SAOR – ANNUAL REPORT 2019 - 2026

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South African Orthopaedic Association

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SOUTH AFRICAN ORTHOPAEDIC REGISTRY (SAOR)

Annual Report Outline

1. Chairperson's Message

We are pleased to present the **First Annual Report of the South African Orthopaedic Registry (SAOR)**. This milestone marks the culmination of more than a decade of vision, collaboration, and dedication to advancing orthopaedic care in South Africa.

The SAOR formally commenced in **2019**, building on the foundation of the **South African National Joint Registry**, whose historic data has been incorporated into this platform. Together, these datasets represent one of the most comprehensive collections of orthopaedic information in Africa — spanning procedures, implants, and outcomes across the country.

From the outset, the Registry's purpose has been clear: to improve **patient outcomes, surgical quality, and provide value-based care** through reliable data collection and shared learning. What makes the SAOR truly unique is its scope — encompassing **68 orthopaedic pathways** across every subspecialty, representing a world first in orthopaedic registry design.

However, we must also acknowledge a fundamental reality. As a **voluntary registry**, participation is not yet universal, and this report cannot claim to represent all procedures performed nationally. Building a culture of consistent data entry remains one of our greatest challenges. Yet it is also one of our greatest opportunities.

Every data point entered by a surgeon represents not just a number, but a story — a patient's journey, a surgeon's decision, a medical device implanted. Collectively, these entries form the evidence that will shape our profession's future, guide training and policy, and ultimately improve patient care. The more complete the data, the more powerful the insights we can derive.

We therefore call upon every orthopaedic surgeon in South Africa to contribute actively to this shared national endeavour. Participation is both a professional responsibility and an investment in the future of our discipline. Achieving **comprehensive participation** remains a key strategic goal. A more complete dataset will not only enhance the accuracy of benchmarking and audit, but also empower clinicians to identify best practice, reduce unwarranted variation, and demonstrate value to funders and patients alike. The success of the SAOR ultimately depends on **collective ownership** — surgeons contributing their data so that we, as a profession, can learn from our collective experience.

This first annual report represents a **foundational step**. It is both a reflection of what has been achieved and a call to action — to contribute, to participate, and to ensure that every orthopaedic patient in South Africa benefits from the knowledge we build together.

On behalf of the Registry Committee, I extend sincere thanks to every colleague, hospital, and partner who has supported this vision. Your contributions have made this first report possible — and your continued engagement will determine how much further we can go.
All members of the Steering committee have reviewed this report, but the persons responsible for pathway report write ups are mentioned as authors.

As of January 2026, the SAOR committee consists of the following members who report directly to the SAOA presidential line.

Chairperson: A/Prof M Nortje
Admin coordinator: Ms B Morar

Dr Ashley Arakkal
Prof Brian Bernstein
Dr Bryan Botha
Dr Elzabe Britz
Dr Shaun de Villiers
Dr Hammaad Gamieldien
Dr Vuyo Gezengana
Prof Sikheto Golele
Dr Thomas Hilton
Dr Anton Julyan
Dr Joseph Chalumkal John
Prof Odette Koch
Dr Neil Kruger
Prof Maritz Laubscher
Dr Phakamani Mthethwa
Dr Megan O' Connor
Prof Archie Rachuene
Dr Khodi Sikhauli

2. Executive Summary

The **South African Orthopaedic Registry (SAOR)** is fully owned and managed by the **South African Orthopaedic Association (SAOA)** and is paid for by the members and by donations from sponsors. It is an online registry that is fully secure and links can be found on the SAOA website. It is a unified, national platform for recording orthopaedic procedures and patient outcomes and contribution is currently voluntary. The report does not represent a complete national census of orthopaedic activity. Nevertheless, the data captured is robust, representative, and already provides valuable insights into national trends, implant use, outcomes, and practice variation. There are currently 237 orthopaedic surgeons registered as pathway owners on the registry. The total membership for the SAOA is in the below table:

Membership Category	Description	Paid April 2026	Invoiced 2026
Affiliate	Overseas	12	17
Associate	Registrars	162	215
Emeritus	Retired	189	189
PAM	Researcher	1	1
Supernumerary	Registrars	21	21
Life	Mostly retired	9	9
Honorary	Overseas	12	12
Full	Private Practice	421	493
Full State	Full State Practice	49	69
		876	**1026**

Pathway owners (the orthopaedic surgeons) can authorize delegates (secretary, data capturer or registrar) to enter data on their behalf. There are 508 delegates registered, a total of 730 users, but only about 10% have logged in within the last 3 months. Over the last six months the number of unique user logins per month range from 54 – 81 and these users add between 536 and 886 new patients per month.

This inaugural report summarises seven years of data (2019–2026), focusing on the **most commonly used pathways**, including hip, knee and hand surgery.
The top six pathways by number of cases are:

1. Hip (Primary Arthroplasty) Pathway
2. Knee (Primary Arthroplasty) Pathway
3. Hand/Wrist Pathway (PRO Series)
4. Knee Pathway (soft tissue)
5. Shoulder Pathway (soft tissue)
6. Shoulder (Primary Arthroplasty) Pathway

The SAOR's long-term vision is to build a **living orthopaedic knowledge system** — one that evolves through continuous data entry, analysis, and feedback. As participation grows, the registry will become an indispensable national resource for **research, education, and clinical excellence**.

3. Highlights of the 2019–2026 period

- Integration of the historic National Joint Registry data.
- Expansion to 68 orthopaedic pathways, the first of its kind globally.
- Reporting on the top pathways representing most of the registry activity.
- Growing engagement across both public and private sectors.

- Establishment of a framework for clinical governance, quality improvement, and benchmarking.
- Research publications and congress presentations.
- Receipt of over seven hundred thousand rands of sponsorship from partners who believe in the value of the registry.
- Thank you to the following universities for their contribution in the way of ethics approval: University of Cape Town, University of KwaZulu Natal and Stellenbosch University.

4. Pathway Data Components

Core Dataset and Reporting Variables

- Patient demographics: age, sex.
- Surgery details: date, hospital, surgeon, procedure name/description.
- Surgical approach and anaesthetic type.
- Implant/prosthesis details.
- Patient-reported outcome measures (PROMs), where available.
- Data presented as tables, graphs, and dashboards.
- Narrative commentary on national trends, practice variation, outcomes.
- Minimum required fields for various forms are listed in Appendix 1.

Preamble to the Hip and Knee Primary Arthroplasty Pathways

The SAOR incorporates historic data from the earlier South African National Joint Registry (SANJR), which recorded procedures prior to 2018. While this legacy dataset includes 8,422 total hip replacements (THR) and 9048 total knee replacements (TKR), much of the information is of limited quality due to mismatched fields and incomplete records.

Since its inception, the SAOR has focused on capturing comprehensive, standardized data through defined clinical pathways. The Hip and Knee Primary Arthroplasty Pathways, introduced in 2019, have seen steady growth in participation.

Over the first seven years, 8,280 hip pathways and 11,516 knee pathways have been opened, reflecting strong engagement despite a temporary decline during the COVID-19 pandemic. Annual pathway openings increased from 2,929 in 2019 to 4,567 in 2024, demonstrating progressive adoption across practices.

Compliance with the minimum dataset (MDS) remains an ongoing challenge. While 984 forms were completed in 2019, subsequent years have shown completion rates between 45% and 63%, with 4,637 fully completed forms to date. A pathway remains incomplete until all mandatory fields are captured, and improving this compliance is a key focus for the registry moving forward.

Year	Pathway opened	Form complete
2019	2929	2722
2020	1432	898
2021	2763	1233
2022	3840	1891
2023	4265	2046
2024	4567	2405
Grand Total	**19796**	**11195**

The following two reports summarize the outcomes and trends observed within the Hip and Knee Primary Arthroplasty Pathways, highlighting progress, challenges, and opportunities for enhancing data quality and patient care.

Hip Primary Arthroplasty Pathway

Marc Nortje

Indications for Hip Arthroplasty (2019–2026)

Of the 8280 pathways opened, the indication was recorded in 5429 (66%). Most cases continue to be performed for degenerative conditions, with primary osteoarthritis accounting for more than 70% of procedures.

The number of procedures captured annually has increased substantially over the six-year period, reflecting both increased registry participation and national procedural volume growth.

Diagnostic Group	2019	2020	2021	2022	2023	2024	Total
Primary Osteoarthritis	472	529	590	657	792	866	**3906**
Secondary Osteoarthritis	39	40	50	48	52	61	**290**
Avascular Necrosis (AVN)	12	11	19	17	15	20	**94**
Fracture	97	121	145	169	183	215	**930**
Failed Previous Surgery	13	21	27	25	30	35	**151**
Inflammatory Arthropathy	4	1	2	3	2	3	**15**
Tumour / Bone Lesion	1	0	2	1	2	3	**9**
Other / Unspecified	7	4	5	8	4	7	**35**
Total per Year	**645**	**726**	**840**	**928**	**1080**	**1210**	**5429**

Table 1. Trend in indications (2019–2026).

Fracture-related cases total 930, these should be recorded in the Neck of Femur Fracture Pathway and when this data is entered in the primary arthroplasty pathway users are prompted to change pathways. The Neck of Femur Fracture Pathway has 323 cases recorded for the period but only 110 of these cases have had the type of procedure or implant recorded, shown in Table 2.

Table 2

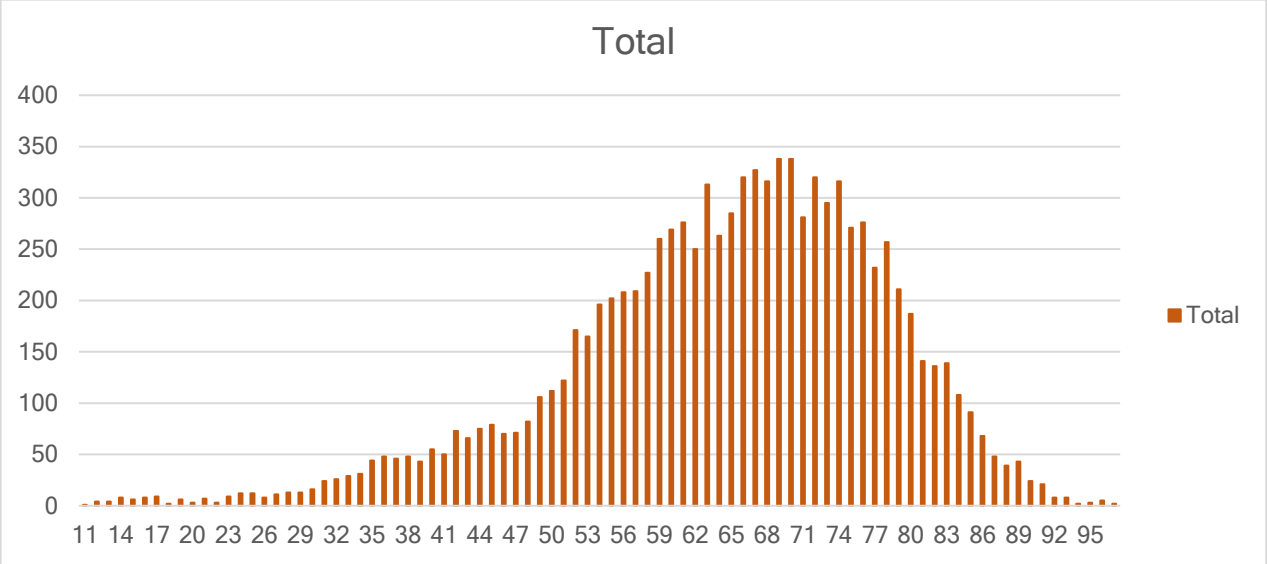
Year	THR	ORIF	Dual Mobility	Hemiarthroplasty	Grand Total
2019		**2**			**2**
2020		**2**		**3**	**5**
2021	**9**	**3**		**4**	**16**
2022	**16**	**5**		**3**	**24**
2023	**18**	**4**	**9**	**6**	**37**
2024	**13**	**2**		**11**	**26**
Grand Total	**56**	**18**	**9**	**27**	**110**

The demographic profile of the total 16,759 patients in the registry is shown in Table 3. Consistent with the female predominance observed in most international arthroplasty registries.

Table 3.

Sex	Number	Percentage
Female	10144	61%
Male	6598	39%
Unknown	5	0%
Total	16759	

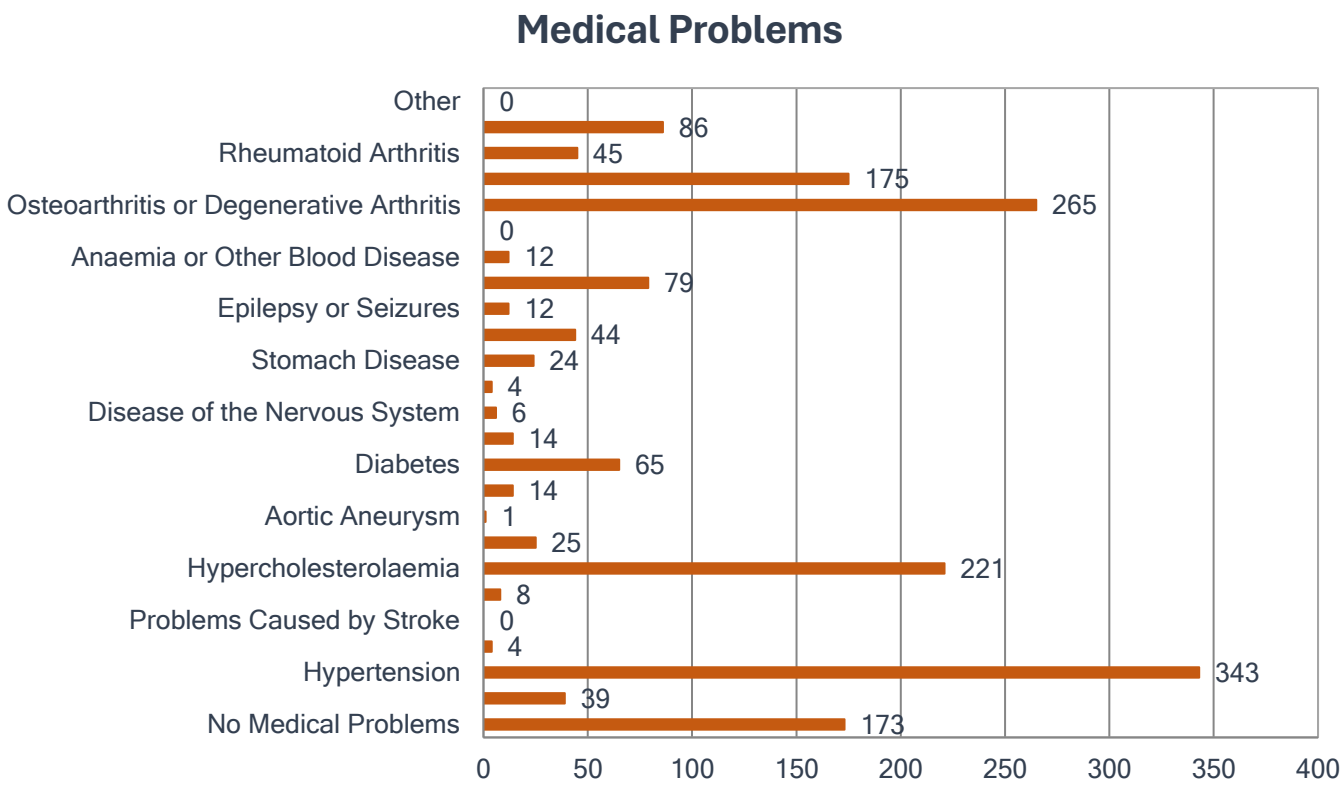
Body mass index (BMI) data were variably reported, but among available records, the distribution followed expected patterns for an arthroplasty population, with most patients in the normal to overweight range (BMI 18.5–30). A smaller proportion were underweight or obese, and several missing data points account for the discrepancy from the total cohort size.



A total of 9,920 patients (59.1% of the full cohort of 16759) had age data recorded. The ages ranged from 11 to 98 years, with the largest proportion between 55 and 75 years, indicating that most patients were in the middle-to-older adult age groups typically affected by degenerative hip pathology. The mean age of patients with available data was 64.5 years (median 66; IQR 17).

There were few patients younger than 30 years, after which the frequency rose steadily through the fourth and fifth decades, peaking between the late 50s and early 70s. The modal ages were 69-70 years, each with 338 recorded patients. Beyond age 80, the numbers declined progressively, with only a small representation of nonagenarians.

Overall, the age distribution demonstrates a broad, unimodal curve skewed slightly toward the older population, consistent with an arthroplasty-dominant cohort.

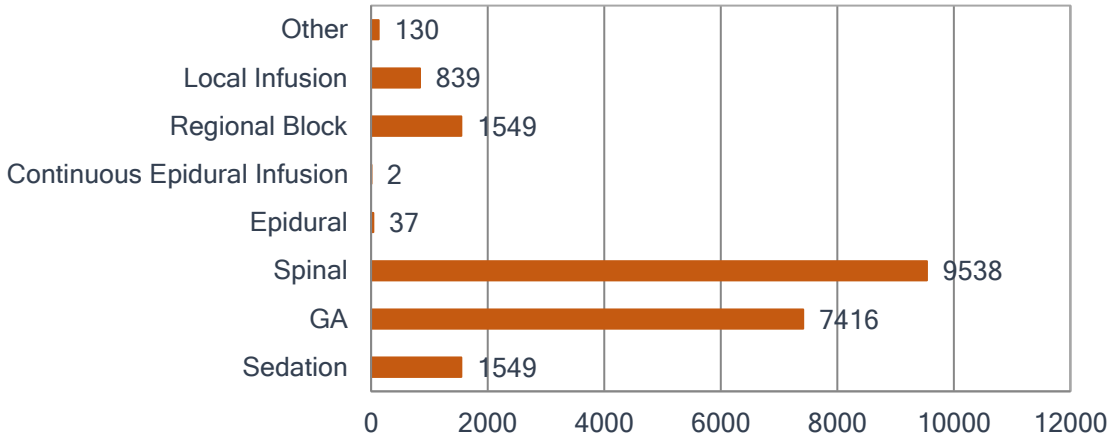


Across the 16,759 recorded cases, only 1,486 medical comorbidities were documented, indicating that the vast majority of patients lacked reported data. Among the comorbidities captured, hypertension (343), osteoarthritis or degenerative arthritis (265), hypercholesterolaemia (221), back pain (175) and diabetes (65) were the most common.

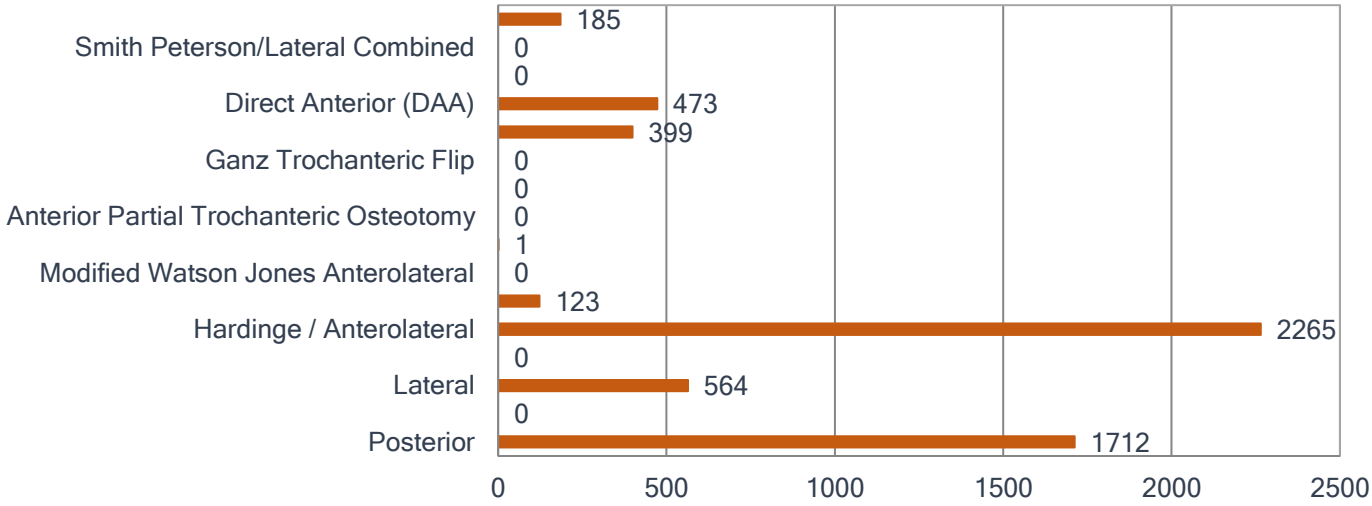
Procedure details

The procedure-related graphs presented in this section reflect only the cases for which specific intraoperative details were recorded. These totals do not represent the full primary hip arthroplasty cohort captured in the registry but only the subset with completed fields for anaesthetic type, surgical approach, implant modularity, cementing technique, cup fixation, and use of acetabular bone graft. As a result, the figures should be interpreted as documentation-dependent summaries, rather than a comprehensive description of all procedures performed.

