



# CANADA

## Disease Burden

### Prevalence, Diagnosis, and Comorbidities

#### The International Study for Asthma and Allergies in Childhood (ISAAC)

revealed an increase in the prevalence of AD in Canadian children.

Specifically, the prevalence among children aged 6–7 increased from 8.7% in phase 1 of the study (1992–1998) to 12.0% in phase 3 (1999–2004).<sup>222</sup>

An analysis of the ISAAC phase 3 data by Wang et al. estimated a prevalence of 9.4% among 13–14 year-olds in 5 Canadian cities; the prevalence was higher among females (vs. males) and those who lived Winnipeg or Vancouver (vs. Saskatoon, Hamilton, or Halifax).<sup>223</sup> The prevalence of AD in Canadian adults was estimated to be 3.5% in an international web-based survey.<sup>196</sup>

Until recently, there was a lack of research regarding AD in the Canadian indigenous populations. A 2018 cross-sectional survey of first-grade students living in Iqaluit (approximately 50% Inuit<sup>224</sup>) found eczema prevalence to be 20.5%; eczema prevalence was even higher in the Inuit population specifically (25%).<sup>225</sup> Similarly, a survey of children aged 2–12 in Natuashish (a Mushuau Innu First Nations community<sup>226</sup>) found eczema prevalence to be 16.5%.<sup>227</sup> A cross-sectional survey of seventh-grade students in Iqaluit found a point prevalence of 27.6% and a lifetime prevalence 34.5%.<sup>228</sup> The estimates for AD prevalence in indigenous individuals are significantly higher than in the general Canada population as well as international estimates.<sup>225,227,228</sup> Notably, half of the children in Iqaluit who reported AD identified as mixed Inuit-Caucasian, and a quarter identified as Inuit.<sup>228</sup>

Drucker et al investigated cardiovascular and metabolic risk factors associated with AD; the authors did not find a significant association between AD and hypertension, MI, or stroke, much like in the European COI and unlike in the US.<sup>229</sup>

<sup>222</sup>Asher, M. I. et al. Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. *The Lancet* 368, 733–743 (2006).

<sup>223</sup>Wang, H.-Y. et al. Disparate geographic prevalences of asthma, allergic rhinoconjunctivitis and atopic eczema among adolescents in five Canadian cities. *Pediatric Allergy and Immunology* 21, 867–877 (2010).

<sup>224</sup>Demographics | City of Iqaluit. <https://www.iqaluit.ca/visitors/explore-iqaluit/demographics>.

<sup>225</sup>Ahmed, A., Hakim, A. & Becker, A. Evaluation of eczema, asthma, allergic rhinitis and allergies among the Grade-1 children of Iqaluit. *Allergy, Asthma & Clinical Immunology* 14, 9 (2018).

<sup>226</sup>Natuashish : Community of Utshimassit | Portrait of a Nation | Culture | Nametau innu: Memory and knowledge of Nitassinan. <http://www.nametauinnu.ca/en/culture/nation/detail/74>.

<sup>227</sup>Forsey, R. G. Prevalence of childhood eczema and food sensitization in the First Nations reserve of Natuashish, Labrador, Canada. *BMC Pediatr* 14, 76 (2014).

<sup>228</sup>Ahmed, A. & Becker, A. Evaluation of eczema, asthma, allergic rhinitis and allergies among the grade-7 children of Iqaluit. *Allergy Asthma Clin Immunol* 15, 1–10 (2019).

<sup>229</sup>Drucker, A. M., Qureshi, A. A., Dummer, T. J. B., Parker, L. & Li, W.-Q. Atopic dermatitis and risk of hypertension, type 2 diabetes, myocardial infarction and stroke in a cross-sectional analysis from the Canadian Partnership for Tomorrow Project. *Br J Dermatol* 177, 1043–1051 (2017).



Children with moderate-to-severe AD reported **sleep disturbances (70%), anxiety symptoms due to AD (32%), and school absenteeism (20%, of which 23% missed 10 or more days of school due to their AD).**

## Physical and Psychosocial Consequences

An online cross-sectional survey of adult patients with moderate-to-severe AD, conducted by the Eczema Society of Canada (ESC), identified the most common QoL impairments. 87% reported some form of QoL impairment; the most common were sleep dysfunction (48%), anxiety (64%), and the avoidance of social activities (48%), physical activity (47%), and intimacy (40%).<sup>230</sup>

The ESC conducted another online cross-sectional survey study among children and their caregivers. Children with moderate-to-severe AD reported sleep disturbances (70%), anxiety symptoms due to AD (32%), and school absenteeism due to AD (20%, of which 23% missed 10 or more days of school due to their AD). Less prevalent concerns included depression, bullying from peers, avoidance of social activities, and difficulties performing physical activities due to AD.<sup>9</sup>

