



# Annual Report 2019

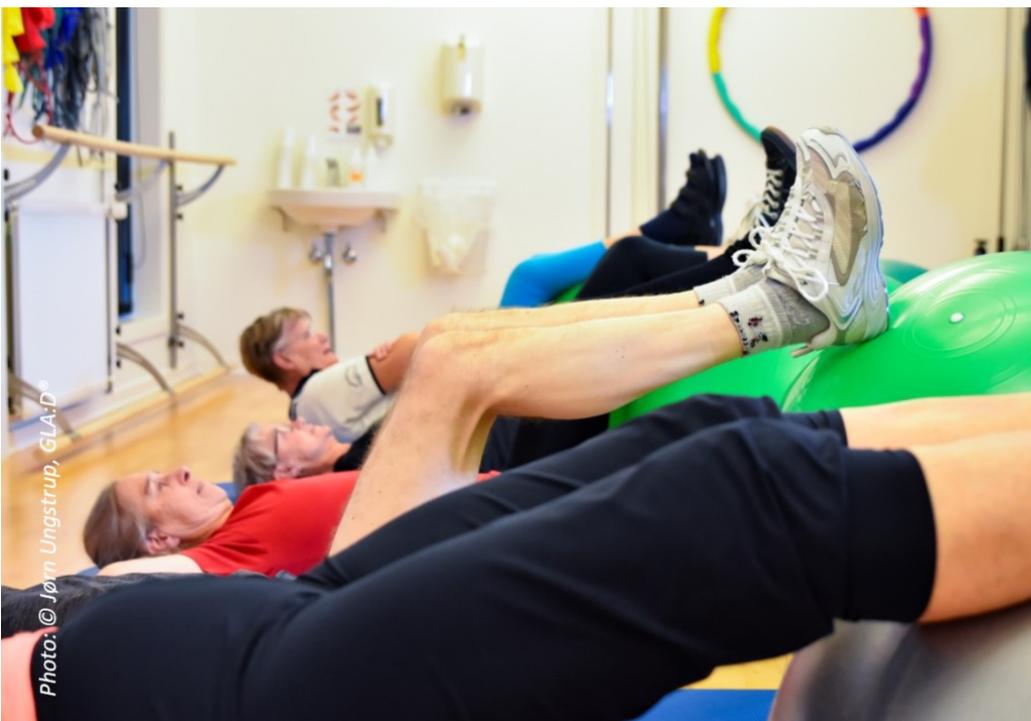


**GLA:D**<sup>®</sup>  
DENMARK

ValueBased  
HealthCare

Winner  
Prize 2019

# GLA:D® Annual Report 2019



**GLA:D®**



Treatment for knee and hip osteoarthritis



In Denmark since 2013



GLA:D® has been implemented internationally

Good Life with osteoArthritis in Denmark (GLA:D®) is an initiative from the Research Unit for Musculoskeletal Function and Physiotherapy at the University of Southern Denmark (SDU). GLA:D® represents an evidence-based treatment plan for knee and hip osteoarthritis consisting of patient education and neuromuscular exercise.

GLA:D® facilitates the implementation of the national clinical guidelines and was launched in Denmark in 2013. About 350 private practice clinics and municipal rehabilitation centers deliver GLA:D® programs to approximately 10,000 patients each year. The initiative has also been implemented in Canada, Australia, China, Switzerland and New Zealand.

Over the last seven years, close to 50,000 Danish patients have participated in a GLA:D® program.

The GLA:D® Annual Report 2019 presents an overview of the results that patients have achieved, including reduced pain, reduced intake of painkillers, improved physical function and quality of life.

Happy reading!



*Ewa Roos,  
PhD, Professor  
University of Southern Denmark*



*Søren Thorgaard Skou,  
PhD, Professor and Head of Research  
University of Southern Denmark &  
Næstved-Slagelse-Ringsted Hospitals*

# What is GLA:D<sup>®</sup>?



## Elements of GLA:D<sup>®</sup>



Patient education  
2 x 1 ½ hours



Supervised neuromuscular  
exercise  
2 times a week for 6 weeks

## Access to GLA:D<sup>®</sup>



The patient is able to self-  
refer to a GLA:D<sup>®</sup> unit



The patient can be referred to  
a GLA:D<sup>®</sup> unit by their GP or by  
an orthopedic surgeon

### Three mandatory elements of GLA:D<sup>®</sup>:

- Education of physical therapists in delivering patient education and neuromuscular exercise training,
- Two sessions of patient education and a minimum of 6 weeks of neuromuscular exercise for patients at the individual GLA:D<sup>®</sup> units,
- Registration of patient data in the national GLA:D<sup>®</sup> registry.

