

## Is Weight Loss the Answer?\*

Weight loss is generally recommended for overweight persons primarily because weight loss intervention is frequently associated with improvements in health status. Theoretically, weight loss in overweight individuals should reduce death rates. However, there is a dearth of evidence available to support this scenario.<sup>1</sup> To the contrary, most relevant epidemiological studies indicate that weight loss is associated with *increased* mortality rates.<sup>2,3,4,5,6</sup>

A major limitation of many of the epidemiological studies on weight loss and mortality, however, is that they do not distinguish between intentional and unintentional weight loss.<sup>7</sup> Because unintentional weight loss may be associated with illness, interpretation of the results of any study that does not distinguish between intentional and unintentional weight loss is problematic at best.

Even the studies with data on *intentional* weight loss fail to provide compelling evidence for a positive impact of weight loss on mortality rates.<sup>8,9,10</sup> In the American Cancer Society's Cancer Prevention Study I, involving 43,457 never-smoking overweight (Body Mass Index, BMI > 27) U.S. white women, ages 40-64, the impact of intentional weight loss on mortality rates depended upon health status.<sup>11</sup>

Among the 28,388 women with no pre-existing illness, intentional weight loss generally was not associated with reduced mortality rates. In some instances intentional weight loss was associated with statistically significantly higher mortality rates.

By comparison, for the 15,069 women with one or more obesity-related health conditions, intentional weight loss was associated with an approximately 20% lower rate of all-cause mortality over a 12-yr follow-up. It is noteworthy that the reduction in death rate was independent of the amount of weight lost: women who lost 1-19 pounds experienced the same reduction in all-cause mortality rate as did women who lost 20 or more pounds. This suggests that specific weight loss goals for overweight women with obesity-related health conditions may not be necessary.

Two 1999 reports in the *American Journal of Epidemiology* support these findings, again undermining the “lose weight-live longer” paradigm.<sup>12,13</sup> In one, on men with BMI over 27, intentional weight loss had no positive effect on overall mortality, regardless of current health status.<sup>14</sup> Although intentional weight loss among overweight men with health problems was associated with a lower mortality rate for diabetes, the reduction in mortality rate was independent of the amount of weight loss, again suggesting that specific weight loss goals may be unnecessary.

The Iowa Women’s Health Study provides perhaps the most compelling evidence to refute the hypothesis that losing weight lengthens life.<sup>15</sup> In this study of 25,764 women, ages 55-69, three different statistical models were used to evaluate the impact of weight loss on total and cardiovascular disease mortality among women categorized by weight status, health status, and amount and intentionality of weight loss. Among overweight women (BMI>27.3), in no instance was weight loss – whether intentional or unintentional – associated with significantly reduced mortality rates. In fact, intentional weight loss in almost all cases was associated with *elevated* death rates.

Taken together, these epidemiological findings strongly suggest that categorical recommendations for all overweight persons to lose weight, regardless of current health status, are not justified.

## WEIGHT LOSS PARADOX

The high mortality rates associated with weight loss, particularly for cardiovascular disease, are paradoxical in view of the conventional wisdom on weight loss. More often than not weight loss is associated with improvements in established cardiovascular risk factors. This, theoretically, should translate into reduced mortality. Not only does the bulk of epidemiological evidence fail to support the “lose weight-live longer” paradigm, it suggests that weight loss in some instances may do more harm than good, particularly for persons with no pre-existing health conditions. There are several potential explanations for this weight loss paradox.

Intentional weight loss is not always associated with an improved health profile. Low-carbohydrate diets, for example, increase serum total cholesterol<sup>16</sup> and low-density lipoprotein cholesterol, and reduce serum high-density lipoprotein cholesterol, particularly in women.<sup>17</sup> These unfavorable lipoprotein changes occurred even in the face of weight loss. This may have particular relevance to the U.S. population because low-carbohydrate diets have been the most popular weight-reducing diets in the United States since the early 1960s.

Major weight loss has been reported to reduce adipose tissue and serum concentration of  $\alpha$ -linolenic acid,<sup>18,19</sup> a reduction that cannot be prevented even with dietary supplementation.<sup>20</sup> Low levels of  $\alpha$ -linolenic acid may increase the risk of atherosclerosis.<sup>21</sup> Tang et al. cautioned that “a subtle but chronic risk state could be established if recurrent dieting depletes  $\omega$ 3 reserves and intake during maintenance or weight gain does not allow

effective repletion.”<sup>22</sup>

## WEIGHT LOSS AS A MARKER FOR WEIGHT CYCLING

It is possible that the increased mortality rates associated with weight loss are due to weight cycling, and not necessarily weight loss itself. Several epidemiological studies revealed higher all-cause (primarily from cardiovascular disease) death rates among men and women who had experienced considerable weight fluctuation (for review see Gaesser<sup>23,24</sup>).

