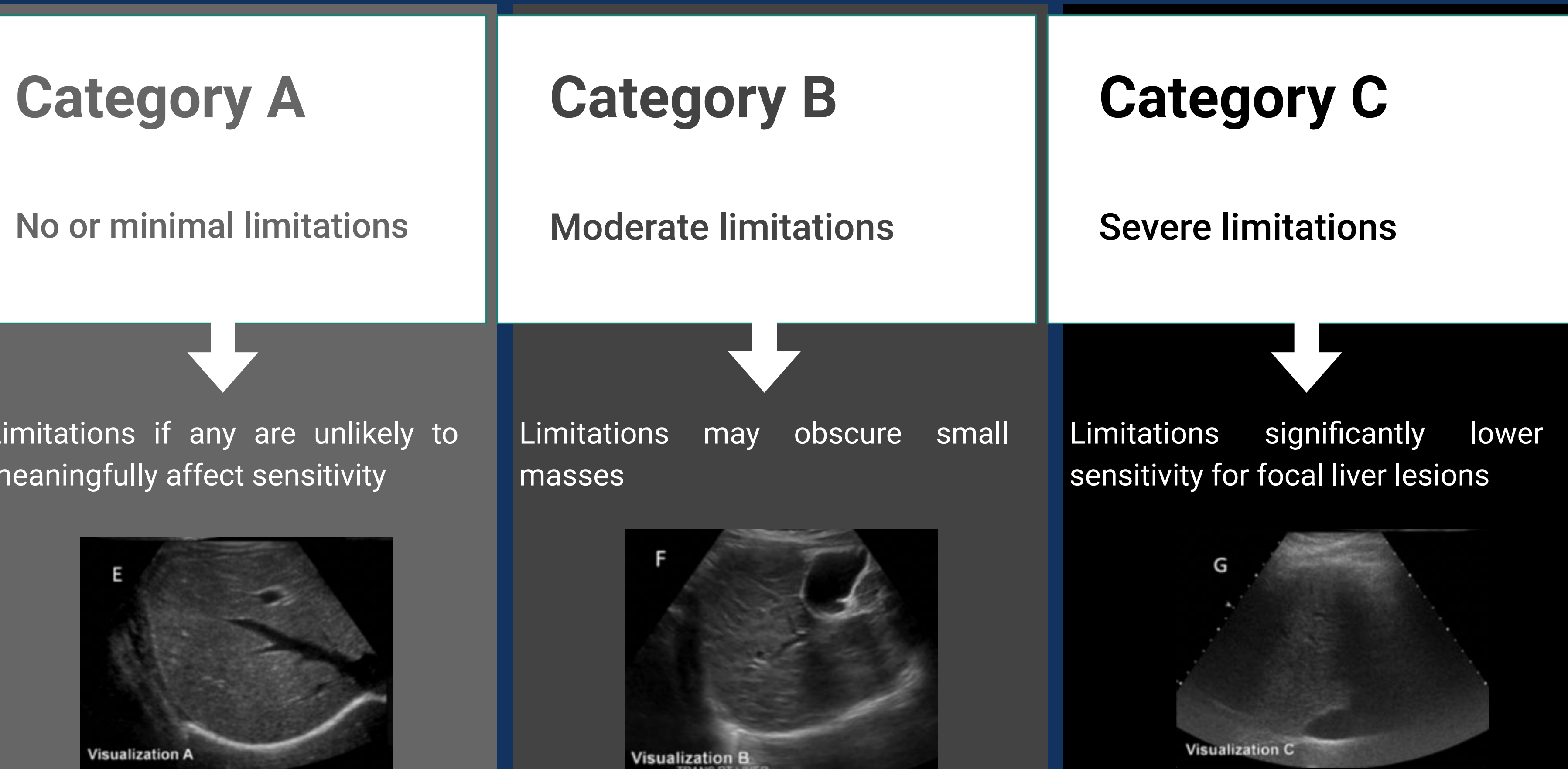
# Background

- Ultrasound Liver Imaging reporting and Data System (US LI-RADS) is a standardised system for performing, interpreting and reporting US scans for hepatocellular carcinoma (HCC) surveillance.



# Background

- US LI-RADS visualisation score assesses the sensitivity of a surveillance ultrasound scan.





# Background

- The US LI-RADS category determines the management recommendation and is divided into 3 categories: negative (US-1), subthreshold (US-2) and positive (US-3).

## US-1 Negative

No evidence of HCC

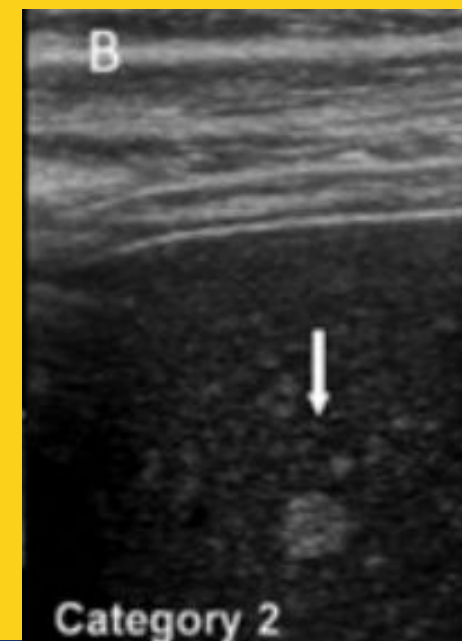
No observation / definitely benign observations