### GLA:D<sup>®</sup> patient objectives

- Increased physical function
- Reduced pain
- Reduced intake of painkillers
- Improved quality of life

The aim is that this will result in decreased health care utilization and lower costs.

See [presentation of GLA:D<sup>®</sup>](#).

### Access to GLA:D<sup>®</sup>

Patients with hip or knee osteoarthritis may join the GLA:D<sup>®</sup> program through

- referral from a general practitioner,
- referral from an orthopedic surgeon,
- self-referral to a GLA:D<sup>®</sup> unit.

### GLA:D<sup>®</sup> aims to

accelerate implementation of the national clinical guidelines into clinical practice, and the overall objective is to ensure:

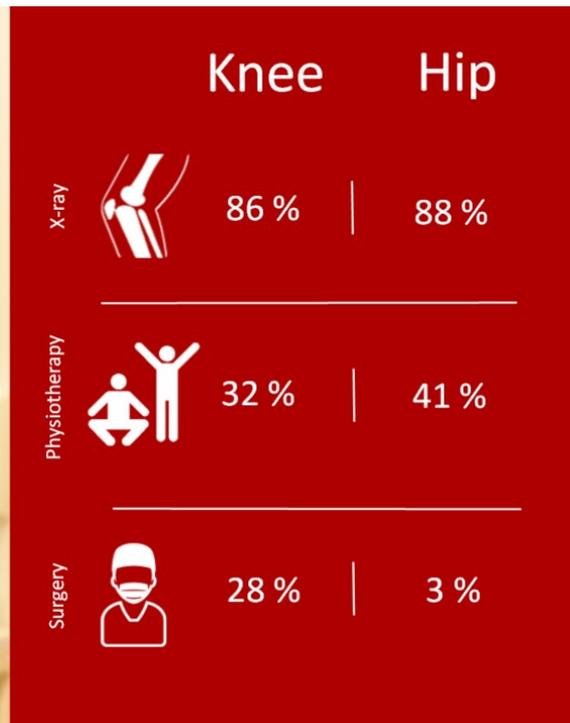
- that all patients with osteoarthritis have equal access to evidence-based treatment irrespective of place of residence or financial situation,

- surgery is considered only when conservative treatment measures have failed.

# Before GLA:D®



Photo: © Jørm Ungstrup, GLA:D®



## X-ray

86% of the knee patients and 88% of the hip patients reported that they had x-rays taken of their joints prior to commencing the GLA:D® program. More than 90% of those stated that the x-ray showed osteoarthritis. The number of patients who have had x-rays within the last six months increases with time. In 2013, 40% of the knee patients and 54% of the hip patients reported having had x-rays taken of their joints within the last six months compared to 62% and 66%, respectively, in 2019.

This trend has been observed despite the fact that osteoarthritis may be diagnosed clinically without the use of x-ray and that x-ray is only relevant when surgery is considered or differential diagnoses cannot be excluded.

## Previous visits to the physiotherapist

From 2013 to 2019 a total of 32% of knee patients and 41% of hip patients reported that they have previously visited a physiotherapist because of their joint problems. These numbers have fallen slightly over the years.

Prior to commencing the GLA:D® program, 60% of the patients reported that they had received advice on the importance of physical activity and exercise.

## Advice on weight loss

Among weight loss candidates\*, 43% of the knee

\*Working in collaboration with the patient, the GLA:D® therapist assessed whether weight loss is relevant

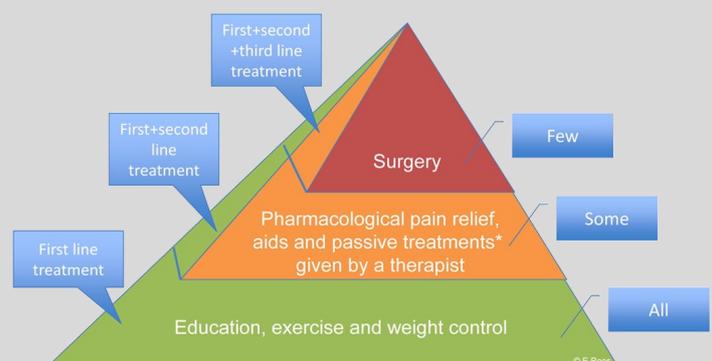
patients and 35% of the hip patients had received weight loss advice prior to commencing the GLA:D® program.