Among adolescents and adults, a case-control study by Drucker et al. found that individuals aged 15–55 with persistent AD (5 or more visits to the physician in the 5 years prior) were more likely to die by suicide than matched controls. Although this association is largely explained by the heightened risk of several neuropsychiatric illnesses (depression, anxiety, sleep disorders, and substance use), the finding nevertheless points to a significant mental health burden in adolescents and adults with persistent AD.<sup>231</sup> Another study of adults found a significant burden attributable to sleep disturbances.<sup>232</sup>

## Caregiver Burden

The literature search yielded only one study on the caregiver burden: the aforementioned ESC study involving children with moderate-to-severe AD. Caregivers reported impacts on the family's QoL, sleep loss, and mental health concerns such as anxiety and depression.<sup>9</sup>

## Financial Burden

Barbeau et al. found that Ontario adults with AD bore an average annual cost of \$282 for mild disease, \$454 for moderate disease, and \$1242 for severe disease in 2002 Canadian dollars (\$399, \$642 and \$1,758 respectively in 2021 CDN dollars). These sums included direct medical expenses (medical visits and prescriptions), indirect medical expenses (OTC medications and household items), and indirect costs (namely, work absenteeism). The authors note that the personal financial burden to patients in Canada is less than in the US.<sup>232</sup>

<sup>230</sup>Bobotsis, R., Fleming, P., Eshtiaghi, P., Cresswell-Melville, A. & Drucker, A. M. A Canadian Adult Cross-Sectional Survey of the Burden of Moderate to Severe Atopic Dermatitis. *J Cutan Med Surg* 22, 445–446 (2018).

<sup>231</sup>Drucker, A. M., Thiruchelvam, D. & Redelmeier, D. A. Eczema and subsequent suicide: a matched case-control study. *BMJ Open* 8, e023776 (2018).

<sup>232</sup>Barbeau, M. & Bpharm, H. L. Burden of Atopic dermatitis in Canada. *Int J Dermatol* 45, 31–36 (2006).

## Treatment

The Totri et al. study detailing prescribing patterns of US and Canadian clinicians for systemic medications in children with AD was previously discussed in the US section; 18 of the respondents were Canadian.<sup>106</sup> Briefly, there was observed to be great variation in choices for first-line (cyclosporine: 45.2%; methotrexate: 29.6%; mycophenolate mofetil: 13.0%), second-line (methotrexate: 31.3%; mycophenolate mofetil: 30.4%; azathioprine: 20.0%), and third-line (azathioprine: 33.0%; mycophenolate mofetil: 24.3%; methotrexate: 19.1%) agents among the combined US and Canadian respondents, suggesting that there may be improvements in the choice of systemic agents for Canadian children with severe AD.<sup>106</sup>



The ESC study on adult patients with moderate-to-severe AD found that 41% of respondents had unmet treatment needs.<sup>230</sup> Furthermore, only 9% of respondents reported feeling as though their AD was well-controlled, and 78% of respondents reported having lived at least one year without appropriate management of their AD.<sup>230</sup> Another study of Canadian adults found prevalent concerns regarding the use of TCS.<sup>232</sup>

The ESC study on children and caregivers found that many caregivers believed that their child's AD was not well controlled. 85% of respondents reported past use of at least 3 treatment modalities and 18% were using systemic corticosteroids. Furthermore, 80% of respondents noted difficulty with adhering to the prescribed treatment regimen due to time constraints and difficulties with topical applications.<sup>9</sup>

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## Healthcare

### Utilization

The ESC study on adult patients with moderate-to-severe AD found that 32% perceived that it was difficult to access treatment. Only 42% of patients with severe AD had seen a dermatologist at all, and of those, 69% had waited 3 months or more for their first visit.<sup>230</sup> Canadian caregivers and their children with AD had similar difficulties: 27% of caregivers had trouble obtaining treatment for their child's AD, and of the 27% of children with AD who received care from a dermatologist, 46% waited 3 months or more for an appointment and 25% waited 6 months or more.<sup>9</sup>

### Satisfaction with Care

The literature search did not yield any studies on patient or caregiver satisfaction with care in Canada.

### Patient-Centered Interventions

The literature search did not yield any studies on educational interventions in Canada.

## KEY FINDINGS

The prevalence of AD in Canadian adults is lower than in other countries such as the US, but as in most other COI, the prevalence of AD in Canadian children has been increasing in recent years. Even more concerning, recent data suggests a substantially higher AD burden in Canada's indigenous population. Population-based studies of comorbidities associated with AD in Canadians are lacking, suggesting a potential area for further research.

A pair of cross-sectional surveys conducted by the ESC have done much to describe the burden of AD among both Canadian adults and children (and their caregivers) with moderate-to-severe AD. Sleep loss and mental health comorbidities were seen in adults, children, and caregivers. Finally, access to specialized dermatologic care is a widespread problem for both Canadian children and adults with AD.