## US-2 Subthreshold

Observations detected that may warrant short-term US surveillance

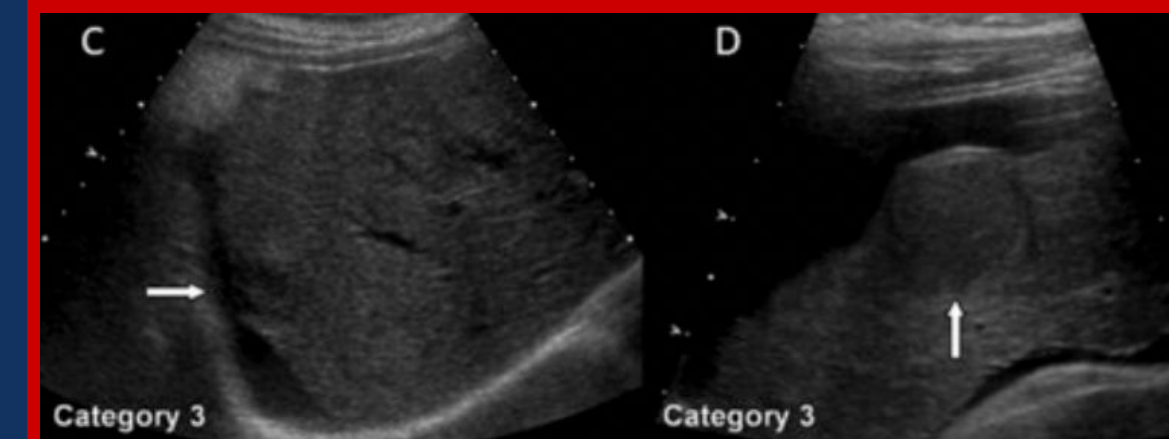
Observations <10mm in diameter, not definitely benign



## US-3 Positive

Observations detected that may warrant multiphase contrast-enhanced imaging

Observations >10mm in diameter, not definitely benign or new thrombus in vein



# Aim

- To compare US LI-RADS knowledge between two UK centres, one with an established US-LIRADS service and the other where US-LIRADS has not been implemented.

# Method

- Waiving ethical approval, practitioners performing HCC surveillance ultrasound at two centres (**hospital 1: established US LI-RADS service** versus **hospital 2: US LI-RADS NOT implemented**) were invited to complete a questionnaire between 01/11/2023 and 15/11/2023.

# Method

## Participant recruitment:

- An online questionnaire was emailed to all sonographers and doctors performing abdominal ultrasound in both hospitals.

## Questionnaire design:

- 20 questions were designed under the following categories: demographics, HCC surveillance (n=2), general US LI-RADS (n=2), US technique (n=3), US LI-RADS category (n=4) and US LI-RADS visualisation scores (n=2).

# Method

## Analysis:

- Fisher's exact test was used to compare categorical data between the two hospitals.



# Method

## Examples from questionnaire:

Q11. What are the 2 key components included in the assessment and reporting of US LI-RADS? (select one) \*

- US category and number of hepatic lesions
- US category and US visualisation score
- US visualisation score and number of hepatic lesions
- US visualisation score and presence of signs of portal hypertension (ascites, varices, doppler flow chang...
- I don't know

Q13. According to US-LIRADS, which of the following should be considered to improve US image quality? (select all that apply) \*

- Instruct patients to be nil by mouth for 4-6 hours prior to US
- Adjust patient positioning, inspiration level, and acoustic window
- Apply adequate probe pressure against abdominal wall
- Adjust image settings (e.g. transducer presets, pulse frequency, harmonics)
- I don't know

Q18. According to US-LIRADS, which of the following statements below are **INCORRECT** for a US-3 (positive) category score? (select one) \*

- Observation(s) detected that warrant characterisation with multi-phasic contrast-enhanced imaging
- A patient with a chronic thrombus within the main intrahepatic portal vein
- A patient with a new thrombus in the IVC
- A patient with new parenchymal distortion but no discrete mass
- A patient with a solid nodule (any echogenicity)  $\geq 10$  mm
- I don't know

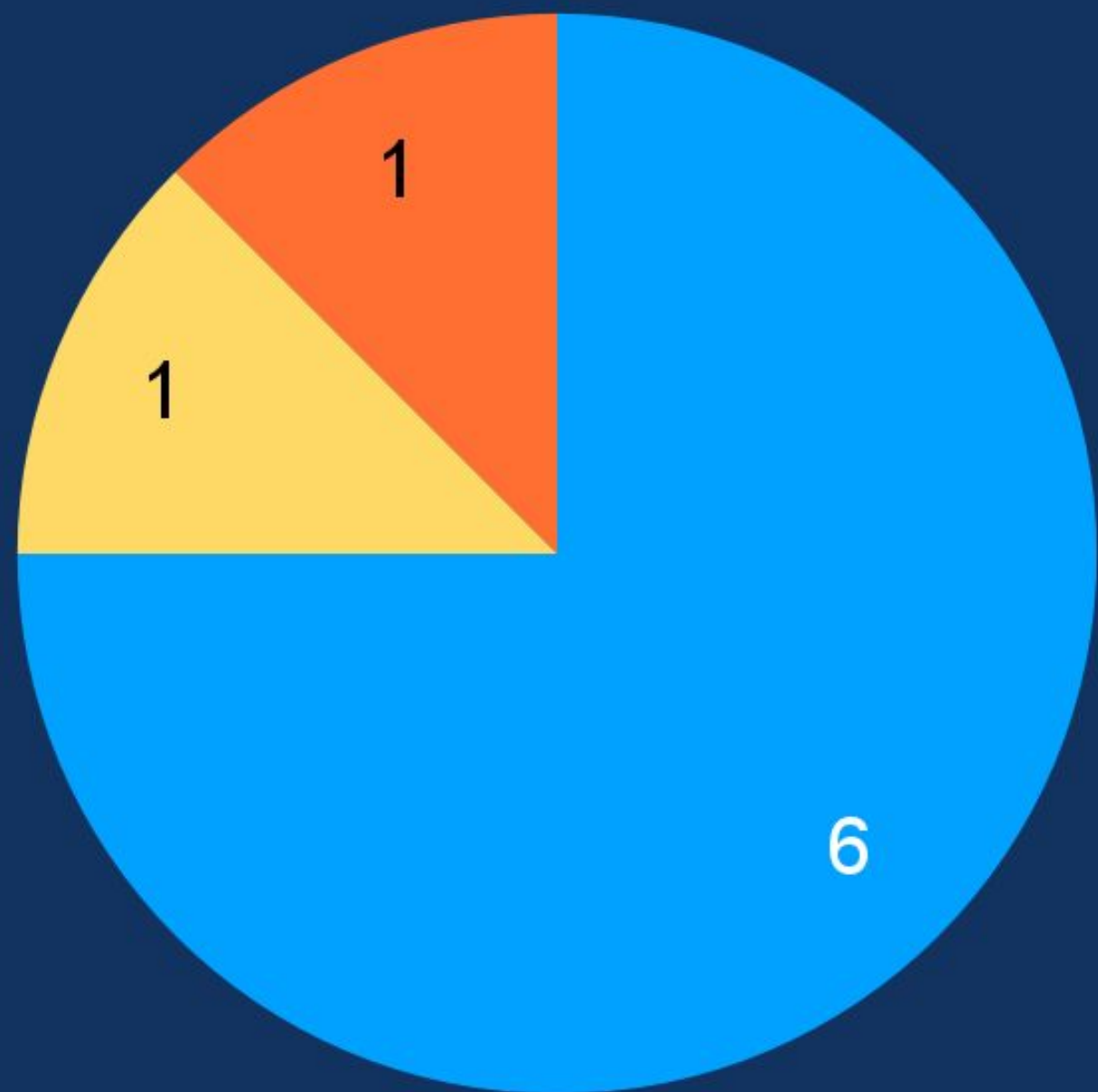
Q19. According to US-LIRADS, which of the following does **NOT** reflect the intended purpose of US visualisation scores? (select one) \*

