GLA:D™ Canada Implementation and Outcomes

2019 Annual Report

GLA:D™ CANADA

GLA:D™ Canada Project Team

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Acknowledgements

GLA:D™ Canada is licensed to the Canadian Orthopaedic Foundation (COF) with implementation under Bone and Joint Canada, the knowledge translation division of the COF. Details of the program can be found at https://gladcanada.ca/

Executive Summary

Implementation status

GLA:D™ Canada, is a community-based education and exercise program for people with hip and knee osteoarthritis (OA) that has been implemented across Canada. Since its inception:

- 25 training courses for Health Care Providers (HCPs) were conducted, and 209 sites were actively implementing the GLA:D® program across 9 provinces and one territory.
- 3,803 people with hip (n=1,601) and knee (n= 2,774) OA have contributed data to the GLA:D outcomes registry as part of their participation in GLA:D.

Improved Participant Outcomes at 3- and 12- Month Follow

- Pain improved significantly from baseline to 3 months ($p<0.001$), and from baseline to 12 months ($p<0.001$) for both hip and knee groups across three pain outcome measures.
- Most participants reported a clinically meaningful improvement in pain from participating in the GLA:D® program.

Completed Surveys (n=2,734)	**3-month follow-up (n=1,912)**		**12-month follow-up (n=822)**	
	Hip (n=527	**Knee (n=1,385)**	**Hip (n=248)**	**Knee (n=574)**
15% to 29% improvement in pain	13.5%	11.8%	10.1%	8.9%
≥30% improvement in pain and/or zero pain	40.4%	48.7%	44.4%	47.6%

** differences measured from baseline using the numeric pain rating (NPR).*

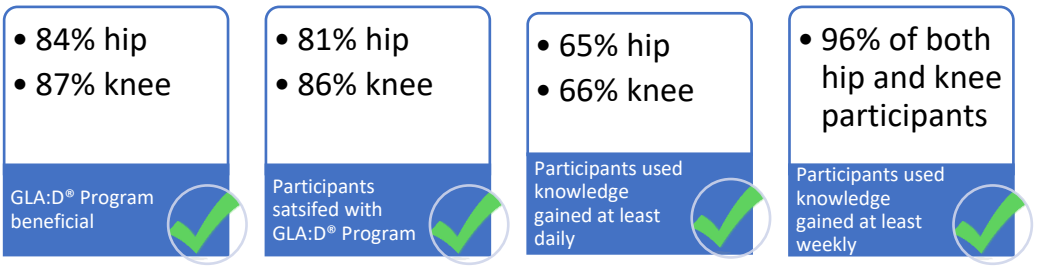
- Marked decreases were seen in the proportions of patients reporting that they were afraid of damaging their joint at the 3-month follow-up, with 47% and 50% reductions for hip and knee patients, respectively.
- Patients experienced significant improvements in their functional abilities as demonstrated by their 30-second sit to stand test, and the 40-meter walk test ($p<0.001$).

High Participation Rates

- Participation was high with 79% of participants attending 2 or more education sessions, and 81% attending 11 or more exercise sessions.

Participant Benefits and Satisfaction with the GLA:D® Program

- Most participants found the program beneficial and were satisfied or very satisfied with it.



Based on program implementation by clinical sites and participant outcomes to date, the GLA:D® program is successfully supporting people with hip and knee OA to manage their symptoms and improve their function and quality of life.


GLAiD

Table of Contents

List of Tables and Figures

What is GLA:D™ Canada?

Good**L**ife with osteo**A**rthritis in **D**enmark (GLA:D®)[i] is:

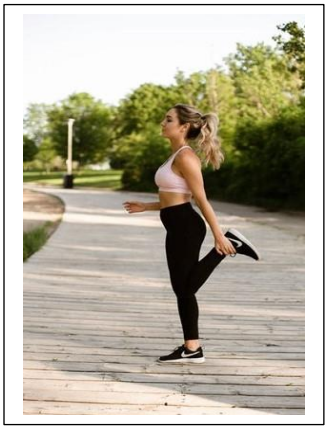
- a supervised, evidence-based education and personalized, targeted exercise program for people with symptomatic hip and or knee osteoarthritis (OA).
- aligned with the international guidelines for the management of hip and knee osteoarthritis[ii,iii].
- a non-profit initiative developed at the University of Southern Denmark.
- licensed for implementation in Canada through the Canadian Orthopaedic Foundation (COF) and implemented under its knowledge translation division, Bone and Joint Canada (BJC)[iv].
- branded as GLA:D™ Canada for sites to implement across Canada (referenced as GLA:D throughout this report)
- overseen by a leadership team with input from leaders from each of the provinces where the program is implemented, as well as from organizations with a mandate for OA education and exercise.

The Key to Successfully Managing Osteoarthritis of the Hip and Knee
EDUCATION AND EXERCISE

Three Elements of the GLA:D® Program

One: Health Care Provider Certification

- Health Care Providers (HCPs) are certified by attending a 1.5-day course that includes lectures as well as exercise instruction and practice.
- The training is appropriate for HCPs whose scope of practice includes the management of` people with hip and knee OA through education and exercise (e.g. physiotherapists, chiropractors, regulated kinesiologists, exercise physiologists).
- The courses are standardized and provided by trained HCPs who are knowledgeable of the evidence for OA management and therapists with expertise in exercise, neuromuscular exercise and delivery including 4 researchers and 12 clinical staff across Canada.
- The course includes:
  - current evidence on OA and its management.
  - introduction to the GLA:D® program and an overview of outcomes to date.
  - instructions on the GLA:D protocols, including delivering patient education, supervising and instructing exercise based on neuromuscular principles[v,vi] training on data entry into the electronic registry.
  - access to a digital 'tool box' with implementation support materials. (e.g. power point presentations for use in patient education, etc.).
- HCPs who successfully complete the GLA:D course are certified to provide the GLA:D® program to patients.



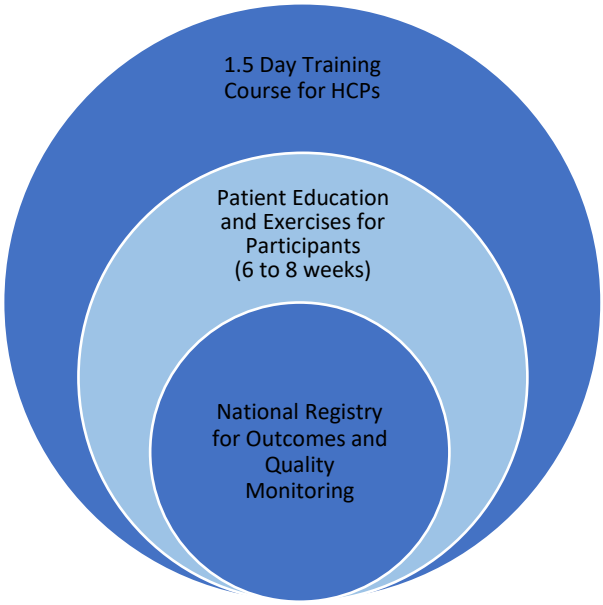
- **EDUCATION** about osteoarthritis and managing pain through exercise improves knowledge and confidence in managing OA symptoms and functional challenges.
- Reduced strength in the legs can increase osteoarthritis pain symptoms.
- Maintaining a level of physical activity through **EXERCISE** reduces pain and fear of movement, increases motivation to exercise and be physically active, and improves one's quality of life.

