

# Arteriosclerosis and Thrombosis

A Journal of Vascular Biology

Volume 14, Number 6 June 1994

## Original Contributions

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# Transition to SI Units

At its October 1990 meeting the Scientific Publishing Committee explored the use and prevalence of *Système International* (SI) units for reporting measures of clinical and laboratory data. The committee since has sanctioned the use of SI units in the American Heart Association (AHA) journals.

The SI, an update of the metric system, is the outcome of a century of effort to provide a common system of measurement between nations and among the sciences. To promote its use, which can reduce the present confusion about measurements, the World Health Assembly in 1977 recommended the use of SI units in medicine.

The *SI base units* are the meter, kilogram, second, ampere, kelvin, candela, and mole, respectively representing length, mass, time, electric current, temperature, luminous intensity, and amount of substance. By multiplying a base unit by itself, or by combining two or more basic units by multiplication or division, many units can be formed, known as SI-derived units. Examples of derived units are the square meter, cubic meter, mole per cubic meter, pascal (Pa), and joule (J).

Exceptions to the rule for SI unit conversion as currently applied to biomedical sciences include blood pressure, oxygen pressure, and enzyme activity. Retained as presently used are temperature, the pH scale, and the use of liter for volume. Table 1 illustrates the measurements excluded from SI unit conversion.

In the AHA journals, an average article contains few items that need conversion. Often the same conversion is made over and over in a manuscript and takes little extra effort. It is our belief that, in return for a small effort, the AHA can take a large step, along with many other international and domestic journals, toward perpetuating a common system for reporting medical and scientific measurements. The SI unit is to be used in text, followed by the presently used measurement in parentheses.

The accompanying conversion table (Table 2) lists the measurements most commonly used in the AHA jour-

nals and their corresponding SI units. A review of this table may serve as an introduction to the forthcoming transition to SI units.

**TABLE 2. Examples of Measurement Conversions to *Système International* (SI) Units for American Heart Association Journals\***

Current Unit	Conversion Factor	SI Unit	Normal Laboratory Values†	
			Current	SI
Concentration				
M (molar)	1	mol/L	...	...
mM	1	mmol/L	...	...
Pressure				
torr	1	mm Hg	...	...
atm	101.325	kPa	...	...
Hematocrit				
%	0.01	No units	36-54	0.36-0.54
Red blood cell count				
10 <sup>6</sup> /mm <sup>3</sup>	1	10 <sup>12</sup> /L	4.0-6.0	4.0-6.0
White blood cell count				
/mm <sup>3</sup>	0.001	10 <sup>9</sup> /L	5000-10 000	5.0-10.0
Cholesterol				
mg/dL	0.02586	mmol/L	<200	<5.20
Sodium ion (Na <sup>+</sup> )				
mEq/L	1	mmol/L	135-145	135-145
Potassium ion (K <sup>+</sup> )				
mEq/L	1	mmol/L	3.5-5.0	3.5-5.0
Calcium ion (Ca <sup>2+</sup> )				
mEq/L	0.5	mmol/L	4.5-5.5	2.25-2.75
Energy				
Calories	4.2	J	...	...
Conductance				
mho	1	S	...	...

\*For a brief discussion of the development and use of SI units, see World Health Organization: *The SI for the Health Professions*, Geneva, Switzerland: World Health Organization, 1982. For a convenient list of commonly used laboratory measurement conversions to SI units, see "SI unit implementation—the next step" (editorial) in *JAMA* (1988;260:73-76).

†For illustration only; normal values may vary by laboratory.

**TABLE 1. Measurements Currently Not Converted to *Système International* (SI) Units in Biomedical Applications**

Measurement	Current Unit
Blood pressure	mm Hg
Oxygen pressure	mm Hg
Enzyme activity	IU
H <sup>+</sup> concentration	pH
Temperature	°C
Volume	L