- Reflects technical or other factors that may affect liver visualisation or nodule detection
- Helps to communicate the expected level of sensitivity of the screening exam for HCC detection in an in...
- Data on visualisation scores can be used for quality assurance and inform future refinements of LI-RADS...
- To categorise the echogenicity of a liver lesion relative to the background liver
- I don't know

# Results

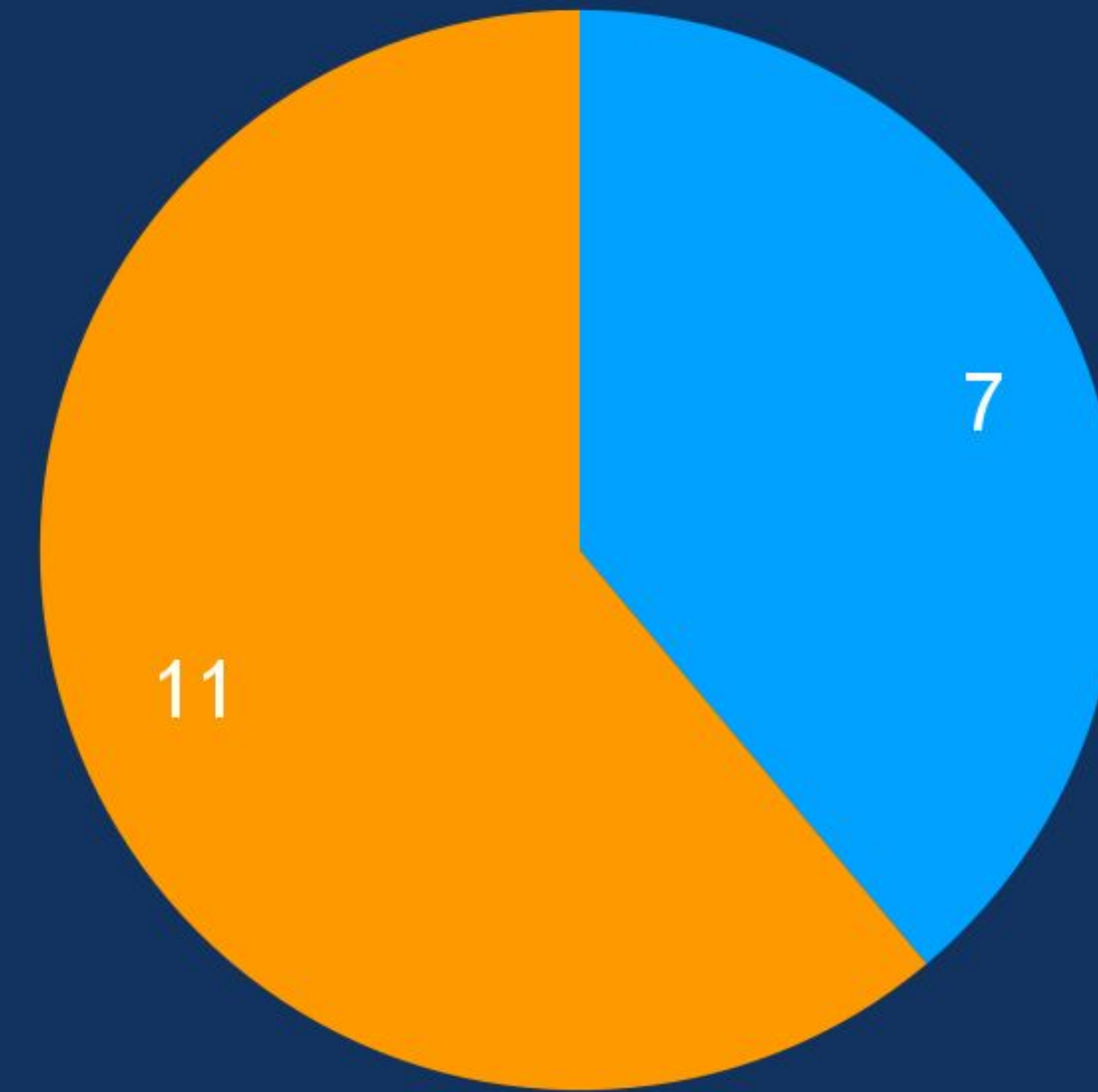
- 26 practitioners completed the questionnaires: 13 sonographers and 13 doctors