Two: Patient Education and Exercises

- Patients attending the GLA:D® program participate in 2 or 3 education sessions, and 12 sessions of supervised and individualized exercise.
- Patients are strongly encouraged to participate in the group-based **NE**uro**M**uscular **EX**ercise program **(NEMEX)** for the 12 sessions as a group format enhances motivation and learning with peer-support[v,vi].
- The patient education and exercise program are delivered over a 6-to-8 week period and the delivery processes are organized by each site optimizing logistics for the site and their patient population.

Three: Quality Monitoring

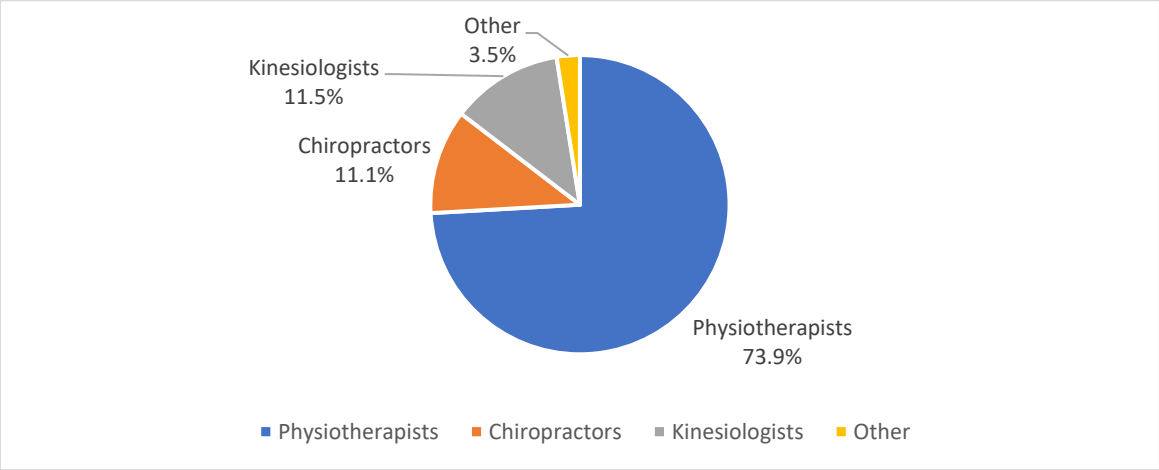
- Data from pre-program (baseline), 3- and 12-month follow-up are input into the national electronic GLA:D registry.
- Data include patient-reported, validated outcome measures and functional tests.
- The registry is designed to evaluate pain, function, quality of life as well as other outcomes at 3 and at 12-month follow-up.
- Additional activity is undertaken to ensure the quality for the GLA:D® program including:
  - Opportunity for patients to offer feedback to the GLA:D National team through the website and directly.
  - Clinic reviews to address any identified patient concerns.



GLA:D™ Canada Implementation – 2016-2019

- A total of 25 training courses were held through 2016 to the end of 2019 with 14 in Ontario, 3 in BC, 4 in Alberta, 2 in Nova Scotia and 1 each in Manitoba, New Brunswick Newfoundland.
- In total, 1080 HCPs were trained in the GLA:D program nationally.
- The majority were physiotherapists (73.9%); 11.1% were chiropractors and 11.5% were kinesiologists.
- Course evaluation data indicated that 80% of HCPs felt ready to deliver the GLA:D program by the conclusion of the course, and 98% felt confident in providing instruction on alignment and exercise based on neuromuscular principles.
- 97% were confident in their ability to answer GLA:D participants' questions.

GLA:D Certified HCPs Trained in Canada 2016-2019 (n= 1,046)

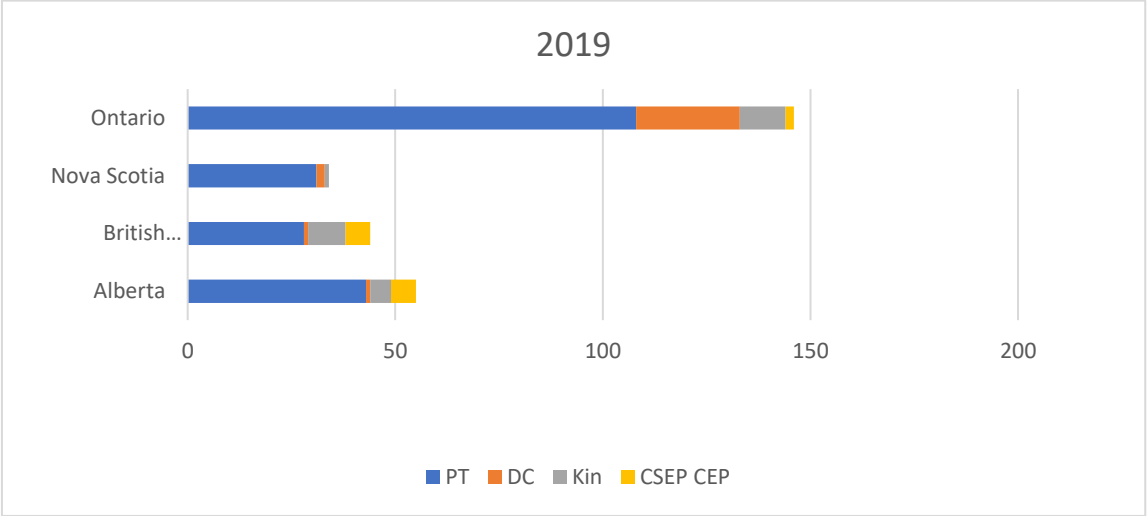


Number and Type of Health of Care Providers Completing GLA:D HCP Training by Province for 2019

Year	Cities in Ontario	No. of HCPs Trained for GLA:D®	PT	DC	Kin	CSEP CEP	CAT	Nurse	NSCA	Other
2019	**Alberta**									
	Edmonton Oct 26-27, 2019	55	43	1	5	6	--	--	--	--
	British Columbia									
	Richmond Jun 22-23, 2019	44	28	1	9	6	--	--	--	--
	Nova Scotia									
	Halifax Dec 7-8, 2019	34	31	2	1	--	--	--	--	--
	Ontario									
	Toronto Jan 26-27, 2019	83	57	19	5	1	--	--	--	1
	Toronto Sept 14-15, 2019	52	39	8	5	--	--	--	--	--
	Ottawa Jun 8-9, 2019	52	40	4	7	1	--	--	--	--
	TOTALS	**320**	**238** (74%)	**35** (11%)	**33** (10%)	**14** (0.05%)				**1**

CSEP CEP=Canadian Society of Exercise Physiology – Certified Exercise Physiologist; DC=Chiropractor; Kin=Kinesiologist; NSCA= National Strength and Conditioning Association – Certified Personal Trainer; PT=Physiotherapist.