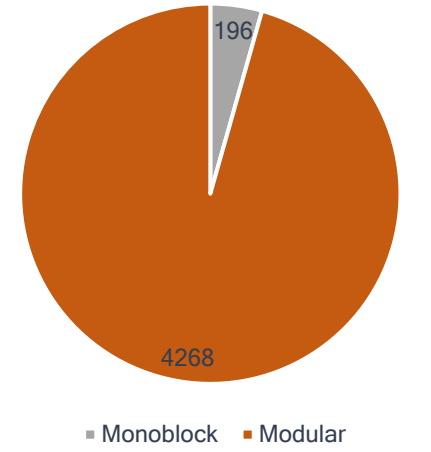
Anaesthetic



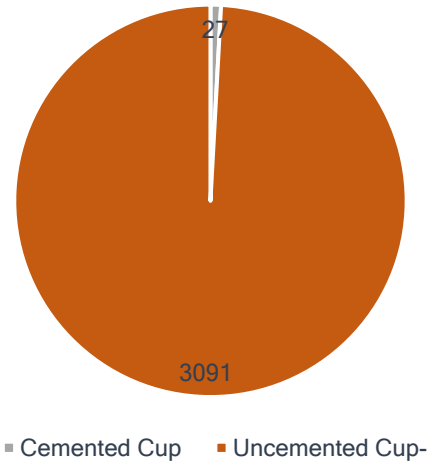
Approach to the Hip Joint



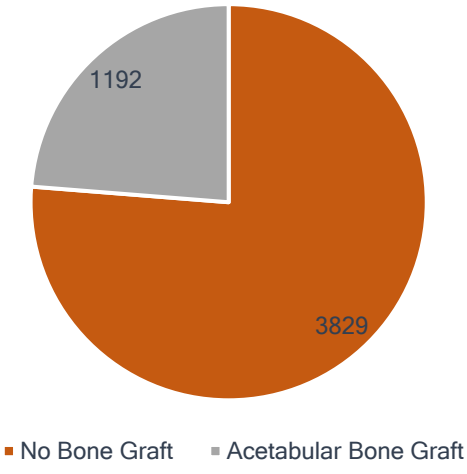
Femoral Component



Acetabular Cup



Acetabular Bone Graft



Implant Manufacturer

The registry's implant manufacturer data is incomplete for earlier years, as manufacturer details were not consistently captured prior to 2019. From 2019 onwards, however, implant information has been reliably recorded, representing approximately 9 000 cases with complete manufacturer data. This more recent dataset allows meaningful analysis of device usage patterns across resurfacing implants, cemented and uncemented stems and cups, bipolar heads, and head size and material. When grouping devices by manufacturer, several interesting trends emerge: the top 10 manufacturers account for most recorded implants, and small discrepancies between stem and cup numbers reflect the ongoing practice among some surgeons of mixing components from different manufacturers. This context should be kept in mind when interpreting the manufacturer tables that follow.

Top Implant Manufacturers		
Company	Stem	Cup
DePuy Synthes	2055	2060
Smith & Nephew	684	677
Zimmer Biomet	600	586
Medacta	543	542
Stryker	261	264
Corin	194	199
Mathys Orthopaedics Ltd	186	181
Amplitude	139	133
Total	4662	4642

Manufacturer - Resurfacing THR	**No.**
Smith & Nephew - Birmingham Femoral Resurfacing	57
Mathys Orthopaedic - Other	1
MatOrtho Ltd - Adept Femoral Resurfacing	12

Manufacturer - Cemented Cup	**No.**
DePuy Synthes - Bi-Mentum Cemented Dual Mobility Acetabular System	4
DePuy Synthes - Marathon OGEE Cup	2

DePuy Synthes - MARATHON XLPE Cemented Cup	13
DePuy Synthes - Marathon XLPE Cup	3
Smith & Nephew - R3 Acetabular System	2
Zimmer Biomet - Avantage Cemented Cup	27
Zimmer Biomet - M2A Magnum Acetabular Cup	1
Zimmer Biomet - Other	1
Zimmer Biomet - Trabecular Metal Acetabular Shell	1
Zimmer Biomet - Durasul PE low-Profile Cemented Cup	3
Mathys Orthopaedics Ltd - CCB (Muller Cup)	2
Mathys Orthopaedics Ltd - Other	4
Stryker - Other	2
Zimmer Biomet - Apollo Polyethylene	1
Stryker - Exeter Contemporary Flanged Cup	3
B Braun / Aesculap - PE Cup	4
Stryker - Omnifit Series II Cup 10 Degree Insert	1
Smith & Nephew - Other	1
Stryker - Exeter Duration HP Acetabular Cup	1

Manufacturer - Uncemented Cup/Bipolar Head	**No.**
Amplitude - Saturne II Uncemented (Dual Mobility) Cup	114
Amplitude - Stellar Cup	14
B Braun / Aesculap - Plasmafit Plus 3 (Three Holes)	12
B Braun / Aesculap - Plasmafit Poly (Symmetrical Vitelene)	62
B Braun / Aesculap - Plasmafit Poly (Uncemented Shell)	3
Corin - DC-Fit Bi Coated (With Holes) Cup	5
Corin - DC-Fit Tri Porous Coated (With Holes and Apical Pin) Cup	1
Corin - DC-Fit UHMWPE Standard Liner	1
Corin - Global Cup (3 Hole)	1
Corin - Global Cup (Multi Hole)	1
Corin - MobiliTi Monoblock (Flanged) Uncemented Cup	3
Corin - MobiliTi Monoblock Uncemented Cup	1
Corin - Other	1
Corin - Trinity Cup (Cluster Holes)	144
Corin - Trinity Cup (No Holes)	24

Corin - Trinity Cup (Non Occluded)	1
Corin - Trinity Plus Cup (Cluster Holes)	9
Corin - Trinity Shell - HXLPE Liner (Neutral)	4
DePuy Synthes - Bi-Mentum Pressfit Dual Mobility Acetabular System	3
DePuy Synthes - Duraloc Shell 100 series	23
DePuy Synthes - Duraloc Shell 300 series	24
DePuy Synthes - Duraloc Shell Sector	2
DePuy Synthes - Other	17
DePuy Synthes - Pinnacle 100 Series Duofix Shell	22
DePuy Synthes - Pinnacle 100 Series Gription Shell	828
DePuy Synthes - Pinnacle 100 Series Porocoat Shell	160
DePuy Synthes - Pinnacle 300 Series Porocoat Shell	526
DePuy Synthes - Pinnacle Bantam Gription Shell	7
DePuy Synthes - Pinnacle Bantam Porocoat Shell	46
DePuy Synthes - Pinnacle Multihole Gription Shell	13
DePuy Synthes - Pinnacle Sector Duofix Shell	35
DePuy Synthes - Pinnacle Sector Gription Shell	325
Evolutis - Other	31
JRI Orthopaedics Ltd - Furlong H-AC Coated CSF Plus Acetabular Cup	1
Mathys Orthopaedics Ltd - Other	8
Mathys Orthopaedics Ltd - RM Classic Full-Profile Cup	1
Mathys Orthopaedics Ltd - RM Pressfit Cup	16
Mathys Orthopaedics Ltd - RM Pressfit Vitamys Cup	149
Medacta - Mpact 3D Metal Two-Holes Cup	64
Medacta - Mpact Multi-Hole Cup	4
Medacta - Mpact Rim-Holes Cup	1
Medacta - Mpact Two-Holes Cup	443
Medacta - Other	1
Medacta - Versafitcup CC TRIO Acetabular Shell	27
Medacta - Versafitcup CC TRIO No-hole Acetabular Shell with CoCrMo DM Converter	1
MicroPort Orthopedics - Lineage Ceramic	1
MicroPort Orthopedics - Procotyl L Quadrant (3-Hole) Cup	13
Other	2
Smith & Nephew - MPF Standard 0-Hole Acetabular Shell	1

Smith & Nephew - Polar Cup Dual Mobility Acetabulum	9
Smith & Nephew - R3° Multi-Hole Fully Porous Acetabular Cup	15
Smith & Nephew - R3° No-Hole Fully Porous Acetabular Cup	238
Smith & Nephew - R3° Three-Hole Fully Porous Acetabular Cup	333
Smith & Nephew - Redapt° Fully Porous Acetabular Cup	63
Smith & Nephew - Reflection° 3-Hole Shell	10
Smith & Nephew - Tandom Bipolar Head	1
Stryker - Restoration ADM and ADM/MDM CoCr Mobile Bearing Liner	1
Stryker - TriAD Acetabular System - PSL Cup	1
Stryker - Trident Hemispherical Clusterhole Shell	12
Stryker - Trident Hemispherical Shell	1
Stryker - Trident II Clusterhole HA Shell	25
Stryker - Trident II PSL Clusterhole HA Shell	6
Stryker - Trident II PSL Clusterhole HA Shell and MDM CoCr Mobile Bearing Liner	1
Stryker - Trident II Tritanium Clusterhole Shell	61
Stryker - Trident II Tritanium Clusterhole Shell and MDM CoCr Mobile Bearing Liner	1
Stryker - Trident II Tritanium Multihole Shell	6
Stryker - Trident II Tritanium Multihole Shell and MDM CoCr Mobile Bearing Liner	1
Stryker - Trident II Tritanium Solidback Shell	94
Stryker - Trident PSL Acetabular Shell	3
Stryker - Trident PSL Clusterhole Shell	1
Stryker - Trident PSL Clusterhole Shell and MDM CoCr Mobile Bearing Liner	1
Stryker - Tritanium Hemispherical Primary Cup	37
Stryker - Tritanium Hemispherical Primary Cup and MDM CoCr Mobile Bearing Liner	1
Summit Medical - Other	1
United Orthopedic Corporation - Other	13
United Orthopedic Corporation - U2 Acetabular Cup XPE 10.Deg	3
United Orthopedic Corporation - U-Motion II Ti PS (Cluster-Hole)	51
Zimmer Biomet - Allofit Alloclassic Shell	31
Zimmer Biomet - Allofit IT Acetabular Shell Without Screw Holes	6
Zimmer Biomet - Allofit-S Alloclassic Shell	1
Zimmer Biomet - Allofit-S IT Acetabular Shell With Screw Holes	15

Zimmer Biomet - Avantage Reload Cup	2
Zimmer Biomet - Bipolar Metal Head	4
Zimmer Biomet - Continuum Acetabular Shell Cluster	54
Zimmer Biomet - Continuum Acetabular Shell Multi-hole	23
Zimmer Biomet - Continuum Acetabular Shell Uni	162
Zimmer Biomet - G7 Bone Master Limited Hole Shell	5
Zimmer Biomet - G7 OsseoTi Limited Hole Shell	206
Zimmer Biomet - G7 OsseoTi Multi Hole Shell	22
Zimmer Biomet - M2a Magnum Dual Mobility Acetabular Cup	12
Zimmer Biomet - Trabecular Metal Modular Shell	1
Zimmer Biomet - Trilogy IT Cluster-holed Shell	1
Zimmer Biomet - Trilogy Trabecular Metal Modular (TMM) Cluster-holed Shell	2
Zimmer Biomet - Trilogy Trabecular Metal Modular (TMM) Multi-holed Shell	2
Zimmer Biomet- Other	2
Stryker - Trident Hemispherical Clusterhole Shell and MDM CoCr Mobile Bearing Liner	1
Smith & Nephew - Reflection° No-Hole Shell	1
United Orthopedic Corporation - U-Motion II Ti PS (No Hole)	7
Medacta - Mpact Multi-Hole Cup with High Nitrogen Stainless Steel DM Converter	1
Amplitude - Saturne Cup	4
United Orthopedic Corporation - U2 HA/Ti Plasma Spray Cup	4
Smith & Nephew - BICON-PLUS Titanium Shell Standard	2
Stryker - Trident II Clusterhole HA Shell and MDM CoCr Mobile Bearing Liner	3
Zimmer Biomet - Standard Cup	1
Lima - Delta Revision Acetabular Cup	1
Lima - Delta TT Cup	4
DePuy Synthes - Pinnacle Sector Porocoat Shell	5
Corin - DC-Fit Tri Porous Coated (With Holes) Cup	1
Amplitude - Saturne II Reconstruction (Dual Mobility) Cup	1
DePuy Synthes - Bi-Mentum Revision Dual Mobility Acetabular System	1
Corin - DC-Fit Tri Porous Coated (No Holes) Cup	1
B Braun / Aesculap - Plasmafit Plus 7 (Three Holes)	1

Zimmer Biomet - Mallory-Head Shell 6HLS + Apex HL PC	1
Mathys Orthopaedics Ltd - SeleXys DS Shell	1
Smith & Nephew - OR30° Dual Mobility Acetabular Cup	1
Zimmer Biomet - Argos Acetabular	1
DePuy Synthes - Duraloc Acetabular Cup	1
Corin - Trinity Shell - Biolox Delta Ceramic Liners	1

Manufacturer - Primary Stem Inserted	**No.**
Adler Ortho - Hydra Fix Cemented Stem	2
Amplitude - EVOK Cemented Stem	4
Amplitude - EVOK Standard Cementless Stem	12
Amplitude - F.A.I.R Lateralised Cementless Stem	31
Amplitude - F.A.I.R Standard Cementless Stem	75
Amplitude - Other	16
Aston Medical - SYMETRIC Femoral Cementless Stem	1
Braun / Aesculap - Excia 12/14 Cemented Stem	3
Braun / Aesculap - Excia 12/14 Cementless Stem	11
Braun / Aesculap - Excia T Cemented Stem	3
Braun / Aesculap - Excia T Cementless Stem	51
Corin - Metafix - 125° Collared Standard Stem	3
Corin - Metafix - 125° Collarless Standard Stem	30
Corin - Metafix - 135° Collared Standard Stem	26
Corin - Metafix - 135° Collarless Lateralised Offset Stem	39
Corin - Metafix - 135° Collarless Standard Stem	40
Corin - Oxford Universal Stem	1
Corin - TaperFit 38 mm Offset Stem	25
Corin - TaperFit 45 mm Offset Stem	12
Corin - TaperFit CDH Stem	2
Corin - TriFit Lateralised Stem	1
Corin - TriFit Standard Stem	13
DePuy Synthes - ACTIS High Offset Stem	89
DePuy Synthes - ACTIS Standard Stem	124
DePuy Synthes - AML Standard Stem	1
DePuy Synthes - Charnley Modular Extra Heavy Flanged 40 Stem	3

DePuy Synthes - Corail Cemented Stem	8
DePuy Synthes - Corail Coxa Vera Neck Angle Stem	2
DePuy Synthes - Corail High Offset Collared Cementless Stem	206
DePuy Synthes - Corail High Offset Collarless Cementless Stem	11
DePuy Synthes - Corail Short Neck Collared Cementless Stem	37
DePuy Synthes - Corail Standard Collared Cementless Stem	388
DePuy Synthes - Corail Standard Collarless Cementless Stem	22
DePuy Synthes - C-Stem (Asian)	2
DePuy Synthes - C-Stem AMT High Offset Stem	23
DePuy Synthes - C-Stem AMT Standard Stem	111
DePuy Synthes - C-Stem CDH	1
DePuy Synthes - C-Stem Classic	6
DePuy Synthes - C-Stem High Offset	3
DePuy Synthes - Other	3
DePuy Synthes - S-ROM Modular Stem	2
DePuy Synthes - Summit Cemented Stem	10
DePuy Synthes - Summit Tapered Duofix Stem (Standard)	730
DePuy Synthes - Summit Tapered Porocoat Stem (Standard)	4
DePuy Synthes - Tri-Lock Stem	267
Elite Surgical - Other	1
Evolutis - HACTIV Standard Stem	9
Mathys Orthopaedics Ltd - Centris Standard Stem	1
Mathys Orthopaedics Ltd - Optimys Lateral Stem	28
Mathys Orthopaedics Ltd - Optimys Standard Stem	118
Mathys Orthopaedics Ltd - Other	2
Mathys Orthopaedics Ltd - twinSys Cemented Lateral Stem	11
Mathys Orthopaedics Ltd - twinSys Cemented Standard Stem	9
Mathys Orthopaedics Ltd - twinSys Uncemented Lateral Stem	8
Mathys Orthopaedics Ltd - twinSys Uncemented Standard Stem	8
Medacta - AMIS-K Lateralized Stem	1
Medacta - AMIS-K Standard Stem	5
Medacta - AMIStem-C Stem	11
Medacta - AMIStem-H Collared Stem	31
Medacta - AMIStem-H Stem	14
Medacta - MasterLoc Stem	11

Medacta - Other	12
Medacta - QUADRA -C Stem	19
Medacta - QUADRA -H Stem	16
Medacta - QUADRA -P Cemented Stem	41
Medacta - QUADRA -P Collared Stem	252
Medacta - QUADRA -P Stem	130
Nakashima - Delta-Lock Stem	3
Smith & Nephew - Anthology Stem	100
Smith & Nephew - CPCS High Offset Cemented Stem	79
Smith & Nephew - CPCS Standard Cemented Stem	57
Smith & Nephew - CPS-Plus Cemented Stem	3
Smith & Nephew - Other	2
Smith & Nephew - POLARStem Cemented	15
Smith & Nephew - POLARStem Collared Non-Cemented	11
Smith & Nephew - POLARStem Non-Cemented	201
Smith & Nephew - POLARStem Non-Cemented US	2
Smith & Nephew - Proxy-PLUS Stem	1
Smith & Nephew - Synergy Cemented Primary Stem	1
Smith & Nephew - Synergy Porous Plus HA Coated Stem	205
Stryker - Accolade HFx Stem	1
Stryker - Accolade TMZF 127° Offset Stem	48
Stryker - Accolade TMZF 132° Offset Stem	66
Stryker - Exeter V40 CDH Stem	2
Stryker - Exeter V40 Long Stem	4
Stryker - Exeter V40 Primary Stem	87
Stryker - Exeter V40 Short Stem	1
Stryker - MITCH V40 Modular Head with Accolade TMZF 127° Offset Stem	1
Stryker - MITCH V40 Module Head with Accolade TMZF 132° Offset Stem	3
Summit Medical - Other	1
United Orthopedic Corporation - Conformity Coxa vara Collared Stem	2
United Orthopedic Corporation - Conformity High-Offset Collared Stem	4
United Orthopedic Corporation - Conformity Shortn neck Collared Stem	8
United Orthopedic Corporation - Conformity Standard Collared Stem	39
United Orthopedic Corporation - U2 HA/Ti Plasma Spray Stem	17

United Orthopedic Corporation - U2 Press-Fit Stem	6
Zimmer Biomet - Arcos Cone Proximal Body wit STS Distal Stem	4
Zimmer Biomet - Avenir Stem	101
Zimmer Biomet - Avenir-Müller Stem	67
Zimmer Biomet - CLS Brevius Stem	1
Zimmer Biomet - CLS Spotorno Stem	57
Zimmer Biomet - CPT 12/14 Extended Offset Stem	16
Zimmer Biomet - CPT 12/14 Extra Extended Offset Stem	5
Zimmer Biomet - CPT 12/14 Standard Stem	16
Zimmer Biomet - Fitmore	7
Zimmer Biomet - Fitmore 127° C Stem	12
Zimmer Biomet - Fitmore 137° B Stem	62
Zimmer Biomet - Fitmore 140° A Stem	52
Zimmer Biomet - Fitmore Ext Offset 129° B Stem	19
Zimmer Biomet - MS-30 Standard Stem	4
Zimmer Biomet - Multi Centre (HA Coated)	1
Zimmer Biomet - Revitan Revision Curved Stem	1
Zimmer Biomet - Segmental Basic Prox Femur 38mm Offset Stem	1
Zimmer Biomet - Taperloc Complete Microplasty High Offset Stem	6
Zimmer Biomet - Taperloc Complete Microplasty Standard Stem	142
Zimmer Biomet - Taperloc Complete Microplasty XR 123° Stem	1
Zimmer Biomet - Trabecular Metal Uncemented Primary Stem	14
Zimmer Biomet - Wagner SL Revision 190mm Stem	2
OMNI - Apex ARC Modular Stem	3
Groupe-Lepine - Other	1
Smith & Nephew - POLARStem Collared Non-Cemented USA	1
Stryker - Accolade II Stem	37
MicroPort Orthopaedics - Profemur Gladiator HA Coated Stem	12
Signature Orthopaedics - Other	2
Zimmer Biomet - Taperloc Complete Femoral BMT 12/14 Tapers	2
Zimmer Biomet - M/L Taper Standard Stem	2
Zimmer Biomet - VerSys Advocate Cemented Stem	1
Groupe-Lepine - PAVI Cemented Stem	2
Stryker - Insignia Stem	4

OMNI - APEX MODULAR Stem	2
Smith & Nephew - POLARStem Valgus	4
Stryker - Other	3
DePuy Synthes - AML High Offset Stem	1
Stryker - ABG I Cemented Stem	2
Stryker - Secur-Fit HA Stem (Original)	1
Zimmer Biomet - Taperloc Complete Full Profile High Offset Stem	1
United Orthopedic Corporation - Conformity Standard Collarless Stem	2
Corin - Oceane+ Revision Long Cemented Stem	1
Zimmer Biomet - Taperloc Complete Full Profile Standard Stem	1
Stryker - MITCH V40 Modular Head with ABG II Cemented Stem	1
DePuy Synthes - AutoBloquante Stem	1
Zimmer Biomet - APR CSTi Porous Coated Stem	1
Amplitude - EVOK Lateral Cementless Stem	1
Gruppo Bioimpianti - Other	1
Smith & Nephew - REDAPT Sleeveless Revision Stem	1
Smith & Nephew - Synergy HA Coated Stem	1
Mathys Orthopaedics Ltd - Stellaris Standard Stem	1
Zimmer Biomet - Arcos Broached Proximal Body with STS Distal Stem	1
Corin - Other	1

Surgeon contribution

A total of 143 surgeons has contributed data to the primary hip pathway on the registry. Across all years of submitted data—combining the historic registry and the current registry (established in 2019)- the number of cases entered per surgeon shows a wide distribution, ranging from 1 entry at the lower end to 1 162 at the upper end. The median number of cases is 26, meaning half of all contributing surgeons have entered 26 or fewer cases. The mean is approximately 120 cases per surgeon, reflecting the influence of a relatively small number of high-volume contributors whose activity elevates the average.