Hospital 1 (experience)



● Sonographers ● Consultant radiologist ● GP with special interest in ultrasound

Hospital 2 (no experience)

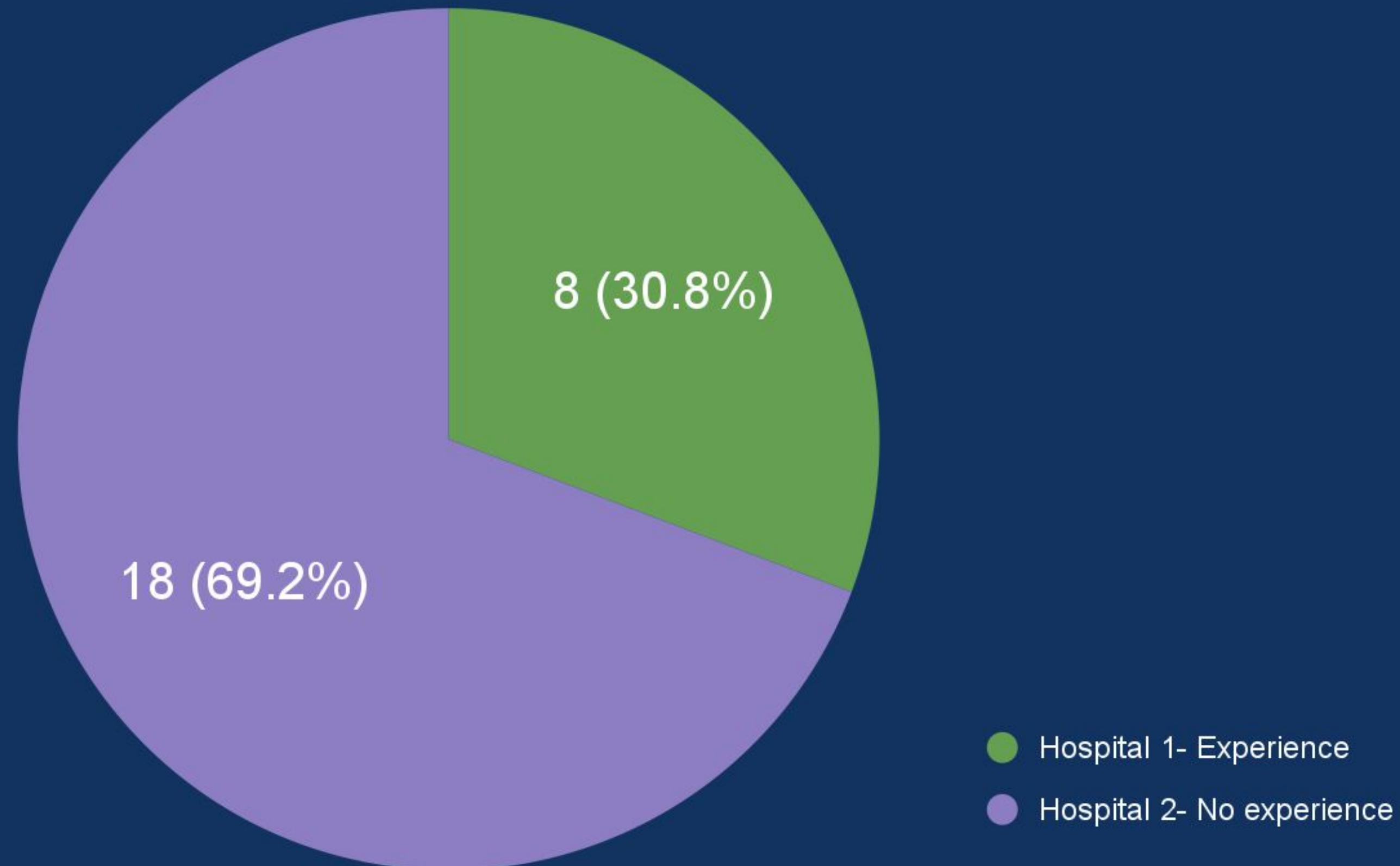


● Sonographers ● Radiology registrars



# Results

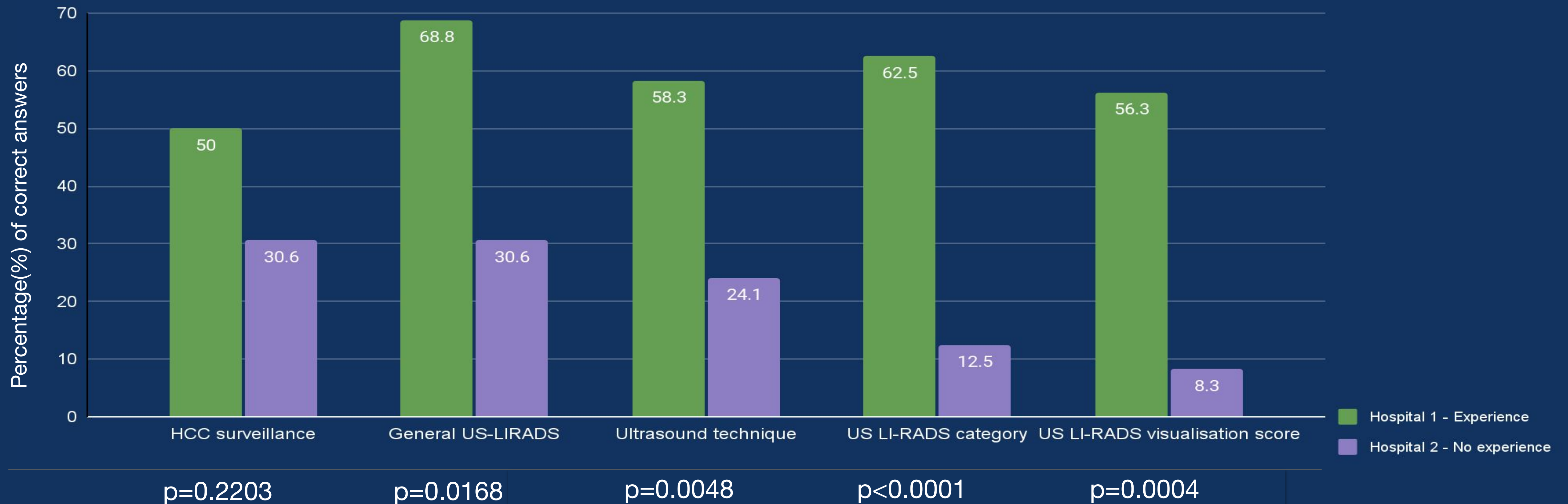
- 8 (30.8%) responses were from hospital 1 (experience) and 18 (69.2%) from hospital 2 (no experience).