## Previous surgery

28% of the knee patients and 3% of the hip patients reported having had surgery of their knee or hip in the past. Among knee patients, the proportion has dropped from 39% in 2013 to 26% in 2019, while the proportion is somewhat stable over time for the hip patients. The most common procedure among the knee patients is knee arthroscopy including partial meniscectomy and removal of loose fragments of bone or cartilage. A few hip patients have had joint replacement and surgery for proximal femoral fractures.

## National clinical guidelines for treatment of knee/hip osteoarthritis:

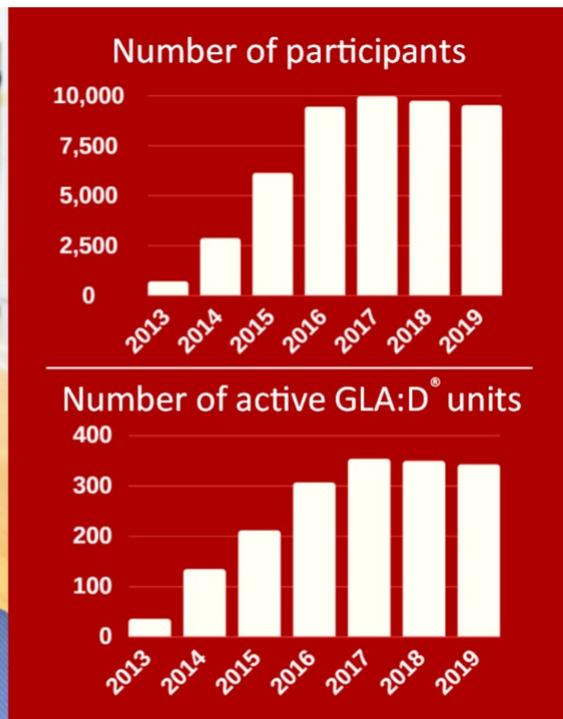
*All patients should be offered the first line treatment, some may need supplementary treatment, while only 10-15% need surgery in the form of joint replacement.*



# GLA:D<sup>®</sup> all over Denmark



Photo: © Jørn Ungstrup, GLA:D<sup>®</sup>



## GLA:D<sup>®</sup> is available in all parts of Denmark

In 2019, 342 GLA:D<sup>®</sup> units, including 31 municipal rehabilitation centers, offered GLA:D<sup>®</sup> programs. The units offering GLA:D<sup>®</sup> programs changes slightly from year to year. From 2013 to 2019, a total of 432 units, including 38 municipal rehabilitation centers, have offered GLA:D<sup>®</sup>.

84% of the patients attended GLA:D<sup>®</sup> in private physiotherapy clinics, while the other 16% attended the program in municipal rehabilitation centers. Municipal rehabilitation centers are accounting for a slightly increasing proportion of patients. The municipalities of Roskilde and Copenhagen rank as the two busiest GLA:D<sup>®</sup> units.

From 2013 to 2019, SDU held 19 courses to certify 1386 clinicians to deliver the GLA:D<sup>®</sup> program.

