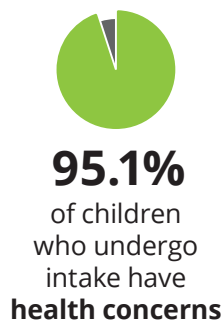
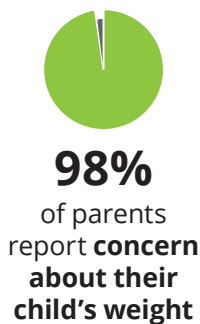


Program Impact

Reporting Period: April 1, 2022- March 31, 2024

1| Health Status at Intake

The majority of children were identified as having at least one co-occurring health condition.



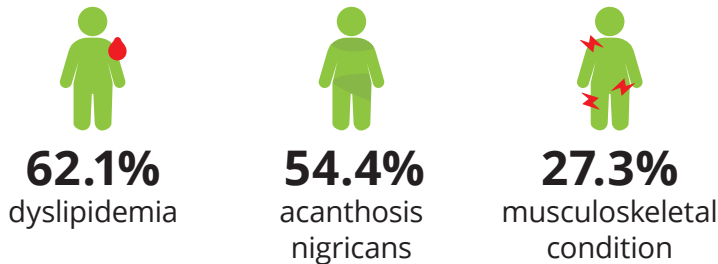
The Edmonton Obesity Staging System – Pediatric (EOSS-P) is a clinical staging tool that examines obesity-related co-morbidities. **At intake, 95.1% of children met criteria for Stage 1 or greater. Over half (53.9%) met criteria for Stage 2 or 3.**

EOSS-P staging (N = 258; being piloted at BC Children's Hospital and Fraser Health - English Program)

	Total	Metabolic	Mechanical	Mental	Milieu
Stage 0	2.7%	19.6%	50.5%	24.1%	32.1%
Stage 1	41.2%	58.2%	39.4%	45.8%	34.5%
Stage 2	47.3%	16.4%	8.7%	26.5%	27.7%
Stage 3	6.6%	1.1%	0.3%	2.0%	4.0%
Defer	0.0%	1.1%	0.3%	0.0%	0.0%
N/A	2.2%	3.6%	0.7%	1.6%	1.6%

Physical Health

The majority of children referred to Generation Health Clinic experience at least one co-morbidity. Of the different conditions assessed, the most common were:

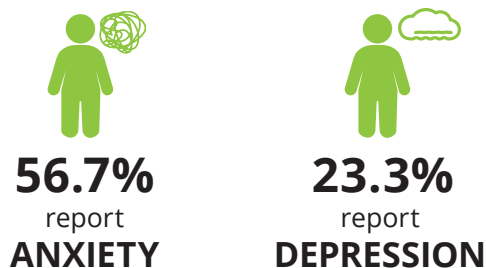


Co-Morbidity Type	Percentage
Dyslipidemia	62.1%
Acanthosis nigricans	54.4%
Musculoskeletal conditions	27.3%
Asthma	22.1%
Sleep-disordered breathing	23.1%
Liver Disease / MAFLD	22.9%
Hypertension	20.3%
Impaired fasting glucose	10.8%
PCOS	7.5%

At intake, children referred to Generation Health Clinic had a mean BMI z-score of 3.010 (SD = 1.758), a value greater than the 99.9th percentile. Systolic and diastolic blood pressure were approximately normal, at the 57.56th (SD = 27.95) and 55.74th (SD = 23.99) percentiles, respectively.

Mental Health

The majority of children attending intake reported psychosocial difficulties. Neurodevelopmental conditions were common, with prevalence approximately 3-5 times greater than base rates within the general population.



Psychosocial Type	Percentage
School difficulties	52.8%
Peer difficulties	53.0%
Teasing or bullying	54.5%
Depression	23.3%
Anxiety	56.7%
Intellectual disability	7.9%
Learning disability	14.7%
ADHD	22.1%
Autism spectrum disorder	10.4%

Note: Lifetime prevalence rates of neurodevelopmental and mental health conditions are estimated as follows. Depression: 14%; Anxiety: 27%; Intellectual disability: 1-3%; Learning disability: 2-10%; ADHD: 5-9%; ASD: 2%.

Beck Youth Inventories, Second Edition

The Beck Youth Inventories, Second Edition (BYI-2) is a validated self-report questionnaire that looks at mental health symptomatology in three domains: self-esteem, depression, and anxiety.