# Results

## Summary of results:

- Total correct responses were significantly higher for hospital 1 (59.6%) than hospital 2 (20.1%) ( $p < 0.001$ ). Breakdown of knowledge in each category as follows:

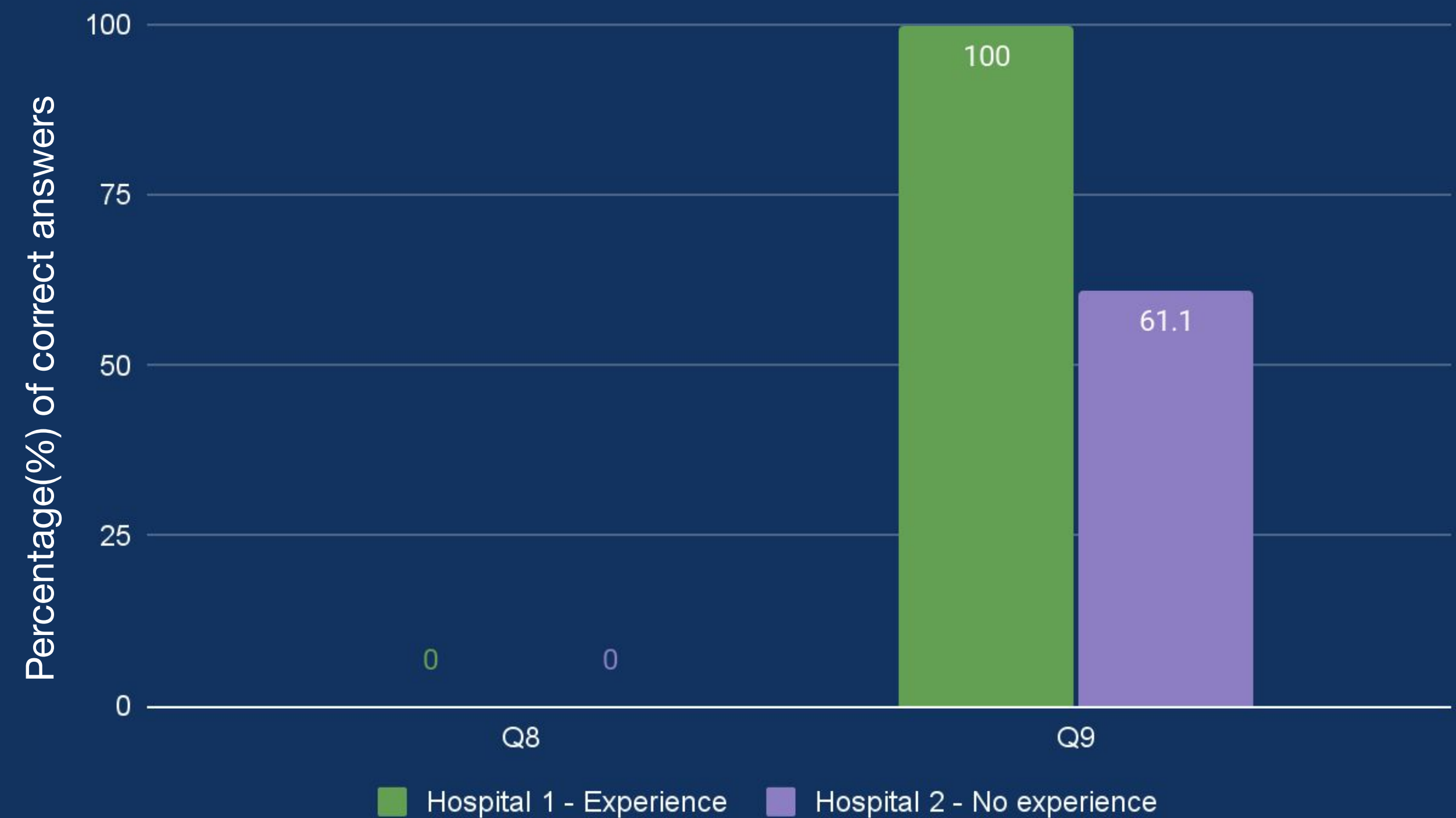


# Results

## Questions on HCC surveillance:

Q8. According to the latest 2017 NICE guidelines, which patient groups are HCC surveillance recommended for?

Q9. According to the latest 2017 NICE guidelines, how frequent should routine primary HCC primary surveillance liver ultrasounds be?