Analysis of surgeon participation before and after 2019 reveals a pattern of continuity with partial turnover. Of the top 10 contributing surgeons from the historic registry, six also appear in the top 10 of the current registry indicating strong ongoing engagement from a core group of high-volume contributors. The remaining four places in each era's top-10 list are filled by individuals who reached high-volume status in only one period. This suggests that some historically active contributors may have reduced their clinical volumes, retired, or chosen not to continue at the same intensity under the new

registry structure. Conversely, several new high-volume surgeons have emerged since 2019, demonstrating healthy renewal and an expanding base of committed contributors.

Overall, the data illustrates both sustained leadership from long-standing contributors and the successful onboarding of new high-volume surgeons into the modern SAOR platform. This combined continuity and growth strengthens the registry's data quality and long-term value.

Hospital and regional contribution
Hip Replacement Activity Across Provinces

The distribution of primary hip replacement procedures in South Africa during the reporting period reflects significant regional variation, both in overall volumes and in the concentration of cases within individual hospitals. The voluntary nature of the SAOR means that several high-volume centres are misrepresented but the available data summarizes as follows:
Western Cape and Gauteng remain the dominant contributors, accounting for the largest share of national activity.

Western Cape recorded 3,716 procedures across 24 hospitals, with an average of 155 cases per facility. The province's performance is strongly influenced by two high-volume centres: Life Vincent Pallotti (1,474 cases) and Groote Schuur Hospital (1,145 cases). These hubs drive the provincial mean upward, while most other hospitals in the province report modest volumes, typically between 20 and 115 cases. This highlights a difference in reporting rates and not necessarily a difference in capacity.

Gauteng, with 4,769 procedures across 34 hospitals, demonstrates the widest footprint nationally. The province combines several high-volume private facilities - Mediclinic Morningside (1,128 cases), Netcare Unitas (923 cases), and Life Fourways (411 cases) - with a long tail of smaller hospitals performing fewer than 50 cases annually. The median of 35 cases per hospital contrasts sharply with the upper range, underscoring the concentration of reporting in a handful of centres.

KwaZulu-Natal contributed 1,015 cases across 17 hospitals, but intra-provincial variability is pronounced. While Life Westville Private Hospital (573 cases) and Hillcrest Private Hospital (184 cases) are major players, most other facilities report single-digit or low double-digit volumes, reflecting a mix of hospitals with limited orthopaedic capacity or variable reporting.

Eastern Cape delivered 836 cases across 7 hospitals, with relatively balanced contributions: Life St George's (378 cases) and Frere Hospital (189 cases) lead the province, supported by mid-range

facilities such as Life St Dominic's (126 cases) and East London Eye Hospital (114 cases). This distribution suggests a more even spread of surgical activity compared to Gauteng or KZN.

Free State reported 393 cases across 5 hospitals, heavily skewed by Mediclinic Bloemfontein (284 cases). Other hospitals in the province recorded fewer than 100 cases, indicating a strong reliance on a single high-volume centre.

Mpumalanga and North - West remain low-volume regions. Mpumalanga's 234 cases are concentrated in Life Midmed (224 cases), while North West's 50 cases are dispersed across six hospitals, none exceeding 22 cases.

National Perspective

The overall distribution is highly right-skewed, with a small number of hospitals performing the majority of procedures. The top five hospitals alone account for more than 50% of all recorded hip replacements, emphasizing the central role of major academic and private centres in meeting surgical demand.

Trends and Implications

Current patterns in the registry data reflect substantial variation in reporting rates across hospitals rather than true differences in surgical volume or service capacity. Centres with established reporting systems naturally appear to perform higher numbers of hip replacements, while many hospitals record very few or no cases. This uneven data submission makes it difficult to draw valid conclusions about regional workload, service distribution, or access to care.

Instead, the primary implication is the need to strengthen and standardize data capture across all hospitals. Improving completeness of reporting will not only enhance the accuracy of national trends but also ensure that comparisons between centres are meaningful. Facilities with low or absent submission rates represent an important opportunity for targeted support, training, and system integration to improve registry participation. As reporting compliance improves, the dataset will more reliably reflect the true national burden of hip disease and allow for better planning, quality monitoring, and resource allocation.

Outcome Measures for Primary Hip Replacement Surgery

Patient-reported outcomes following primary hip replacement demonstrate significant and sustained improvements across all measured domains.

EQ-5D Health VAS scores improved from an initial average of 72.3 to 85.4 at 6 months, peaking at 86.7 at 1 year, and remaining high at 83.7 after 2 years. These results closely align with registry averages, indicating consistent performance.

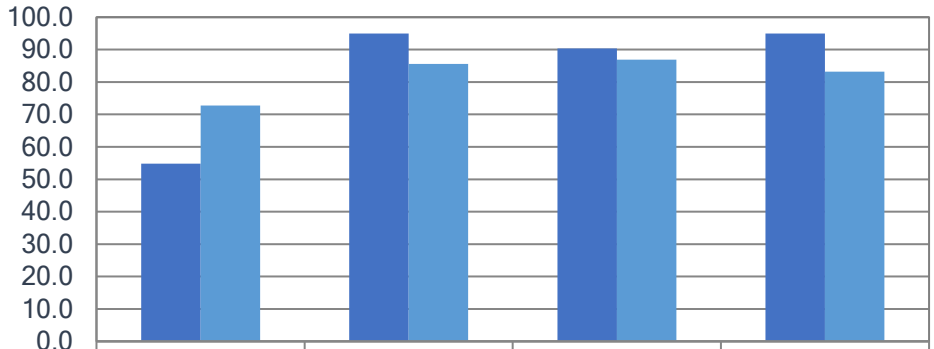
Similarly, the EQ-5D Health Index showed marked improvement from 0.480 preoperatively to 0.853 at 6 months, stabilizing at 0.881 at both 1 and 2 years, reflecting substantial gains in overall health-related quality of life.

Functional outcomes, measured by the Oxford Hip Score, increased from 21.6 preoperatively to 43.0 at 6 months and maintained excellent levels at 1 year (44.3) and 2 years (44.0), confirming durable functional recovery.

Pain relief was profound, with VAS Pain scores decreasing from 60.3 preoperatively to 11.2 at 6 months and remaining low at 1 year (9.2) and 2 years (10.0), indicating sustained pain control.

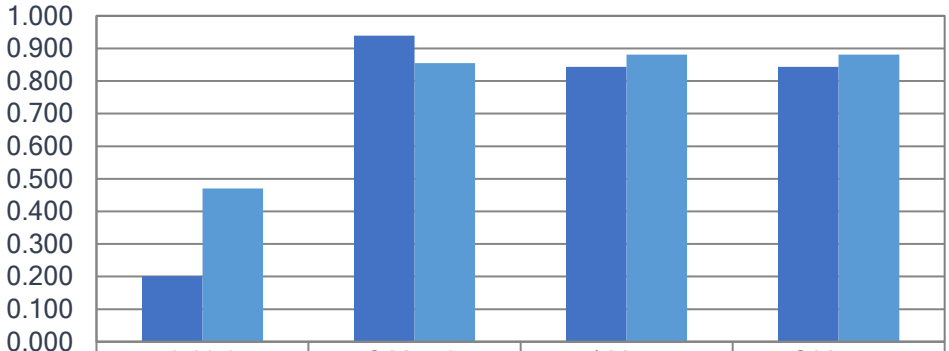
Overall, these outcomes highlight the effectiveness of primary hip replacement in improving quality of life, function, and pain, with results comparable to national registry benchmarks.

EQ5D Health VAS



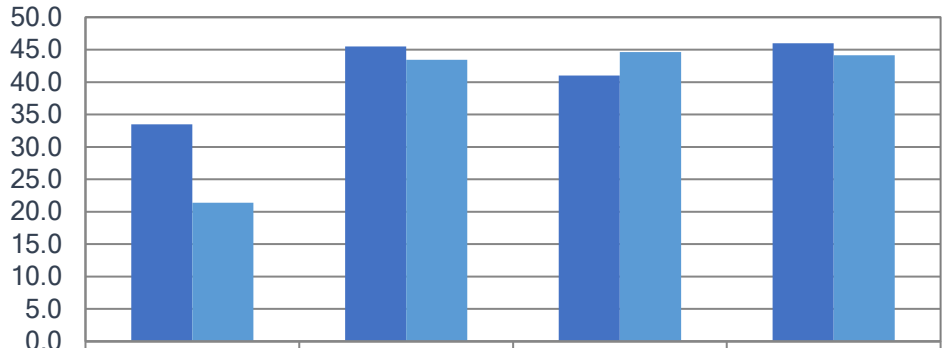
	Initial	6 Month	1 Year	2 Years
Selection Average	54.8	95.0	90.3	95.0
Registry Average	73	86	87	83
n	6	2	3	1

EQ5D Health Index



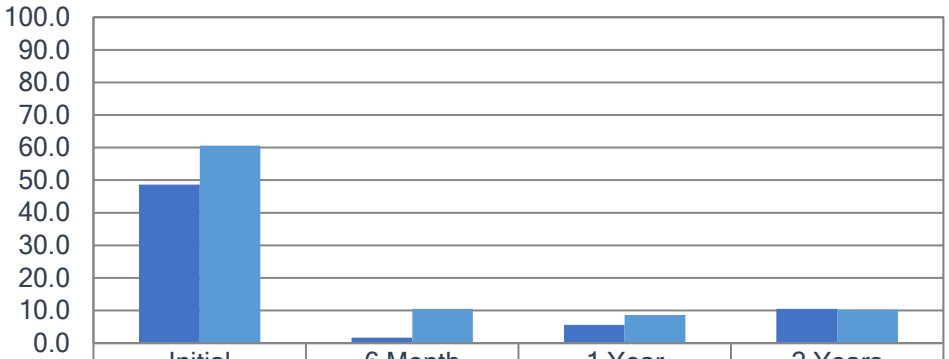
	Initial	6 Month	1 Year	2 Years
Selection Average	0.201	0.940	0.844	0.844
Registry Average	0.47	0.85	0.88	0.88
n	6	2	3	3

Oxford Hip Score



	Initial	6 Month	1 Year	2 Years
Selection Average	33.5	45.5	41.0	46.0
Registry Average	21	43	45	44
n	4	2	3	1

VAS Pain

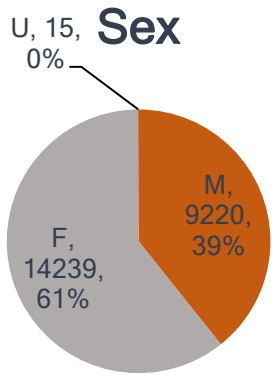


	Initial	6 Month	1 Year	2 Years
Selection Average	48.7	1.7	5.6	10.5
Registry Average	61	11	9	10
n	6	2	3	1

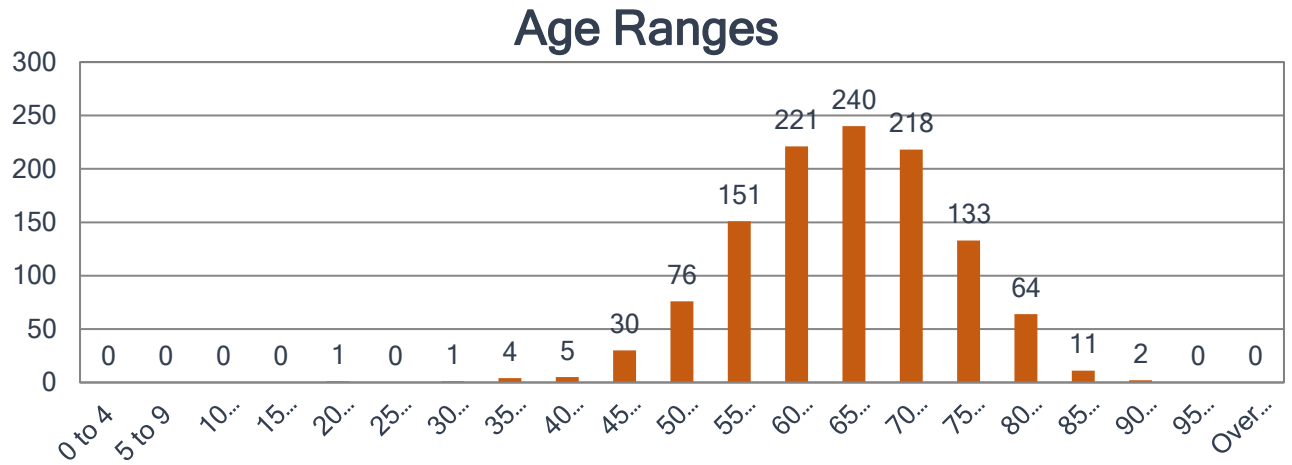
Knee Primary Arthroplasty Pathway

Marc Nortje

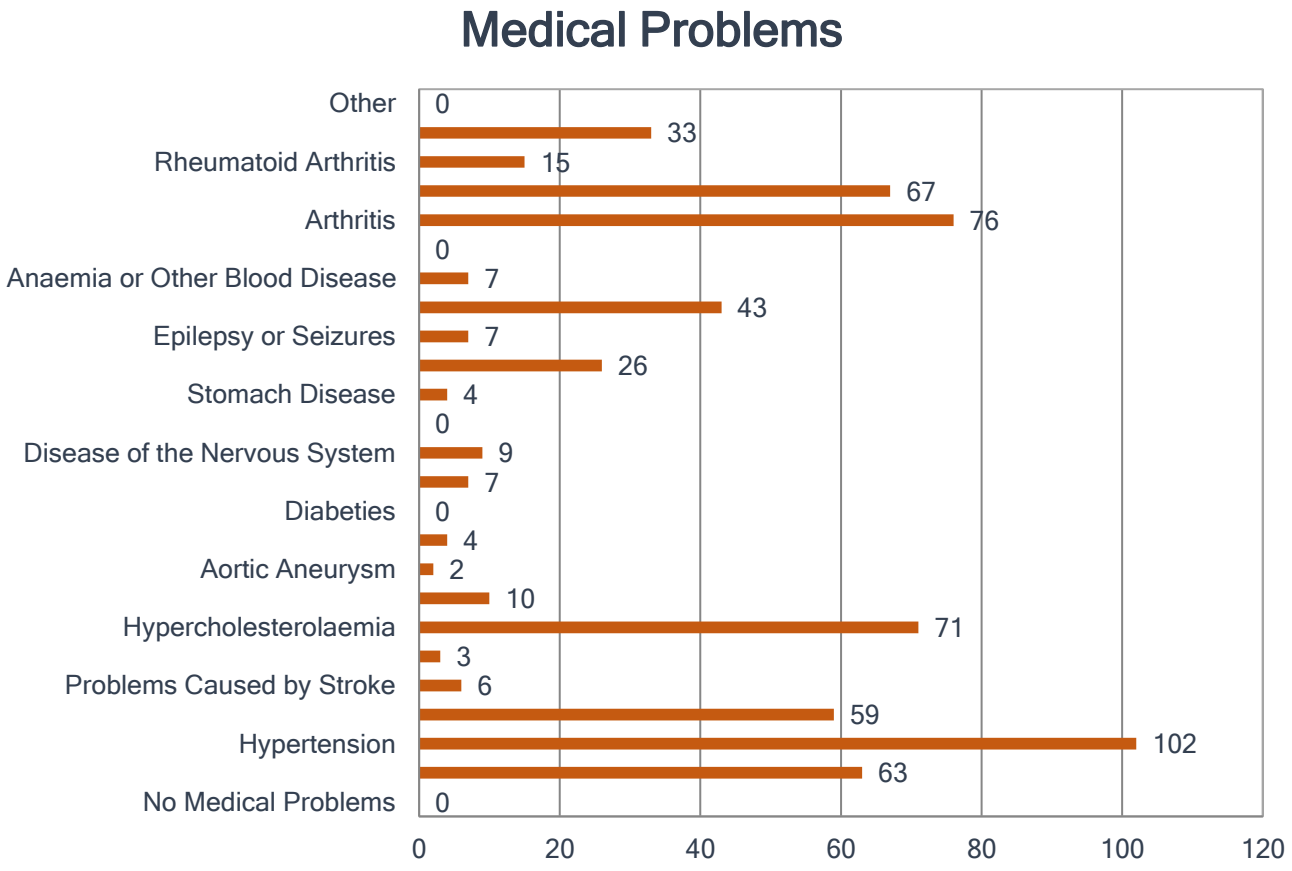
The sex distribution of patients undergoing knee arthroplasty shows a clear predominance of females. Of the total cohort, 61% (14 239 patients) were female. A very small number of cases (15 patients, <1%) had an unspecified sex recorded. This pattern is consistent with the known higher prevalence of symptomatic knee osteoarthritis among women, particularly in the older age groups typically represented in joint-replacement populations.



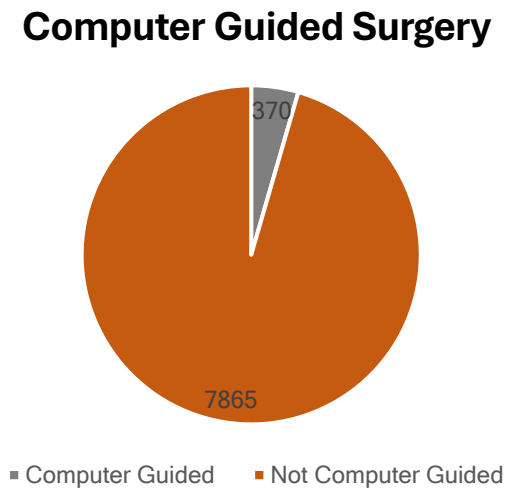
The BMI profile of patients undergoing knee arthroplasty shows that the vast majority fall within the overweight and obese categories. No patients were recorded in the underweight range, while the normal-weight group was relatively small. Most patients had BMIs between 25 and 35, with similar case numbers in the overweight (25–30) and class I obesity (30–35) ranges. The largest single category was BMI ≥35, reflecting the well-established association between elevated BMI and advanced degenerative knee disease requiring surgical intervention.

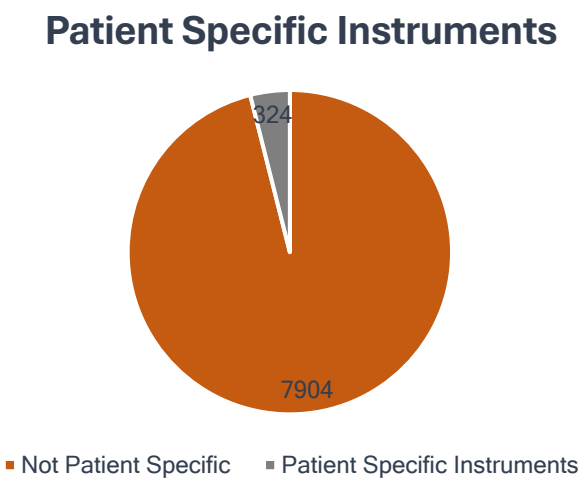


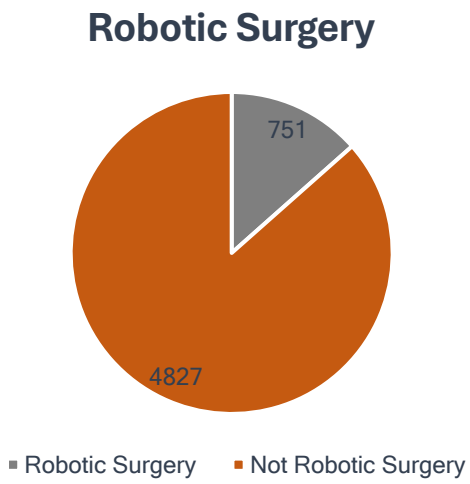
The age distribution of patients undergoing knee arthroplasty continues to show a characteristic pattern dominated by older adults, with procedure frequency rising sharply from mid-adulthood and peaking in the seventh decade, with the average age being 67 years. Case numbers remain relatively low below the age of 40, after which volumes begin to increase rapidly, particularly from the mid-40s onward. A pronounced escalation occurs through the 50s and early 60s, reflecting the growing prevalence of symptomatic osteoarthritis in this age range. The highest concentration of surgeries occurs between ages 60 and 75, with annual counts consistently exceeding 600 procedures per single-year age and reaching a maximum around age 65, where approximately 800 cases were performed. Beyond age 75, the distribution shows a progressive decline, although substantial numbers of procedures are still completed into the late 70s and early 80s. By age 90 and above, case numbers fall to very low levels. Overall, the data demonstrates that knee replacement surgery is most commonly performed in the 60–75-year age group, aligning with established epidemiological patterns of degenerative joint disease in the ageing population.



