

The great transformation: A long-run perspective on physical well-being in Canada

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Abstract

During the 19th century the physical stature of the Canadian-born stagnated or declined slightly in spite of a substantial increase in income. Stature varied regionally within Canada. The Quebec population was especially short; men in the Atlantic coastal region were taller than their low incomes would lead us to expect. Heights increased dramatically in the 20th Century. The pattern of long-run change is consistent with evidence of age-specific mortality and with the relationship between income and physical well-being envisaged by Preston [Preston, S., 1975. The changing relationship between mortality and the level of economic development. *Popul. Stud.* 29, 231–248]. The transition from stagnant or declining stature to secular increase points to a dramatic shift ca. 1900 in the evolution of the physical standard of living in Canada.

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1. Introduction

Most populations experienced a marked increase in physical stature during the 20th century (Bielicki, 1986; Fogel et al., 1982, 1983; Van Wieringen, 1986). In a number of societies, however, average height is known to have declined or remained unchanged for large parts of the

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19th century (Costa and Steckel, 1997; Fogel, 1986a, 1986b; Komlos, 1989, 1998; Margo and Steckel, 1983). The latter experience is remarkable because income was increasing, and with it the ability to improve nutrition, housing and other factors that arguably would have improved the physical standard of living and potential for stature increase. Stagnating and declining stature in the early stages of industrialization has been understood as a byproduct of economic growth that heightened social inequalities, increased the relative price of key foodstuffs, demanded more work effort from some people, and increased exposure to disease through urbanization and transportation improvements (Haines, 2004; Komlos, 1985, 1987, 1996; Steckel, 1995; Steckel and Floud, 1997). These factors exerted a depressing influence on stature through their adverse impact on ‘net nutrition’, or nutrition after allowing for losses through work, climate and disease.

Another way to consider this experience is suggested by Preston’s argument that income growth contributes to mortality reduction but at a diminishing rate, and that other forces alter the relationship between income and mortality in important ways and hence influence life expectancy (Preston, 1975). Demographic researchers continue to rely on this framework and have extended it other aspects of human health (Cutler et al., 2006; Deaton, 2002, 2003; Easterlin, 1998). The same framework informs our understanding of changes in physical stature. Specifically, there are diminishing returns to the effect of income on height, and cultural, organizational and technological changes have the potential to shift the relationship between income and stature in a positive or negative direction. For example, advances in medical and public health knowledge, improvements in the social capability to take advantage of them and evolving preferences for diet and personal health practices might cause an upward shift in the income–height relationship and thereby reinforce the impact of income growth. Other changes such as an increase in the relative price of protein-rich food, deteriorating work-regimes, urbanization and disease exposure and, at the level of an entire community, heightened social inequality may have the opposite effect. The net effect of positive and negative influences in a particular community depends on their strength, the nature of income change and, given its declining marginal importance, the level of income.

As yet, Canada has attracted little attention in the anthropometric literature. We hypothesize that Canada experienced a great transformation in stature similar to that of other societies in the north Atlantic community. Specifically, we argue that physical stature in Canada although large by international standards declined slowly in the 19th century (or at best remained unchanged) in contrast to the 20th century experience of a dramatic secular increase. We also consider consistency with other health indicators, undertake preliminary analysis on the 19th century data and situate the Canadian experience in an international context.

2. Physical stature in 19th-century Canada

Little is known about height or other aspects of physical well-being in 19th century Canada except on birth weight; Ward and Ward (1984) document a decline in birth weights in Montreal towards the end of the 19th century. An examination of Northwest Police recruiting files shows an increase in height from the 1870s to the end of the century (Dick, 1995). The significance of this evidence is weakened by lack of birth-place or birth-date information in most of the files. Moreover, the Northwest Police, a mounted police force, maintained a minimum height requirement that was so high (68 in.) as to make sample truncation a very serious problem.

In this paper we introduce new evidence from military enlistment and prison admission records (Union Army, Kingston Penitentiary admissions, South African War enlistments and

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