Type of HCPs Completing GLA:D Certification by Province 2019

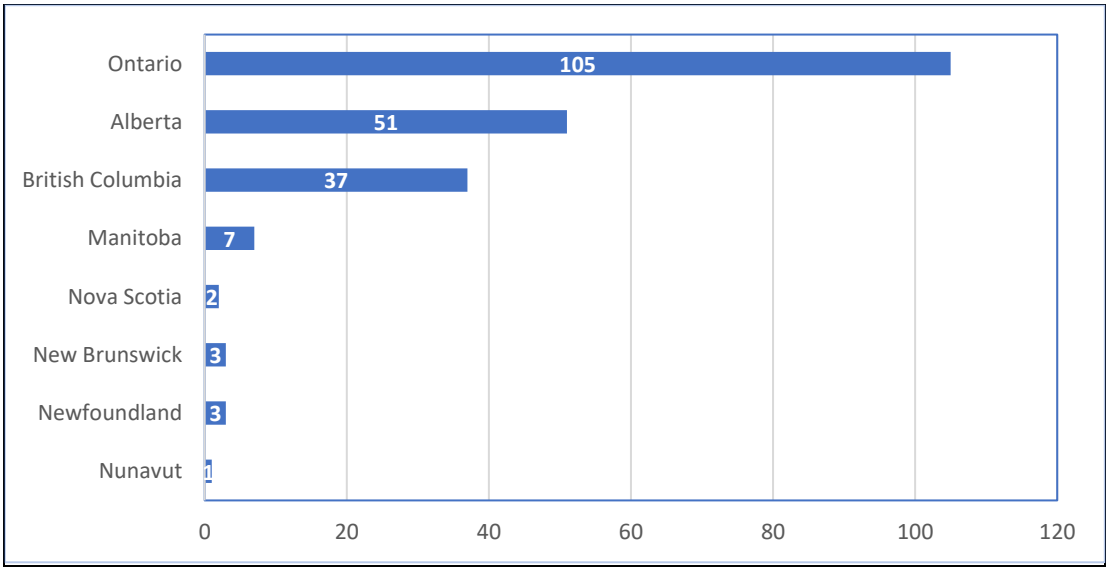


CSEP CEP=Canadian Society of Exercise Physiology – Certified Exercise Physiologist., DC=Chiropractor; Kin=Kinesiologist; PT=Physiotherapist.

GLA:D Sites Launched

- By the end of 2019, 209 sites in 9 provinces and one territory had implemented or were in the process of implementing the program.
- The majority of sites providing GLA:D in Canada are in Ontario, Alberta and British Columbia.
- GLA:D® sites are supported by the GLA:D™ Canada National team through email, phone calls and meetings with the GLA:D clinicians as well as the individuals who are in a management position and who have the authority and oversight of the quality of the program within the organization.

The Number of GLA:D™ Canada Sites Across Canada (n=209)



Patient Participation and Satisfaction

Program Participation Rates

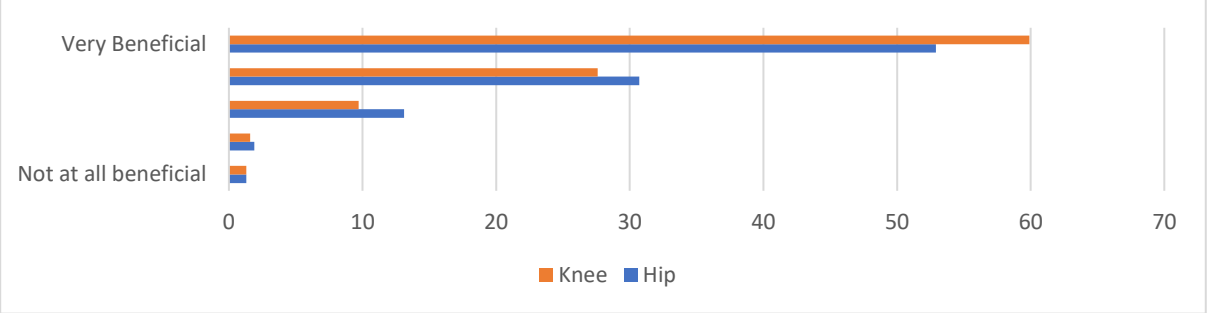
GLA:D program participation rates are high, with the large majority of patients attending almost all sessions:

- 71% attended 2 or more education sessions (2 sessions are required with an optional session offered in some sites).
- 81% attended 11 or more sessions (12 sessions offered in total).

Rates of Perceived Benefit from GLA:D

84% hip participants and 87% of knee participants found the GLA:D program to be beneficial or very beneficial.

How much have participants benefited from the GLA:D® program? (n=527 hips; n=1385 knees)

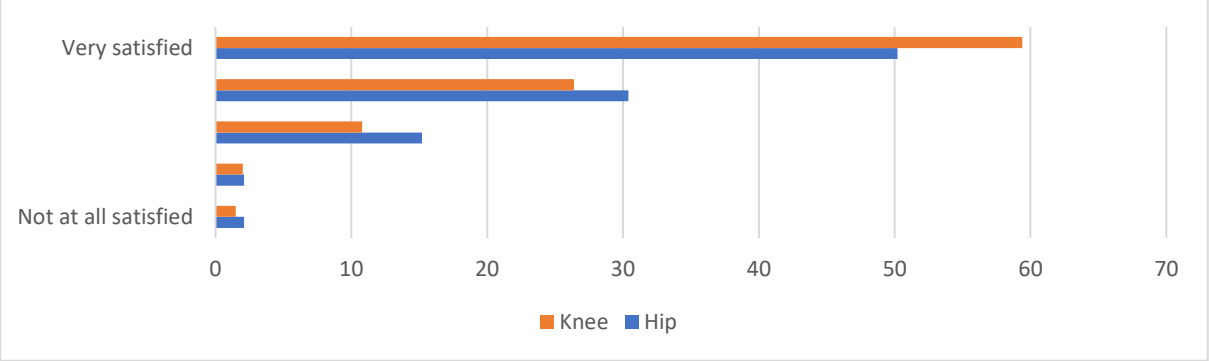


Reported benefits included: decreased joint pain, increased joint strength, improvements in balance, sleep quality, and energy levels.

