

## **Motivation of the subject area**

Vitamin D is believed to be particularly crucial during childhood growth as the requirement for calcium increases <sup>[1]</sup>. In addition to skeletal health, vitamin D status has been inversely associated with various metabolic and cardiovascular risk markers such as hypertension, hypertriglycerol, and insulin resistance in children <sup>[2-4]</sup>. Evaluation of Vitamin D status is complex because it is modified by several factors and because the level of optimal vitamin D concentration is uncertain. The primary source of vitamin D in humans is believed to be the synthesis that occurs in the skin upon sun exposure while intake from diet, supplements, and potential fortified foods are secondary sources <sup>[5]</sup>. Yet, very few foods are rich in vitamin D and data on the effect of dietary vitamin D on children's vitamin D status is scarce. Synthesis of vitamin D from sun exposure is negligible during winter at northern latitudes such as Denmark <sup>[6,7]</sup>, and low winter concentrations have been observed in Danish children <sup>[8]</sup>. There is a lack of studies investigating vitamin D status in Danish children during times of the year when status is expected to be at its highest. This will elucidate if there are groups of children who are deficient throughout the year and thereby at particular risk of implications from vitamin D deficiency.

The overall aim of this PhD project was to investigate aspects of Danish children's vitamin D status with regard to sufficiency level, possibilities to improve status, and whether status is associated with cardio-metabolic markers.