Most patients having knee arthroplasty had one or more chronic medical conditions, with hypertension being the most common comorbidity (102 patients), followed by heart disease (63), hypercholesterolaemia (71), and arrhythmia (59). Musculoskeletal conditions such as arthritis (76) and back pain (67) were also frequent. Smaller proportions of patients reported depression, cancer within the last five years, thyroid disease, or neurological disorders. As with hip arthroplasty the recording of medical co morbidities was poor.







Use of Technology in TIKR

The capture of technology-related variables within the TIKR dataset has evolved gradually, and due to reporting inconsistencies, this section reflects information recorded up to the end of 2025, whereas the remainder of the knee arthroplasty report includes data only up to the end of 2024. Data for computer-guided surgery, patient-specific instrumentation, and related technologies have been

collected only in recent years, and the completeness of these fields is still improving across participating sites.

Robotic-assisted knee arthroplasty datasets had dedicated recording commence in 2020. The pattern over time demonstrates a clear and steady increase in the utilisation of robotic platforms within South Africa. This trend is best appreciated in the table below, which summarises participating hospitals and their recorded robotic volumes over the five-year period from 2020 to 2024. The expansion reflects the progressive rollout of robotic systems across both public and private centres, alongside broader surgeon adoption and institutional readiness.

Overall, while reporting variability limits direct comparison with other sections of the dataset, the available information shows a consistent upward trajectory in the use of enabling technology, most notably robotics—within knee arthroplasty practice across the TIKR network.

Hospital	Robotic cases recorded
2020	**14**
Groote Schuur Hospital	4
Life Vincent Palotti	10
2021	**3**
Groote Schuur Hospital	1
Mediclinic Milnerton	1
Tygerberg Hospital	1
2022	**53**
Mediclinic Durbanville	18
Mediclinic Milnerton	23
Mediclinic Panorama	3
Mediclinic Winelands Orthopaedic Hospital	5
Netcare Pretoria East Hospital	3
Netcare Unitas Hospital Centurion	1
2023	**99**
Groote Schuur Hospital	3
Life Westville Private Hospital	12
Mediclinic Durbanville	39
Mediclinic Hoogland (Bethlehem)	3
Mediclinic Milnerton	27
Mediclinic Paarl	3
Mediclinic Panorama	3
Netcare Pretoria East Hospital	9
2024	**246**
Groote Schuur Hospital	2
Life Eugene Marais Hospital	2
Life Faerie Glen Hospital	2
Life Hilton Private Hospital	44
Life Westville Private Hospital	36
Mediclinic Bloemfontein (Private)	2
Mediclinic Durbanville	67
Mediclinic Milnerton	34
Mediclinic Paarl	33
Mediclinic Vergelegen	6
Netcare Pretoria East Hospital	5
Westville Hospital	12
Zuid-Afrikaans Hospital	1
Grand Total	**415**

Patella resurfacing trends over the years			
Year	Not Resurfaced	Resurfaced	Grand Total
2014	5		5
2015	41		41
2016	41		41
2017	32	2	34
2018	50	5	55
2019	134	15	149
2020	356	42	398
2021	419	175	594
2022	771	311	1082
2023	802	332	1134
2024	921	426	1347
2025	803	407	1210
Grand Total	**4375**	**1715**	**6090**

Patella Resurfacing Trends

The patella resurfacing data from 2014 to 2025 demonstrates a clear and evolving shift in surgical practice. In the early years of the dataset, resurfacing was essentially non-existent, with almost all total knee arthroplasties proceeding without patellar replacement. From 2017 onward, however, resurfacing began to appear in small but gradually increasing proportions.

A notable change occurred from 2020, when the percentage of resurfaced patellae started to rise more sharply. Over the subsequent years this upward trajectory continued, with resurfacing representing an expanding share of all knee arthroplasties. By 2024, patella resurfacing accounted for a significantly larger proportion of cases compared with the mid-2010s, indicating a steady and sustained increase in surgeon adoption.

Despite this growth, non-resurfacing still remained the majority approach across the full 11-year period. However, the year-on-year trend shows a clear and consistent narrowing of the gap between resurfaced and non-resurfaced procedures, reflecting changing practice patterns, evolving evidence, and broader comfort with resurfacing techniques.

Prosthesis Manufacturer Distribution

Prosthesis manufacturer information was available for 5,143 recorded cases, allowing an overview of the relative market share of implant suppliers within the TIKR dataset. The table below reflects the ranked order of manufacturers, showing a clear predominance of a small number of companies, with several others represented at much lower volumes.

A single manufacturer accounts for the largest proportion of recorded implants, followed by a cluster of mid-volume suppliers that together make up a substantial share of the remaining cases. Beyond these, several companies contribute only a small fraction of the total, highlighting the long-tail distribution typical of implant selection in mixed public–private datasets.

This table provides a high-level overview of manufacturer usage only. A separate, more detailed table will follow, outlining the specific prosthesis models used by each company.

Manufacturer	Number
Zimmer Biomet	2702
Smith & Nephew	803
Medacta UK Ltd	791
Depuy Synthes	550
MicroPort Orthopedics	547
Stryker	462
United Orthopedic Corporation	387
Braun / Aesculap	128
Corin	36
Mathys Orthopaedics Ltd	27
DJO	13
Gruppo Bioimpianti	10
Other Implant	8
Episurf	5
Johnson and Johnson	5
Amplitude	2
Link	2
Grand Total	**6478**

Manufacturer of Inserted Implant	
Name	**No.**
Amplitude - UNI-SCORE Unicompartmental Knee	2
Braun / Aesculap - EnduRo	1
Braun / Aesculap - Other	31
Braun / Aesculap - Search Evolution PS Cemented Implant (CoCrMo)	1
Braun / Aesculap - Total Knee Replacement Columbus CR/PS	38
Braun / Aesculap - Total Knee Replacement Columbus CR/RP	3
Braun / Aesculap - Total Knee Replacement Columbus CR/RP Cemented	49
Braun / Aesculap - Total Knee Replacement Columbus CR/RP Cementless	1
Braun / Aesculap - Total Knee Replacement Columbus PS Cemented	1
Braun / Aesculap - Total Knee Replacement Columbus Revision	1
Braun / Aesculap - Total Knee Replacement Columbus Revision Femur Stem 5 deg. Cementless Stems	2
Corin - Other	1
Corin - Unity CR Component	16
Corin - Unity PS Component	19
Depuy Synthes - Attune CR	393
Depuy Synthes - Attune PS	11
Depuy Synthes - LCS	28
Depuy Synthes - LCS Primary Component	115
Depuy Synthes - Sigma HP Partial Knee	3
DJO - Empowr 3D Knee	13
Episurf - Other	5
Gruppo Bioimpianti - K-MOD Knee	10
Johnson and Johnson - Other	5
Link - Endo-Model Hinge Knee	1
Link - Endo-Model Rotational Knee	1
Mathys Orthopaedics Ltd - BalanSys Bicondylar CR	25
Mathys Orthopaedics Ltd - Balansys PS	2
Medacta UK Ltd - GMK	200
Medacta UK Ltd - GMK Sphere	459
Medacta UK Ltd - Other	132
MicroPort Orthopedics - EVOLUTION Medial Pivot Femur CS/CR	384
MicroPort Orthopedics - EVOLUTION Medial Pivot PS	162

MicroPort Orthopedics - Other	1
Other Implant	8
Smith & Nephew - Genesis II Non-Porous CR	11
Smith & Nephew - Genesis II Non-Porous PS	48
Smith & Nephew - Genesis II Oxinium CR	1
Smith & Nephew - Genesis II Oxinium PS	16
Smith & Nephew - Genesis II P/S	3
Smith & Nephew - Genesis II Porous PS	11
Smith & Nephew - Journey II BCS	19
Smith & Nephew - Journey II BCS (Bi-Cruciate Stabilised Total Knee System)	15
Smith & Nephew - Journey II Bi-Cruciate Stabilized Component	4
Smith & Nephew - Journey II CR (Cruciate Retaining)	30
Smith & Nephew - Journey II UK	8
Smith & Nephew - Journey PFJ Patello-Femoral Replacement	1
Smith & Nephew - JOURNEY UNI	1
Smith & Nephew - Journey UNI Replacement	5
Smith & Nephew - Legion CR/PS	519
Smith & Nephew - Legion Narrow	18
Smith & Nephew - Legion Revision Knee	2
Smith & Nephew - Other	91
Stryker - Duracon Total Knee System - Standard Component	1
Stryker - Restoris MCK	70
Stryker - Triathlon CR	172
Stryker - Triathlon CS	127
Stryker - Triathlon Knee System - CR Component	8
Stryker - Triathlon Knee System - PS Component	12
Stryker - Triathlon PS	71
Stryker - Triathlon TS	1
United Orthopedic Corporation - U2 Knee System CR	361
United Orthopedic Corporation - U2 Knee System PS	25
United Orthopedic Corporation - U2 PSA Revision Knee	1
Zimmer Biomet - Birmingham RHK Knee	1
Zimmer Biomet - CR Total Knee Prosthesis	2
Zimmer Biomet - Gender Solution PFJ Solution	30
Zimmer Biomet - INNEX CR component	1
Zimmer Biomet - Knee Replacement System	3
Zimmer Biomet - Legacy Constrained Condylar Knee LCCK	3
Zimmer Biomet - NexGen CR	2

Zimmer Biomet - NexGen Gender Solutions LPS-Flex Option	1
Zimmer Biomet - NexGen LCCK Options	1
Zimmer Biomet - NexGen LPS Options	1
Zimmer Biomet - NexGen LPS-Flex Option	1
Zimmer Biomet - NexGen Rotating Hinge Knee	4
Zimmer Biomet - NexGen Sharp Fluted Stem Extensions	1
Zimmer Biomet - Other	4
Zimmer Biomet - Oxford Partial Cemented Twin Peg Knee High Flex	8
Zimmer Biomet - Oxford Partial Knee	129
Zimmer Biomet - Oxford Partial Knee Phase 3	14
Zimmer Biomet - Oxford Partial Knee Phase 3 Domed Lateral	2
Zimmer Biomet - Persona CR Narrow Component	647
Zimmer Biomet - Persona CR Standard Component	1027
Zimmer Biomet - Persona Partial Knee	35
Zimmer Biomet - Persona PS Narrow Component	74
Zimmer Biomet - Persona PS Standard Component	704
Zimmer Biomet - Segmental Distal Component	1
Zimmer Biomet - Segmental Fluted Stem Extension Straight	2
Zimmer Biomet - Trabecular Metal Cone Augment	4

Surgeon contribution

A total of 153 surgeons has contributed cases to the knee arthroplasty pathway. Across all years—combining historical entries (pre-2019) and the modern registry period (2019 onward)—the number of cases recorded per surgeon shows a wide distribution, ranging from 1 case at the lower end to 1,682 at the upper end. The median number of cases is 40, meaning half of all contributing surgeons have recorded 40 or fewer cases. The mean is approximately 137 cases per surgeon, reflecting the influence of a relatively small number of high-volume contributors whose activity elevates the average.

Looking at participation across eras, just as in the hip pathway, the knee data show continuity with renewal. When comparing the top 10 contributors from the historic period (pre-2019) with the top 10 in the modern registry period (2019–2025), there is an overlap of 3 surgeons, indicating strong ongoing engagement from a core group, alongside turnover where some historic high-volume contributors have reduced volumes and several new high-volume contributors have emerged since 2019.

Volume distribution is characteristically skewed. The top decile of contributors (≈16 surgeons) accounts for roughly 57% of all recorded knee arthroplasty cases, while most surgeons contribute low- to moderate-annual volumes typical of mixed-practice settings or lower-throughput units.

Annual activity within the modern registry shows expansion in case counts with a relatively stable number of active surgeons. From 2021 to 2025, total annual cases nearly doubled (≈95% increase), while the number of surgeons recording cases each year remained in a narrow band (roughly 56–63 active contributors per annum). Overall, post-2019 cases represent about 56% of all recorded knee arthroplasties in the dataset, underscoring the growth of the modern registry and broader onboarding of participating centres.

Summary of Regional TKR Activity

The national dataset shows considerable variation in total knee replacement activity across regions. Gauteng records by far the highest overall volume, contributing a substantial proportion of all procedures nationally. The Western Cape follows as the second-largest contributor with a strong and diverse mix of high-volume centres. KwaZulu-Natal and the Eastern Cape sit in the mid-range, each providing a meaningful share of national activity, while Mpumalanga, the Free State, and the North-West contribute markedly smaller totals.

Eastern Cape

The Eastern Cape's total reflects a moderate overall contribution, with activity concentrated in a small number of larger urban hospitals. A single centre dominates the region's total, while several medium-volume facilities contribute steadily, and the remaining hospitals provide relatively low volumes. This results in a region where service delivery is present across multiple sites but is heavily weighted toward one major provider.

Free State

The Free State shows a small overall total relative to most other provinces. The bulk of its activity comes from one major private institution, with very limited volumes spread thinly across several smaller hospitals. This pattern indicates a centralised provincial service in which one key site accounts for most procedures.

Gauteng

Gauteng stands out as the country's largest contributor by a wide margin. The region has a dense network of high-, medium, and low-volume hospitals, ranging from major tertiary centres with extremely high throughput to numerous mid-sized private hospitals with substantial case volumes of their own. A few very large contributors significantly shape the provincial total, but unlike many other regions, Gauteng displays broad distribution across many active sites rather than reliance on one or two dominant centres. This reflects both population density and the concentration of orthopaedic services across the province.

KwaZulu-Natal

KwaZulu-Natal reports a moderate-to-high total, comparable to the Eastern Cape. One high-volume private hospital accounts for most of the region's activity, with several other mid-volume hospitals contributing notable but smaller shares. A long tail of low-volume centres rounds out the distribution. The pattern shows strong private-sector dominance with limited public-sector volumes.

Mpumalanga

Mpumalanga contributes a relatively small portion of the national total, with the majority of activity concentrated in one dominant centre. A few additional facilities contribute modest volumes, but overall, the region's surgical activity is clustered, with limited spread across sites.

North - West

The North - West province has one of the lowest overall totals nationally. Activity is scattered across a handful of facilities, each contributing relatively small numbers, with no major regional high-volume centre. This reflects a sparse distribution of knee arthroplasty services in the province.

Western Cape

The Western Cape is the second-largest contributor after Gauteng. The region shows a healthy spread of activity across a mix of high-, medium-, and low-volume hospitals. One exceptionally high-volume centre dominates the provincial total, but several other hospitals also contribute strongly, reflecting a robust network of arthroplasty services across both metros and surrounding towns.

Province and Hospital	**Number of TKR**
Gauteng	**5938**
1 Military Hospital	232
Cintocare Private Hospital	8
City Hospital Ltd.	6
Cormed Private Hospital	55
Cure Day Hospital Erasmuskloof	1
Hyperlife Medical Centre	7
Life Bedford Gardens Hospital	126
Life Eugene Marais Hospital	44
Life Faerie Glen Hospital	592
Life Flora Hospital (Roodepoort)	1

Life Fourways Hospital	111
Life Glynnwood Hospital (Benoni)	41
Life Groenkloof Pretoria	177
Life Robinson Hospital (Randfontein)	156
Life Wilgeheuwel Hospital	18
Life Wilgers Hospital Pretoria	400
Mediclinic Donald Gordon (WITS)	22
Mediclinic Emfuleni (Vanderbijlpark)	326
Mediclinic Midstream	43
Mediclinic Morningside	460
Mediclinic Muelmed	189
Mediclinic Sandton	43
Netcare Jakaranda Pretoria	35
Netcare Linksfield Hospital	108
Netcare Montana Hospital	36
Netcare Moot General Hospital	11
Netcare Pinehaven Hospital	371
Netcare Pretoria East Hospital	321
Netcare Sunninghill Hospital	3
Netcare Unitas Hospital Centurion	1516
Netcare Waterfall Hospital in partnership with Phelang Benolo	4
Steve Biko Hospital	16
Union Hospital (Alberton)	10
Wits University Donald Gordon Medical Centre	23
Zuid-Afrikaans Hospital	426
WC	**4101**
Groote Schuur Hospital	541
Life Bay View Hospital	18
Life Kingsbury Hospital	3
Life Vincent Palotti	1193
Mediclinic Cape Town	7
Mediclinic Constantiaberg	32
Mediclinic Durbanville	287
Mediclinic George	1

Mediclinic Hermanus	39
Mediclinic Milnerton	336
Mediclinic Paarl	222
Mediclinic Panorama	120
Mediclinic Stellenbosch	637
Mediclinic Vergelegen	70
Mediclinic Winelands Orthopaedic Hospital	334
Netcare Blaauwberg Hospital	131
Netcare Christiaan Barnard	12
Netcare N1 City Hospital	52
Tygerberg Hospital	4
Victoria Hospital	62
#N/A	**3100**
Other	3085
Unknown	15
KZN	**1316**
Ahmed Al Kadi Hospital (Mayville Durban)	3
Busamed Gateway Hospital	6
Edendale Hospital	1
Entabeni Private Hospital	2
Hillcrest Private Hospital	135
Life Entabeni Hospital	27
Life Hilton Private Hospital	339
Life The Crompton Hospital	11
Life Westville Private Hospital	647
Mediclinic Howick	1
Mediclinic Pietermaritzburg	14
Netcare Kingsway Hospital	75
Netcare St Augustine's Hospital	5
Netcare Umhlanga Hospital	2
Westville Hospital	48
EC	**1273**
Frere Hospital	91
Life St Dominic’s Hospital	198
Life St George's Hospital	741

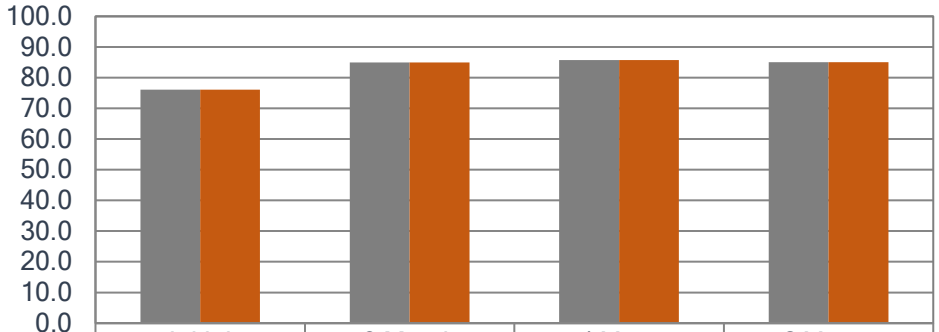
Life St James Hospital	66
Netcare Greenacres Hospital	11
The East London Eye Hospital (The Eye Centre)	166
Freestate	**562**
Bedford Hospital	3
Life Rosepark Hospital (Private)	128
Mediclinic Bloemfontein (Private)	393
Mediclinic Hoogland (Bethlehem)	36
Stoffel Coetzee Provincial Hospital (Smithfield)	2
Mpumalanga	**377**
Life Cosmos Hospital	19
Life Dalview Hospital	4
Life Midmed Hospital (Middelburg)	269
Lowveld Day Hospital	1
Mediclinic Nelspruit	10
Midvaal Private Hospital	74
NW	**53**
Anncron	1
Ferncrest Private Hospital (Thlabane)	11
Life Peglerae Private Hospital (Rustenburg)	8
Medicare Hospital Rustenburg	9
Mediclinic Potchefstroom	2
Netcare Mulbarton Hospital	4
Wilmed Private Hospital	18
Grand Total	**16720**

Patient-Reported Outcome Measures (PROMs)

Patient-reported outcome measures form a core component of the Knee Primary Arthroplasty Pathway, providing critical insight into patient-perceived pain relief, function, and overall health status that cannot be captured by surgical or radiographic metrics alone. Within the TIKR dataset, PROMs collection has centred primarily on validated knee-specific and generic instruments, recorded pre-operatively and at defined postoperative intervals. While uptake has improved over time, PROMs completeness remains variable across centres and years, limiting longitudinal analysis at present. Nevertheless, the available data consistently demonstrate substantial postoperative improvement in pain, function, and quality-of-life scores following knee arthroplasty, in keeping with international benchmarks. Ongoing

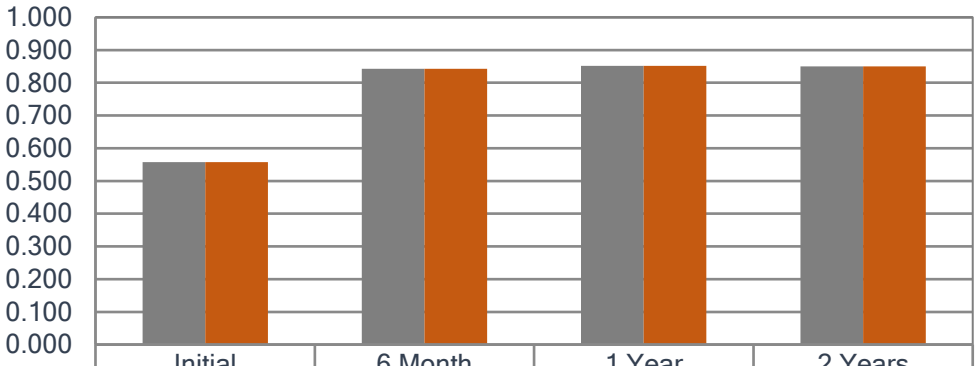
emphasis on standardised PROMs capture and follow-up is essential to strengthen outcome benchmarking, support quality improvement initiatives, and ensure that registry outputs remain aligned with patient-centred definitions of success.

