

CAA Approved Interpretive Software for ECG Machines

If you have computer diagnostic software installed on your machine, you can pass an ECG as acceptable when supported by:

- Acceptable computer diagnostic statements
- Clinical assessment of the applicant
- Adherence to ECG reporting protocols
- Your own reading of the rhythm strip
- Your comparison of the ECG with previous ECGs, if available

The computer has a set of reporting algorithms, which when certain conditions are met, lead to diagnostic statements being printed on the top of the ECG. The wording of the statements is fixed, but several statements may appear together.

AMEs must not code an ECG as "Acceptable Machine Read (AMR)" if the ECG has **any** computer statement that is **not** on the list of acceptable diagnostic statements for that software.

This applies even if the unacceptable ECG statement has occurred previously and had been over-read by a cardiologist as acceptable. This also applies if the applicant has been investigated in the past for the same ECG finding. The reason for this is that there may be progression of the ECG finding over time that merits further cardiological investigation.

Clinical assessment of the applicant and adherence to ECG reporting protocols

There is more to this scheme than just relying on the statements below. For some of the acceptable computer statements, whether they appear alone or in an acceptable statement group, you can only accept them if the following conditions are met:

- Marked sinus bradycardia: accept only if rate > 40 bpm
- Minimal or moderate voltage criteria for LVH, may be normal variant: accept only if physically fit, no hypertension, no murmur
- Rightward axis: accept only if no murmur
- Sinus tachycardia: accept only if rate < 110 bpm

The rhythm strip

The recording of a rhythm strip is optional; however, if you do decide to record a rhythm strip then you must check the rhythm strip carefully. The reason for this check is that the computer may not report the rhythm strip and so diagnostic statements relate only to the 12 lead recording. Hence, it may be possible that you could have a computer-reported normal 12 lead ECG with an abnormality on the attached rhythm strip.

Compare computer statements from previous ECGs

Use your judgment to compare statements from previous recordings. When you report an ECG in this way the overall responsibility for the accuracy of the report lies with you personally, and so if your ECG reading skills are rusty you should update your skills with a suitable course.

Acceptable machines / software

E-Lite

Acceptable diagnostic statements

- Normal ECG
- Sinus bradycardia: accept only if rate >40 bpm

Marquette 12 SL software

Acceptable diagnostic statements

- Marked sinus bradycardia: accept only if rate > 40 bpm
- Marked sinus arrhythmia
- Minimal voltage criteria for LVH, may be normal variant: accept only if physically fit, no hypertension, no murmur
- Moderate voltage criteria for LVH, may be normal variant: accept only if physically fit, no hypertension, no murmur
- Normal ECG
- Normal sinus rhythm
- Rightward axis: accept only if no murmur
- Sinus arrhythmia
- Sinus bradycardia
- Sinus tachycardia: accept only if rate <110 bpm

Schiller (SECA, ESAOTE) software

Acceptable diagnostic statements

- Sinus bradycardia: accept only if rate > 40 bpm
- Sinus arrhythmia
- Moderate amplitude criteria for left ventricular hypertrophy borderline ECG (as a single statement): accept only if physically fit, no hypertension, no murmur
- Amplitude criteria for left ventricular hypertrophy possibly abnormal ECG (as a single statement): accept only if physically fit, no hypertension, no murmur
- Rightward axis: accept only if no murmur
- Otherwise normal ECG
- Normal ECG
- Sinus rhythm
- Sinus tachycardia: accept only if rate < 110bpm

We suggest that "low" sensitivity is not selected, see page 51 of your physician's guide.

Cardio View (Biolog) 3000

Acceptable diagnostic statements

- Normal sinus rhythm
- Normal
- Sinus bradycardia: accept only if rate > 40 bpm
- Sinus arrhythmia

Nihon Kohden

Acceptable diagnostic statements

- 1100 Sinus rhythm
- 1102 Sinus arrhythmia
- 1108 Marked sinus arrhythmia
- 1120 Sinus tachycardia: accept only if rate < 110 bpm
- 1130 Sinus bradycardia: accept only if rate > 40 bpm
- 5211 Minimal voltage criteria for LVH, may be normal variant: accept only if physically fit, no hypertension, no murmur
- 5222 Moderate voltage criteria for LVH, may be normal variant: accept only if physically fit, no hypertension, no murmur
- 7102 Moderate right axis deviation: accept only if no murmur
- 9110 ** normal ECG**

In this scheme an ECG with any number of the above statements can be acceptable but, no matter how many acceptable diagnostic statements the ECG has, if there are any statements that are not on the list above (there is an exception – see below), or if you have any other doubts about the ECG, then you should refer that ECG for over-reading.

For example:

- Sinus bradycardia / Moderate voltage criteria for LVH, may be normal variant” **is acceptable**

However:

- Sinus bradycardia / Moderate voltage criteria for LVH, may be normal variant / Non-specific T wave abnormality” **is not acceptable**

There is an exception to this. The program produces diagnostic statements with various codes and then the last statement that the program produces may be the so called "overall judgment" statement, which will begin with the code 91. The list of acceptable statements above only includes one overall judgment code which is invariably acceptable: 9110 ** Normal ECG**.

However, sometimes, but not always, the overall judgment codes 9130 **Borderline ECG** and 9140 **Abnormal rhythm ECG** can be associated with acceptable diagnostic statements. To get around this problem these overall judgment codes (9130 and 9140) are acceptable only when they appear in the following groups:

Acceptable diagnostic statement groups

- 1100 Sinus rhythm
- 5211 Minimal voltage criteria for LVH, may be normal variant
- 9130 **Borderline ECG**
- 1100 Sinus rhythm
- 5222 Moderate voltage criteria for LVH, may be normal variant
- 9130 **Borderline ECG**
- 1120 Sinus tachycardia
- 9140 **Abnormal rhythm ECG**
- 1130 Sinus bradycardia
- 9140 **Abnormal rhythm ECG**
- 1100 Sinus rhythm
- 1108 Marked sinus arrhythmia
- 9130 **Borderline ECG**

Hewlett Packard

Acceptable diagnostic statements

- Normal ECG
- Otherwise normal ECG
- Sinus rhythm
- Sinus arrhythmia
- Sinus bradycardia: accept only if rate >40 bpm
- Sinus tachycardia: accept only if rate <110bpm
- LVH by voltage: accept only if physically fit, no hypertension, no murmur
- Right axis deviation: accept only if no murmur

Glasgow Interpretive Algorithm

Any AME wishing to use a machine where the software uses this algorithm, must first inform the CAA, by e-mailing amesupport@caa.co.uk.

On receipt of an acknowledgement that the email has been received, they can immediately start using the machine as part of their practice.

The following statements are acceptable

- Rightward axis: accept only if no murmur
- Consider LVH suggested by voltage criteria only: accept only if physically fit, no hypertension, no murmur
- Sinus rhythm
- Sinus tachycardia: accept only if rate <110bpm
- Sinus bradycardia
- Sinus arrhythmia
- Within normal limits

Any other statement is **not acceptable** and will require that the ECG is over-read by a cardiologist (ROR). A copy of all ECGs and MED 108 forms (where the ECG needed to be over-read) should be uploaded to Cellma as usual.