

## State of the Science on Cardiometabolic Risk After Spinal Cord Injury: Recap of the 2013 ASIA Pre-Conference on Cardiometabolic Disease

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### Abstract

Cardiovascular disease (CVD) is a leading cause of death in persons with spinal cord injury (SCI) who survive at least 1 year post injury. Persons with SCI who are younger than 45 years of age are four times more likely to die of cardiac causes than their age-matched counterparts without SCI. There is evidence that people with SCI are at increased risk for CVD compared to the general population, however prospective trials documenting true incidence have not confirmed this. These figures are not surprising, due to the effect of paralysis on body composition, challenges to physical activity, and the body's response to physical activity after SCI. Individuals with SCI may also be less likely, depending on level of injury, to experience angina or other cardiac-related symptoms as a warning sign of cardiac compromise due to sympathetic nervous system disruption. Because measures of risk, and subsequent preventive practices, are based on and designed for the general population and because persons with SCI experience CVD earlier and with fewer cardiac symptoms than the general population, there is a need to better characterize the risks in this population.<sup>6</sup> One of the significant risks of CVD in persons with SCI is their tendency to develop *cardiometabolic syndrome*, defined as a cluster of risk factors that includes obesity, insulin resistance, diabetes mellitus, dyslipidemia, and subclinical atherosclerosis.

Cardiometabolic risk (CMR) has been a principal research focus of the Rehabilitation Research and Training Center (RRTC) on Secondary Conditions in the Rehabilitation of Individuals with Spinal Cord Injury. Research conducted during a previous cycle of SCI-RRTC (2003-2009) funding demonstrated that 76.9% of subjects exhibited risk clustering, with elevated low-density lipoprotein cholesterol (LDL-C) occurring in 64% of subjects and depressed high-density lipoprotein cholesterol (HDL-C) occurring in 53% of subjects (42% and 11%, respectively, for males and females). Further, overweight/obesity was the most prevalent CMR (74%) among 121 community-dwelling persons with chronic SCI.

Body mass index (BMI) provides a proxy measure of body fat, as the ratio of weight (kg) and height (m<sup>2</sup>). Although BMI may be adequate for providing a gross estimate of obesity in the general population, it is problematic after SCI due to the significant changes in body composition that are nearly universal and are characterized by a loss of lean and increase in fat mass. As a result, the BMI scale significantly underestimates obesity in individuals after SCI and therefore may not signal actual risk. Similarly, although optimization of the lipid profile is integral to general population CVD prevention, the way in which lipid patterns may differ after SCI and how those differences impact CVD risk in persons with SCI have not received much attention.