Satisfaction Rates Following Participation in GLA:D

81% of hip participants and 86% of knee participants were satisfied or very satisfied with the GLA:D program.

How satisfied are participants with the outcome of the GLA:D program? (n=520 hips; n=1367 knees)

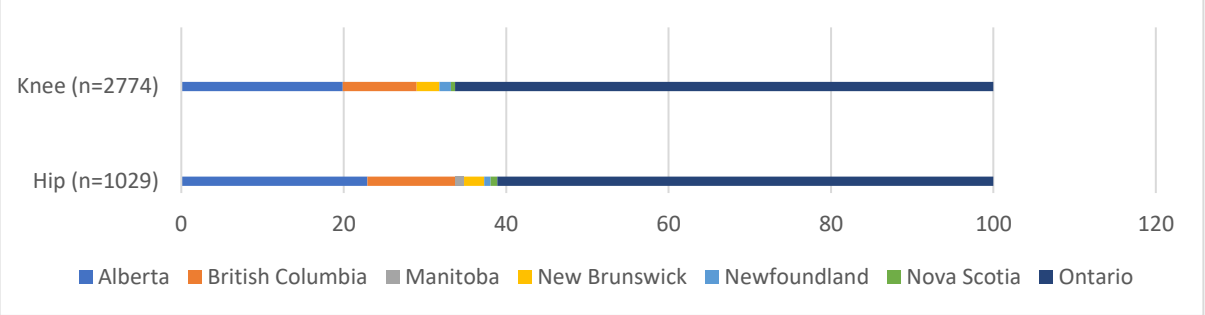


Participant Characteristics

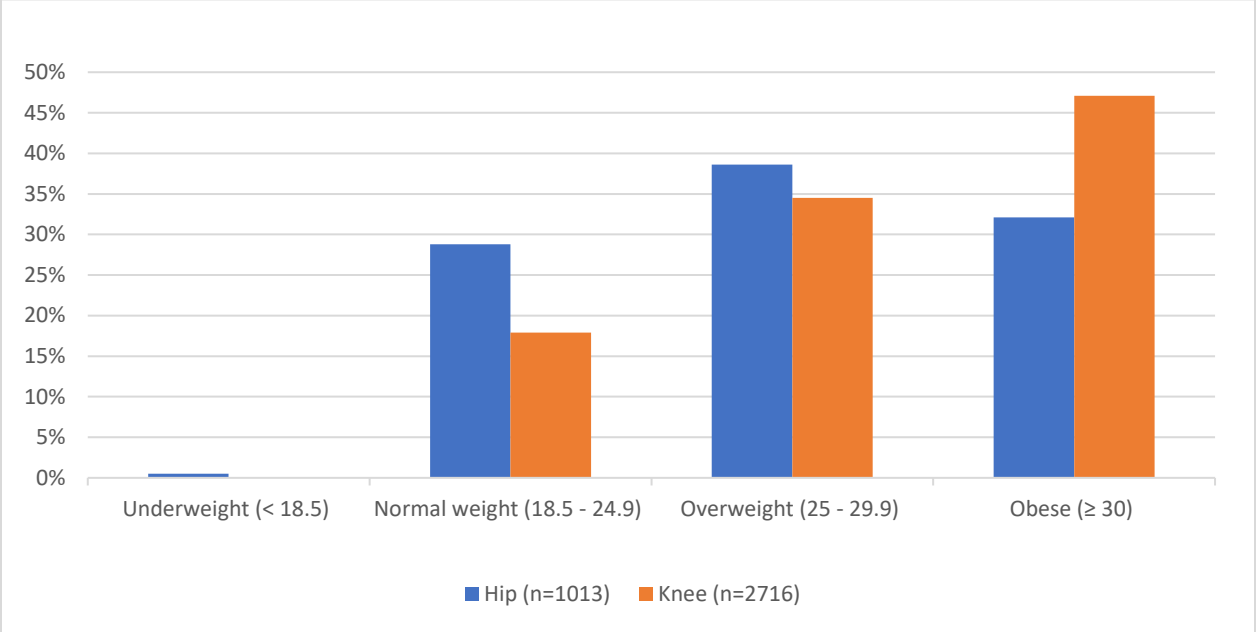
Characteristics of GLA:D Participants at Baseline Assessment

- By the end of December 2019, 3,803 participants had enrolled in the GLA:D Canada outcomes registry and provided information concerning their demographic characteristics and baseline clinical and functional status.
- These 3,803 GLA:D program participants are from 7 provinces: New Brunswick, Nova Scotia, Newfoundland, Manitoba, Ontario, Alberta, British Columbia.
- Of note, additional patients may have registered with and/or participated in a GLA:D program, but not provided data to the GLA:D outcomes registry. A primary aim of GLA:D Canada was to offer patients access to high quality, standardized, evidence-based OA care. Due to complexities associated with launching data collection in each province the GLA:D program was launched at some sites to meet patients' clinical needs prior to local implementation of the registry.

National Distribution of GLA:D® Program Participants (n=3803)



- Appendix 2 summarizes the baseline characteristics of GLA:D participants.
- Of the 3,803 participants with baseline data in the registry, 1,029 (27%) reported the hip being their most problematic joint, while 2,774 (73%) reported that their knee was most problematic.
- Most participants were female in both groups (74% female vs. male 27% in the hip group, and 76% female vs. 24% male in the knee group).
- The mean age was similar in both the hip and knee groups: 65 (±9) years.
- Overall, in both the hip and knee groups, approximately 60% were retired and 3% were on leave receiving sick benefits.