EQ5D Health VAS



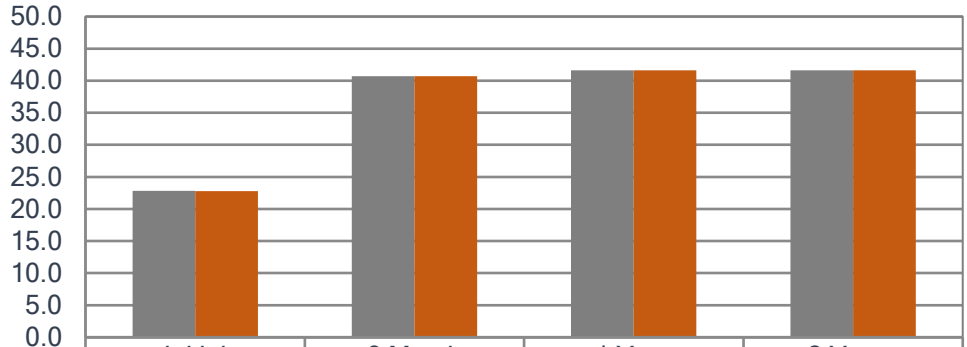
	Initial	6 Month	1 Year	2 Years
Selection Average	76.1	85.0	85.8	85.0
Registry Average	76	85	86	85
n	2421	1379	1157	533

EQ5D Health Index



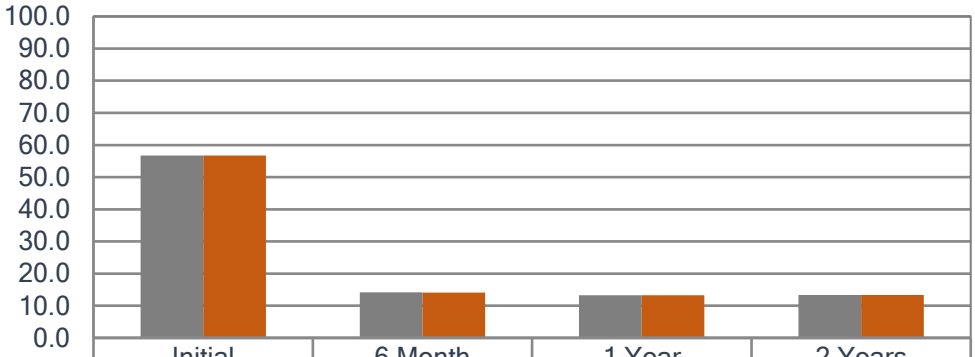
	Initial	6 Month	1 Year	2 Years
Selection Average	0.557	0.842	0.851	0.850
Registry Average	0.56	0.84	0.85	0.85
n	2421	1379	1157	533

Oxford Knee Score



	Initial	6 Month	1 Year	2 Years
Selection Average	22.8	40.7	41.6	41.6
Registry Average	23	41	42	42
n	2278	1439	1201	559

VAS Pain



	Initial	6 Month	1 Year	2 Years
Selection Average	56.7	14.2	13.2	13.4
Registry Average	57	14	13	13
n	2336	1332	1074	475

Hand/Wrist Pathway

Megan O'Connor

1. Introduction

This report summarizes pathways captured in the SAOR Hand/Wrist pathway (PRO Series) from database inception in 2019 to 2025. Each unique pathway represents a single patient that potentially had more than one 'instance' of capture in the registry (each instance represents a procedure or surgery). The report describes patient demographics (age, sex, dexterity and BMI), their surgical care (the operative year, hospital location of procedure, anesthetic modality, surgeon, nature of procedure, and surgical approach utilised. Implant utilisation for certain procedures is discussed in-depth, and the report concludes with analysis of the appropriate patient-reported outcome measures (PROMs). During this period a total of 1564 patient pathways were initiated. As with many real-world registries, this pathway does not mandate completion of all fields, and missingness varies substantially between variables. Where possible, missing data is explicitly quantified and interpreted in the context of available data.

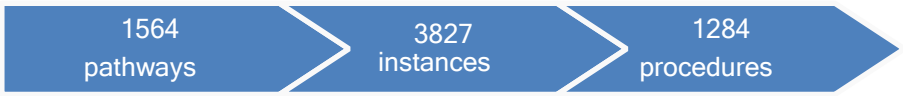


Figure 1.1. Overview of Hand/Wrist pathway (PRO Series) activity and data completeness (inception to 2 February 2026).

2. Patient Demographics

A total of 1564 patient pathways were initiated, with 3827 instances, representing 2.5 instances per patient. Completion of demographic fields was variable, and are summarized in Table 2.1

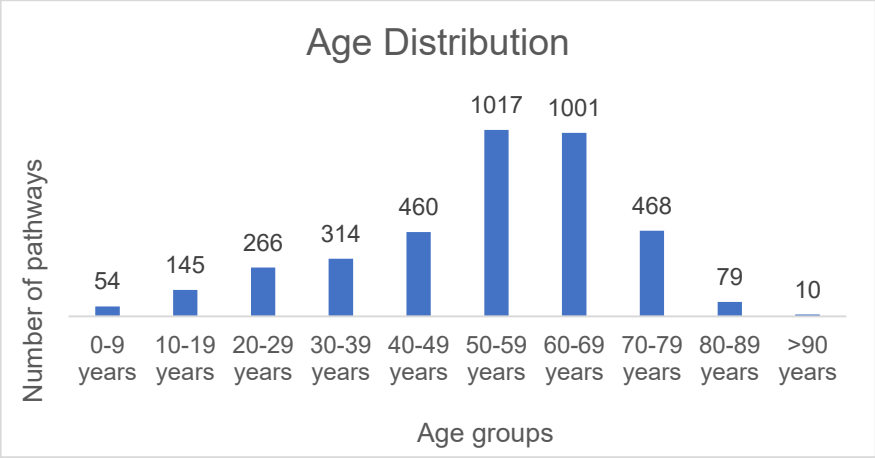
Table 2.1. Summary of pertinent demographic field completion and missing values for each pathway instance (n=3827)

Variable	Recorded (n)	Missing (n)	Missing (%)
Age (years)	3,814	13	0.3%
Sex	3,810	17	0.4%
Dexterity/handedness	1,375	2,452	64.1%
BMI (kg/m²)	2,241	1,586	41.4%

Age was recorded for 3,814 pathways, with the distribution concentrated in the 50–59 and 60–69-year categories (n=1,017 and n=1,001). Although the detailed indications for surgery are presented later, the

age profile already suggests a predominance of elective hand-surgery conditions, particularly degenerative and compressive neuropathies, which increase in prevalence with age. This pattern is well documented internationally: procedures such as thumb-base arthroplasty and carpal tunnel decompression predominantly affect individuals over 50, while trauma-related operations (fractures, tendon lacerations, and similar injuries) occur more commonly in younger, working-age populations.[1] This mirrors findings from the British Society for Surgery of the Hand (BSSH) United Kingdom Hand Registry, which similarly reports an older age distribution for elective cases and a younger one for trauma.[2]

Sex was recorded for 3,810 pathways, with females comprising 62.8% (n=2,391) and males 37.2% (n=1,417).



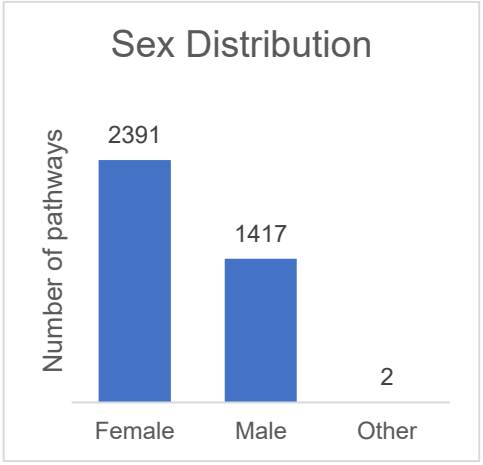


Figure 2.1 and 2.2. Age and sex distribution of pathways

Hand dominance is an important consideration in hand-surgery outcomes, given its influence on functional limitation, recovery burden, and socioeconomic impact. Dexterity was documented for 1,375 pathways, while 2,452 pathways lacked this information. Among recorded cases, right-hand dominance predominated (n=1,256; 91.3%). In the subset where both dexterity and operated side were available (n=1,225), procedures involved the dominant hand in 53.4% of cases (52.6% when ambidextrous patients are excluded). This near-equal split underscores the meaningful functional implications of surgery for many patients, particularly those whose dominant hand is affected. To support more robust analyses of functional burden, time-to-return-to-work, and economic impact, systematic capture of operated side alongside dexterity should become a registry standard.

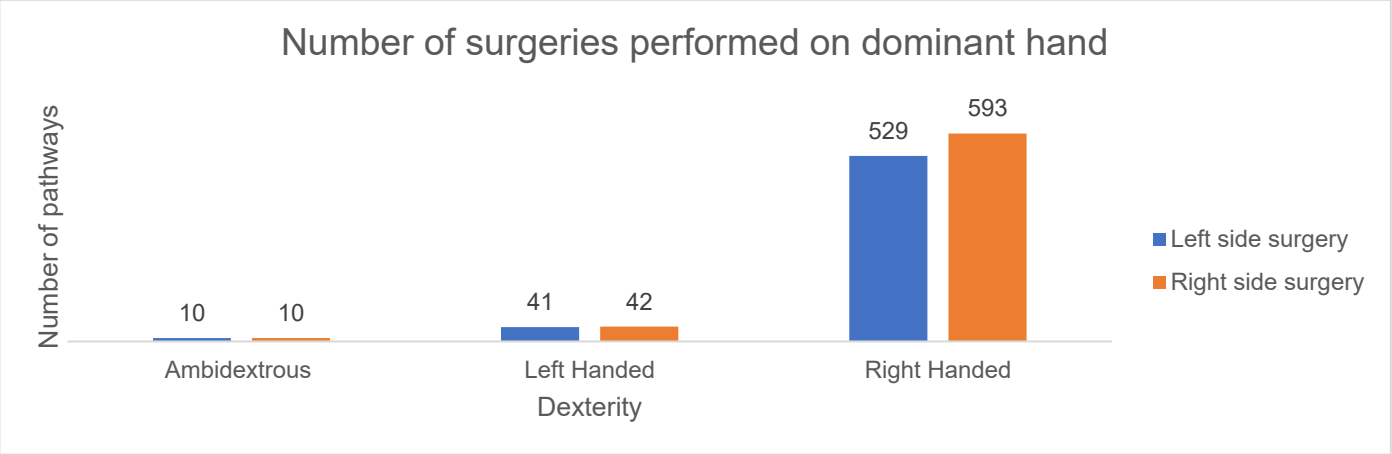


Figure 2.3. Dexterity (hand dominance) distribution split by side operated

Body Mass Index (BMI) was recorded for 2,241 pathways (1,586 missing; 41.4%). Of those with available data, an alarming 46.1% (n=1,032) fell within an obesity category (BMI ≥30 kg/m²).

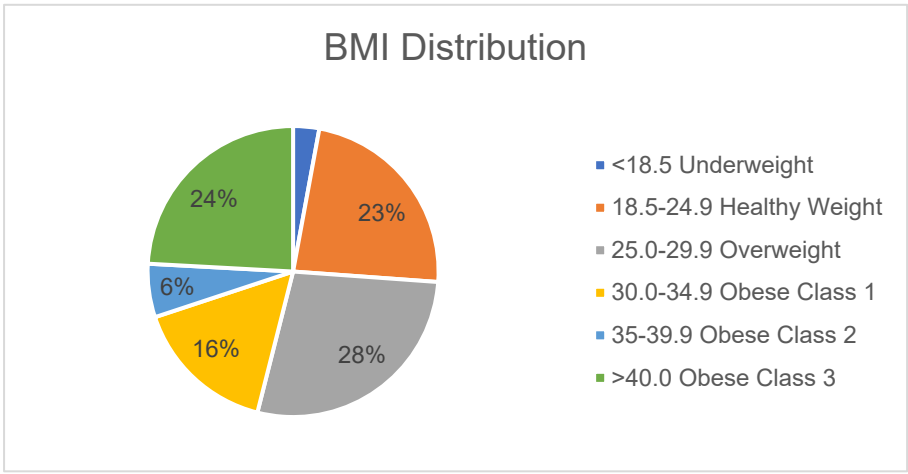


Figure 2.4. BMI distribution of patients along pathway instances.

Although BMI is not traditionally emphasised in hand-surgery reporting, its relevance is increasing, particularly in South Africa's private sector, where the application of modifier 0018 for obesity-related surgical complexity is under heightened scrutiny. Importantly, the high prevalence of obesity observed in this cohort is consistent with national epidemiological trends. The World Health Organisation (WHO) African Region analysis identifies South Africa as having the highest adult obesity prevalence in the African region, with approximately one in three adults classified as obese.[3] Similarly, the 2021–2023 Human Sciences Research Council National Food and Nutrition Security Survey reports that nearly half of South African adults are overweight or obese, with the highest prevalence occurring in individuals aged 35–64 years, a demographic strongly represented in this dataset.[4] These findings highlight an important intersection between population health trends and peri-operative planning, emphasising the need for more consistent BMI documentation within the registry.

3. Surgery, anaesthetic and implant detail

Surgical details were available for a subset of pathway instances with procedure information recorded. The nature of the procedure was available for 1,284 cases, while 1,288 pathways had a recorded year of surgery, including six entries dated prior to 2019 (year of inception) and three entries dated 2026 (after registry data extraction date). This anomaly is reported for transparency, as it illustrates a broader principle, incomplete or inaccurate data captured in the registry directly limits the accuracy and analytic value of the registry. Additional surgical variables analysed included the hospital of treatment, anaesthetic modality, the primary surgeon (anonymised), the nature of the surgery and the surgical approach. Although surgical approach categories (dorsal, volar, or combined) offered limited discriminatory value, the remaining variables provide useful insights into practice patterns, data completeness, and case distribution across contributing centres and surgeons.

Table 3.1. Summary of surgery details presented in the report of the total pathway instances

Variable	Recorded (n)	Missing / Not recorded (n)	Missing (%)
Year of surgery (procedure date)	1,279	6 (dated < 2019) 3 (dated > 2025)	—
Hospital of treatment	783	505	39.2%
Anaesthetic modality	764	524	40.7%
Surgical approach	545	743	57.7%
Procedure group classification	1,284	4	0.3%
Primary surgeon (pathway owner)	3,827	0	0%

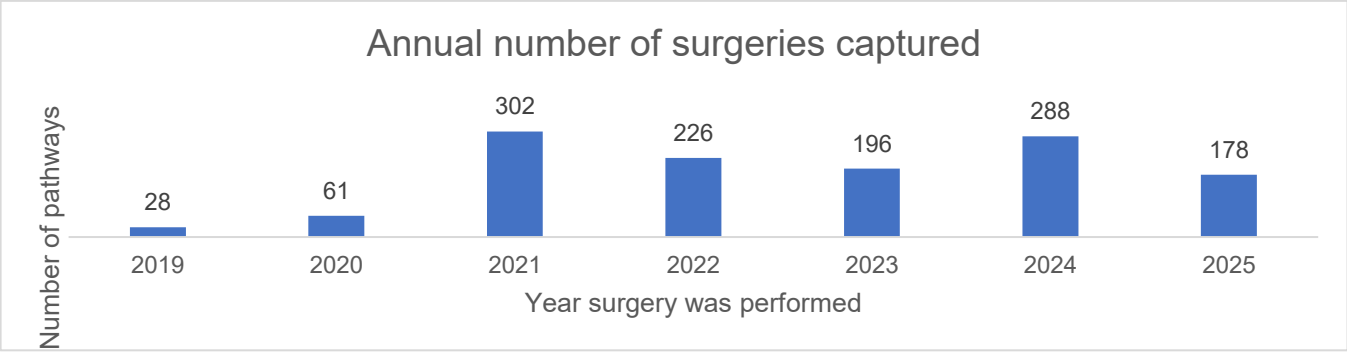
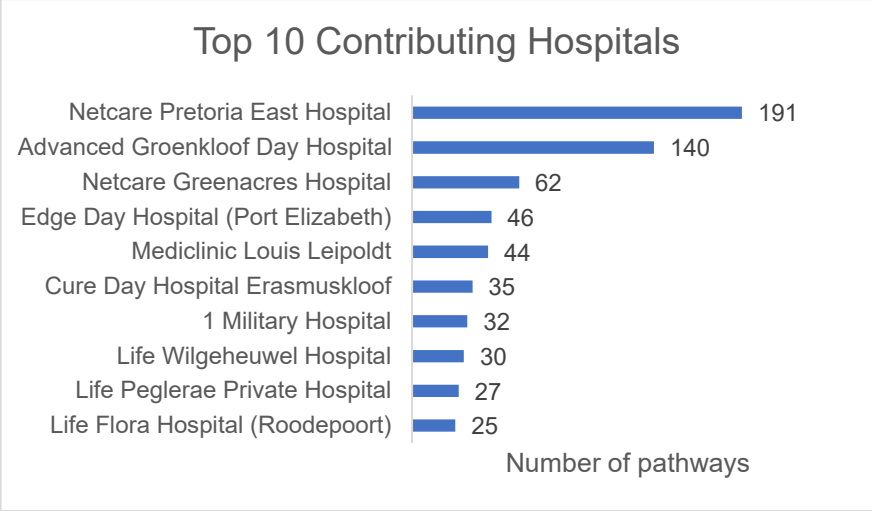


Figure 3.1. Annual number of recorded procedures (2019–2025). Entries dated <2019 and >2025 excluded

Recorded procedures increased gradually from registry inception, with the highest annual counts observed in 2021, reflecting limited early adoption of the pathway and then fluctuating annual capture rates thereafter. Across the 2019–2025 period, 1,279 procedures had a *valid* recorded year of surgery.



Hospital of treatment was recorded in 783 cases. Case volume was concentrated within a small number of facilities, most notably Netcare Pretoria East Hospital (n=191) and Advanced Groenkloof Day Hospital (n=140), with progressively smaller contributions from a range of other private and day-surgery centres.

Figure 3.2. Top contributing hospitals by recorded case count (denominator: cases with hospital captured).

Anaesthetic modality was recorded in 764 cases, while 524 lacked this information. General anaesthesia (GA), with or without local or regional blocks, was the predominant modality (n=663). This pattern is consistent with practice norms in the South African private sector, where GA is described by private anaesthetic groups as the most commonly used technique for surgical procedures, including hand surgery.[5] In contrast, although WALANT has gained momentum in public sector units to reduce theatre burden and improve access, it remains less widely adopted in private hospitals, where traditional GA-based workflows continue to dominate.[6,7] The predominance of GA in this registry is therefore unsurprising, given that the majority of contributing hospitals are private facilities.

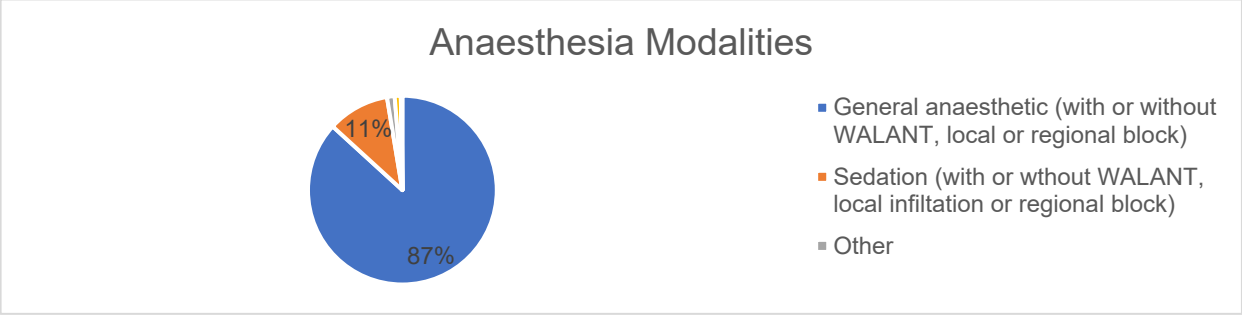


Figure 3.3. Anaesthetic modality distribution.

