

**DIETARY
SUPPLEMENTS
FOR
MUSCLE BUILDING
AND
WEIGHT LOSS**

**ADDRESSING KNOWLEDGE
AND POLICY GAPS**

KYLE T. GANSON PHD, MSW

ELIANA SINICROPI MPPc

nedic
National Eating Disorder
Information Centre



FACTOR-INWENTASH
FACULTY OF SOCIAL WORK
UNIVERSITY OF TORONTO

Defining Muscle-Building and Weight Loss Dietary Supplements

Muscle-building and weight loss supplements are dietary products used to alter appearance and performance, often to achieve a specific sociocultural ideal.¹ The vast majority of muscle-building and weight loss supplements are legally used, sold, and purchased, including whey protein, creatine monohydrate, and amino acids. Given muscle-building and weight loss supplements are classified as dietary products, they are loosely regulated and easily accessible.¹

Muscle-Building and Weight Loss Supplements are Used to Achieve Specific Body Ideals

Use of muscle-building and weight loss supplements is growing in prevalence among the general population, with the highest prevalence of use occurring among adolescents and young adults.² Notably, there is a higher prevalence of muscle-building supplements use among boys and young men, likely due to the association between the perceived benefit of these supplements in the development and maintenance of muscularity, aligning with the male body ideal.³ Conversely, girls and women are more likely to use weight loss products given the female ideal emphasizing a thin and toned body.^{2,4}

PREVALENCE OF MUSCLE-BUILDING AND WEIGHT LOSS SUPPLEMENT USE AMONG CANADIAN ADOLESCENTS AND YOUNG ADULTS IN THE PAST 12 MONTHS²

Amino Acids



FEMALES
15%

MALES
32%

Creatine Monohydrate



FEMALES
10%

MALES
50%

Energy Drinks



FEMALES
29%

MALES
42%

Pre-workout drinks or powders



FEMALES
18%

MALES
36%

Diuretics or Water Pills



FEMALES
3%

MALES
1%

Whey Protein or Protein Shakes



FEMALES
52%

MALES
83%

Use of Muscle-Building and Weight Loss Dietary Supplements is Not Without Potential Consequence

There is a growing body of research that has described the numerous adverse health and psychosocial effects associated with use of muscle-building and weight loss supplements.

This includes, problematic alcohol behaviours, such as binge-drinking, future use of anabolic-androgenic steroids, criminal offending, intimate partner violence, sexual risk behaviours, muscle dysmorphia and eating disorder symptoms, disability, and death.^{3,5-11} The potential effects of muscle-building and weight loss supplements use are compounded by research that has consistently documented that these supplements may be contaminated with stimulants and are mislabeled,¹²⁻¹⁴ as well as subject to regularity alerts.¹⁵ The current research on the adverse health and psychosocial correlates of muscle-building and weight loss supplements use, as well as data on tainted and mislabeled products are direct evidence of current policy failures.

Potential adverse health and psychosocial effects^{3,5-11}



Problematic Alcohol Behaviours



Anabolic-Androgenic Steroid Use



Criminal Offending



Intimate Partner Violence



Sexual Risk Behaviours



Muscle Dysmorphia & Eating Disorder Symptoms



Disability



Death

Current Regulatory Landscape in Canada

In Canada, the regulation of “natural health products”, including muscle-building and weight loss supplements, is overseen by the federal government through Health Canada. Specifically, the Health Products and Food Branch, which includes the Natural and Non-Prescription Health Product Directorate and Marketed Health Products Directorate. Natural health products are regulated under the *Food and Drugs Act* and the *Natural Health Products Regulations*.¹⁶

In Canada, these muscle-building and weight loss supplements are subject to both pre- and post-market regulatory mechanisms. Prior to being distributed, natural health products must be issued a product license and Natural Product Number or Homeopathic Medicine Number by the Natural and Natural and Non-Prescription Health Products Directorate. Manufacturers are required to submit evidence of health claims, which may include peer reviewed literature, clinical trials, or other formal reporting measures. The degree of evidence required to establish a health claim varies with the specificity of the medicinal claim and ingredient composition. Further, manufacturers must obtain site licenses, demonstrating compliance with Good Manufacturing Practices of the *Natural Health Products Regulations*.¹⁶ Following market distribution, the continued safety assessment of products is the responsibility of the Marketed Health Products Directorate. Health Canada relies on a complaints-based process, primarily through adverse reaction reporting by consumers, to identify non-compliance.

There is a growing body of research that has described the numerous adverse health and psychosocial effects associated with use of muscle-building and weight loss supplements.

Regulation Landscape in Canada Needs to be Strengthened

Muscle-building and weight loss supplements use poses a significant risk to consumers, which is exacerbated by the insufficient regulations in Canada. Therefore, additional mechanisms to protect the health and well-being of the Canadian population, particularly young people, are needed. Importantly, muscle-building and weight loss supplements are federally regulated by Health Canada, making it challenging for provinces to implement their own regulatory mechanisms via public health departments.

