

## Supplementary Online Content

Heriot GS, Tong SYC, Cheng AC, Liew D. A scenario-based survey of expert echocardiography recommendations for patients with *Staphylococcus aureus* bacteremia at varying risk for endocarditis. *JAMA Netw Open*. 2020;3(4):e202401. doi:10.1001/jamanetworkopen.2020.2401

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This supplementary material has been provided by the authors to give readers additional information about their work.

## eMethods: Supplemental Methods

### Survey instrument and question-specific responses

#### Demographic questions

1. "In which country do you currently practice?"

Drop down entry

- Australia 249 (38%)
- United States of America 199 (31%)
- France 71 (11%)
- United Kingdom 46 (7%)
- Singapore 22 (3%)
- Israel 15 (2%)
- Ireland 7 (1%)
- New Zealand 6
- Switzerland 6
- Italy 6
- Canada 5
- Sweden 5
- Turkey 4
- Spain 3
- Denmark 2
- Netherlands 2
- Other countries with one respondent each 8

2. "Which of the following best describes your primary area of medical specialty?"

Multiple choice

- Infectious diseases 510 (78%)
- Clinical microbiology 65 (10%)
- Cardiology 43 (7%)
- Internal medicine 15 (2%) ] These two categories were collapsed
- Other (free text entry) 23 (4%) ] for analysis due to significant overlap

3. "How many years have you been in post-fellowship practice?"

Multiple choice

- Yet to complete postgraduate training 84 (13%)
- 0-10 years 265 (41%)
- 11-20 years 146 (22%)
- More than 20 years 159 (24%)
- (not answered) 2

4. "Approximately how many cases of *S. aureus* bacteremia do you manage per year?"

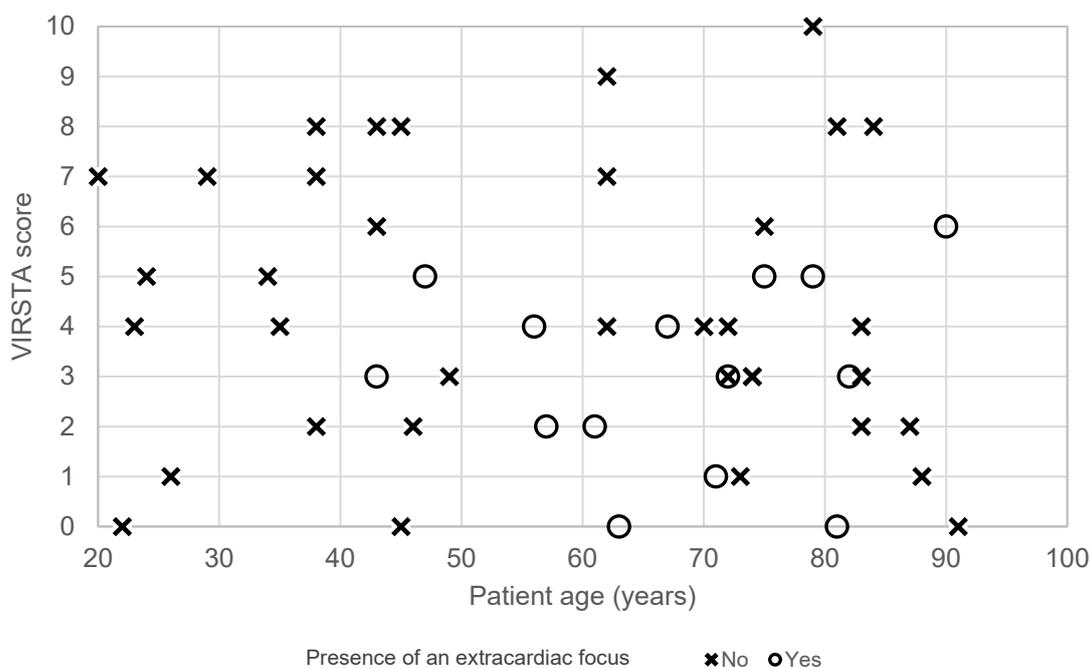
Multiple choice

- 0-10 cases 95 (15%)
- 11-20 cases 199 (30%)
- 21-50 cases 242 (37%)
- More than 50 cases 119 (18%)
- (not answered) 1

## Development of the *Staphylococcus aureus* bacteremia scenarios

Fifty text-based scenarios were constructed by varying the components of the VIRSTA score, patient age, and the presence of an extra-cardiac focus of infection warranting prolonged treatment ( $\geq 28$  days) even in the absence of endocarditis (vertebral osteomyelitis or a prosthetic joint infection). Scenario variables were not randomly distributed. Instead, combinations were chosen to ensure that scenarios were clinically plausible while maintaining a useful distribution across the variables of interest. More low- and moderate-risk scenarios (VIRSTA score  $< 5$  points) than high-risk scenarios were constructed to reflect the areas of anticipated disagreement. eFigure 1 presents the distribution of the resulting scenarios by the three variables used in their construction.

eFigure 1. Distribution of *S. aureus* bacteremia scenarios by variables of interest



Certain components of the VIRSTA score were deliberately avoided in the construction of scenarios. For example the component “cerebral or peripheral emboli” in the original VIRSTA score was represented within scenarios only as cutaneous emboli to avoid the complicating considerations related to adverse prognosis or the timing of endocarditis surgery in patients suffering significant embolic cerebral infarcts. The “meningitis” component of the VIRSTA score was not used at all due to the rarity of this situation in the original VIRSTA cohort, uncertainty regarding its definition in the original report, and the complex clinical situation the development of *S. aureus* meningitis usually implies (e.g. following a neurosurgical procedure).

The “permanent intracardiac device or previous infective endocarditis” component was always represented as a history of a prior episode of endocarditis in the scenarios as discussed in the main text. “Community or non-nosocomial healthcare-associated acquisition) was represented by the first positive blood culture being positive at the time of hospital admission with (non-nosocomial healthcare-associated) or without (community acquired) a history of haemodialysis or a recent admission to hospital for an unrelated problem. “Pre-existing native valve disease” was variably described as a range of pre-existing aortic and mitral valve lesions of moderate haemodynamic severity.