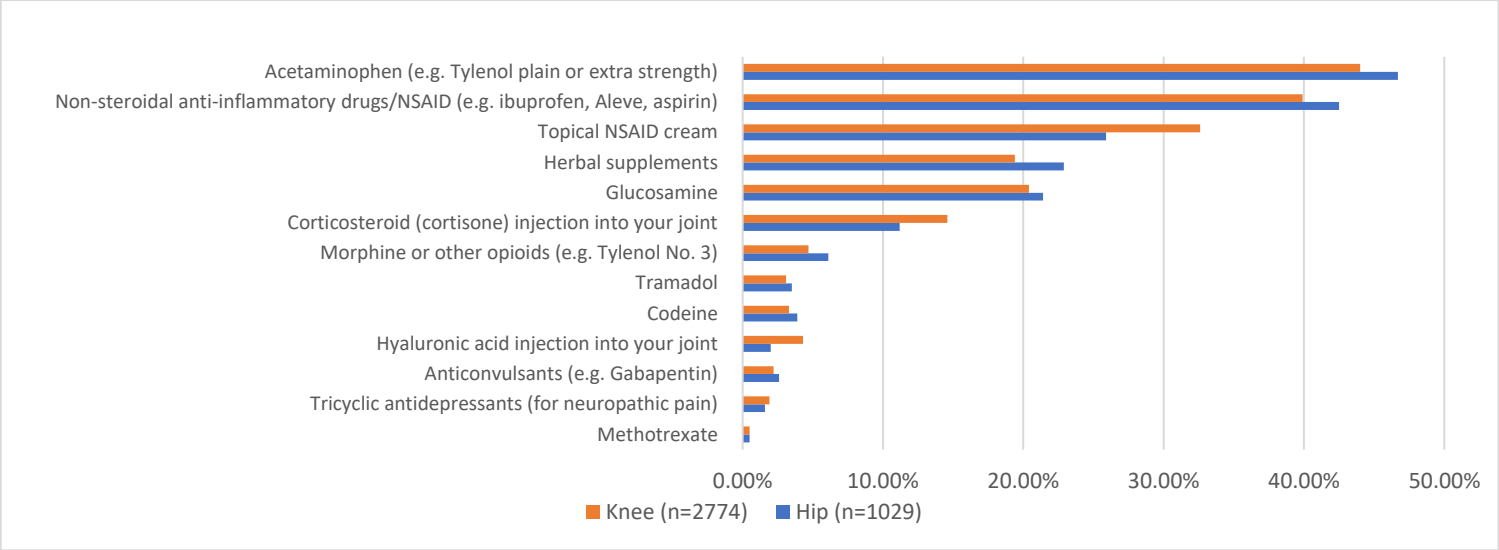
- The majority of participants were overweight or obese (70.7% in the hip group, and 81.6% in the knee group).
- Both groups had a mean BMI in the overweight category >25 kg/m^2. Hip patients on average had a BMI of 28.5 kg/m^2, whereas knee participants on average were overweight with a BMI of 30.6 kg/m^2.

Mean Duration of Symptoms in Affected Hip/Knee (in years) Prior to Enrollment in GLA:D

- Hip Group (n=1,018) = 4.5 years
- Knee Group (n=2,731) = 6.6 years

Medication Use at Baseline

- Acetaminophen was the most widely used medication at baseline assessment. Percent of GLA:D participants using medication at baseline (in the last 3 months).



Clinical and Functional Outcomes

Participant Outcomes at 3- and 12-Month Follow-Up

Decreased Pain

- Patient-reported pain was assessed using:
    - The numeric pain rating scale (NPRS[vii]).
    - The Hip Disability and Osteoarthritis Outcome Score (HOOS)[viii] – Pain Subscale.
    - The Knee Injury and Osteoarthritis Outcome Score (KOOS)[ix] – Pain Subscale.
- Pain improved significantly from baseline to 3 months ($p<0.001$), and from baseline to 12 months ($p<0.001$) for both hip and knee groups across all three outcome measures.

Mean Percent Improvement in Pain from Baseline

Measure	Group	Follow-up time	N	Mean percent improvement from baseline	p value (FDR-adjusted)
Numeric pain rating	Hip	3 months	527	19.6%	<0.001 (<0.001)
		12 months	248	22.9%	<0.001 (<0.001)
	Knee	3 months	1385	29.4%	<0.001 (<0.001)
		12 months	574	26.0%	<0.001 (<0.001)
HOOS - Pain subscale	Hip	3 months	526	12.3%	<0.001 (<0.001)
		12 months	248	18.9%	<0.001 (<0.001)
KOOS - Pain subscale	Knee	3 months	1386	13.4%	<0.001 (<0.001)
		12 months	574	16.5%	<0.001 (<0.001)

Paired hypothesis tests (paired t-test, McNemar's chi-square test, or paired Wilcoxon signed-rank test as appropriate) were used to compare initial versus outcome values. Given the large number of comparisons, p-values adjusted for false discovery rate are presented along with the actual p-values. FDR= False discovery rate (p-value correction for multiple comparisons).

- Most participants reported a clinically meaningful improvement in pain from participating in the GLA:D program.

Proportion of Participants with Clinically Meaningful Improvement in Pain

Completed Surveys (n=2,734)	3-month follow-up (n=1,912)		12-month follow-up (n=822)	
	Hip (n=527)	Knee (n=1,385)	Hip (n=248)	Knee (n=574)
15% to 29% improvement in pain	13.5%	11.8%	10.1%	8.9%
≥30% improvement in pain and/or zero pain	40.4%	48.7%	44.4%	47.6%

** differences measured from baseline using the numeric pain rating (NPR).*

Improved Quality of Life, Activities of Daily Living, and Sports/Recreation

- Patient-reported quality of life was assessed using the HOOS/KOOS subscales for Quality of Life.
- All three HOOS/KOOS subscale outcomes showed improvements from baseline to 3 months ($p<0.01$), and from baseline to 12 months ($p<0.05$) for both hip and knee groups.

Mean Percent Improvement in Quality of Life from Baseline

HOOS/KOOS Subscales	Group	Follow-up time	N	Mean percent improvement from baseline	p value (FDR-adjusted)
Quality of Life	Hip	3 months	526	17.2%	<0.001 (<0.001)
		12 months	247	27.4%	<0.001 (<0.001)
	Knee	3 months	1386	24.1%	<0.001 (<0.001)
		12 months	574	31.5%	<0.001 (<0.001)

Paired hypothesis tests (paired t-test, McNemar's chi-square test, or paired Wilcoxon signed-rank test as appropriate) were used to compare initial versus outcome values. Given the large number of comparisons, p-values adjusted for false discovery rate are presented along with the actual p-values. FDR= False discovery rate (p-value correction for multiple comparisons).

- Most participants in the GLA:D program reported modest or marked improvements in their quality of life at the 3-month and 12-month follow-up.

Proportion of Participants with Clinically Meaningful Improvement in Quality of Life

HOOS/KOOS Scores		Hip		Knee	
		3 months	12 months	3 months	12 months
Quality of Life	No change or worsened	45.1% (237)	35.6% (88)	36.4% (504)	35.5% (204)
	Negligible improvement (0.1 - 4.9 points)	0.6% (3)	0.0% (0)	0.3% (4)	0.2% (1)
	Possible Improvement (5 - 9.9 points)	16.3% (86)	14.6% (36)	-17.1% (237)	11.0% (63)
	Clinically important improvement (≥ 10 points and/or perfect score)	38.0% (200)	49.8% (123)	46.2% (641)	53.3% (306)

Reduced Use of Pain Medications in the Knee Group

- Hip participants reported no significant changes from baseline in use of any medications, either at 3 months or 12 months after enrollment.
- In contrast, 12 months after enrollment, knee participants were significantly less likely to report using any pain medications in the prior three months compared to their baseline use.
- Knee patients also reported significantly less use of intra-articular injections in the prior three months at both 3- and 12-months post-enrollment, as compared to baseline (42% reduction at 3 months, 46% reduction at 12 months, both p<0.001).