The increased morbidity and mortality associated with weight cycling in humans is supported by a number of animal models (for review, see Gaesser<sup>25,26</sup>). Weight cycling has also been reported to significantly modify whole body fatty acid composition in rats (i.e., decreases in linoleate and  $\alpha$ -linolenate) which may increase the risk of cardiovascular disease. Chen et al. demonstrated that carcass and adipose tissue fatty acid compositional changes were similar whether weight cycling (two cycles) was induced by caloric intake reductions of 36%, 60% or 100% of daily caloric intake, thus suggesting that a relatively moderate caloric restriction is potentially as hazardous as complete fasting.<sup>27</sup>

Weight fluctuation may also increase the risk for certain cancers. Tagliaferro et al.<sup>28</sup> reported that cyclic food restriction increased mammary tumor incidence in rats. Also, Uhley et al.<sup>29</sup> reported that weight cycling increased oxidative DNA damage levels in mammary glands of rats. Four or five weight cycles of either 20% above or below baseline weight increased oxidative damage in the DNA of mammary gland cells. The kind of DNA damage observed in these animals may be a potentially useful marker for breast cancer in humans.<sup>30</sup> Whether the high breast cancer rates in the United States are related to weight cycling is entirely speculative, but the animal data are certainly cause for concern given the prevalence of weight loss attempts by U. S. women.<sup>31,32</sup> The authors emphasised that “cyclic dieting attempts at weight loss should not be viewed as a benign behaviour in women and may be an important risk factor for breast cancer.”<sup>33</sup> In a study of Swedish women, Lindblad et al.<sup>34</sup> reported that weight cycling was a major predictor of renal cell cancer.

## BODY COMPOSITION: DOES IT REALLY MATTER?

It has been suggested recently that it's not weight loss *per se* that is unhealthy, but rather loss of fat-free mass that is associated with increased mortality rates. On the basis of two cohort studies (Tecumseh; Framingham), Allison and colleagues<sup>35</sup> reported that although weight loss was associated with higher mortality rates, fat loss was associated with reduced mortality rates. On the face of it, this suggests that loss of fat-free mass is undesirable, and that the loss of body fat is a good thing – at least in terms of mortality. However, body composition, or changes in body composition, may not be as important as this study suggests.

Data from the Aerobics Center Longitudinal Study suggest that aerobic fitness is considerably more important as a predictor of mortality rate than either BMI, percent body fat, absolute

amount of body fat or fat-free mass, or waist circumference.<sup>36</sup> Furthermore, fat loss was associated with only modestly reduced mortality rates in the report of Allison et al. (15 to 17% for each standard deviation of reduction in skinfold thickness), whereas modest changes in aerobic fitness have been reported to be associated with reductions in mortality rate on the order of 40 to 70%, independently of changes in BMI.<sup>37</sup> Because it may be considerably easier to change aerobic fitness level than it is to lose weight (and maintain it), emphasis on physical activity rather than weight reduction is perhaps the best strategy.

## CONCLUSIONS AND PRACTICAL APPLICATIONS

Contrary to conventional wisdom, the scientific evidence does not support the assertion that weight loss will increase the longevity prospects of women and men classified as overweight (i.e., by BMI criteria). In fact, a good deal of data suggests that, as Kassirer and Angel opined,<sup>38</sup> “the cure for obesity may be worse than the condition.” Thus urging naturally heavy men and women to lose weight, without also considering lifestyle factors and current health status, may be counterproductive.

Mortality issues aside, many weight-related comorbidities, such as high blood pressure, abnormal blood lipids, hyperinsulinemia, and glucose intolerance, can be improved independently of weight loss (for review, see Gaesser<sup>39,40</sup>). Thus public health may be better served by focusing more on increasing physical activity and fitness, and on improving nutrition, than on weight reduction *per se*. Due to the rather poor success rates for permanent weight loss, this may be the only viable option for millions of U. S. adults stigmatised as ‘too fat.’ Countless heavier-than-average women and men need to be reassured that the road to a fitter and healthier body is wide enough for everyone.

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