Overall, children attending Generation Health Clinic reported average (i.e., normative / non-clinical) scores relative to peers. **However, a notable minority of children reported low self-esteem, and elevated anxiety and depressive symptoms relative to peers.**



44.8%
elevated
DEPRESSION



41.9%
lower than average
SELF ESTEEM



30.6%
elevated
ANXIETY

	M (SD)	Interpretation	Notable Findings
Self-esteem	46.31 (9.63)	Average	41.9% report lower than average self-esteem
Anxiety symptoms	51.46 (11.99)	Average	30.6% report elevated anxiety symptoms
Depressive symptoms	49.64 (12.94)	Average	44.8% report elevated depressive symptoms

2| Pre-Post Program Changes

Between April 2022 and March 2023, 467 families attended group programming and 319 attended individual sessions.

As a short-term intervention (i.e., 10-week group; an average of 2.4 individual sessions), Generation Health Clinic does not expect children to experience significant changes in BMI and/or resolve chronic health conditions. Rather, our goal is to empower families to engage in healthy living behaviours.



Children who completed the group program reported improved mental health symptoms and improved quality of life.

Anthropometrics

At the group level, a significant overall reduction in BMI z-scores was observed between intake and post-group (0.179 reduction; $p = 0.01$, $d = 0.16$). The change from intake to pre-group, and from pre-group to post-group were small and not significant, suggestive that changes were occurring gradually.

Mental Health

Overall, children attending Generation Health Clinic reported improvement in mental health symptoms, as indicated by the BYI-2.



Change in BYI-2 symptom severity (N=663 intake, N=306 post-group, N=246 change scores)


	Intake, M (SD)	Post-Group, M (SD)	Change, M (SD), d*
Self-esteem	46.6 (9.7)	48.6 (10.1)	1.3 (8.2), 0.20**
Anxiety symptoms	51.8 (12.1)	48.7 (10.9)	-1.7 (10.8), 0.27*
Depressive symptoms	49.5 (12.7)	47.9 (11.8)	-0.36 (9.4), 0.13


Children who completed the group program reported improvements in self-esteem, and reductions in depressive and anxiety symptoms.

Pediatric Quality of Life Inventory

The Pediatric Quality of Life Inventory (PedsQL) is a brief measure of health-related quality of life in children and adolescents. Responses on the parent-report form indicate significant improvements in psychosocial quality of life (including emotional and social quality of life) and overall quality of life (4.4 point increase).



	Intake, M (SD)	Post-Group, M (SD)	Change, M (SD), d*
 Child Self-Report (N=362 pre-group, N=284 post-group; N=242 change scores)			
Physical QOL	71.4 (17.3)	73.9 (16.7)	3.5 (14.6), 0.21*
Psychosocial QOL	67.3 (17.1)	68.0 (16.2)	1.3 (13.5), 0.08
• Emotional QOL	63.6 (21.0)	65.6 (20.2)	1.9 (19.5), 0.09
• Social QOL	72.6 (21.3)	79.5 (20.1)	2.8 (16.9), 0.13
• Academic QOL	66.1 (19.9)	65.3 (19.8)	-1.9 (18.9), 0.08
Total QOL	70.1 (15.9)	70.1 (15.0)	1.7 (12.2), 0.12

	Intake, M (SD)	Post-Group, M (SD)	Change, M (SD), d*
 Parent Report (N = 362 at intake, N = 294 at post-group; N = 284 change scores)			
Physical QOL	63.5 (29.1)	67.6 (19.5)	3.5 (30.8), 0.14
Psychosocial QOL	63.3 (16.5)	67.9 (16.0)	4.0 (14.5), 0.25**
• Emotional QOL	60.6 (19.9)	66.4 (18.4)	4.2 (17.9), 0.21*
• Social QOL	66.3 (22.1)	70.4 (20.6)	4.9 (20.4), 0.23*
• Academic QOL	63.1 (20.0)	66.9 (18.4)	2.9 (18.9), 0.15
Total QOL	62.8 (16.2)	67.5 (15.7)	4.4 (14.2), 0.27**

The PedsQL is scored on a 0 to 100 scale, with higher scores indicating higher quality of life.

* p < 0.05, ** p < 0.01, *** p < 0.001

Engagement in Healthy Living Behaviours

The 10-week group program aims to promote four healthy living behaviours: (1) balanced, nutritious eating, (2) regular engagement in physical activity, (3) sufficient, consistent, and good quality sleep, and (4) reduced sedentary behaviour and screen time.