Extracardiac foci of infection requiring prolonged treatment were presented as either vertebral osteomyelitis (which is associated with an increased risk of endocarditis and contributes two points in the VIRSTA score) or a prosthetic joint infection (which is not associated with an increased risk of endocarditis). These extracardiac foci were predominantly included in low- to moderate-risk scenarios as the impact of an alternative reason for prolonged therapy was thought most relevant in scenarios where clinicians might otherwise aim to use short-course treatment (14 days).

## Scenario conditions

The following text was presented to survey respondents prior to the first scenario:

“The following questions present eight fictional *Staphylococcus aureus* bacteremia scenarios. Each scenario is different, although some differences may be subtle.

For each scenario, imagine that you have been asked to provide an opinion regarding the initial management of the patient on day 3-5 after the onset of bacteraemia.

The following conditions apply to each scenario:

1. Transesophageal (TEE) and transthoracic (TTE) echocardiography are equally accessible.
2. None of the patients have an absolute contra-indication for TEE.
3. None of the patients have clinical features to suggest an intra-cardiac complication of endocarditis (e.g. clinical heart failure or atrioventricular conduction disturbance).
4. No new complications arise after your assessment, unless explicitly stated.

These scenarios are simplifications of a complex disease. Where a clinical variable relevant to your choice of echocardiography strategy is not described, please assume the average conditions seen in your practice.”

### Estimated diagnostic performance of the six echocardiography strategies.

Results from a previous modelling study (Heriot *et al.* Benefit of Echocardiography in Patients with *Staphylococcus aureus* Bacteremia at Low Risk of Endocarditis. *Open Forum Infectious Diseases* 2018;5(12):ofy303) can be used to estimate the diagnostic performance for endocarditis of the six echocardiography strategies presented to respondents. The eTable 1 and 2 below present the likelihood ratios generated from 10 000 iteration simulations using the inputs described in the original paper for various values of % $e_{max}$ . This term represents the proportion of the maximum possible value for  $e$ , where:

$$P(TTE \text{ positive} \cap TEE \text{ positive} | \text{endocarditis present}) = \text{Sensitivity}_{TTE} \cdot \text{Sensitivity}_{TEE} + e$$

$$P(TTE \text{ negative} \cap TEE \text{ negative} | \text{endocarditis absent}) = \text{Specificity}_{TTE} \cdot \text{Specificity}_{TEE} + e$$

**eTable 1. Negative likelihood ratios (95% confidence intervals) of the six echocardiography strategies by degree of error covariance between transthoracic and transesophageal echocardiography.**

% $e_{max}$	Highly exclusionary strategies			Non-highly exclusionary strategies		
	<i>TEE</i>	<i>TTE+TEE</i>	<i>TEE TTE-</i>	<i>TEE TTE+</i>	<i>TTE</i>	<i>NE</i>
0%	0.05 (0.02 - 0.08)	0.05 (0.02 - 0.08)	0.02 (0.01 - 0.03)	0.43 (0.4 - 0.46)	0.43 (0.39 - 0.48)	1
25%	0.05 (0.02 - 0.08)	0.05 (0.02 - 0.08)	0.03 (0.02 - 0.05)	0.48 (0.44 - 0.52)	0.5 (0.46 - 0.55)	1
50%	0.05 (0.02 - 0.08)	0.05 (0.02 - 0.08)	0.04 (0.03 - 0.07)	0.53 (0.49 - 0.58)	0.57 (0.52 - 0.63)	1
75%	0.05 (0.02 - 0.08)	0.05 (0.02 - 0.08)	0.06 (0.04 - 0.08)	0.59 (0.53 - 0.66)	0.65 (0.57 - 0.72)	1
100%	0.05 (0.02 - 0.08)	0.05 (0.02 - 0.08)	0.07 (0.04 - 0.1)	0.66 (0.58 - 0.74)	0.73 (0.63 - 0.82)	1

**eTable 2. Positive likelihood ratios (95% confidence intervals) of the six echocardiography strategies by degree of error covariance between transthoracic and transesophageal echocardiography.**

% $e_{max}$	Highly exclusionary strategies			Non-highly exclusionary strategies		
	<i>TEE</i>	<i>TTE+TEE</i>	<i>TEE TTE-</i>	<i>TEE TTE+</i>	<i>TTE</i>	<i>NE</i>
0%	11 (9.6 - 16)	11 (9.6 - 16)	6.6 (5.8 - 8.0)	96 (71 - 146)	8.3 (6.8 - 11)	1
25%	11 (9.6 - 16)	11 (9.6 - 16)	6.3 (5.6 - 7.7)	23 (19 - 33)	5.9 (4.9 - 7.1)	1
50%	11 (9.6 - 16)	11 (9.6 - 16)	6.0 (5.3 - 7.4)	12 (9.6 - 18)	4.3 (3.6 - 5.3)	1
75%	11 (9.6 - 16)	11 (9.6 - 16)	5.8 (5.1 - 7.2)	7.5 (5.9 - 11)	3.2 (2.6 - 4.2)	1
100%	11 (9.6 - 16)	11 (9.6 - 16)	5.6 (4.9 - 7.0)	5.1 (3.8 - 8.5)	2.5 (1.9 - 3.4)	1

Three strategies (*TTE*, *TTE+TEE*, and *TEE|TTE-*) have a negative likelihood ratio of <0.10 regardless of the degree of error covariance (non-independence) between transthoracic and transesophageal echocardiography. These negative likelihood ratios represent an ability to reduce a pre-test probability of endocarditis of 10% to less than 1% with negative results. These three strategies are labelled “highly exclusionary” strategies in the manuscript.