Primary surgeon (pathway owner) data were complete for all 3,827 pathways. Cases were contributed by a broad group of clinicians (n=20), although volume was notably concentrated among a small number of high-volume surgeons. The five largest contributors together accounted for about 85% of the pathways. This pattern of unequal distribution is typical of national registries in which a small group of early adopters or high-volume specialists contribute the majority of cases. While this provides a strong base for early analyses, expanding participation remains essential to achieving representative national benchmarking.

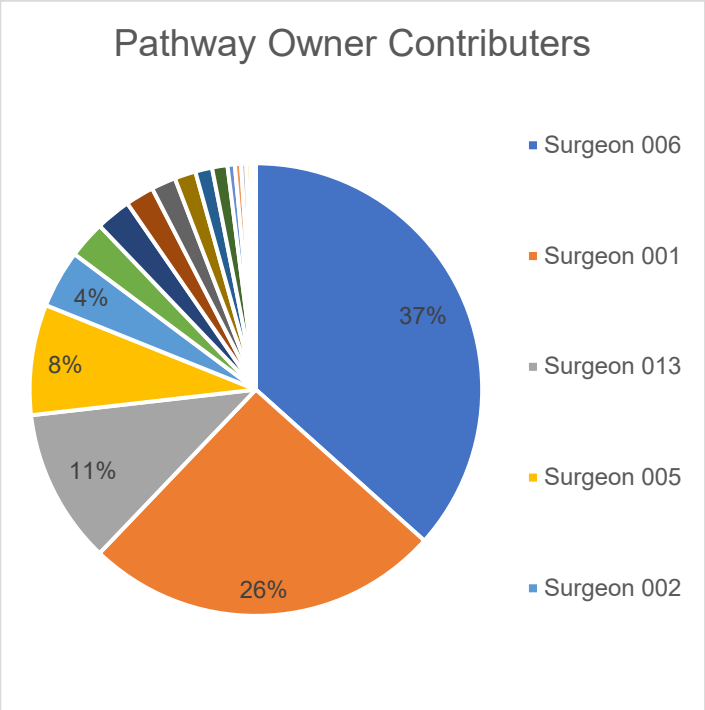


Figure 3.4: Surgeon contributors to the Hand/Wrist (PRO Series) Pathway

Because the Hand/Wrist (PRO Series) Pathway encompasses a broad spectrum of pathology, the recorded procedures represent a heterogeneous mix of elective and trauma-related conditions. To derive meaningful insights from this diversity, procedures were grouped according to the primary anatomical structure involved and broadly distinguishes between trauma and elective surgery. The full, ungrouped procedural breakdown is provided in Appendix A for completeness. The total number of procedures recorded were 1284. Within this grouped framework, carpometacarpal joint (CMC) of the thumb reconstructive procedures (n=368, 28.7%) and tendinopathy related surgery (n=222, 17.3%) emerged as the most frequently recorded categories, reinforcing the impression of a predominantly elective cohort. Trauma related procedures accounted for a smaller proportion of the case mix, with distal radius fracture (n=68,2, 4.8%) management predominating the surgeries for trauma. This pattern aligns with published trends in hand-surgery practice, where degenerative and overuse conditions dominate elective workloads, while trauma related interventions typically constitute a smaller subset of routine adult hand surgery.[2] In the sections that follow, the specific details of interphalangeal joint (IPJ), carpometacarpal joint (CMC) of the thumb, and wrist arthroplasty procedures are examined individually, given their clinical importance and the added value of analysing implant-level data.

Table 3.2. Procedures grouped by anatomical structure

Grouped Hand/Wrist Pathway Procedures	Count	%
Trauma		
Phalanx and metacarpal fracture & malunion management	49	3.8%
Carpal fracture & nonunion management	18	1.4%
Distal radius fracture & malunion management	62	4.8%
Removal metalware	46	3.6%
Flexor and extensor tendon repair or tenolysis	33	2.6%
Amputation (digit level)	4	0.3%
Nerve surgery	30	2.3%
Infection and wound management	16	1.3%
Tumour resection & management (incl. ganglia, Dupuytren's, gout tophi & cysts)	156	12.1%
Elective		
IPJ reconstructive surgery incl. fusion & replacement (fingers & thumb)	111	8.6%
MCPJ reconstructive surgery incl. fusion & replacement (fingers & thumb)	41	3.2%
CMC reconstructive surgery incl. resection, fusion & replacement (fingers & thumb)	368	28.7%
Carpal reconstructive surgery incl. partial fusions & carpectomy	25	1.9%
Radio- and ulno-carpal joint reconstructive surgery incl. stabilisation, fusion & replacement)	41	3.2%
Reconstruction (mixed tissues of fingers and thumb)	4	0.3%
Tendon transfers	9	0.7%
Tendinopathies	222	17.3%
Inflammatory disease incl. synovectomy for flexors, extensors & joints of wrist and hand	25	1.9%
Other (including contracture release and foreign body removal)	24	1.9%
Grand Total	**1284**	

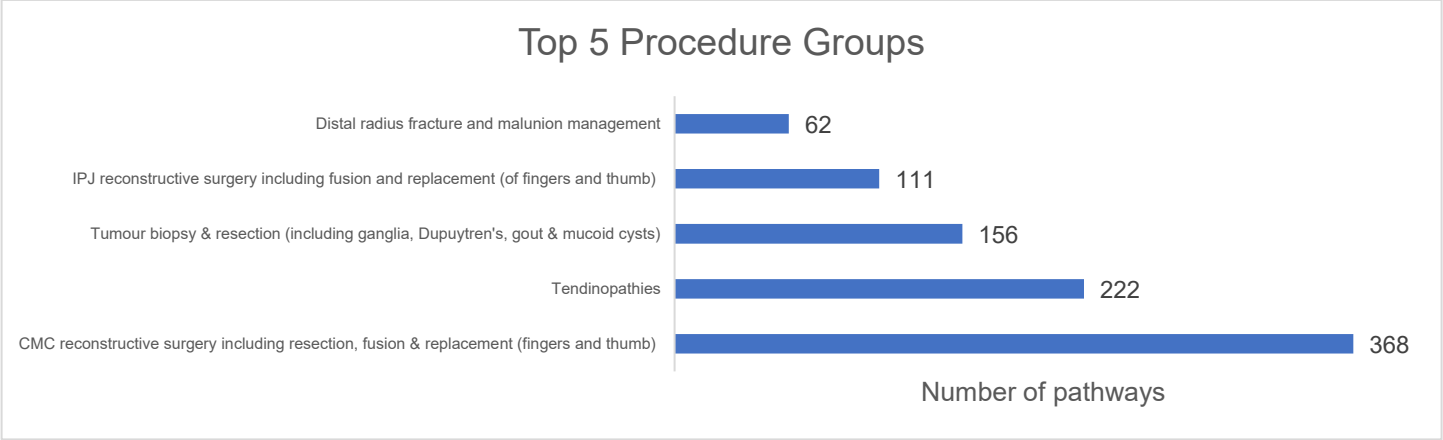


Figure 3.5: Top 5 procedure groups represented in the Hand/Wrist (PRO Series) Pathway

Thumb carpometacarpal (CMC) replacement

CMC reconstructive surgery was the most frequently recorded procedure group in the Hand/Wrist PRO Series pathway (n=368 of 1,284 procedures). Within this spectrum, CMC joint (basal joint) replacement was performed in 120 cases, with implant details documented for 107 of these. The KeriMedical Touch

dual-mobility prosthesis was the predominant device recorded, reflecting current adoption patterns within contributing South African centres. When compared with international practice patterns, the proportion of CMC arthroplasty observed in this registry appears higher than in several large national datasets, particularly those from the United States (US) and the United Kingdom (UK), where prosthetic CMC replacement represent only a small minority of thumb-base procedures.[10,11] A national US insurance-database analysis of over 160,000 CMC surgeries (2010–2022) reported that prosthetic arthroplasty accounted for just 1.1% of cases, with the overwhelming majority treated using ligament reconstruction and tendon interposition (LRTI, 60.8%) or other non-prosthetic procedures.[10] Similarly, European survey data from the Federation of European Societies for Surgery of the Hand (FESSH) showed that although practice varies geographically, prosthetic CMC joint replacement was the first-choice procedure for only 25% of responding surgeons overall, rising to high adoption in Belgium and France (96% and 72%, respectively), but remaining substantially lower across most other member countries.[11]

The pattern observed in this South African cohort, where 107 of 120 CMC arthroplasties reported a predominant prosthesis type and accounted for about a third (33%, 120 of 368) of CMC surgeries performed, reflects a notably concentrated, implant-driven surgical profile. This may relate to the relative novelty of CMC arthroplasty in the local context, selective reporting focused on arthroplasty-type procedures, or a combination of surgeon preference, private-sector implant availability, and training exposure. Given that implant choice is known to influence complication rates, functional outcomes, and the likelihood of revision in CMC osteoarthritis, the detailed capture of implant-specific practice patterns offers an important foundation for future benchmarking and outcome assessment. A contemporary systematic review indicates that although prosthetic arthroplasty may provide improved short-term function, trapeziectomy-based procedures continue to demonstrate lower complication rates and remain the dominant global standard of care.[12]

Table 3.3. Recorded CMC replacement implants

Implant	Count (n)	%
Kerimedical: Touch Dual Mobility CMC Joint Prosthesis	95	88.8%
Medartis: KeriMedical Touch CMCJ Replacement	10	9.3%
Lepine: MAIA Carpometacarpal Prosthesis	1	0.9%
Sovereign Medical: MAIA Trapezio-metacarpal Dual Mobility Joint Prosthesis	1	0.9%

Total wrist arthroplasty

Wrist total joint replacement implants were recorded in 6 of the 9 pathways that reported that a wrist replacement was performed. All recorded devices were Swemac Motec wrist joint prostheses, with no other wrist arthroplasty systems represented.

Interphalangeal joint (IPJ) and metacarpophalangeal joint (MCPJ) arthroplasty

IPJ reconstructive surgery accounted for 111 procedures and MCPJ reconstructive surgery for 41 procedures. Within this group, IPJ arthroplasty (single and multiple) was performed in 49 pathway instances and MCPJ arthroplasty (single and multiple) was performed in 12 pathway instances. Implants were recorded in 37 cases. Most recorded implants were Stryker devices.

Table 3.5. Recorded MCP/IPJ arthroplasty implants (denominator: cases with MCP/IPJ implant recorded).

Implant	Count (n)	%
Stryker	30	81.1%
Osteotech: Silicone Finger	3	8.1%
KLS Martin: CapFlex PIP	2	5.4%
Other	2	5.4%

Plate and screw fixation systems (overview)

Plate and screw manufacturer was recorded in 99 cases across a number of procedures. Vertice systems (including Stratmed, Medartis and Trimed) were most frequently utilised in the Wrist/Hand (PRO Series) pathway since inception.

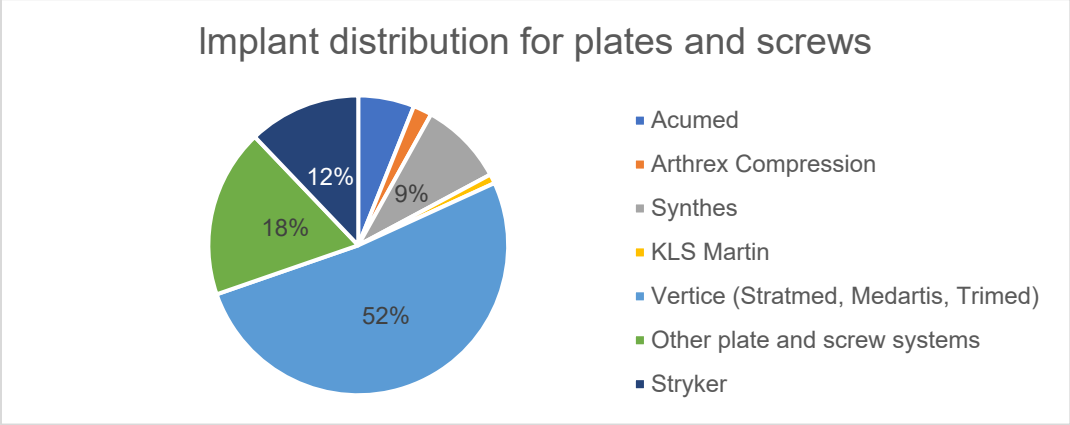


Figure 3.6. Predominant plate and screw fixation system manufacturers

4. Patient-reported outcome measures (PROMs)

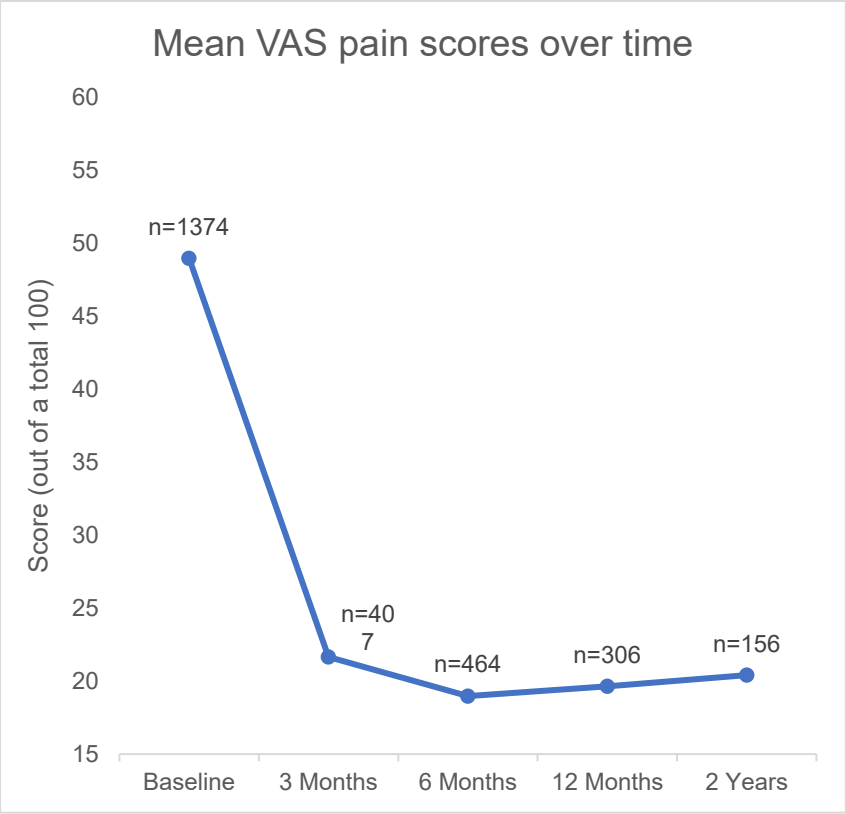
This section reports patient-reported outcome measures for the 1,564 patient pathway instances that had at least one PROM available in the current SAOR Hand/Wrist dataset. Importantly, the dataset reflects PROMs captured across multiple clinical practices and procedures, using standardised instruments including VAS Pain, PEM, QuickDASH, DASH, and the EQ-5D-5L. These measures provide insight into patients' perceived pain, function, disability, and health-related quality of life over time. Although the PROM dataset provides rich information, completion rates varied substantially across instruments and timepoints, with the highest response rates at baseline and substantial attrition thereafter. These patterns are consistent with national and international experience in routine PROM collection.[12]

Table 4.1 summarises completion and missingness across PROM instruments for the five core timepoints used in this report. Counts reflect pathway PROM entries (using the denominator of 1,564 pathway instances).

ROM Measure	Timepoint	Completed (n)	Missing (n)	Missing (%)
VAS Pain	Baseline	497	1,067	68.2%
	3 Months	144	1,420	90.8%
	6 Months	164	1,400	89.5%
	12 Months	92	1,472	94.1%
	2 Years	47	1,517	97.0%
PEM	Baseline	494	1,070	68.4%
	3 Months	245	1,319	84.4%
	6 Months	219	1,345	86.0%
	12 Months	147	1,417	90.6%
	2 Years	73	1,491	95.3%
QuickDASH	Baseline	456	1,108	70.9%
	3 Months	267	1,297	82.9%
	6 Months	180	1,384	88.5%
	12 Months	107	1,457	93.2%
	2 Years	62	1,502	96.0%
DASH	Baseline	29	1,535	98.1%
	3 Months	88	1,476	94.4%
	6 Months	14	1,550	99.1%
	12 Months	3	1,561	99.8%
	2 Years	3	1,561	99.8%
EQ-5D-5L Index	Baseline	476	1,088	69.6%
	3 Months	163	1,401	89.6%
	6 Months	198	1,366	87.3%
	12 Months	122	1,442	92.2%
	2 Years	73	1,491	95.3%

PROM completion at baseline ranged from approximately 8% to 32% of the 1,564 eligible patient pathways, depending on the instrument. Completion steadily declined at subsequent timepoints, with 2-year completion typically between 3 and 10%. This pattern reflects the well-recognised challenge of

sustaining PROM engagement beyond the early post-operative period.[12] Although the PROMs included in this analysis span a diverse range of hand and wrist conditions and procedures, the available data consistently demonstrate clinically meaningful improvements in pain, function, and health-related quality of life over time. Despite incomplete longitudinal responses, the trajectory of recovery is clear, the greatest improvements occur within the first three postoperative months, with gains largely maintained through 12 months and up to 2 years.



Focusing briefly on the individual measures, patients reported a marked early reduction in pain, with mean VAS scores improving from 48.97 at baseline to 21.65 at 3 months. Pain levels continued to decline and stabilised at approximately 20 from 6 months onwards. This degree of change exceeds established benchmarks such as the Patient Acceptable Symptom State (PASS) for VAS pain, which has been reported at approximately 30mm on a 100mm VAS in orthopaedic populations.[13]

Figure 4.1. VAS Pain scores over time (mean ± 95% CI).

Self-reported hand function improved markedly following treatment. The Patient Evaluation Measure (PEM), demonstrated substantial and sustained improvement over the follow-up period. Mean PEM scores decreased from 45.14 (out of a total 100) at baseline to 25.90 at 3 months, with continued progressive improvement to 19.67 at 2 years. Paired analyses showed typical reductions of 20–30 points, indicating robust and clinically meaningful gains in hand function across the recovering cohort.

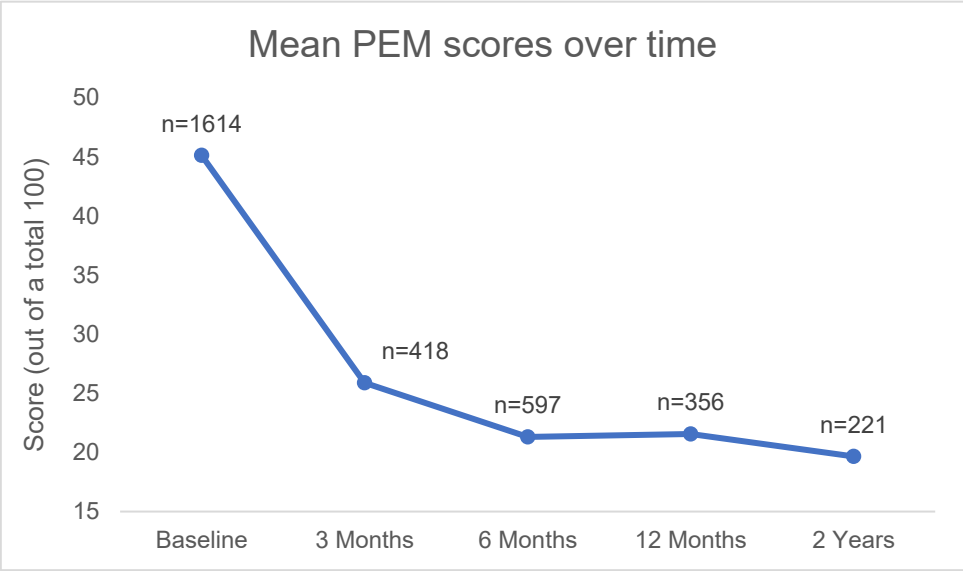


Figure 4.2. PEM Part 2 scores over time (mean ± 95% CI).