Self-report questionnaires completed at intake and post-group indicate improvements in many healthy living indicators, including:

- Fruit and vegetable consumption
- Eating breakfast
- Meals eaten outside of the house (e.g., restaurants, take-out)
- Engagement in moderate-to-vigorous physical activity (MVPA)
- Using screens when eating meals
- Weekday screen time use in excess of national guidelines


Nutrition

Children reported greater consumption of fruits & vegetables post-group (3 additional servings per day). There was a small decline in sugar sweetened beverages, primarily accounted for by reduced frequency of beverage consumption (2.7 times/week reduced to 2.1 times/week).


↓ **decline**
consumption
SUGAR SWEETENED BEVERAGES



↑ **3 servings**
increase per day
VEGETABLES & FRUITS

Pre-post nutrition indicators (N = 199 pre-group; N = 80 post-group)

	Outcome	Intake	Post-Group
	Fruits & vegetables, servings / day (M, SD)	5.8 (4.1)	9.0 (5.9)
	Sugar sweetened beverages, days / week (M, SD)	2.7 (2.1)	2.1 (1.8)
	Sugar sweetened beverages, cups / day (M, SD)	1.5 (1.2)	1.4 (1.4)
	Sugar sweetened beverages, servings / week (M, SD)	2.6 (5.6)	2.4 (4.1)

Eating Behaviours

Pre-post eating behaviour indicators (N = 199 pre-group; N = 80 post-group)

	Outcome	Intake	Post-Group
	Breakfasts / week (M, SD)	5.3 (2.2)	5.5 (2.0)
	Proportion reporting > 2 breakfasts / week	81.8%	87.8%
	Family meals / week (M, SD)	5.3 (2.2)	5.1 (2.4)
	Proportion reporting < 2 family meals	84.4%	81.1%
	Times eating out of the home / week (M, SD)	2.5 (1.7)	2.3 (1.7)
	Proportion reporting > 3 meals out of the home	44.7%	33.8%


There was a small increase in the proportion of children reporting eating breakfast per week and a 10% absolute decline in families eating > 3 meals out of the house.


↑ breakfast
increase per week


↓ dining out
decrease per week


Physical Activity

Pre-post physical activity indicators (N = 199 pre-group; N = 80 post-group)

	Outcome	Intake	Post-Group
	Proportion reporting any level of MVPA	72.7%	80.3%
	MVPA days per week (M, SD)	3.8	3.8
	MVPA minutes per day (M, SD)	43.7 (14.6)	41.5 (15.0)
	MVPA minutes per week (M, SD)	172.5 (103.4)	164.8 (96.7)
	Proportion reporting > 420 min MVPA / week	3.5%	1.7%
	Proportion reporting family physical activity	49.2%	49.3%


Screen Time

Pre-post screen time indicators (N = 199 pre-group; N = 80 post-group)

	Outcome	Intake	Post-Group
	Proportion endorsing eating meals with screens	70.1%	63.2%
	Weekday hours of screen time (M, SD)	3.9 (2.5)	4.2 (2.8)
	Proportion reporting > 2 hours / weekday	76.0%	74.7%
	Weekend hours of screen time (M, SD)	5.0 (2.8)	5.1 (3.0)
	Proportion reporting > 2 hours / weekend day	85.6%	85.3%
	Proportion reporting screens in bedroom	64.4%	71.6%

Sleep


Pre-post sleep indicators (N = 199 pre-group; N = 80 post-group)

	Outcome	Intake	Post-Group
	Average hours of sleep / night (M, SD)	9:35 (2:14)	9:18 (1:26)
	Reporting < 9 hours sleep / night	35.8%	50.0%
	Proportion reporting consistent bedtime*	72.1%	76.1%
	Proportion reporting sleep quality > 4/5	12.1%	13.0%
	Proportion reporting daytime fatigue > 3/5	82.1%	73.9%

* Within a margin of approximately 30 minutes

Confidence

Pre-post motivational indicators (N = 199 pre-group; N = 80 post-group)

	Outcome	Intake	Post-Group
	Importance of making healthy changes (M, SD)	8.1 (2.02)	8.3 (1.7)
	Proportion reporting > 7/10 importance	82.4%	90.3%
	Confidence to make healthy changes (M, SD)	6.5 (2.4)	6.6 (2.6)
	Proportion reporting > 7/10 confidence	51.7%	54.9%