## eResults. Supplemental Results

### *Staphylococcus aureus* bacteremia scenarios and echocardiography recommendations

#### Scenario 1

You are referred a 91-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 85mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 91 years  
 VIRSTA score 0 points  
 Extracardiac focus No

Scenario recommendations 90

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	10	11%
TTE as the only study (TTE)	45	50%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	13	14%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	15	17%
Both TTE and TEE (TTE+TEE)	4	4%
TEE as the only study (TEE)	3	3%

#### Scenario 2

You are referred an 81-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a right total hip joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 149mg/L. A comprehensive assessment reveals infection of the patient's prosthetic hip joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age 81 years  
 VIRSTA score 0 points  
 Extracardiac focus Yes

Scenario recommendations 102

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	14	14%
TTE as the only study (TTE)	40	39%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	24	24%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	11	11%
Both TTE and TEE (TTE+TEE)	7	7%
TEE as the only study (TEE)	6	6%

#### Scenario 3

You are referred a 22-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 142mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 22 years  
 VIRSTA score 0 points  
 Extracardiac focus No

Scenario recommendations 81

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	7	9%
TTE as the only study (TTE)	24	30%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	22	27%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	10	12%
Both TTE and TEE (TTE+TEE)	8	10%
TEE as the only study (TEE)	10	12%

#### Scenario 4

You are referred a 63-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a right total knee joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 134mg/L. A comprehensive assessment reveals infection of the patient's prosthetic knee joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age 63 years  
VIRSTA score 0 points  
Extracardiac focus Yes

Scenario recommendations 85

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	10	12%
TTE as the only study (TTE)	26	31%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	24	28%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	12	14%
Both TTE and TEE (TTE+TEE)	8	9%
TEE as the only study (TEE)	5	6%

#### Scenario 5

You are referred a 45-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 105mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 45 years  
VIRSTA score 0 points  
Extracardiac focus No

Scenario recommendations 86

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	15	17%
TTE as the only study (TTE)	20	23%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	17	20%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	15	17%
Both TTE and TEE (TTE+TEE)	8	9%
TEE as the only study (TEE)	11	13%

#### Scenario 6

You are referred a 53-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 145mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 73 years  
VIRSTA score 1 points (severe sepsis)  
Extracardiac focus No

Scenario recommendations 80

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	12	15%
TTE as the only study (TTE)	20	25%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	16	20%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	15	19%
Both TTE and TEE (TTE+TEE)	8	10%
TEE as the only study (TEE)	9	11%

### Scenario 7

You are referred a 26-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 108mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 26 years  
VIRSTA score 1 points (severe sepsis)  
Extracardiac focus No

Scenario recommendations 84

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	13	15%
TTE as the only study (TTE)	14	17%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	19	23%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	20	24%
Both TTE and TEE (TTE+TEE)	10	12%
TEE as the only study (TEE)	8	10%

### Scenario 8

You are referred an 88-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 197mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 88 years  
VIRSTA score 1 points (CRP>190mg/L)  
Extracardiac focus No

Scenario recommendations 73

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	9	12%
TTE as the only study (TTE)	20	27%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	20	27%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	16	22%
Both TTE and TEE (TTE+TEE)	1	1%
TEE as the only study (TEE)	7	10%

### Scenario 9

You are referred a 71-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a left total hip joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 263mg/L. A comprehensive assessment reveals infection of the patient's prosthetic hip joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age 71 years  
VIRSTA score 1 points (CRP>190mg/L)  
Extracardiac focus Yes

Scenario recommendations 94

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	9	10%
TTE as the only study (TTE)	35	37%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	18	19%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	16	17%
Both TTE and TEE (TTE+TEE)	10	11%
TEE as the only study (TEE)	6	6%

### Scenario 10

You are referred a 57-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 135mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 57 years  
VIRSTA score 2 points (vertebral osteomyelitis)  
Extracardiac focus Yes

Scenario recommendations 87

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	9	10%
TTE as the only study (TTE)	20	23%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	18	21%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	16	18%
Both TTE and TEE (TTE+TEE)	10	11%
TEE as the only study (TEE)	14	16%

### Scenario 11

You are referred an 87-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 182mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 87 years  
VIRSTA score 2 points (non-nosocomial acquisition)  
Extracardiac focus No

Scenario recommendations 80

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	4	5%
TTE as the only study (TTE)	23	29%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	14	18%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	23	29%
Both TTE and TEE (TTE+TEE)	9	11%
TEE as the only study (TEE)	7	9%

### Scenario 12

You are referred a 38-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 143mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 38 years  
VIRSTA score 2 points (non-nosocomial acquisition)  
Extracardiac focus No

Scenario recommendations 96

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	5	5%
TTE as the only study (TTE)	18	19%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	27	28%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	21	22%
Both TTE and TEE (TTE+TEE)	11	11%
TEE as the only study (TEE)	14	15%

### Scenario 13

You are referred an 83-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 121mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age	83 years
VIRSTA score	2 points (non-nosocomial acquisition)
Extracardiac focus	No

Scenario recommendations 80

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	5	6%
TTE as the only study (TTE)	18	23%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	22	28%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	21	26%
Both TTE and TEE (TTE+TEE)	8	10%
TEE as the only study (TEE)	6	8%

### Scenario 14

You are referred a 46-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 205mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age	46 years
VIRSTA score	2 points (CRP>190mg/L, severe sepsis)
Extracardiac focus	No

Scenario recommendations 86

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	15	17%
TTE as the only study (TTE)	18	21%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	13	15%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	21	24%
Both TTE and TEE (TTE+TEE)	12	14%
TEE as the only study (TEE)	7	8%

### Scenario 15

You are referred a 61-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a left total hip joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 217mg/L. A comprehensive assessment reveals infection of the patient's prosthetic hip joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age	61 years
VIRSTA score	2 points (CRP>190mg/L, severe sepsis)
Extracardiac focus	Yes

Scenario recommendations 82

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	6	7%
TTE as the only study (TTE)	30	37%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	10	12%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	17	21%
Both TTE and TEE (TTE+TEE)	11	13%
TEE as the only study (TEE)	8	10%

### Scenario 16

You are referred a 74-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 121mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 74 years  
VIRSTA score 3 points (pre-existing native valve disease)  
Extracardiac focus No