Improved Function

- Patients demonstrated significant improvements from their first session to their last session in:
  - the number of times they can sit to stands from a chair in 30 seconds; and
  - walking speed using the 40-meter walk test.
- Neither hip nor knee patients reported significant changes in the days they were physically active per week, either at 3 months or 12 months post follow-up.

The Impact of GLA:D on Functional Test Results

	Hip (n=399)			Knee (n=1078)		
	Baseline	At completion	Change from initial status: 95%CI	Baseline	At completion	Change from initial status (percent)
30-second chair stand: Mean number of stands	12.5 ± 4.9	15.8 ± 6.6	2.8, 3.8 (<0.001)	12.3 ± 5.6	16.2 ± 6.6	3.6, 4.2 (<0.001)
40m walk test: speed in m/s	1.3 ± 0.3	1.4 ± 0.4	0.09, 0.15 (<0.001)	1.3 ± 0.3	1.4 ± 0.4	0.14, 0.18 (<0.001)

- Clinically important improvements (≥ 2 stands) in the 30-second chair stand were reported by 65% of hip patients and 73% of knee patients.
- Clinically important improvements (≥ 0.2 m/s) in the 40m walk test were reported by 38% of hip patients and 39% of knee patients.

Fear of Damaging Joint

- Marked decreases were seen in the proportions of patients reporting that they were afraid of damaging their joint at the 3-month follow-up, with 46% and 48% reductions for hip and knee patients, respectively.

Self-Efficacy and Patient Use of Knowledge Gained from GLA:D

- Hip and knee participants demonstrated significant improvement in mean self-efficacy scores, at both 3- and 12-month follow-up periods compared to baseline, suggesting an increased level of confidence in managing their arthritis symptoms.

  Hip

  3 months (n=524): 6.3 vs 6.0 points (0.15-0.49; p<0.001)

  12 months (n=246): 6.4 vs 6.0 points (0.12-0.66; p<0.001)

  Knee

  3 months (n=1383): 6.7 vs 6.3 points (0.34-0.53; p<0.001)

  12 months (n=574): 6.9 vs 6.4 points (0.29-0.61; p<0.001)

- At three months, the majority of participants reported that they were using knowledge gained from the program at least daily (66% of hip participants and 65% of knee participants); the vast majority of both groups reported using knowledge from the program at least weekly (96% of both hip and knee participants).

Sustainability and Summary

Sustainability: Building Evidence and Supporting Spread

The GLA:D program has continued to grow throughout 2019 with:

- Additional sites being launched and an expediential increase in the number of patients attending the program.
- More than 130% growth in the number of participants contributing to the outcome registry.
- Registered clinics and trained HCPs in 9 provinces and one territory in Canada.
- French translation completed for launch in Quebec.
- The program is available through private funding (insurance and self-pay) and is being made available in some provinces through public sector funding.
- Increased awareness and promotion of GLA:D across Canada by MSK specialist physicians including orthopaedic surgeons and rheumatologists.
- There has been international expansion of GLA:D and the program is now available in 7 countries collecting the same data points. This allows for comparison of data between countries to support early identification of improvements in patient care.

Summary: GLA:D™ Canada at the End of 2019

- A total of 1080 HCPs from various professions had completed their GLA:D training, while 209 sites in 7 provinces and one territory were delivering the program to patients through a mix of public sector and private funding. Two additional provinces had registered sites and trained HCPs preparing to offer the program.

- Three thousand eight hundred and three participants were enrolled in the national registry contributing to our knowledge of the outcomes for individuals with OA and allowing for quality monitoring of the program.

- With three years of participant outcomes available for analysis in the registry, several key findings are emerging. These include:

    - **Reduction in Pain:** The majority of patients enrolled in GLA:D experienced meaningful improvement in their pain symptoms. This results in a decrease in medication use including joint injections for knee patients.

    - **Improved Quality of Life:** Significant improvements in quality of life measures are seen at both 3 and 12 months as compared to baseline, for both hip and knee groups.

    - **Improved Function:** A large majority of patients in both hip and knee groups demonstrated significant and clinically important improvements in objective physical function.

- The improvements in pain, quality of life and physical function seen with GLA:D in Canada and are reflective of the type and magnitude of the findings reported with GLA:D in Denmark[x].

- Based on program implementation by clinical sites and participant outcomes to date, the GLA:D program is successfully supporting people with hip and knee OA to manage their symptoms, improve their function and enhance their quality of life.

Appendix 1: GLA:D™ Canada Team Members

GLA:D™ Canada Leadership Team

Name	Position	Organization
Aileen Davis	Senior Scientist and Division Head	Division of Health Care and Outcomes Research Krembil Research Institute University Health Network, and Professor, University of Toronto, Toronto, Ontario
Rhona McGlasson	Executive Director	Bone and Joint Canada
Isla Horvath	Executive Director and Chief Executive Officer	Canadian Orthopaedic Foundation, Toronto, Ontario
Michael Zywiel	Orthopaedic Surgeon and Assistant Professor of Surgery	Division of Orthopaedic Surgery, Arthritis Program, University Health Network Department of Surgery, University of Toronto Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, Ontario
Christian Veillette	Orthopaedic Surgeon and Assistant Professor of Surgery	Division Head, Orthopaedic Surgery, Arthritis Program, University Health Network, Department of Surgery, University of Toronto, Toronto, Ontario
Kira Ellis	Provincial Osteoarthritis Practice Lead Bone and Joint Health Strategic Clinical Network	Alberta Health Services, Alberta
Nancy Cho	Practice Lead, Physiotherapy	Vancouver Coastal Health, Vancouver, British Columbia
Amy Wainwright	Physiotherapist	Sunnybrook Health Sciences Centre, Division of Physiatry, Physical Medicine and Rehabilitation, Toronto, Ontario
Jill Robert	Senior Provincial Director of Surgery and Bone & Joint Health Strategic Clinical Networks	Alberta Health Services, Alberta