**350 units offer GLA:D<sup>®</sup> to almost 10,000 patients each year**

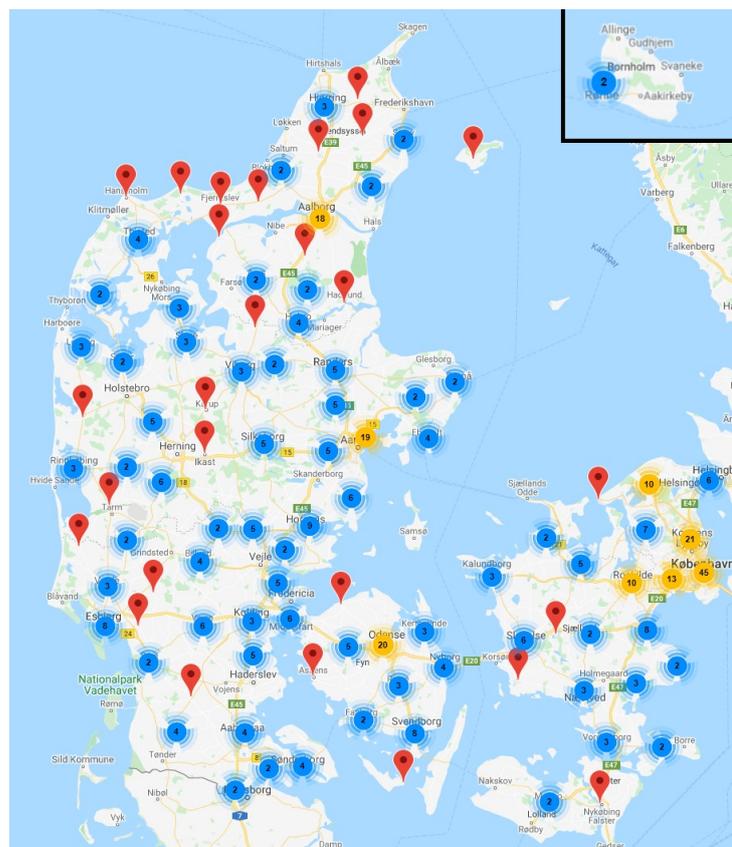
## Almost 50,000 patients

From 2013 to 2019, 48,285 GLA:D<sup>®</sup> programs were commenced. The annual number of GLA:D<sup>®</sup> patients increased from 2013 to 2016 and has now stabilized at about 10,000 patients.

## High degree of participant satisfaction

After completing the GLA:D<sup>®</sup> program, nine out of ten indicated that they are pleased or very pleased with GLA:D<sup>®</sup>. Also, nine out of ten stated that they apply what they have learned from GLA:D<sup>®</sup> at least once a week.

## Geographical location of active GLA:D<sup>®</sup> units



# Who participated in GLA:D®?



## Sex and age

A total of 71% of the GLA:D® patients were women and 29% were men. However, the number of men seems to be on the rise.

The average age for all patients was 65.3 years and is slowly increasing. The oldest patient was 100 years old. On average, the hip patients were a bit older than the knee patients.

---

**The typical GLA:D® participant is a 65-year-old, overweight woman with knee pain**

---

## Knee and hip

Most GLA:D® participants reported the knee as their primary problem and fewer reported the hip as their primary problem (75% vs. 25%).

## Symptom duration

About half of the patients report having had symptoms for more than a year before commencing GLA:D®. Knee patients had an average duration of symptoms of 3.5 years, while hip patients reported having had symptoms for 2 years and 8 months when they commenced the GLA:D® program. Each

year, there is a decrease in the mean duration of symptoms prior to GLA:D®. Knee patients have seen a decrease in symptom duration from 6 years to 2 years and 8 months from 2013 to 2019 and hip patients have seen a decrease from 4 years and 2 months to 2 years and 3 months.

## Overweight

Knee patients had an average BMI of 28.9 and hip patients of 27.1. A total of 75% of the knee patients and 63% of the hip patients were overweight.

---

**Knee patients typically have longer symptom duration and more are overweight**

---

## Previous injury and other diseases

Half of the knee patients and one third of the hip patients had a history of previous knee/hip injury. Other diseases are common. Almost four in ten were suffering from high blood pressure and three in ten from high level of cholesterol. Heart disease, lung disease or diabetes were reported by 6-8% of the patients.

# Results after GLA:D®



	Knee	Hip
Pain 	- 27 %	- 22 %
Medication 	- 25 %	- 20 %
Walking speed 	+ 7 %	+ 7 %
Quality of life 	+ 13 %	+ 10 %

## Reduced pain

After GLA:D®, the average knee/hip pain intensity decreased by 27% (from 47.0 to 34.2 mm on VAS 0-100) for knee patients and 22% (from 46.7 to 36.4 mm on VAS 0-100) for hip patients.

## Reduced pain and intake of painkillers, improved physical function and quality of life

### Reduced intake of painkillers

After GLA:D®, the proportion of patients reporting having used either paracetamol, NSAID or opioids/opioid-like medications within the past two weeks fell from 56% to 41% for knee patients and from 65% to 52% for hip patients.

The proportion of patients reporting having used opioids/opioid-like medications within the past two weeks fell from 4% to 3% for knee patients and from 6% to 5% for hip patients.

43% of knee patients and 40% of hip patients report using less painkillers compared to before commencing GLA:D®.

## Improved physical function

For both knee and hip patients, the average walking speed increased by 7% from 1.5 m/sec before GLA:D® to 1.6 m/sec after GLA:D®. Before GLA:D®, 1.9% of the patients used walking aids during the functional test and after GLA:D®, this number had fallen to 1.5%.