Scenario recommendations 106

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	6	6%
TTE as the only study (TTE)	15	14%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	18	17%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	22	21%
Both TTE and TEE (TTE+TEE)	21	20%
TEE as the only study (TEE)	24	23%

### Scenario 17

You are referred an 83-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 163mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 83 years  
VIRSTA score 3 points (prolonged bacteremia)  
Extracardiac focus No

Scenario recommendations 134

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	5	4%
TTE as the only study (TTE)	16	12%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	23	17%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	45	34%
Both TTE and TEE (TTE+TEE)	28	21%
TEE as the only study (TEE)	17	13%

### Scenario 18

You are referred a 74-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 165mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 74 years  
VIRSTA score 3 points (prolonged bacteremia)  
Extracardiac focus No

Scenario recommendations 101

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	3	3%
TTE as the only study (TTE)	14	14%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	12	12%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	32	32%
Both TTE and TEE (TTE+TEE)	18	18%
TEE as the only study (TEE)	22	22%

### Scenario 19

You are referred an 82-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a right total knee joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 178mg/L. A comprehensive assessment reveals infection of the patient's prosthetic knee joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age 82 years  
VIRSTA score 3 points (severe sepsis, non-nosocomial acquisition)  
Extracardiac focus Yes

Scenario recommendations 111

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	7	6%
TTE as the only study (TTE)	33	30%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	18	16%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	25	23%
Both TTE and TEE (TTE+TEE)	17	15%
TEE as the only study (TEE)	11	10%

### Scenario 20

You are referred a 43-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 198mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 43 years  
VIRSTA score 3 points (CRP>190mg/L, vertebral osteomyelitis)  
Extracardiac focus Yes

Scenario recommendations 115

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	10	9%
TTE as the only study (TTE)	25	22%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	18	16%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	33	29%
Both TTE and TEE (TTE+TEE)	18	16%
TEE as the only study (TEE)	11	10%

### Scenario 21

You are referred a 72-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for intermittent haemodialysis through a long-term dialysis catheter. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 254mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 72 years  
VIRSTA score 3 points (CRP>190mg/L, non-nosocomial acquisition)  
Extracardiac focus No

Scenario recommendations 108

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	7	6%
TTE as the only study (TTE)	19	18%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	13	12%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	25	23%
Both TTE and TEE (TTE+TEE)	25	23%
TEE as the only study (TEE)	19	18%

### Scenario 22

You are referred a 49-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 213mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 49 years  
VIRSTA score 3 points (CRP>190mg/L, non-nosocomial acquisition)  
Extracardiac focus No

Scenario recommendations 109

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	7	6%
TTE as the only study (TTE)	23	21%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	16	15%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	23	21%
Both TTE and TEE (TTE+TEE)	21	19%
TEE as the only study (TEE)	19	17%

### Scenario 23

You are referred a 72-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a left total hip joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 204mg/L. A comprehensive assessment reveals infection of the patient's prosthetic hip joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age 72 years  
VIRSTA score 3 points (CRP>190mg/L, non-nosocomial acquisition)  
Extracardiac focus Yes

Scenario recommendations 102

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	10	10%
TTE as the only study (TTE)	31	30%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	22	22%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	20	20%
Both TTE and TEE (TTE+TEE)	11	11%
TEE as the only study (TEE)	8	8%

### Scenario 24

You are referred a 23-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for recreational intravenous drug use. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 154mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 23 years  
VIRSTA score 4 points (intravenous drug use)  
Extracardiac focus No

Scenario recommendations 112

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	6	5%
TTE as the only study (TTE)	21	19%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	14	13%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	36	32%
Both TTE and TEE (TTE+TEE)	22	20%
TEE as the only study (TEE)	13	12%

### Scenario 25

You are referred a 56-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 141mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 56 years  
VIRSTA score 4 points (non-nosocomial acquisition, vertebral osteomyelitis)  
Extracardiac focus Yes

Scenario recommendations 121

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	6	5%
TTE as the only study (TTE)	30	25%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	18	15%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	31	26%
Both TTE and TEE (TTE+TEE)	21	17%
TEE as the only study (TEE)	15	12%

### Scenario 26

You are referred a 67-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 96mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 67 years  
VIRSTA score 4 points (non-nosocomial acquisition, vertebral osteomyelitis)  
Extracardiac focus Yes

Scenario recommendations 101

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	4	4%
TTE as the only study (TTE)	27	27%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	22	22%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	19	19%
Both TTE and TEE (TTE+TEE)	16	16%
TEE as the only study (TEE)	13	13%

### Scenario 27

You are referred a 62-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 88mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 62 years  
VIRSTA score 4 points (severe sepsis, pre-existing native valve disease)  
Extracardiac focus No

Scenario recommendations 124

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	5	4%
TTE as the only study (TTE)	15	12%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	11	9%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	41	33%
Both TTE and TEE (TTE+TEE)	25	20%
TEE as the only study (TEE)	27	22%

### Scenario 28

You are referred a 72-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 141mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 72 years  
VIRSTA score 4 points (severe sepsis, prolonged bacteremia)  
Extracardiac focus No

Scenario recommendations 113

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	2	2%
TTE as the only study (TTE)	21	19%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	10	9%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	35	31%
Both TTE and TEE (TTE+TEE)	24	21%
TEE as the only study (TEE)	21	19%

### Scenario 29

You are referred a 35-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 223mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 35 years  
VIRSTA score 4 points (CRP>190mg/L, prolonged bacteremia)  
Extracardiac focus No

Scenario recommendations 102

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	4	4%
TTE as the only study (TTE)	18	18%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	11	11%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	36	35%
Both TTE and TEE (TTE+TEE)	13	13%
TEE as the only study (TEE)	20	20%

### Scenario 30

You are referred an 83-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 247mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 83 years  
VIRSTA score 4 points (CRP>190mg/L, prolonged bacteremia)  
Extracardiac focus No

Scenario recommendations 150

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	0	0%
TTE as the only study (TTE)	20	13%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	26	17%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	55	37%
Both TTE and TEE (TTE+TEE)	34	23%
TEE as the only study (TEE)	15	10%

