Editorial

Appropriate technology in body composition

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Scientifically-based medical disciplines advance not only because they deal with particular areas of health, but because of what they can measure. For clinical and public health nutrition, measurement of food intake, body composition and various functional outcomes of nutrient or food component imbalance (like those of haemopoiesis, muscle function, visual function, metabolic function or immune function), are essential yet far from ideal. Indeed, we can expect that with greater precision and accuracy, body compositional studies will define hitherto unrecognized syndromes. For example, time was when we were satisfied to talk about weight disorders, then body fat disorders, then body fat distribution disorders, then visceral (as opposed to subcutaneous abdominal) fatness and now, may be, visceral fat composition. Each of these assessments requires a different technology, an appropriate technology. The body composition questions will inspire new questions, and the questions will inspire new technologies.

But *appropriate technology in body composition* is more than that for the underlying nutritional disturbance. It *has to do with* the:

a) underlying nutritional disturbance
and b) different age groups
c) people in different physiological states – pregnancy, lactation, grades of physical fitness
d) those of different ethnicity
e) the sick
f) different locations
  – the field, ambulatory care clinics, hospitals, sports centres
g) various levels of affordability
  – developing and developed countries
  – socio-economically advantaged and disadvantaged individuals.

By making the technology more appropriate, body composition assessment is likely to be used to a greater extent and be of increasing health benefit. The present collection of papers has to do with that process. It derives from a conference in Melbourne, Victoria, Australia, held from 23–24 September 1993, just prior to the XV International Congress of Nutrition of the IUNS (International Union of Nutritional Sciences) held in Adelaide, 26 September–1 October 1993.

New and more sophisticated technology does not necessarily mean better or more appropriate. John Durnin makes the point that weight–height relationships remain valuable ways of assessing total body fatness. The changing interest in such relationships has more to do with the search for alternative and superior body compositional predictors of health outcomes like coronary heart disease or diabetes.

We are getting better at assessing body composition in the very young and the very old, each with their own special problems, as outlined by Borovnicar, Stroud, Steen and colleagues and Prinsley.

There remain substantial questions about the cross-ethnic robustness of indirect indices of body composition, particularly in relation to extrapolation to oriental and to Aboriginal Australians from Caucasians as detailed by Roche, Hsu-Hage and Rutishauser.

The greatest challenge, according to Strauss, is in clinical diagnosis and in monitoring the progress and management of disease states – where water, fat, lean mass and bone mass may be shifting in various directions. This is particularly the case where there is oedema, ascites and excessive fat. Thus in cardiac decompensation, renal failure, and severe obesity there are particular difficulties with indirect measurement, which would not obtain with direct measures of water and fat and cell mass. But even here, the presence of accumulated water or fat can make the error of other measurements which might be direct – nitrogen, potassium, for example – less precise. Even if measurements are less accurate (ie do not tell us the 'truth' about a body component or compartment), detecting change from a known baseline can be of considerable clinical benefit. Greater precision for existing body composition methods, to detect change earlier, is eagerly awaited. Most encouraging have been the low coefficients of variation for bone density by DEXA (dual energy Xray absorptiometry) of 1–2%, so that changes in bone density with disease progress or therapeutic intervention at a few months can be recognized.

The technologies of body composition and imaging are increasingly coming together as the interface between DEXA, CT (computerised tomography) scanning and MRI (magnetic resonance imaging) indicates. The next step is the measurement directly of body content of a wider and wider range of molecules by MRI spectroscopy and PET (positron emission tomography) scanning.

More and more, as well, static measurements will become dynamic measurements of body composition in a state of flux, which brings metabolic medicine into full conjunction with body composition.

The science of information and intelligent systems is also beginning to revolutionize the field of body composition as population and individual data bases grow and are more manageable.

These are exciting days for body composition scientists and practitioners!