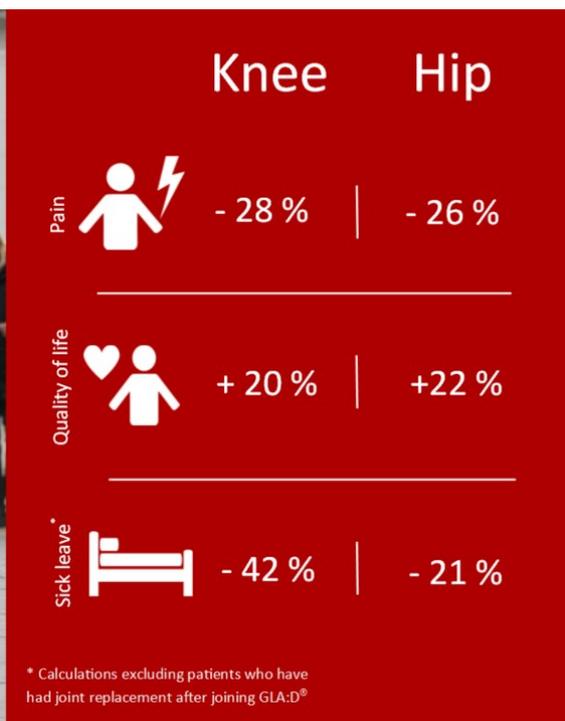
## Higher quality of life

After GLA:D®, average joint-related quality of life increased by 13% for knee patients (KOOS QOL from 45.6 to 51.7) and 10% for hip patients (HOOS QOL from 47.9 to 52.6).

## Compliance in GLA:D®

8 out of 10 attended both education sessions and 8 out of 10 participated in at least 10 group-based exercise sessions.

# Results 1 year after GLA:D<sup>®</sup>



## Reduced pain

The reduction in pain was maintained one year after starting the GLA:D<sup>®</sup> program. The knee patients experienced an average pain reduction of 28% (from 46.4 to 33.6 mm on VAS 0-100) and the hip patients experienced an average pain reduction of 26% (from 46.0 to 33.6 mm on VAS 0-100) compared with before GLA:D<sup>®</sup>.

## Reduced pain, higher quality of life and less sick leave

### Higher quality of life

One year after commencing the GLA:D<sup>®</sup> program, patients reported a further improvement in average joint-related quality of life. Knee patients reported a 20% improvement (from 45.8 to 55.2 KOOS QOL) and hip patients a 22% improvement (from 47.8 to 58.2 HOOS QOL) compared with before GLA:D<sup>®</sup>.

### Reduced intake of painkillers

44% of knee patients and 41% of hip patients report using less painkillers compared to before commencing GLA:D<sup>®</sup>.

## Less sick leave

Among the knee patients who had not undergone joint replacement surgery during the follow-up period, the number of joint-related sick leaves within the last year fell by 42% from 1240 knee patients before GLA:D<sup>®</sup> to 723 one year after commencement of the GLA:D<sup>®</sup> program.

Among hip patients who had not undergone joint replacement surgery during the follow-up period, there was a 21% fall in the number of joint-related sick leaves within the last year. The number fell from 188 hip patients before GLA:D<sup>®</sup> to 149 one year after starting of the GLA:D<sup>®</sup> program.

## Patients who had joint replacement

After one year, 1170 knee patients (8%) and 897 hip patients (17%) reported having undergone joint replacement surgery after joining GLA:D<sup>®</sup>.

To ensure that the changes in outcomes are not a result of joint replacements among the participants, all analyses have been repeated excluding patients who have had joint replacement. Only change in sick leave was strongly affected by this (patients with joint replacement had more sick leave) and therefore the analysis of sick leaves presented above excludes patients who have had a joint replacement during follow up.

# GLA:D<sup>®</sup> in 2019



GLA:D<sup>®</sup> Contest 2019

## GLA:D<sup>®</sup> International Network

2015: GLA:D<sup>®</sup> Canada

2016: GLA:D<sup>®</sup> Australia

2017: GLA:D<sup>®</sup> China

2019: GLA:D<sup>®</sup> Switzerland

2019: GLA:D<sup>®</sup> New Zealand

### International collaboration in GLA:D<sup>®</sup>

GLA:D<sup>®</sup> has been implemented in Australia, Canada, China, New Zealand and Switzerland and implementation is currently ongoing in Austria. Teams from all countries are a part of the GLA:D<sup>®</sup> International Network (GIN) and in 2019 a meeting was held in Toronto, Canada. The aims of the network are to share experiences and to ensure standardization and homogeneity in delivering GLA:D<sup>®</sup> in the different countries. A common website was established in 2019: [www.gladinternational.org](http://www.gladinternational.org).