### Scenario 31

You are referred a 70-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 214mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 70 years  
VIRSTA score 4 points (CRP>190mg/L, severe sepsis, non-nosocomial acquisition)  
Extracardiac focus No

Scenario recommendations 106

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	6	6%
TTE as the only study (TTE)	16	15%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	15	14%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	34	32%
Both TTE and TEE (TTE+TEE)	24	23%
TEE as the only study (TEE)	11	10%

### Scenario 32

You are referred a 79-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 142mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 79 years  
VIRSTA score 5 points (vertebral osteomyelitis, prolonged bacteremia)  
Extracardiac focus Yes

Scenario recommendations 71

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	4	6%
TTE as the only study (TTE)	18	25%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	4	6%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	21	30%
Both TTE and TEE (TTE+TEE)	8	11%
TEE as the only study (TEE)	16	23%

### Scenario 33

You are referred a 24-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 95mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 24 years  
VIRSTA score 5 points (non-nosocomial acquisition, prolonged bacteremia)  
Extracardiac focus No

Scenario recommendations 95

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	2	2%
TTE as the only study (TTE)	7	7%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	10	11%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	34	36%
Both TTE and TEE (TTE+TEE)	20	21%
TEE as the only study (TEE)	22	23%

### Scenario 34

You are referred a 34-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 152mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 34 years  
VIRSTA score 5 points (non-nosocomial acquisition, pre-existing native valve disease)  
Extracardiac focus No

Scenario recommendations 100

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	1	1%
TTE as the only study (TTE)	5	5%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	5	5%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	31	31%
Both TTE and TEE (TTE+TEE)	30	30%
TEE as the only study (TEE)	28	28%

### Scenario 35

You are referred a 47-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for recreational intravenous drug use and a right total hip joint replacement. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 184mg/L. A comprehensive assessment reveals infection of the patient's prosthetic hip joint but no other sites of embolism or infection.

#### Scenario parameters

Patient age 47 years  
VIRSTA score 5 points (severe sepsis, intravenous drug use)  
Extracardiac focus Yes

Scenario recommendations 91

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	4	4%
TTE as the only study (TTE)	22	24%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	12	13%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	18	20%
Both TTE and TEE (TTE+TEE)	20	22%
TEE as the only study (TEE)	15	16%

### Scenario 36

You are referred a 75-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 285mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 75 years  
VIRSTA score 5 points (CRP>190mg/L, non-nosocomial acquisition, vertebral osteomyelitis)  
Extracardiac focus Yes

Scenario recommendations 95

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	4	4%
TTE as the only study (TTE)	19	20%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	14	15%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	29	31%
Both TTE and TEE (TTE+TEE)	16	17%
TEE as the only study (TEE)	13	14%

### Scenario 37

You are referred a 43-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 146mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 43 years  
VIRSTA score 6 points (prolonged bacteremia, pre-existing native valve disease)  
Extracardiac focus No

Scenario recommendations 91

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	0	0%
TTE as the only study (TTE)	5	5%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	3	3%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	28	31%
Both TTE and TEE (TTE+TEE)	30	33%
TEE as the only study (TEE)	25	27%

### Scenario 38

You are referred a 90-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 178mg/L. A comprehensive assessment reveals findings of vertebral osteomyelitis but no other sites of embolism or infection.

#### Scenario parameters

Patient age 90 years  
VIRSTA score 6 points (severe sepsis, vertebral osteomyelitis, prolonged bacteremia)  
Extracardiac focus Yes

Scenario recommendations 86

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	8	9%
TTE as the only study (TTE)	24	28%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	10	12%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	24	28%
Both TTE and TEE (TTE+TEE)	11	13%
TEE as the only study (TEE)	9	10%

### Scenario 39

You are referred a 75-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 203mg/L. A comprehensive assessment reveals multiple cutaneous embolic lesions but no other sites of embolism or infection.

#### Scenario parameters

Patient age 75 years  
VIRSTA score 6 points (CRP>190mg/L, embolic phenomena)  
Extracardiac focus No

Scenario recommendations 84

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	0	0%
TTE as the only study (TTE)	3	4%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	3	4%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	24	29%
Both TTE and TEE (TTE+TEE)	24	29%
TEE as the only study (TEE)	30	36%

#### Scenario 40

You are referred a 29-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for recreational intravenous drug use. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 119mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 29 years  
VIRSTA score 7 points (prolonged bacteremia, intravenous drug use)  
Extracardiac focus No

Scenario recommendations 83

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	1	1%
TTE as the only study (TTE)	6	7%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	7	8%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	31	37%
Both TTE and TEE (TTE+TEE)	21	25%
TEE as the only study (TEE)	17	20%

#### Scenario 41

You are referred a 62-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for intermittent haemodialysis through a long-term dialysis catheter and a previous episode of infective endocarditis. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 163mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 62 years  
VIRSTA score 7 points (severe sepsis, non-nosocomial acquisition, previous endocarditis)  
Extracardiac focus No

Scenario recommendations 97

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	2	2%
TTE as the only study (TTE)	8	8%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	7	7%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	29	30%
Both TTE and TEE (TTE+TEE)	28	29%
TEE as the only study (TEE)	23	24%

#### Scenario 42

You are referred a 38-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem and recreational intravenous drug use. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 139mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 38 years  
VIRSTA score 7 points (severe sepsis, non-nosocomial acquisition, intravenous drug use)  
Extracardiac focus No

Scenario recommendations 96

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	2	2%
TTE as the only study (TTE)	12	13%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	8	8%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	33	34%
Both TTE and TEE (TTE+TEE)	25	26%
TEE as the only study (TEE)	16	17%

### Scenario 43

You are referred a 20-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for recreational intravenous drug use. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 247mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 20 years  
VIRSTA score 7 points (CRP>190mg/L, non-nosocomial acquisition, intravenous drug use)  
Extracardiac focus No

Scenario recommendations 98

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	0	0%
TTE as the only study (TTE)	11	11%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	9	9%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	32	33%
Both TTE and TEE (TTE+TEE)	30	31%
TEE as the only study (TEE)	16	16%

### Scenario 44

You are referred an 81-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive more than 48 hours after admission to hospital for an unrelated problem, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 108mg/L. A comprehensive assessment reveals multiple cutaneous embolic lesions but no other sites of embolism or infection.