QuickDASH scores showed one of the strongest functional recovery patterns. Mean scores declined from 42.97 at baseline to 20.33 at 3 months, reaching 5.18 at 2 years. Although later timepoints included fewer respondents, the observed trend is consistent with substantial, sustained improvement. DASH completion rates were lower than those of other PROMs, particularly at later timepoints (often n < 10). Among available respondents, mean DASH scores improved from 63.59 at baseline to 47.92 at 3 months, with relatively stable values thereafter. The small number of respondents at 2 years (n = 9) likely explains the apparent late increase in DASH scores. With very small samples, mean values are highly sensitive to individual variation and may disproportionately represent patients with ongoing or recurrent symptoms. This pattern is consistent with recognised effects of attrition bias and volatility in long-term PROM follow-up datasets.[14]

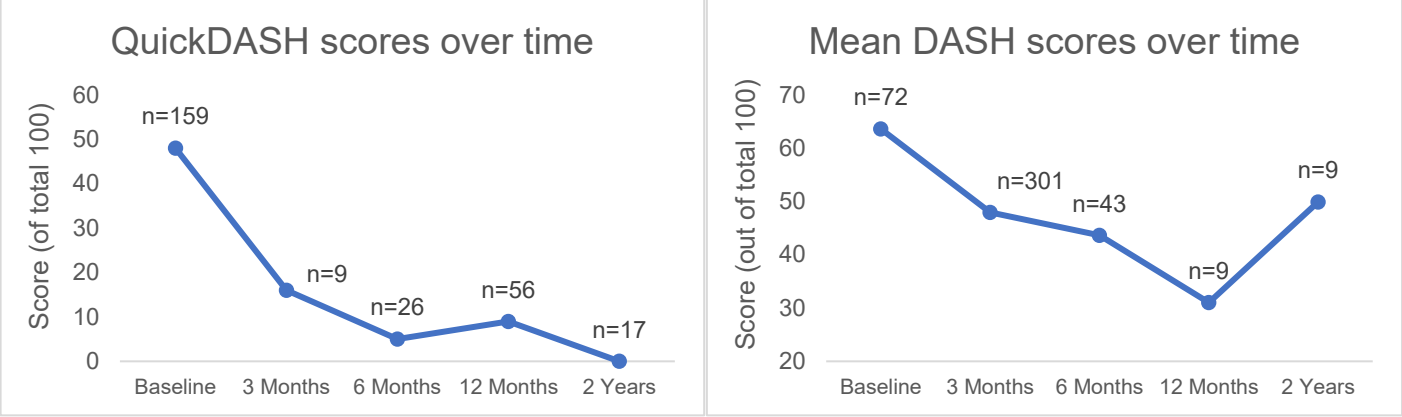


Figure 4.3. QuickDASH and DASH scores over time (mean ± 95% CI).

The EQ-5D-5L Index measure (the only measure where an increase is positive and the score is out of 1.0) reflected improvements consistent with gains seen in function: Rising from 0.66 at baseline to 0.77 at 3 months, and 0.85 at 2 years.

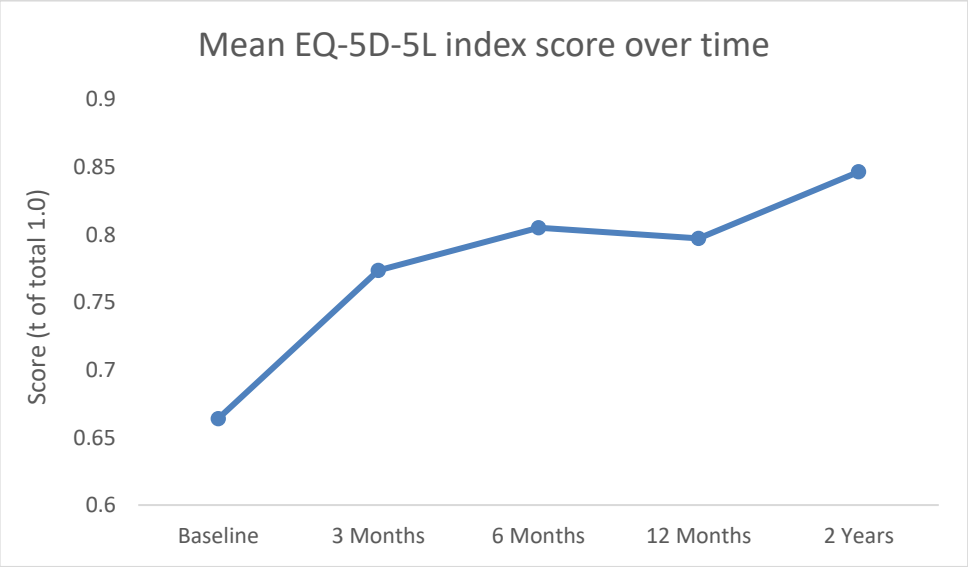


Figure 4.5. EQ-5D-5L Index over time.

Across all instruments, the PROM data reflects a coherent recovery trajectory. Patients demonstrated rapid improvements in pain and functional status within the first three postoperative months, followed by sustained stability through 12 months and 2 years. The consistency of these patterns across VAS Pain, PEM, QuickDASH, and EQ-5D strengthens confidence in the observed recovery trends despite variable response rates. Interpretation is nonetheless limited by incomplete longitudinal follow-up, with progressive attrition particularly evident at later timepoints. DASH responses were notably sparse beyond 3 months, reducing the reliability of those estimates and suggesting that future registry efforts may benefit from prioritising fewer, consistently collected timepoints. Furthermore, PROMs represent only the subset of patients who completed surveys and therefore may not fully capture the experience of the broader SAOR cohort. Even so, the recovery trajectories observed in this dataset are highly congruent with published postoperative outcomes for common hand and wrist procedures, which similarly report early functional improvement and pain reduction followed by ongoing stabilisation.[15]

5. Conclusion

The SAOR Hand/Wrist pathway captures a large case series with a demographic profile consistent with elective hand surgery. Where surgical details are recorded, procedure mix is dominated by CMC reconstructive surgery, tendinopathy interventions and lesion management. Anaesthetic practice is variable, with general anaesthesia most frequently recorded and limited WALANT only use. PROMs show improvements in pain, function and health-related quality of life among respondents, although completion and follow-up rates are low. Improving completeness of key baseline demographics, surgical variables and PROM follow-up will strengthen the registry's capacity for national benchmarking and quality improvement.

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Appendix A

Complete list or surgical procedures	Counts
Phalanx and metacarpal fracture and malunion management	
Thumb Metacarpal Osteotomy	2
Reduction and Internal Fixation Middle Phalanx	2
Reduction and Internal Fixation Distal Phalanx	3
MUA and Pinning Finger Fracture	5
Reduction and Internal Fixation Proximal Phalanx	6
Reduction and Internal Fixation Metacarpal Fracture	31
Carpal fracture and nonunion management	
Reduction and Internal Fixation Scaphoid Nonunion and Bone Graft	3
Reduction and Internal Fixation Acute Scaphoid Fracture	3
Reduction and Internal Fixation Scaphoid Nonunion	6
Resection of Distal Pole of Scaphoid	6
Distal radius fracture and malunion management	
MUA Distal Radius Fracture	2
Manipulation under Sedation and K-Wiring Distal Radius Fracture	3
MUA and Pinning Distal Radius Fracture	4
Reduction and Internal Fixation (Locking Plate) Distal Radius Fracture	7
Corrective Osteotomy Distal Radius	9
Ex-Fix Distal Radius Fracture	11
Reduction and Internal Fixation Distal Radius Fracture	26
Removal metalware	
Removal of Plate	1
Removal of Metalwork	4
Removal of K-Wire	5
Removal of Ex-Fix	6
Removal of Hardware	30
Flexor and extensor tendon repair or tenolysis	
Extensor Tendon Tenolysis	1
Tenodermodesis	1
Repair of Sagittal Bands and Centralising of Extensor Tendon	1
Extensor Pollicus Longus Tendon Repair	2
Extensor Tendon Repair	2
Flexor Tendon Repair	4
Flexor Tendon Tenolysis	22
Amputation (digit level)	
Amputation of a Finger	2
Amputation of a Phalanx	2
Nerve surgery	
Guyon's Canal Release	1
Wrist Denervation	1
Lysis of Adhesions and Decompression of Peripheral Nerves	1
Median Nerve Exploration	2
Repair of Median Nerve	2
Resection of a Peripheral Nerve Lesion	2
Neurolysis	5
Carpal Tunnel Decompression	16
IPJ reconstructive surgery including fusion and replacement (of fingers and thumb)	
PIPJ Hemihamate Arthroplasty	1
Removal of Osteophyte from a Joint	2
PIPJ Silastic Implant (Single)	3
IPJ Fusion	8
PIPJ Fusion	10
PIPJ Total Joint Replacements (Multiple)	11
PIPJ Total Joint Replacement (Single)	35

DIPJ Fusion	41
MCPJ reconstructive surgery including fusion and replacement (of fingers and thumb)	
Thumb MCPJ Fusion	1
Thumb MCPJ Ulna Collateral Ligament Reconstruction	1
MCPJ Excision Arthroplasty and Soft Tissue Interposition	2
Repair of Ulna Collateral Ligament of the Thumb MCPJ	2
MCPJ Total Joint Replacements (Multiple)	5
Thumb MCPJ Excision Arthroplasty and Soft Tissue Interposition	6
MCPJ Total Joint Replacement (Single)	7
MCPJ Fusion	17
CMC reconstructive surgery including resection, fusion & replacement (fingers & thumb)	
Thumb Basal Joint Stabilisation	1
Reduction and Pinning of Carpometacarpal Joint	1
Thumb Basal Joint Resection Arthroplasty	1
Thumb Basal Joint Fusion	2
Total Trapeziectomy and Ligament Reconstruction	61
Total Trapeziectomy and Interposition Reconstruction	89
Total Trapeziectomy	93
Thumb Basal Joint Total Joint Replacement	120
Carpal reconstructive surgery (including partial fusions and carpectomy)	
Scaphocapitate Fusion	1
Partial Wrist Fusion	2
Scapholunate Ligament Reconstruction	2
Proximal Row Carpectomy	4
Midcarpal Fusion (2,3 or 4 Corner)	6
Four Corner Fusion	10
Radio- and ulno-carpal joint reconstructive surgery (incl. fusion & replacement)	
TFCC Repair	1
DRUJ Hemi Joint Replacement	1
Total Resection of the Ulna Head	1
Stabilisation of DRUJ	2
TFCC Debridement	3
Ulna Shortening Osteotomy	4
Partial Resection of Ulna Head	6
Wrist Total Joint Replacement	9
Wrist Joint Fusion	14
Reconstruction (mixed tissues of fingers and thumb)	
Complex Reconstruction of Soft Tissue of Hand	2
Complex Reconstruction of Thumb	2
Tendon transfers	
Tendon Transfer	1
Opposition FDS Transfer to the Thumb	1
Opponenoplasty	2
Tendon Transfer of EIP to EPL	2
Tendon Transfer for Radial Nerve Palsy	3
Tendinopathies	
Injection Trigger Finger	2
Trigger Thumb Release	43
De Quervains's Release	50
Trigger Finger Release	127
Inflammatory disease synovectomy (incl. flexors, extensors and joints of wrist and hand)	
Resection of Tendon Sheath	1
Extensor Re-routing and Synovectomy	1
Joint Synovectomy	2
Tenosynovectomy of Extensor Tendons	5
Synovectomy of the Wrist	6
Flexor Tenosynovectomy	10
Infection and wound management	
Debridement and Washout of Wrist Wound	1
Relook Wound	2
Wrist Debridement	3
Debridement and Washout of a Finger	4
Incision and Drainage of an Abscess	6
Tumour biopsy, resection & management (incl. ganglia, Dupuytren's, gout and cysts)	

Resection of Gouty Tophi	1
Resection of a Bone Tumour	1
Dupuytren's Fasciectomy - Multiple Digit	1
Dupuytren's Digital Fasciectomy	2
Biopsy of the Wrist	2
Resection of a Lesion from the Hand	2
Dupuytren's Palmar Fasciectomy	3
Dupuytren's Contracture Resection	3
Curette and Bone Graft Bony Lesion in the Hand	3
Biopsy Wrist Lesion	5
Biopsy of Hand Soft Tissue Lesion	8
Resection of a Ganglion from the Hand	13
Resection of Mucous Cyst	16
Resection of a Soft Tissue Lesion From the Hand	19
Resection of a Ganglion from the Wrist	77
Other (including contracture release and foreign body removal)	
Other Joint Contracture Release	2
Removal of Foreign Body	2
Other	20
Grand Total	**1284**

Non-Arthroplasty Soft Tissue Knee Procedures

Shaun de Villiers

Pathway summary:

1. **290 cases analysed (2019–2026 YTD).**
   Balanced sex distribution (53% male) with broad age range (median 39.8 years).
2. **Procedure mix reflects routine sports knee practice.**
   Most common: arthroscopy/minor procedures, ACL reconstruction (46 cases), and meniscectomy (46 cases).
3. **Meniscal preservation benchmark established.**
   Meniscus repair rate = **30%** of all meniscal procedures.
4. **ACL demographic profile consistent with international data.**
   Median age 28.6 years, 61% male.
5. **KOOS is the most reliable PROM in the pathway.**
   Baseline completion 34%; mean KOOS improved from 47.4 to 76.1 at 12 months among respondents.
6. **Follow-up attrition is the main limitation.**
   12-month PROM completion remains low, particularly in subgroup analyses.
7. **Data quality generally strong for demographics, moderate for BMI, variable for procedure detail.**
   Implausible BMI entries excluded; 43 cases lacked sufficient procedural classification detail.
8. **Registry structure is currently ambitious but burdensome.**
   Multiple PROM instruments included, but completion patterns suggest streamlining is needed.
9. **Strategic recommendation:**
   Consolidate to a high-yield core PROM set (KOOS ± VAS ± activity measure), improve digital follow-up workflows, and prioritize completeness over instrument breadth.
10. **Bottom line:**
    SAOR now has an early national benchmark for soft tissue knee surgery. With improved participation and simplified data capture, this pathway can become a credible national outcomes platform for sports knee surgery in South Africa.

1. Introduction

The SAOR Non-Arthroplasty Soft Tissue Knee Procedures pathway captures a broad range of knee operations excluding arthroplasty and excluding bony realignment surgery. The pathway includes ligament reconstruction and repair, meniscal procedures, arthroscopic interventions, extensor mechanism surgery, and related soft tissue operations.
Internationally, most national sports knee registries are procedure-specific and commonly centred on anterior cruciate ligament (ACL) reconstruction with a streamlined PROM set. In contrast, SAOR's pathway captures a broader procedural spectrum and incorporates a wider range of outcome instruments. This chapter provides a national descriptive overview of cases recorded between 2019 and 2026 (year to date), reports early patient-reported outcomes, and identifies priorities for registry maturation.

2. Overview of Patients and Data Quality

A total of 290 cases were recorded during the reporting period. Seventeen patients had more than one procedure documented.
Demographic data capture was strong, with near-complete sex and age recording. Procedural classification was available in most cases, although 43 records lacked sufficient detail for reliable grouping. BMI was recorded in approximately half of cases, and implausible entries were excluded from analysis. PROM capture was most complete at baseline and declined substantially at later timepoints.
Specific exclusions applied to analyses were as follows:
Age: 1 case excluded due to date of birth recorded after procedure date.
BMI: 22 entries excluded due to implausible values (including extreme values >100 or BMI recorded as zero).
Procedure classification: 43 cases lacked adequate procedural detail for categorisation.
These exclusions improve interpretability but highlight the need for automated validation at data entry.

Data element	Number excluded	Reason
Age	1	Date of birth recorded after procedure date
BMI	22	Implausible values (e.g., >100 or zero)
Procedure classification	43	Insufficient procedural detail recorded

Table: Data exclusions applied to specific analyses

3. Patient Demographics

Sex distribution was near-balanced, with 155 male cases (53%) and 135 female cases (47%).

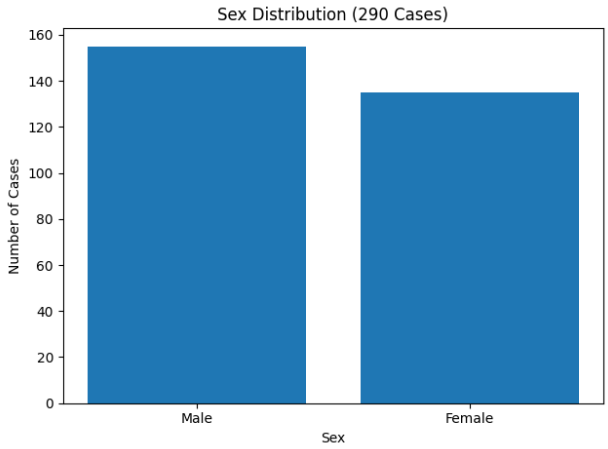

Figure: *Sex distribution.*

Age was reliably calculated in 287 cases. The mean age was 38.6 years and the median 39.8 years, with an interquartile range of 22.4–53.6 years. The age distribution reflects heterogeneous practice including sports-related injury, traumatic soft tissue pathology, and selected degenerative conditions.

Statistic	Age (years)
Mean	38.6
Median	39.8
Interquartile range	22.4 – 53.6
Range	0.2 – 84.4

Table: Age statistics.

BMI was recorded in 148 cases, with 126 values within a plausible range (BMI 12–60). In this subset, the median BMI was 28.4 (IQR 24.4–35.1), indicating a substantial proportion of patients in the overweight or obese categories.

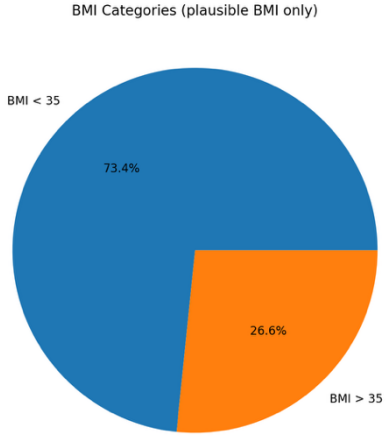

Figure: *BMI distribution*

4. Procedure Spectrum

Procedural classification was available in 247 cases. Arthroscopy and minor procedures were most common, followed by ACL reconstruction or repair and meniscectomy.

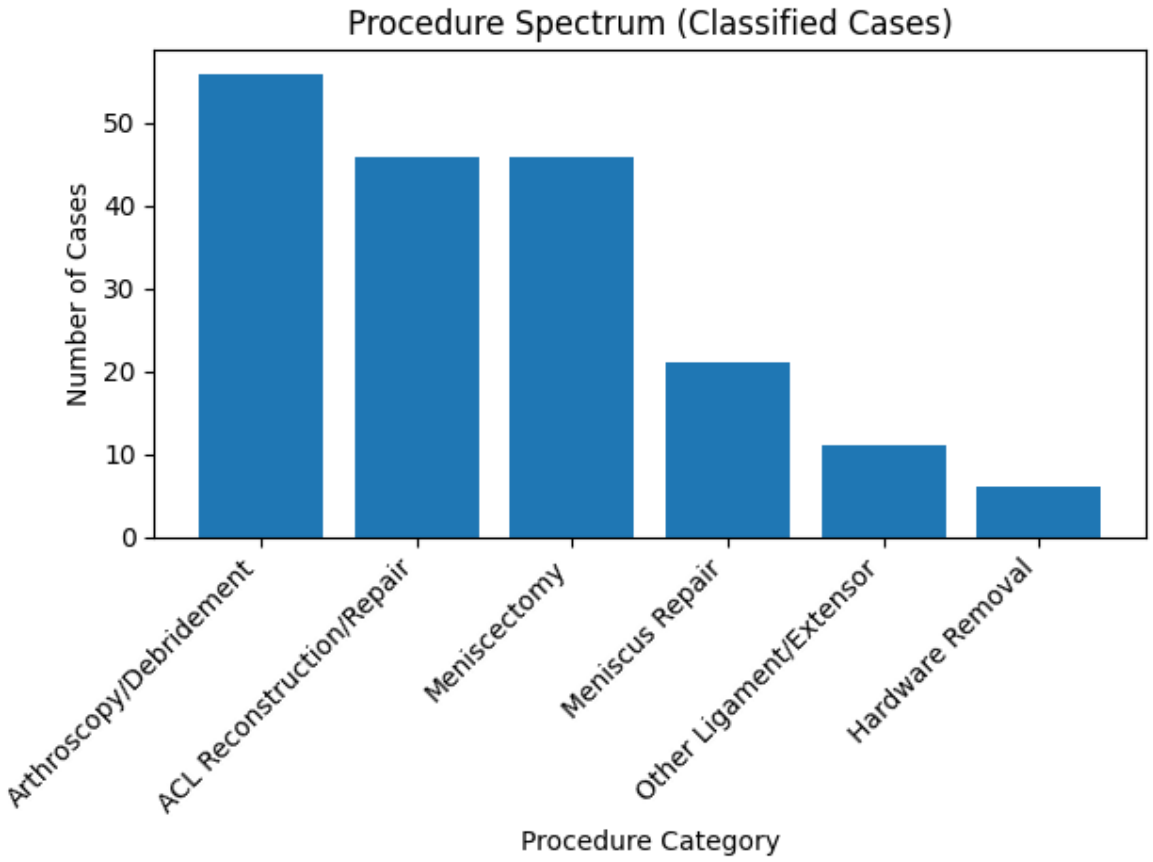

Figure: Distribution of the major soft tissue procedure groups.

Meniscal repair constituted 30% of recorded meniscal procedures (21 repairs out of 69 meniscal operations), providing a measurable national preservation benchmark.