Overall, hospital 1 (50.0%) vs hospital 2 (30.6%),  $p=0.2203$

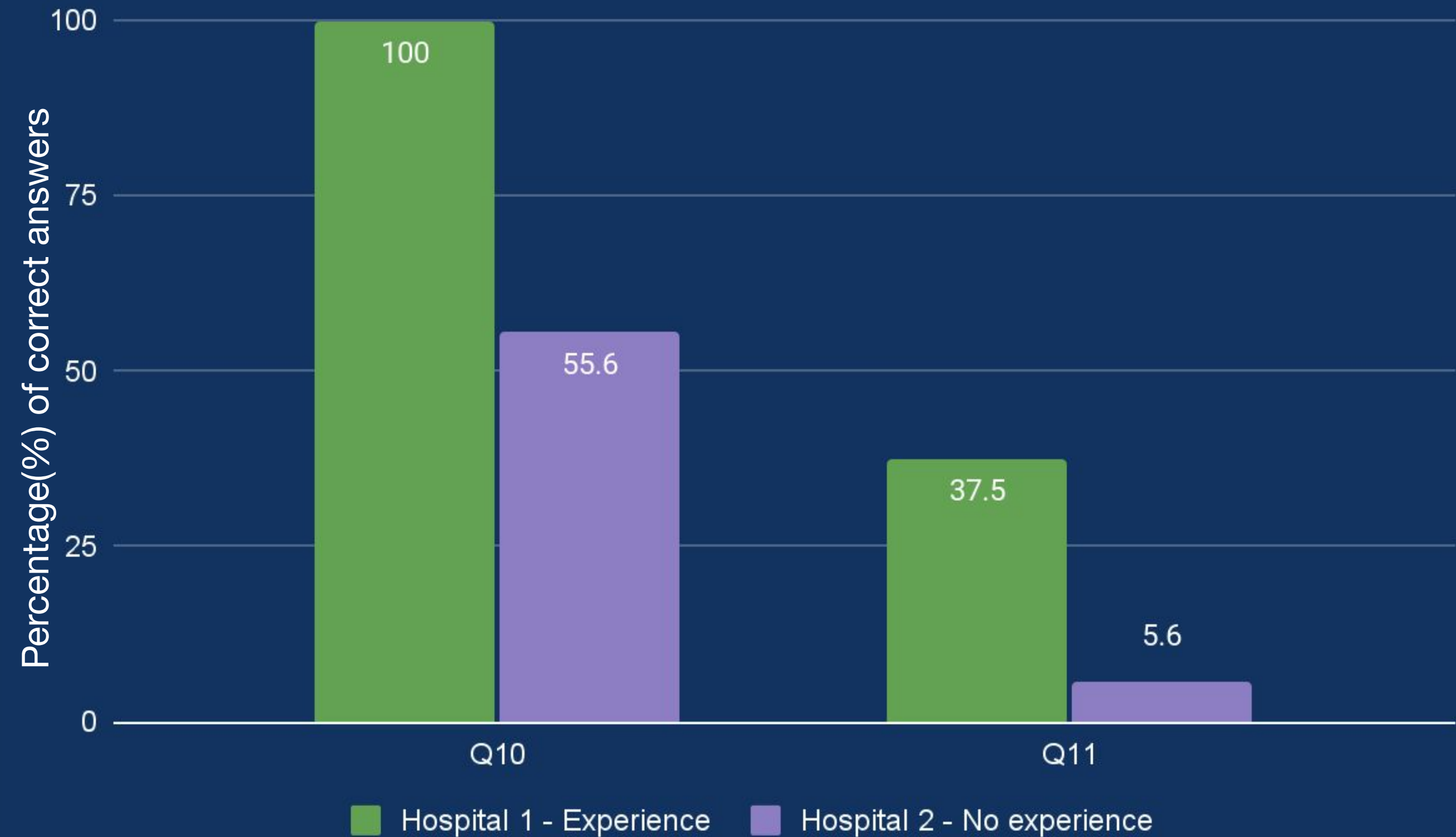


# Results

## General questions on US LI-RADS:

Q10. Which of the following statements is correct regarding US-LIRADS?

Q11. What are the 2 key components included in the assessment and reporting of US LI-RADS?