#### Scenario parameters

Patient age 81 years  
VIRSTA score 8 points (pre-existing native valve disease, embolic phenomena)  
Extracardiac focus No

Scenario recommendations 107

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	2	2%
TTE as the only study (TTE)	4	4%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	3	3%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	40	37%
Both TTE and TEE (TTE+TEE)	28	26%
TEE as the only study (TEE)	30	28%

### Scenario 45

You are referred a 43-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was more than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 171mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 43 years  
VIRSTA score 8 points (non-nosocomial acquisition, prolonged bacteremia, pre-existing native valve disease)  
Extracardiac focus No

Scenario recommendations 88

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	1	1%
TTE as the only study (TTE)	2	2%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	5	6%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	31	35%
Both TTE and TEE (TTE+TEE)	23	26%
TEE as the only study (TEE)	26	30%

#### Scenario 46

You are referred an 84-year-old patient with *Staphylococcus aureus* bacteraemia. The patient has no relevant past medical history. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient has never had features of severe sepsis. The highest measured C-reactive protein level is 243mg/L. A comprehensive assessment reveals multiple cutaneous embolic lesions but no other sites of embolism or infection.

#### Scenario parameters

Patient age 84 years  
VIRSTA score 8 points (CRP>190mg/L, non-nosocomial acquisition, embolic phenomena)  
Extracardiac focus No

Scenario recommendations 96

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	2	2%
TTE as the only study (TTE)	5	5%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	5	5%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	30	31%
Both TTE and TEE (TTE+TEE)	28	29%
TEE as the only study (TEE)	26	27%

#### Scenario 47

You are referred a 38-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for an admission to hospital within the last 30 days for an unrelated problem and a previous episode of infective endocarditis. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 219mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 38 years  
VIRSTA score 8 points (CRP>190mg/L, severe sepsis, non-nosocomial acquisition, previous endocarditis)  
Extracardiac focus No

Scenario recommendations 105

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	1	1%
TTE as the only study (TTE)	9	9%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	6	6%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	29	28%
Both TTE and TEE (TTE+TEE)	27	26%
TEE as the only study (TEE)	33	31%

#### Scenario 48

You are referred a 45-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for a previous episode of infective endocarditis. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was less than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 271mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 45 years  
VIRSTA score 8 points (CRP>190mg/L, severe sepsis, non-nosocomial acquisition, previous endocarditis)  
Extracardiac focus No

Scenario recommendations 88

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	1	1%
TTE as the only study (TTE)	3	3%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	2	2%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	24	27%
Both TTE and TEE (TTE+TEE)	27	31%
TEE as the only study (TEE)	31	35%

#### Scenario 49

You are referred a 62-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for intermittent haemodialysis through a long-term dialysis catheter and pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was more than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 163mg/L. A comprehensive assessment reveals no evidence of a deep focus of infection or any systemic embolic phenomena.

#### Scenario parameters

Patient age 62 years  
VIRSTA score 9 points (severe sepsis, non-nosocomial acquisition, prolonged bacteremia, pre-existing native valve disease)  
Extracardiac focus No

Scenario recommendations 80

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	0	0%
TTE as the only study (TTE)	3	4%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	3	4%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	29	36%
Both TTE and TEE (TTE+TEE)	28	35%
TEE as the only study (TEE)	17	21%

#### Scenario 50

You are referred a 79-year-old patient with *Staphylococcus aureus* bacteraemia. The patient's past history is significant for pre-existing native cardiac valvular dysfunction. The patient does not have a prosthetic heart valve, permanent pacemaker or implantable cardioverter-defibrillator. Blood cultures were first noted to be positive at the time of presentation to hospital, and the total documented duration of bacteraemia was more than 48 hours. The patient initially demonstrated features of severe sepsis, but has since stabilised. The highest measured C-reactive protein level is 173mg/L. A comprehensive assessment reveals multiple cutaneous embolic lesions but no other sites of embolism or infection.

#### Scenario parameters

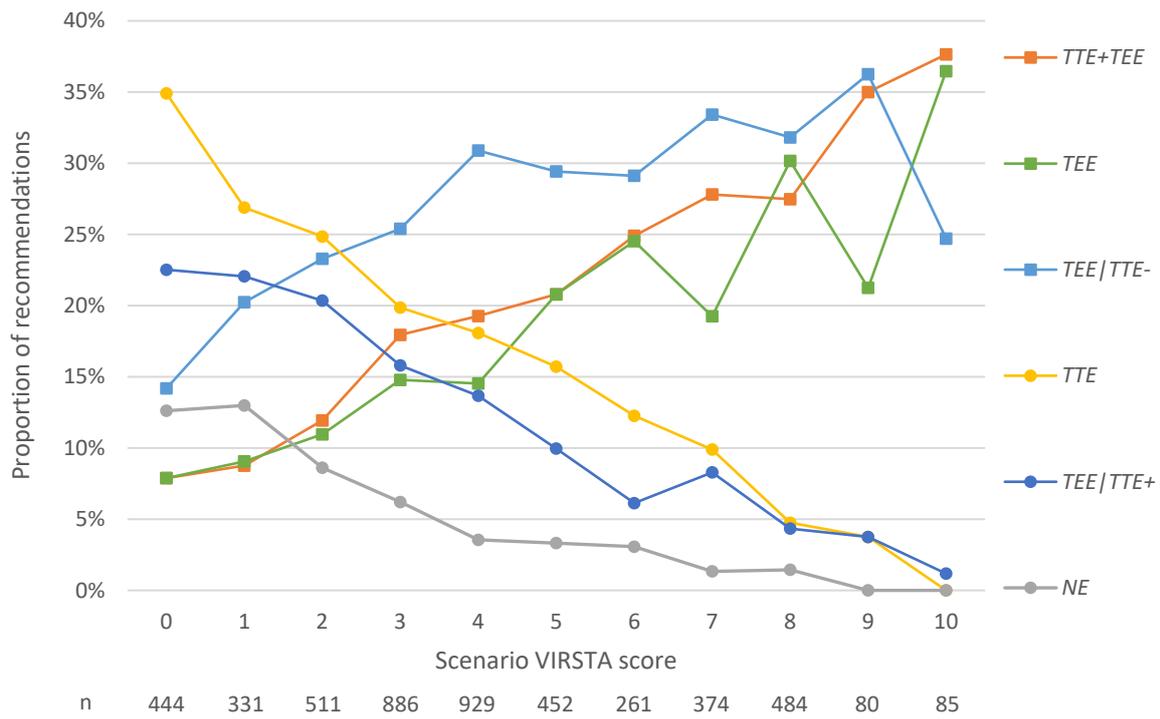
Patient age 79 years  
VIRSTA score 10 points (severe sepsis, non-nosocomial acquisition, prolonged bacteremia, pre-existing native valve disease, embolic phenomena)  
Extracardiac focus No