GLA:D™ Canada National Quality Committee

Name	Position	Organization
Rhona McGlasson	Executive Director	Bone and Joint Canada
Mark Anunciacion	Physiotherapist	Holland Centre, Sunnybrook Health Sciences Centre, Toronto, Ontario
Craig Jacobs	Director, Clinical Education & Patient Care, Assistant Professor Clinical Education	Canadian Memorial Chiropractic College, Toronto, Ontario
Erin Puhalski	Staff Physiotherapist and Project Manager	St. Joseph's Care Group Thunder Bay, Ontario
Brian McGrath	Physiotherapist	Physiothérapie Bouctouche Physiotherapy Inc. New Brunswick
Allison Ezzat	Physiotherapist	North Shore Sports Medicine, Vancouver, British Columbia
Kira Ellis	Provincial Osteoarthritis Practice Lead Bone and Joint Health Strategic Clinical Network	Alberta Health Services, Alberta
Monica Clarke	Physiotherapist	Stittsville Sport Physio, Ottawa. Ontario
Mary Foley	Physiotherapist	Stittsville Sport Physio, Ottawa. Ontario
Leesha Buisman	Registered Kinesiologist	Headwaters Physiotherapy and Woodstock Physiotherapy Clinic, Orangeville, Ontario
Laura Lundquist	Registered International Sports Physical Therapist Advanced Diploma in Manual and Manipulative PT	Halifax, Nova Scotia
Kaeleigh Brown	Physiotherapist	Wildrose Physiotherapy, Yellowknife
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Appendix 2: Participant Characteristics and Outcomes

1. Patient-Reported Participation and Satisfaction Measures at 3-Month Follow-up

Measure	Category	Hip (N=528)	Knee (N=1393)
How much have you benefited from the GLA:D program?	1 - Not at all beneficial	1.3% (7)	1.3% (18)
	2	1.9% (10)	1.6% (22)
	3 – Neutral	13.1% (69)	9.7% (134)
	4	30.7% (162)	27.6% (382)
	5 - Very beneficial	52.9% (279)	59.9% (829)
	Not reported	— (1)	— (8)
How often do you use what you have learned from the GLA:D program in your daily life?	Never	2.1% (11)	1.9% (27)
	Every month	3.8% (20)	3.0% (42)
	Every week	30.6% (161)	33.8% (469)
	Every day	50.5% (266)	47.6% (660)
	Several times a day	9.5% (50)	9.5% (132)
	Don't know	3.6% (19)	4.0% (56)
	Not reported	— (1)	— (7)
How satisfied are you with the outcome of the GLA:D program?	1 - Not at all satisfied	2.1% (11)	1.5% (20)
	2	2.1% (11)	2.0% (27)
	3 – Neutral	15.2% (79)	10.8% (147)
	4	30.4% (158)	26.4% (361)
	5 - Very satisfied	50.2% (261)	59.4% (812)
	Not reported	— (8)	— (26)

Source: GLA:D™ Canada website.

2. Baseline Characteristics of GLA:D Participants (n= 3803)

Measure	Category	Hip (N=1029)	Knee (N=2774)
Demographics			
Province	Alberta	22.9% (236)	19.9% (551)
	British Columbia	10.8% (111)	9.1% (253)
	Manitoba	1.1% (11)	0.0% (0)
	New Brunswick	2.5% (26)	2.8% (78)
	Newfoundland	0.8% (8)	1.4% (38)
	Nova Scotia	0.8% (8)	0.5% (15)
	Ontario	61.1% (629)	66.3% (1839)
Year of enrollment	2016	0.1% (1)	0.0% (1)
	2017	13.1% (135)	10.3% (286)
	2018	32.8% (337)	31.1% (863)
	2019	54.0% (556)	58.5% (1624)
Gender	Female	73.5% (754)	76.4% (2112)
	Male	26.5% (272)	23.6% (653)
	Not reported	— (3)	— (9)
Age (y)	—	65.7 ± 9.0 (N = 1028)	65.3 ± 8.7 (N = 2769)
Age group	< 55	9.4% (97)	10.7% (296)
	55-64	34.3% (353)	34.1% (943)
	65-74	40.4% (415)	41.5% (1149)
	≥ 75	15.9% (163)	13.8% (381)
	Not reported	— (1)	— (5)
Marital status	Single	8.6% (88)	9.7% (267)
	Married	66.0% (678)	63.8% (1765)
	Common-law	5.3% (54)	4.7% (129)
	Living with partner	0.8% (8)	1.7% (46)
	Separated	1.7% (17)	2.7% (75)
	Divorced	9.0% (92)	8.6% (238)
	Widowed	8.8% (90)	8.9% (245)
	Not reported	— (2)	— (9)

Measure	Category	Hip (N=1029)	Knee (N=2774)
Highest education obtained	Some or completed elementary school	0.3% (3)	1.0% (28)
	Some or completed high school	14.9% (153)	15.1% (418)
	Some or completed trade or community college program	27.0% (278)	27.2% (753)
	Some or completed university	50.6% (520)	49.0% (1357)
	Other	7.2% (74)	7.7% (212)
	Not reported	— (1)	— (6)
Employment status	Working full-time	20.3% (207)	21.0% (578)
	Working part-time	9.6% (98)	8.8% (243)
	Not working, on benefits	3.0% (31)	2.9% (81)
	Not working, seeking work	1.1% (11)	1.4% (38)
	Retired	60.7% (619)	59.8% (1642)
	Homemaker	2.4% (24)	2.8% (77)
	Other	2.8% (29)	3.2% (88)
	Not reported	— (10)	— (27)
Health factors			
Smoking status	No	95.4% (981)	96.3% (2668)
	Yes	4.6% (47)	3.7% (102)
	Not reported	— (1)	— (4)
Body-mass index (BMI, kg/m²)	—	28.5 ± 6.1 (N = 1013)	30.6 ± 6.6 (N = 2716)
BMI category	Underweight (< 18.5)	0.5% (5)	0.6% (16)
	Normal weight (18.5 - 24.9)	28.8% (292)	17.9% (485)
	Overweight (25 - 29.9)	38.6% (391)	34.5% (936)
	Obese (≥ 30)	32.1% (325)	47.1% (1279)
	Not reported	— (16)	— (58)
Number of comorbid conditions (excluding osteoarthritis)	None	23.8% (245)	21.1% (586)
	1	30.5% (314)	29.1% (806)
	2	21.2% (218)	22.0% (611)
	3	14.7% (151)	15.6% (432)
	4 or more	9.8% (101)	12.2% (339)
Congestive heart failure	Yes	2.1% (21)	1.7% (48)
	Not reported	— (5)	— (13)
Heart attack (myocardial infarction)	Yes	3.1% (32)	2.9% (79)
	Not reported	— (3)	— (13)
High blood pressure	Yes	35.3% (363)	41.0% (1135)
	Not reported	— (2)	— (4)