Overall, hospital 1 (68.8%) vs hospital 2 (30.6%),  $p=0.0168$

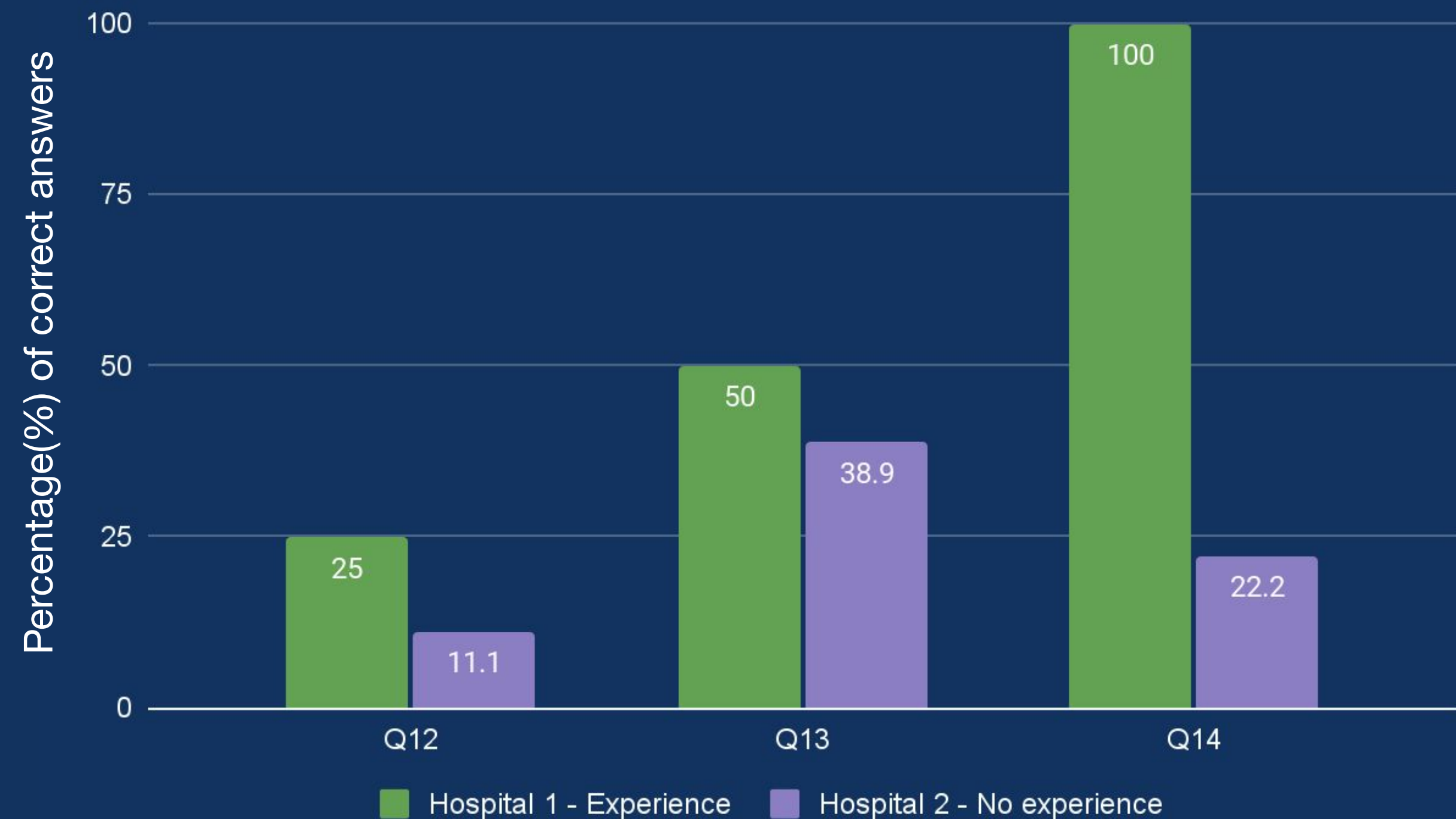
# Results

## Questions on US technique:

Q12. According to US-LIRADS, which of the following factors may result in reduced US visualisation of the liver?

Q13. According to US-LIRADS, which of the following should be considered to improve US image quality?

Q14. According to US-LIRADS, which of the following is NOT recommended in the assessment of liver, biliary system, and portal veins?



Overall, hospital 1 (58.3%) vs hospital 2 (24.1%),  $p=0.0048$

# Results

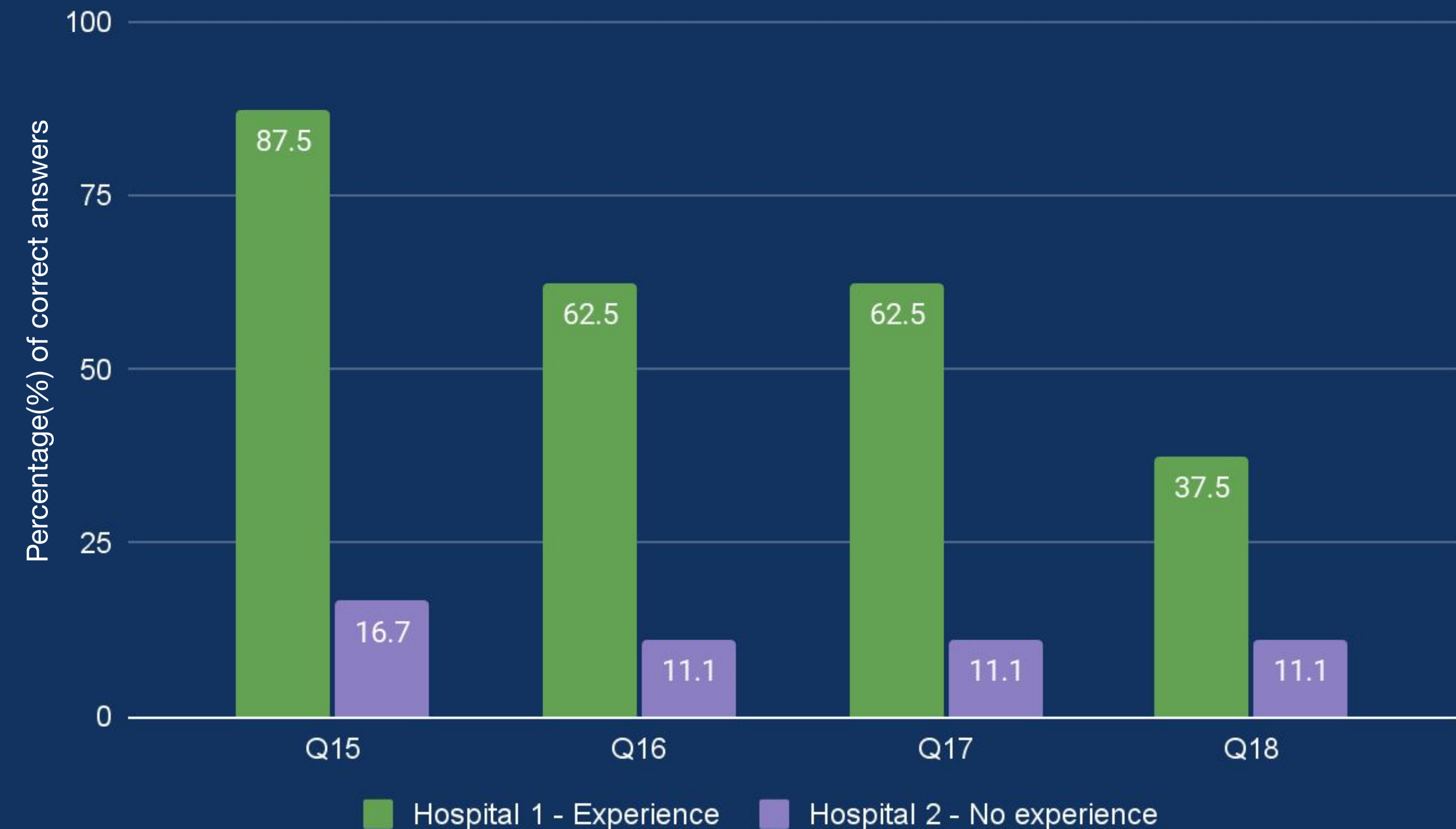
## Questions on US LI-RADS category score:

Q15. According to US-LIRADS, which of the following correctly describes the use of US category scores?