Scenario recommendations 85

#### "Which echocardiography strategy would you recommend?"

	n	%
No echocardiography (NE)	0	0%
TTE as the only study (TTE)	0	0%
TTE first, followed by TEE only if the TTE is positive for endocarditis (TEE TTE+)	1	1%
TTE first, followed by TEE only if the TTE is negative for endocarditis (TEE TTE-)	21	25%
Both TTE and TEE (TTE+TEE)	32	38%
TEE as the only study (TEE)	31	36%

eFigure 2. Preferred echocardiography strategy by scenario VIRSTA score.



NE, no echocardiography; TTE, TTE as the only study; TEE, TEE as the only study; TTE+TEE, both TTE and TEE; TEE|TTE+, TTE first, followed by TEE only if the TTE is positive for endocarditis; TEE|TTE-, TTE first, followed by TEE only if the TTE is negative for endocarditis.

### Risk of relapse after short-course treatment of occult *S. aureus* native valve endocarditis

1. "Consider a patient with *S. aureus* bacteremia who has clinically-occult native valve infective endocarditis (*i.e.* no intra-cardiac prosthetic material, cardiac murmur, heart failure, systemic emboli or immunological manifestations).

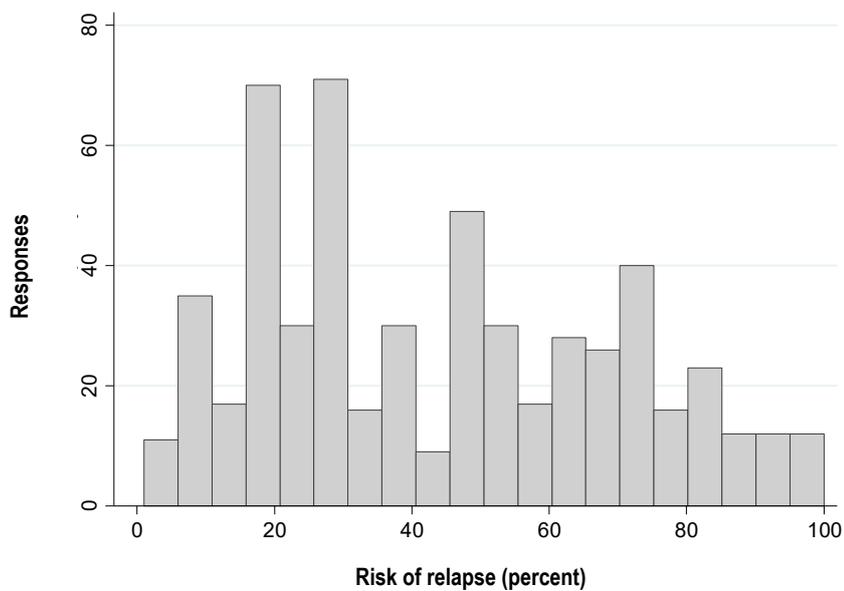
If no echocardiography is performed and the patient is treated with 14 days of intravenous antistaphylococcal therapy, what is the likelihood that this patient will suffer a relapse of their endocarditis?"

Risk of relapse % (slider bar 0-100%)

Responses 554

Median estimated relapse risk 40% (interquartile range 21-66%)

### Estimated risk of relapse after short-course treatment of occult *S. aureus* native valve endocarditis



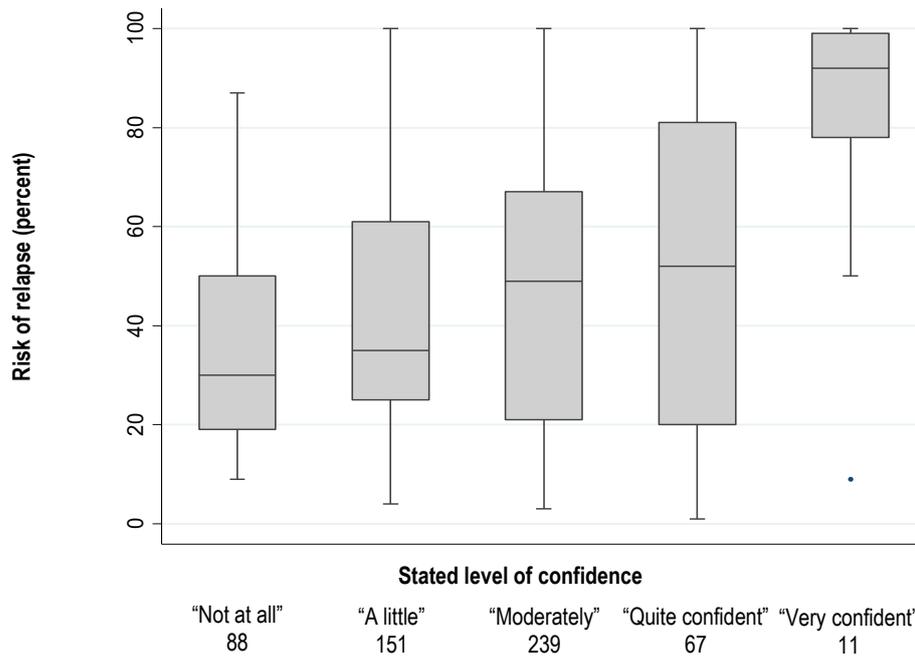
2. "How confident are you in your answer to the above question?"