While current Canadian regulations of muscle-building and weight loss supplements are stronger than those of peer nations, such as the United States, additional improvements are needed to reduce adverse effects. Pre- and post-market recommendations (Table 1) would dramatically improve the current regulation of muscle-building and weight loss supplements to protect the health and well-being on Canadians.

PRE-MARKET POLICY RECOMMENDATIONS AT A GLANCE

Age restriction



Taxation



Behind the counter



Pre-market testing



Pre-market product notice

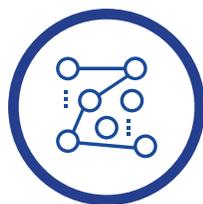


Regulating advertisements



POST-MARKET POLICY RECOMMENDATIONS AT A GLANCE

Post-market testing



Product recalls



Knowledge & awareness dissemination



Improved monitoring of adverse events



Table 1. Policy recommendations for the regulation of muscle-building and weight loss supplements in Canada

RECOMMENDATIONS	SUMMARY	JUSTIFICATION
PRE-MARKET		
Age restriction	Implement federal legislation which prohibits the sale of muscle-building and weight loss supplements to people under 18 years old.	<ul style="list-style-type: none"> • Young people may lack the capacity to consider the potential harmful effects of using muscle-building and weight loss supplements. • Little research on the potential long-term effects of muscle-building and weight loss supplements use on young people.
Taxation	Product taxation to increase the cost of natural health products and deter use.	<ul style="list-style-type: none"> • Prior research demonstrates that taxes on tobacco and alcohol has reduced use among young people. • Funds acquired by taxation may be used for public health programming and continued research related to muscle-building and weight loss supplements.
Behind the counter	Move muscle-building and weight loss supplements behind the counter to limit accessibility.	<ul style="list-style-type: none"> • Creates additional barrier for access. • Requires consumers to interact with pharmacists or retailers, providing an opportunity for counseling or information sharing.
Pre-market testing	Increase pre-market testing, including random testing and more stringent site licensing requirements.	<ul style="list-style-type: none"> • Evidence that muscle-building and weight loss supplements may be mislabeled and tainted with dangerous products. • Safety and efficacy of products and manufacturing sites rests with the industry. • Reduces potential contamination.
Pre-market product notice	Provide consumers with information about new products, through an online database, including pre-market testing results, compliance with current regulations, and any safety or efficacy concerns, to reduce product use.	<ul style="list-style-type: none"> • Currently, consumers do not receive a notice when products enter the market. • Provide increased access to information about pre-market processes to inform consumer decision-making.
Regulating advertisements	Pre-approval of marketing, marketing surveillance and prohibiting the marketing of muscle-building and weight loss supplements to minors.	<ul style="list-style-type: none"> • Pre-approving advertisements may reduce use of inaccurate or coercive terms that inaccurately characterize the benefits of NHPs. • Ensures compliance with marketing regulations. • Reduces use of muscle-building and weight loss supplements among young people.
POST-MARKET		
Post-market testing	Random post-market testing and surveillance to ensure compliance with regulations.	<ul style="list-style-type: none"> • May remove harmful products from shelves through continued quality assessment.
Product recalls	Health Canada reserves the right to force a recall.	<ul style="list-style-type: none"> • Currently, Health Canada can order a recall, but the responsibility to abide by the recall lies with the supplier.
Knowledge and awareness dissemination	Adding warning labels which inform consumers of adverse health effects, potential for contamination, and ingredient composition, in combination with public health notices in retail establishments.	<ul style="list-style-type: none"> • Labelling requirements are already included under current regulations. • Improved labelling requirements will allow consumers to make informed decisions about products they use.
Improved monitoring of adverse events	Funding allocations to inform and train professionals on how to best screen muscle-building and weight loss supplements use and provide appropriate guidance to consumers.	<ul style="list-style-type: none"> • Current monitoring of adverse events relies on consumers and practitioners. • Little evidence on the efficacy of adverse reporting strategies and follow-up investigation and action by Health Canada.

