

### **Safety statement on acoustic output in application presets**

Modern ultrasound equipment is generally designed to constrain thermal (TI) and mechanical (MI) indices within upper limits defined in national and international guidelines, although there may be exceptions where it is possible to exceed these upper limits. BMUS guidelines specify different upper limits for TI and MI in different applications and specify time limits where TI exceeds 0.7. The guidelines also recommend that the ALARA (as low as reasonably achievable) principle is followed.

Ultrasound equipment manufacturers and vendors have different policies on setting output levels within application presets. Some may set output to 100% prior to delivery, others may optimise the image quality at a lower level. One of the aims of introducing TI and MI was to enable ultrasound users to find the best trade-off between the clinical information and the exposure parameters; the onus is therefore on the user to ensure that the ALARA principal is followed in finalising application presets at commissioning, without compromising the diagnosis.

BMUS therefore recommends that ultrasound users (clinical, technical and scientific) work closely with vendors' clinical application specialists at commissioning to establish the minimum acceptable output for each mode within each application preset. (These minimum settings should, whenever possible, not exceed the values of TI and MI for which time limits are set, e.g. TI=0.7 for obstetrics applications.) This minimum acceptable output should be seen as a starting point, and users should be free to use their judgement in making adjustments for individual patients where increased output improves image quality to a level at which it can improve diagnosis.