Multiple choice

Responses 556

- "Not at all" 88 (16%)
- "A little" 151 (27%)
- "Moderately" 239 (43%)
- "Quite confident" 67 (12%)
- "Very confident" 11 (2%)

Association between response confidence and estimated relapse risk



Linear regression coefficient 5.7 (95% confidence interval 3.4-8.0),  $p < 0.001$

## Consequence of relapse of native valve *S. aureus* endocarditis treated with short course therapy

1. "If such a patient does suffer a relapse, how would their risk of complications (such as stroke, heart failure or death) compare to the average patient presenting for the first time with *S. aureus* native valve endocarditis?"

Multiple choice

Responses 554

- The risk would be lower than for the average presentation 28 (5%)
- The risk would be equivalent to the average presentation 182 (33%)
- The risk would be higher than for the average presentation 344 (62%)

2. "How confident are you in your answer to the above question?"

Multiple choice

Responses 539

- "Not at all" 62 (12%)
- "A little" 140 (26%)
- "Moderately" 237 (44%)
- "Quite confident" 85 (16%)
- "Very confident" 15 (3%)

### **Regression analyses**

The following tables present the results of the logistic regression analyses examining the association between the binary outcome of a recommendation in favour of a highly-exclusionary echocardiography strategy (TEE, TTE+TEE, or TEE|TTE-) and various respondent and scenario variables. In all cases, models use binomial generalised estimating equation population-averaged models with logit link functions clustered by respondent, and use an exchangeable correlation structure with robust standard errors. All analyses were performed in Stata version 14.2 (StataCorp, USA).

**eTable 3. Results of univariate analyses for the recommendation of a highly-exclusionary echocardiography strategy.**

Variable	Responses	Odds ratio	95% CI	p
VIRSTA score (per point)	4837	1.43	1.40-1.47	<0.001
Patient age (per decade)	4837	0.91	0.89-0.94	<0.001
Secondary focus	1343	0.38	0.33-0.42	<0.001
Respondent location				
Australia or New Zealand	1895	Referent	-	-
North America	1480	1.22	0.98-1.50	0.07
Continental Europe	726	1.54	1.17-2.03	0.002
United Kingdom and Ireland	383	0.84	0.60-1.17	0.30
Southeast Asia	178	0.80	0.50-1.27	0.35
Other	175	1.49	0.90-1.48	0.12
Respondent specialty				
Infectious diseases	3756	Referent	-	-
Clinical microbiology	472	0.99	0.73-1.33	0.94
Cardiology	329	1.09	0.76-1.56	0.64
Other	280	0.74	0.51-1.07	0.11
Years of post-fellowship experience				
Yet to complete postgraduate training	607	0.95	0.72-1.26	0.72
0-10 years	1924	Referent	-	-
11-20 years	1090	0.97	0.77-1.23	0.81
More than 20 years	1207	1.20	0.96-1.51	0.12
Annual caseload				
0-10 case	681	1.01	0.77-1.33	0.93
11-20 cases	1498	0.94	0.76-1.16	0.56
21-50 cases	1785	-	-	-
More than 50 cases	872	1.07	0.83-1.38	0.59
Risk of relapse after inadvertent short course therapy of occult <i>S. aureus</i> NVIE (per 10% increase in risk estimate)	4417	1.03	0.99-1.07	0.12
Confidence in relapse risk answer				
“Not at all”	702	1.03	0.79-1.36	0.82
“A little”	1206	0.88	0.70-1.11	0.28
“Moderately”	1903	Referent	-	-
“Quite confident”	534	1.21	0.83-1.52	0.47
“Very confident”	88	4.15	1.46-1.94	<0.001
Outcome of relapsed <i>S. aureus</i> NVIE				
Better than average presentation	223	0.91	0.59-1.40	0.67
Equivalent to average presentation	1449	1.00	0.82-1.22	0.98
Worse than average presentation	2745	Referent	-	-
Confidence in outcome answer				
“Not at all”	493	0.87	0.64-1.19	0.37
“A little”	1117	0.89	0.70-1.12	0.32
“Moderately”	1888	Referent	-	-
“Quite confident”	680	1.06	0.80-1.41	0.67
“Very confident”	120	1.53	0.81-2.88	0.19

**eTable 4. Multivariate complete case analysis for the 4334 recommendations from respondents providing an estimate of their confidence in their estimated risk of relapse of *S. aureus* endocarditis after short course therapy**

Variable	Odds ratio	95% CI	p
VIRSTA score (per point)	1.4	1.4 - 1.5	<0.001
Patient age (per decade)	0.98	0.96 - 1.0	0.26
Secondary focus present	0.52	0.46 - 0.60	<0.001
Respondent location			
Australia or New Zealand	Referent	-	-
North America	1.2	0.95 - 1.6	0.11
Continental Europe	1.6	1.2 - 2.3	0.004
United Kingdom and Ireland	0.45	0.27 - 0.78	0.004
Southeast Asia	0.53	0.29 - 0.97	0.04
Other	1.5	0.83 - 2.6	0.19
Respondent specialty			
Infectious diseases	Referent	-	-
Clinical microbiology	1.8	1.1 - 3.3	0.02
Cardiology	1.1	0.71 - 1.7	0.69
Other	0.66	0.42 - 1.0	0.08
Confidence in relapse risk answer			
"Not at all"	1.1	0.77-1.5	0.73
"A little"	0.95	0.73-1.2	0.68
"Moderately"	Referent	-	-
"Quite confident"	1.0	0.74-1.5	0.81
"Very confident"	3.8	1.5-9.6	0.005

CI confidence interval