REFERENCES

1. Ganson KT, Murray SB, Nagata JM. A call for public policy and research to reduce use of appearance and performance enhancing drugs and substances among adolescents. *Lancet Child Adolesc Heal.* 2020;4(1):13-14. doi:10.1016/S2352-4642(19)30345-1
2. Ganson KT, Hallward L, Cunningham ML, et al. Use of Legal Appearance- and Performance- Enhancing Drugs and Substances : Findings from the Canadian Study of Adolescent Health Behaviors Use of Legal Appearance- and Performance-Enhancing Drugs Health Behaviors. *Subst Use Misuse.* 2022;0(0):1-9. doi:10.1080/10826084.2022.2161318
3. Murray SB, Nagata JM, Griffiths S, et al. The enigma of male eating disorders: A critical review and synthesis. *Clin Psychol Rev.* 2017;57(August):1-11. doi:10.1016/j.cpr.2017.08.001
4. Blanck HM, Serdula MK, Gillespie C, et al. Use of Nonprescription Dietary Supplements for Weight Loss Is Common among Americans. *J Am Diet Assoc.* 2007;107(3):441-447. doi:10.1016/j.jada.2006.12.009
5. Ganson KT, Mitchison D, Murray SB, Nagata JM. Legal performance-enhancing substances and substance use problems among young adults. *Pediatrics.* 2020;146(3):e20200409. doi:10.1542/peds.2020-0409
6. Nagata JM, Ganson KT, Gorrell S, Mitchison D, Murray SB. Association between legal performance-enhancing substances and use of anabolic-androgenic steroids in young adults. *JAMA Pediatr.* Published online June 1, 2020:E1-E2. doi:10.1001/jamapediatrics.2020.0883
7. Ganson KT, Testa A, Jackson DB, Nagata JM. Performance-enhancing substance use and criminal offending : A 15-year prospective cohort study. *Drug Alcohol Depend.* 2021;226(June):108832. doi:10.1016/j.drugalcdep.2021.108832
8. Ganson KT, Jackson DB, Testa A, Nagata JM. Performance-Enhancing Substance Use and Intimate Partner Violence: A Prospective Cohort Study. *J Interpers Violence.* 2022;0(0):088626052110730. doi:10.1177/08862605211073097
9. Ganson KT, Jackson DB, Testa A, Murnane PM, Nagata JM. Performance-Enhancing Substance Use and Sexual Risk Behaviors among U.S. Men: Results from a Prospective Cohort Study. *J Sex Res.* 2021;00(00):1-7. doi:10.1080/00224499.2021.2012114
10. Ganson KT, Cunningham ML, Murray SB, Nagata JM. Use of appearance- and performance-enhancing drugs and substances is associated with eating disorder symptomatology among U.S. college students. *Eat Weight Disord - Stud Anorexia, Bulim Obes.* Published online January 22, 2022. doi:10.1007/s40519-022-01364-z
11. Or F, Kim Y, Simms J, Austin SB. Taking stock of dietary supplements' harmful effects on children, adolescents, and young adults. *J Adolesc Heal.* Published online 2019:1-7. doi:10.1016/j.jadohealth.2019.03.005
12. Cohen PA, Travis JC, Vanhee C, Ohana D, Venhuis BJ. Nine prohibited stimulants found in sports and weight loss supplements: deterenol, phenpromethamine (Vonedrine), oxilofrine, octodrine, beta-methylphenylethylamine (BMPEA), 1,3-dimethylamylamine (1,3-DMAA), 1,4-dimethylamylamine (1,4-DMAA), 1,3-dimethylbu. *Clin Toxicol.* 2021;0(0):1-7. doi:10.1080/15563650.2021.1894333
13. Cohen PA, Travis JC, Keizers PHJ, Deuster P, Venhuis BJ. Four experimental stimulants found in sports and weight loss supplements: 2-amino-6-methylheptane (octodrine), 1,4-dimethylamylamine (1,4-DMAA), 1,3-dimethylamylamine (1,3-DMAA) and 1,3-dimethylbutylamine (1,3-DMBA). *Clin Toxicol.* 2018;56(6):421-426. doi:10.1080/15563650.2017.1398328
14. Cohen PA, Sharfstein J, Kamugisha A, Vanhee C. Analysis of Ingredients of Supplements in the National Institutes of Health Supplement Database Marketed as Containing a Novel Alternative to Anabolic Steroids. *JAMA Netw open.* 2020;3(4):e202818. doi:10.1001/jamanetworkopen.2020.2818
15. Abe AM, Hein DJ, Gregory PJ. Regulatory alerts for dietary supplements in Canada and the United States, 2005-13. *Am J Heal Pharm.* 2015;72(11):966-971. doi:10.2146/ajhp140574
16. Government of Canada. *Natural Health Products Regulations.*; 2004. <https://laws-lois.justice.gc.ca/eng/regulations/sor-2003-196/>

FOR MORE INFORMATION CONTACT:

KYLE T. GANSON PHD, MSW

ASSISTANT PROFESSOR, FACTOR-INWENTASH FACULTY OF SOCIAL WORK, UNIVERSITY OF TORONTO
OFFICE: #352 • PHONE: 416-978-6394 • EMAIL: KYLE.GANSON@UTORONTO.CA

nedic
National Eating Disorder
Information Centre



FACTOR-INWENTASH
FACULTY OF SOCIAL WORK
UNIVERSITY OF TORONTO