Measure	Category	Hip (N=1029)	Knee (N=2774)
High cholesterol	Yes	25.3% (260)	29.8% (826)
	Not reported	— (2)	— (5)
Stroke or cerebrovascular accident	Yes	2.2% (23)	1.7% (46)
	Not reported	— (0)	— (12)
Asthma or chronic lung disease	Yes	9.3% (96)	10.6% (295)
	Not reported	— (1)	— (4)
Diabetes	Yes	7.8% (80)	9.9% (273)
	Not reported	— (3)	— (3)
Kidney disease	Yes	1.1% (11)	1.2% (32)
	Not reported	— (1)	— (7)
Liver disease	Yes	0.5% (5)	0.8% (22)
	Not reported	— (3)	— (6)
Anaemia or other blood disease	Yes	2.3% (24)	3.2% (89)
	Not reported	— (1)	— (4)
Stomach/intestinal ulcers	Yes	2.1% (22)	2.9% (81)
	Not reported	— (1)	— (9)
Depression	Yes	12.6% (129)	14.2% (394)
	Not reported	— (2)	— (9)
Cancer (excluding skin cancer)	Yes	3.7% (38)	4.4% (122)
	Not reported	— (4)	— (6)
Lower back pain	Yes	25.0% (257)	19.4% (536)
	Not reported	— (3)	— (13)
History of hip/knee symptoms			
Duration of symptoms in affected hip/knee (years)	—	4.5 ± 6.3 (N = 1018)	6.6 ± 8.1 (N = 2731)
Categorized duration of symptoms (years)	Less than 1	15.0% (153)	13.3% (364)
	1 to 1.9	17.4% (177)	12.9% (351)
	2 to 4.9	37.9% (386)	28.6% (782)
	5 to 9.9	16.8% (171)	18.8% (514)
	10 or more	12.9% (131)	26.4% (720)
	Not reported	— (11)	— (43)
Previous injury to affected hip/knee	No	87.7% (902)	57.0% (1575)
	Yes	12.3% (126)	43.0% (1188)
	Not reported	— (1)	— (11)
Are you so troubled by your hip/knee problems that you want surgery?	No	66.1% (672)	71.8% (1970)
	Yes	33.9% (345)	28.2% (772)

Measure	Category	Hip (N=1029)	Knee (N=2774)
	Not reported	— (12)	— (32)
Previous surgery on affected joint			
Have you had surgery on your hip/knee?	No	94.4% (966)	77.1% (2126)
	Yes	5.6% (57)	22.9% (632)
	Not reported	— (6)	— (16)
Specify surgery type (all that apply):	Joint replacement	3.9% (40)	2.5% (70)
	Arthroscopic procedure	0.8% (8)	17.6% (486)
	Other surgery	1.4% (14)	5.9% (163)
	Not reported	— (6)	— (15)
Physical activity			
Are you afraid that your joints will be damaged from physical activity and exercise?	No	77.2% (793)	68.8% (1896)
	Yes	22.8% (234)	31.2% (860)
	Not reported	— (2)	— (18)
In a typical week, how many days have you been physically active at least 30 minutes per day?	None	6.9% (71)	8.1% (224)
	1 to 3	31.9% (328)	31.7% (879)
	4 to 6	38.5% (395)	37.5% (1037)
	7	22.7% (233)	22.7% (629)
	Not reported	— (2)	— (5)
Medications			
Have you taken any medications including herbal or dietary supplements for your hip/knee in the last 3 months?	No	29.6% (303)	31.7% (874)
	Yes	70.4% (719)	68.3% (1884)
	Not reported	— (7)	— (16)
Specify medications (select all that apply):	Acetaminophen (e.g. Tylenol plain or extra strength)	46.7% (478)	44.0% (1214)
	Non-steroidal anti-inflammatory drugs/NSAID (e.g. ibuprofen, Aleve, aspirin)	42.5% (435)	39.9% (1103)
	Topical NSAID cream	25.9% (265)	32.6% (901)
	Glucosamine	21.4% (219)	20.4% (563)
	Hyaluronic acid injection into your joint	2.0% (20)	4.3% (118)
	Corticosteroid (cortisone) injection into your joint	11.2% (115)	14.6% (403)
	Morphine or other opioids (e.g. Tylenol No. 3)	6.1% (62)	4.7% (130)
	Tramadol	3.5% (36)	3.1% (85)
	Codeine	3.9% (40)	3.3% (92)
	Tricyclic antidepressants (for neuropathic pain)	1.6% (16)	1.9% (53)
	Anticonvulsants (e.g. Gabapentin)	2.6% (27)	2.2% (60)

Measure	Category	Hip (N=1029)	Knee (N=2774)
	Methotrexate	0.5% (5)	0.5% (13)
	Herbal supplements	22.9% (235)	19.4% (536)
Patient-reported scales			
Numeric pain rating: hip/knee pain in the past month (0-10)	—	5.2 ± 2.2 (N = 1029)	5.2 ± 2.1 (N = 2774)
HOOS-12/KOOS-12 subscale (0=extreme symptoms, 100=no symptoms)	Pain	51.0 ± 16.3 (N = 1029)	51.5 ± 15.2 (N = 2774)
	Function	57.1 ± 19.3 (N = 1029)	55.2 ± 18.8 (N = 2774)
	Quality of life	40.4 ± 18.7 (N = 1029)	37.3 ± 17.2 (N = 2774)
EQ-5D utility score	—	0.7 ± 0.2 (N = 1018)	0.7 ± 0.2 (N = 2747)
Arthritis Self-Efficacy Scale (1=lowest self-efficacy, 10=highest)	—	6.0 ± 1.8 (N = 1028)	6.1 ± 1.8 (N = 2769)

3. Categorized Changes in Continuous Outcome Measures, 3 and 12 Months After Enrollment

		Hip (number)		Knee (number)	
Measure	**Outcome category**	**3M**	**12M**	**3M**	**12M**
Pain intensity					
Numeric pain rating (0-10)	No change or worsened	42.3% (223)	42.7% (106)	35.0% (485)	39.7% (228)
	Negligible improvement (0.1 - 14.9%)	3.8% (20)	2.8% (7)	4.5% (62)	3.8% (22)
	Possible improvement (15 - 29.9%)	13.5% (71)	10.1% (25)	11.8% (163)	8.9% (51)
	Clinically important improvement (≥ 30% and/or zero pain)	40.4% (213)	44.4% (110)	48.7% (675)	47.6% (273)
HOOS-12/KOOS-12 scores (0-100)					
Pain	No change or worsened	45.1% (237)	42.3% (105)	41.5% (575)	39.5% (227)
	Negligible improvement (0.1 - 4.9 pt)	0.0% (0)	0.0% (0)	0.2% (3)	0.2% (1)
	Possible improvement (5 - 9.9 pt)	18.6% (98)	12.5% (31)	19.0% (264)	13.9% (80)
	Clinically important improvement (≥ 10 pt and/or perfect score)	36.3% (191)	45.2% (112)	39.2% (544)	46.3% (266)

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GLA:D™ Canada Implementation and Outcomes

2019 Annual Report

GLA:D™ CANADA