Q16. According to US-LIRADS, which of the following statements below are INCORRECT for a US-1 (negative) category score?

Q17. According to US-LIRADS, which of the following statements below are CORRECT for a US-2 (subthreshold) category score?

Q18. According to US-LIRADS, which of the following statements below are INCORRECT for a US-3 (positive) category score?



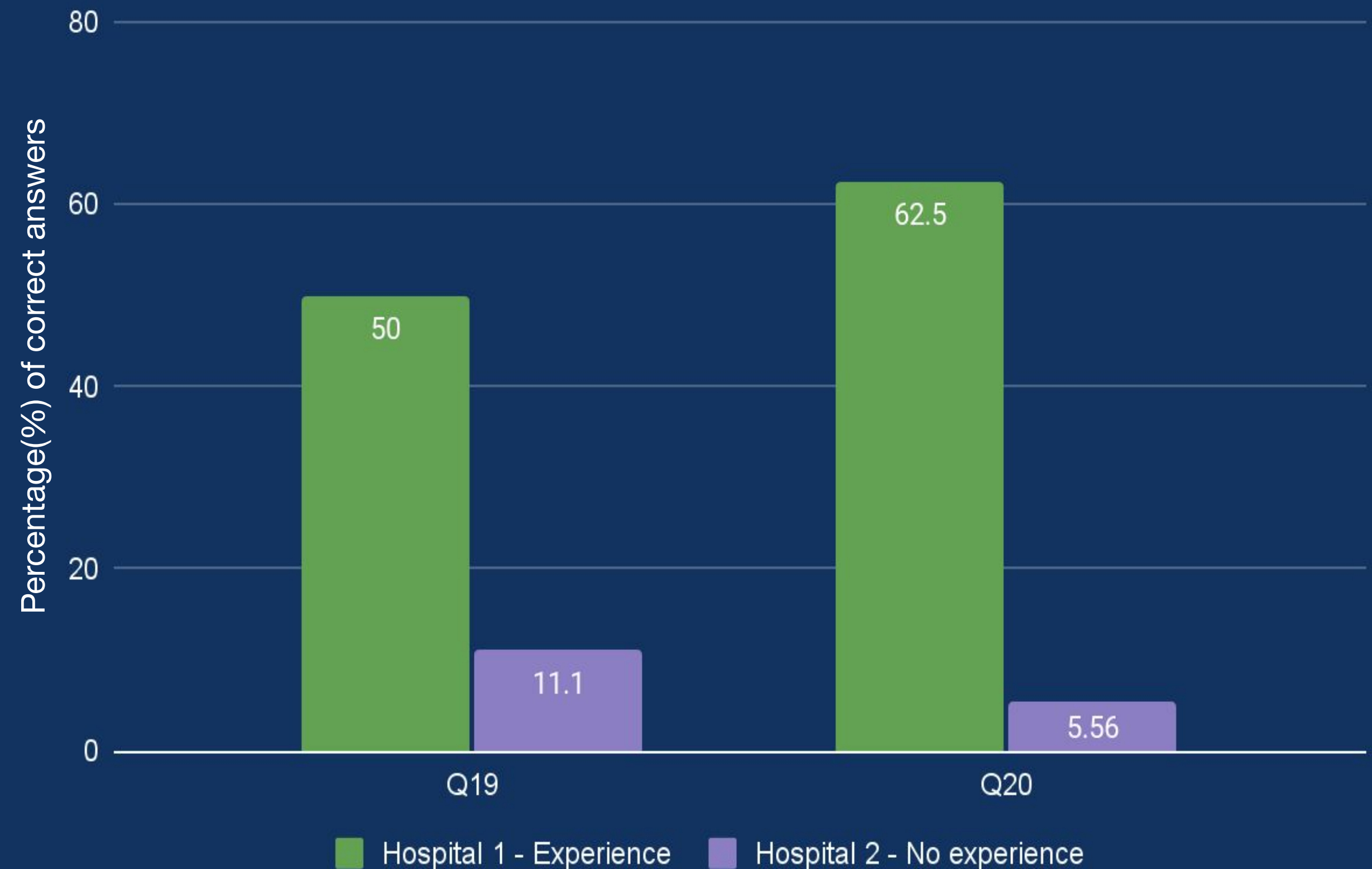
Overall, hospital 1 (62.5%) vs hospital 2 (12.5%),  $p < 0.0001$

# Results

## Questions on US LI-RADS visualisation:

Q19. According to US-LIRADS, which of the following does NOT reflect the intended purpose of US visualisation scores?

Q20. According to US-LIRADS, which of the following is INCORRECT regarding US LI-RADS visualisation scores:



Overall, hospital 1 (56.3%) vs hospital 2 (8.3%),  $p=0.0004$

# Results

- Overall “I don’t know responses” were significantly higher in hospital 2 (39.2%) versus 6.3% for hospital 1 ( $p < 0.0001$ ).



# Conclusion

- Although knowledge of US LI-RADS was higher in the hospital with an established US LI-RADS service, there were knowledge gaps for both hospitals in each category.
- These findings will help inform the development of an educational and training programme prior to implementation of an US LI-RADS service.
- It could also be beneficial to implement a 'refresher' in US LI-RADS and HCC surveillance in hospitals where there is established US LI-RADS service.