### New website for GLA:D<sup>®</sup> Denmark

In collaboration with GLA:D<sup>®</sup> Back, a common website for GLA:D<sup>®</sup> in Denmark was established in 2019: [www.gladdenmark.dk](http://www.gladdenmark.dk).

### Student visiting SDU

In the autumn 2019, Halit Selçuk from Marmara University in Turkey visited the research unit for Musculoskeletal Function and Physiotherapy at SDU. He worked on a research project about the validity of self-report measures in the GLA:D<sup>®</sup>-registry. At the time of writing, this project has not yet been published.

### Research based on the GLA:D<sup>®</sup>-registry

Based on data from the GLA:D<sup>®</sup>-registry, Søren Skou has been leading a [research project](#) showing that one in three patients with knee osteoarthritis and one in five patients with hip osteoarthritis have pain flares in response to a repeated sit-to-stand activity.

When clinicians are introducing exercise therapy to patients with knee or hip osteoarthritis, it is relevant to have in mind that many patients are going to experience harmless pain flares and that the pain flares will reduce over time if the patients are supported to continue exercising.

### GLA:D<sup>®</sup> Contest

The GLA:D<sup>®</sup> Contest was held on June 2019 at SDU in Odense, Denmark. For 24 hours, 6 research teams from different countries worked intensively with research projects based on data from the GLA:D<sup>®</sup>-registry. The projects addressed different topics such as social inequalities in outcomes of GLA:D<sup>®</sup>, trajectories of outcomes in males and females with hip osteoarthritis, placebo, pain medication use, central sensitization and prediction of negative outcome from GLA:D<sup>®</sup>. For several of the projects, the collaboration has continued and we are currently working on publishing some of the results.

# Contact GLA:D®



## Contact



[www.GLAiD.dk](http://www.GLAiD.dk)



Info:  
[glad@sdu.dk](mailto:glad@sdu.dk)



Support for clinicians:  
[gladsupport@sdu.dk](mailto:gladsupport@sdu.dk)

### Included data

The analyses included in this Annual Report are based on data from the GLA:D® registry collected from 29 January 2013 up to and including 31 December 2019. A total of 86% of the patients who have completed the first visit filled in the patient questionnaire. After completion of the treatment program, the response rate was 75% and 12 months after the first visit, the response rate was 60%. The response rate for the physical therapist's form after completion of the treatment plan was 61%.

The analyses of results after GLA:D® are based on programs that include data from before and after the treatment. Only patients who were not retired or on early retirement both before and after GLA:D® are included in the sick leave analysis.

### Interpretation of results

The analyses included in this Annual Report are entirely descriptive and the results should be interpreted with caution. The data are based on validated questionnaires, objective functional tests and questions whose validity has not yet been exami-

ned. We have strived to achieve the highest degree of validity in data collection as possible under the given circumstances, where data are collected in clinical practice. It cannot be ruled out that some data may be associated with uncertainty.

To rule out competing causal factors, the analyses have been repeated excluding patients who have had joint replacement surgery during the follow-up period. Consequently, the most obvious competing causal factor has been taken into account. The analyses do not involve a control group, and therefore it is possible that factors other than the GLA:D® program may have affected the results.

The majority of GLA:D® participants are people who are able and willing to pay for a treatment plan in a private clinic and who are able to attend appointments at the clinic. Consequently, it cannot be ruled out that the composition of the patient population may have affected the results. Overall, the generalizability of the results seems acceptable in relation to knee/hip osteoarthritis patients who are able and motivated to participate in GLA:D®; however, the above limitations must be considered.

---

This Annual Report has been prepared by: Dorte Thalund Grønne, Ewa Roos and Søren Thorgaard Skou, GLA:D®, Research Unit for Musculoskeletal Function and Physiotherapy, Department of Sports Science and Clinical Biomechanics, SDU, June 2020  
In charge of GLA:D®: Ewa Roos, [eroos@health.sdu.dk](mailto:eroos@health.sdu.dk) and Søren T. Skou, [stskou@health.sdu.dk](mailto:stskou@health.sdu.dk)  
Front page photo: © Jørn Ungstrup GLA:D®

# ValueBased HealthCare

*Winner  
Prize 2019*

The VBHC Prize is a prestigious, international prize awarded to inspiring initiatives that have adopted a fundamentally new line of thinking in creating excellent patient value. Implementation is key in the prize.

GLA:D® won the VBHC Prize 2019, beating more than 170 other projects from all over the world. See [video from the award show](#).

Learn more about the [VBHC Prize](#).