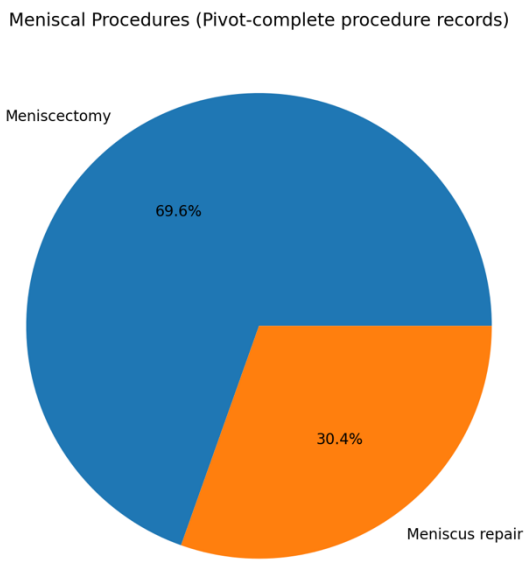

Figure: The proportion of meniscus repair vs meniscectomy.

5. ACL Reconstruction Subgroup

Among ACL reconstruction or repair cases (46 cases), the median age was 28.6 years with a male predominance of 61%. This demographic profile is consistent with international epidemiological patterns of ACL injury.

6.Patient-Reported Outcome Measures

6.1 PROM Framework

The pathway incorporates a broad PROM battery. For reporting purposes, instruments were grouped into three tiers:

Tier 1 – Core knee outcomes: KOOS, VAS Pain, Lysholm, Tegner
Tier 2 – Global and functional measures: EQ-5D, SANE, PSFS
Tier 3 – Real-world and experience metrics: Return to Sport, Time off Work, Physio compliance, PHIN rating, NPIS

Full numeric reporting is presented where at least 20% of cases completed a measure at a given timepoint. Instruments below this threshold are summarised descriptively.

6.2 Tier 1 PROMs

KOOS was the most consistently completed instrument and currently forms the analytical foundation of outcome reporting.

KOOS Total	Cases completed	% of 290 cases
Baseline	100	34%
6 months	34	12%
12 months	24	8%
2 years	1	<1%

Table: KOOS Total completion

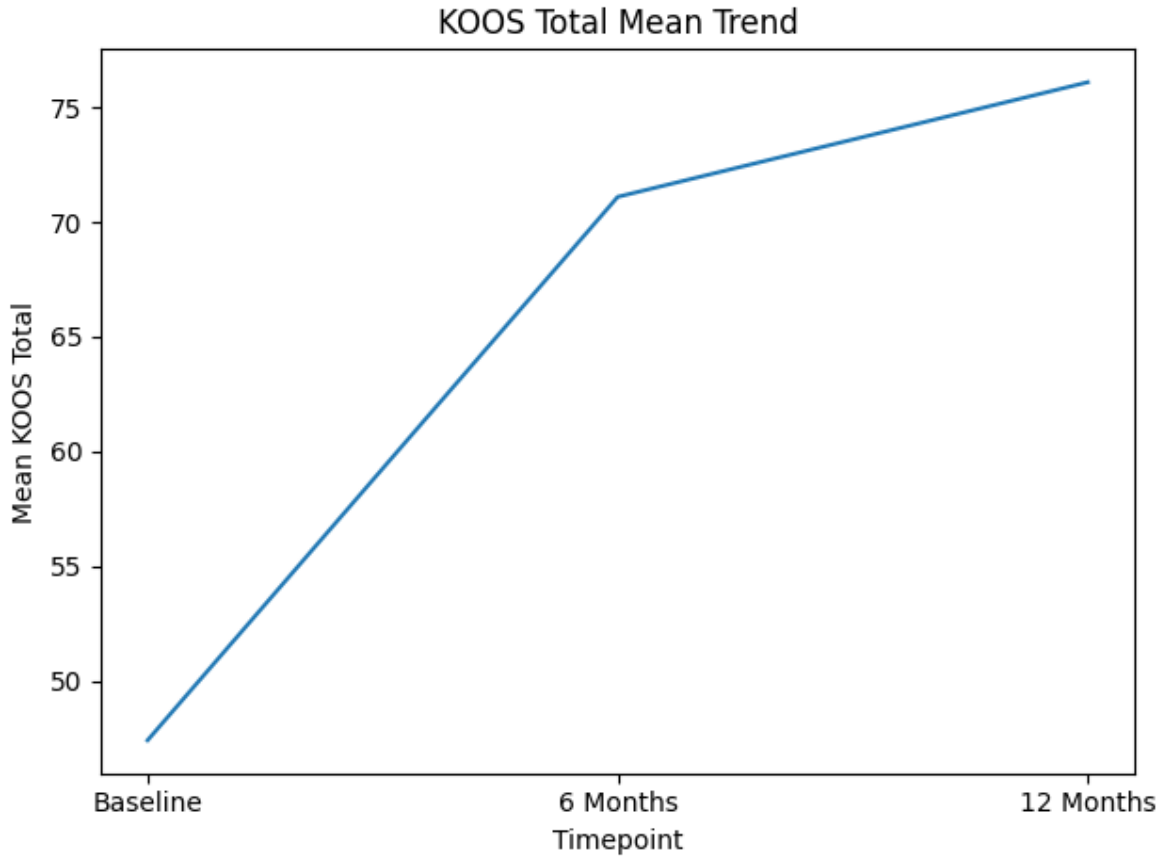

Figure: KOOS Total mean trend (all procedures combined.

Mean KOOS Total improved from 47.4 at baseline to 71.1 at 6 months and 76.1 at 12 months among respondents. These improvements are directionally consistent with recovery trajectories described in comparative ACL treatment trials.
Within the ACL subgroup, baseline KOOS was available in 28 cases and 12-month KOOS in 3 cases. The 12-month ACL estimate should therefore be regarded as exploratory only.

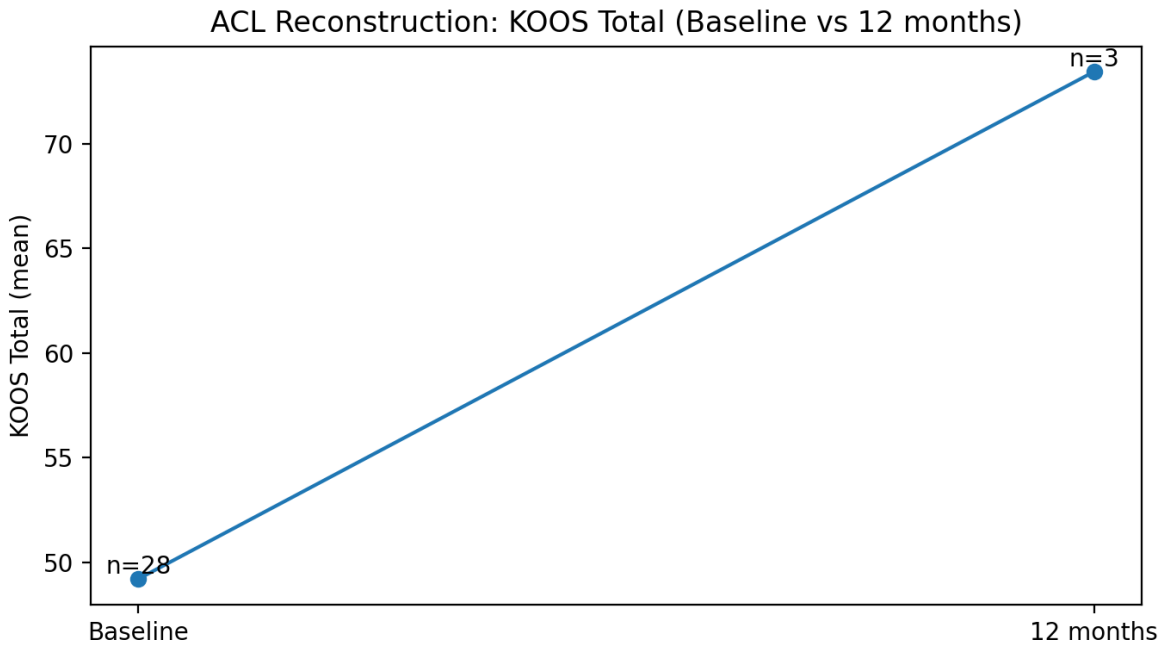

Figure: ACL KOOS baseline vs 12 months.

For meniscal procedures, baseline and 12-month KOOS were available for both meniscectomy and repair, although 12-month repair completion was limited (n=3) and should be interpreted cautiously.

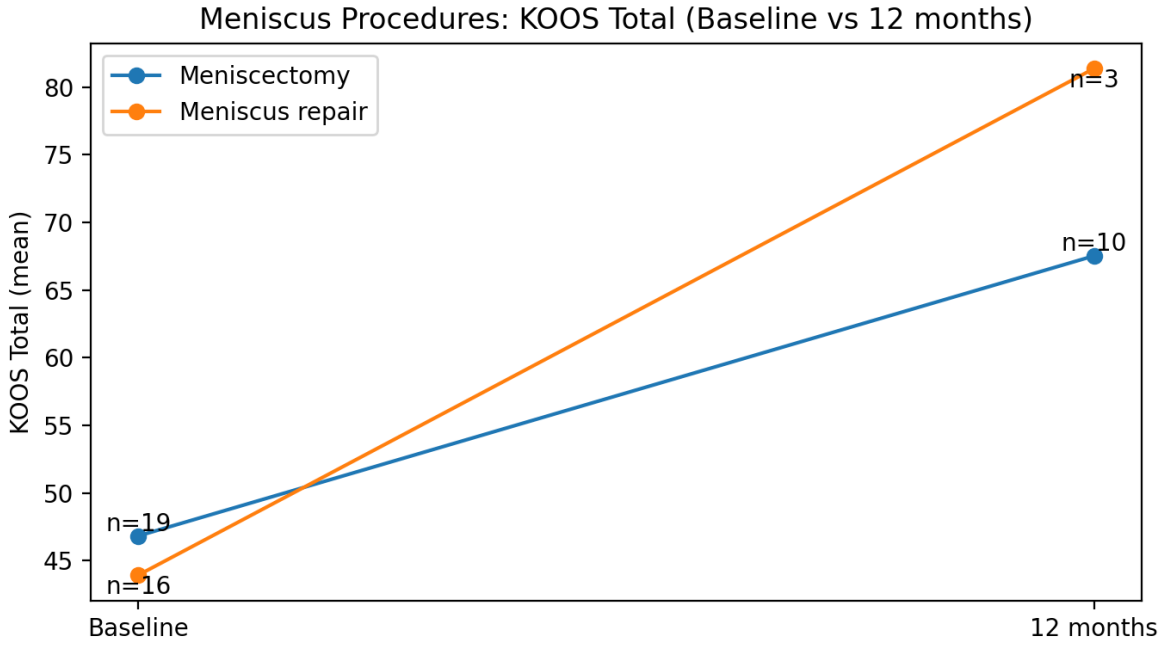

Figure: KOOS at baseline and 12 months for meniscectomy vs repair

VAS Pain exceeded the 20% threshold at baseline and demonstrated meaningful early reduction among respondents.
Lysholm and Tegner completion approached 20% at baseline but declined at follow-up. Where recorded, scores showed improvement consistent with ligament reconstruction recovery patterns.

6.3 Tier 2 and Tier 3 PROMs

EQ-5D, SANE and PSFS were recorded in fewer than 20% of cases at most timepoints, limiting numeric analysis. Return to Sport, Time off Work, Physio compliance, PHIN rating and NPIS were similarly infrequently completed. While clinically meaningful, these instruments currently add administrative burden relative to analytical yield.

7.Discussion

International ligament registries such as the Swedish and UK registries are largely ACL-centred and employ pragmatic PROM sets, typically centred on KOOS with a generic measure and activity scale. SAOR's broader procedural capture and more extensive PROM battery represent methodological ambition but also increase capture burden.

The ACL demographic profile aligns with international epidemiological patterns. High-level evidence supports structured outcome measurement in guiding ACL treatment strategies. Similarly, Level 1 evidence has demonstrated that arthroscopic partial meniscectomy is not superior to sham surgery in selected degenerative tears, reinforcing the importance of distinguishing traumatic from degenerative indications in future registry refinements.

Completion patterns suggest that KOOS currently provides the most feasible and informative routine outcome measure. International registry practice similarly centres on KOOS. A pragmatic evolution of the SAOR pathway may include consolidating mandatory PROM capture around a core set (e.g., KOOS and VAS Pain, with a single activity measure), while reserving additional instruments for research modules.

Practical strategies to reduce capture burden include automated plausibility validation (e.g., BMI range limits), structured dropdown procedural fields, alignment of PROM timepoints with routine clinical review and digital patient-direct completion workflows. Improving completeness rather than expanding instrument breadth will strengthen the registry's long-term value.

8.Conclusion

This SAOR extract provides an early national descriptive benchmark for non-arthroplasty soft tissue knee surgery. The cohort demonstrates balanced sex representation, a broad age range reflecting heterogeneous practice, and a measurable meniscal preservation rate of 30%. Early PROM improvements are evident among respondents, particularly for KOOS, although follow-up attrition limits longer-term interpretation.

The primary developmental opportunity lies in improving completeness through pragmatic streamlining of PROM capture and strengthening digital follow-up workflows. With these refinements, SAOR is well positioned to evolve into a nationally representative benchmarking platform for soft tissue knee surgery in South Africa.

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Shoulder Arthroscopy Pathway

Anton Julyan & Odette Koch

Executive Summary

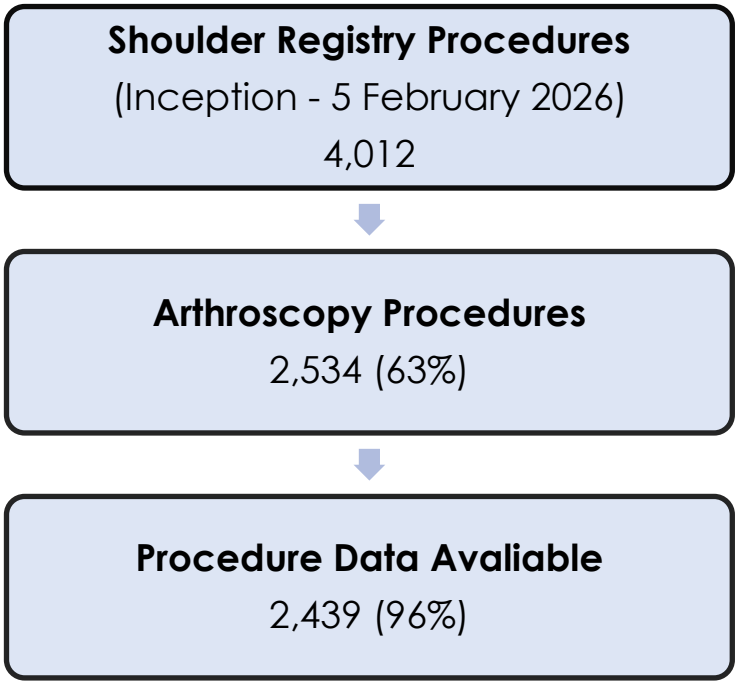
The South African Orthopaedic Registry (SAOR) contains information on 4,012 shoulder procedures since 2019. Of the full shoulder registry, this report includes data from 2,439 shoulder arthroscopy cases contributed by 18 providers from 25 surgical facilities spanning across the Western Cape, Gauteng and the North-West. Shoulder arthroscopy case volume in the SAOR showed a 69% increase between 2024 and 2025.

Of the 2,439 cases, 96% were primary cases with the most common procedures being subacromial decompression and ACJ resection (50.9% of patients), rotator cuff repair (42.5% of patients) and biceps tenodesis (28.7% of patients). The average surgical time (skin-to-skin) for all procedures was 67.6 minutes.

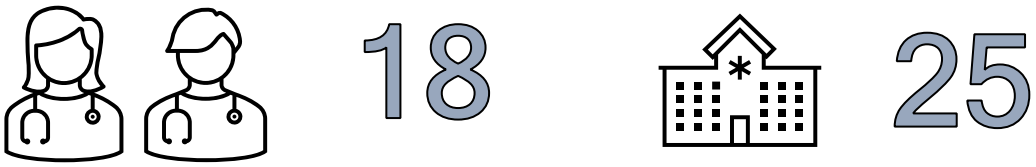
Baseline patient-reported outcome measure (PROM) collection rates ranged between 26 – 28%. Follow ups PROMs were collected at 3 months, 6 months, 1 year and 2 years postoperatively and follow up rates ranged between 11 – 19%. PROMs included EQ5D Health Visual Analog Scale (VAS) and Index scores, Oxford Shoulder Score and VAS Pain scores. All the PROM scores showed improvement between baseline and postoperative time periods.

1. Registry Overview

The South African Orthopaedic Registry (SAOR) contains information on 4,012 shoulder procedures since 2019. Shoulder arthroscopy procedures form a subsection of the SAOR shoulder pathway and total to 2,534 procedures. Despite 2,534 procedures being listed as arthroscopies in the database, only 2,439 of these held sufficient data for analysis to warrant inclusion in this report. Missing data is a common challenge encountered in medical registries[1], this report will document missing data and report on data that is available.



Shoulder arthroscopy data has been contributed by 18 surgeons from 25 surgical facilities.



Of the contributing surgeons, five surgeons contribute 81% of the procedures at 24, 16, 15, 14 and 12% of total procedures each.

Surgical facilities were listed for 1,948 (80%) of the 2,439 included procedures. The highest procedure density is in the Western Cape (55%), followed by Gauteng (43%) and the North-West (2%) (Figure 1.1). Six facilities contributed 90% of cases, namely Mediclinic Panorama (30%), Netcare Pretoria East (23%), Advanced Groenkloof Day Hospital (13%), Life Vincent Palotti (10%), Mediclinic Louis Leipoldt (8%) and Mediclinic Winelands Day Clinic (6%).

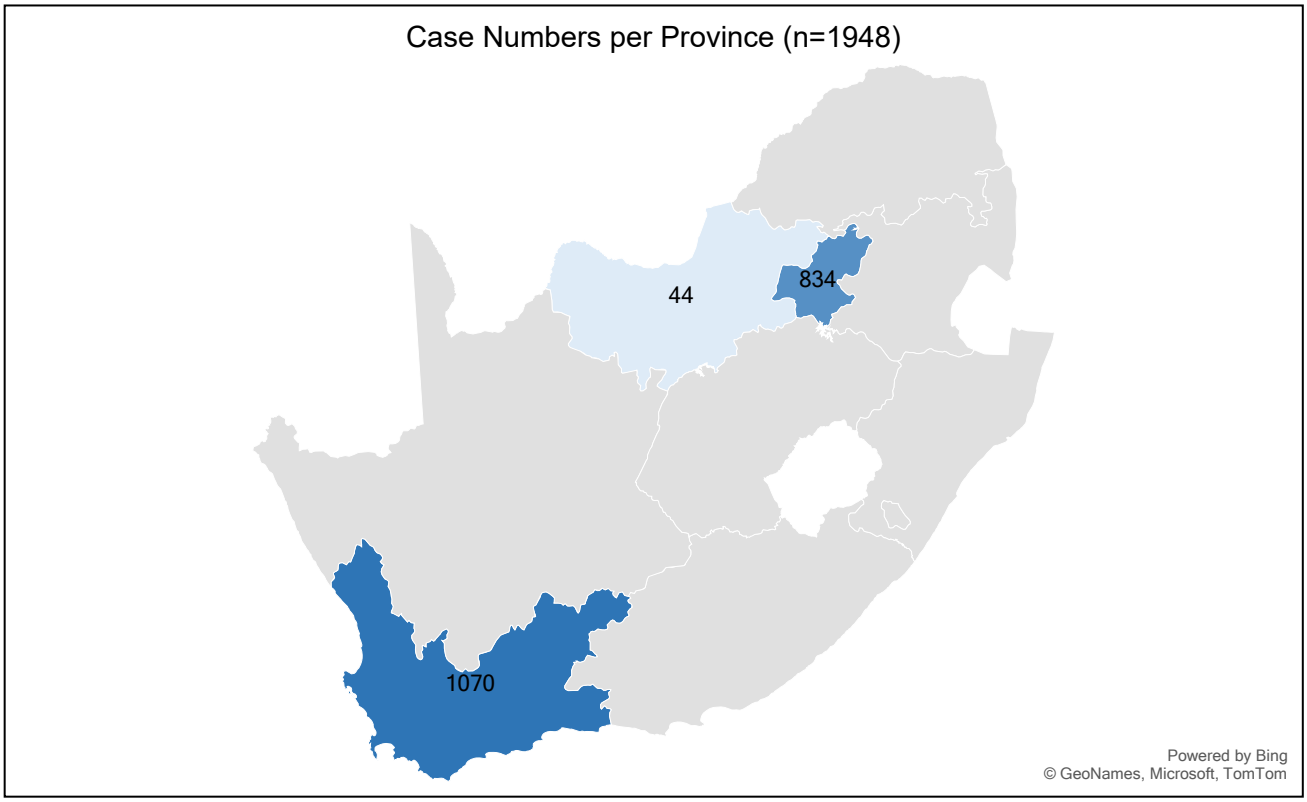


Figure 0.1: Shoulder arthroscopy case numbers per province

Figure 1.2 depicts the annual procedure volume along with the number of contributing surgeons. The case volume growth rate was 164% between 2021 and 2022, 49% between 2022 and 2023, 49% between 2023 and 2024 and 69% between 2024 and 2025. Data for 2026 currently only reflects just over a month of cases.

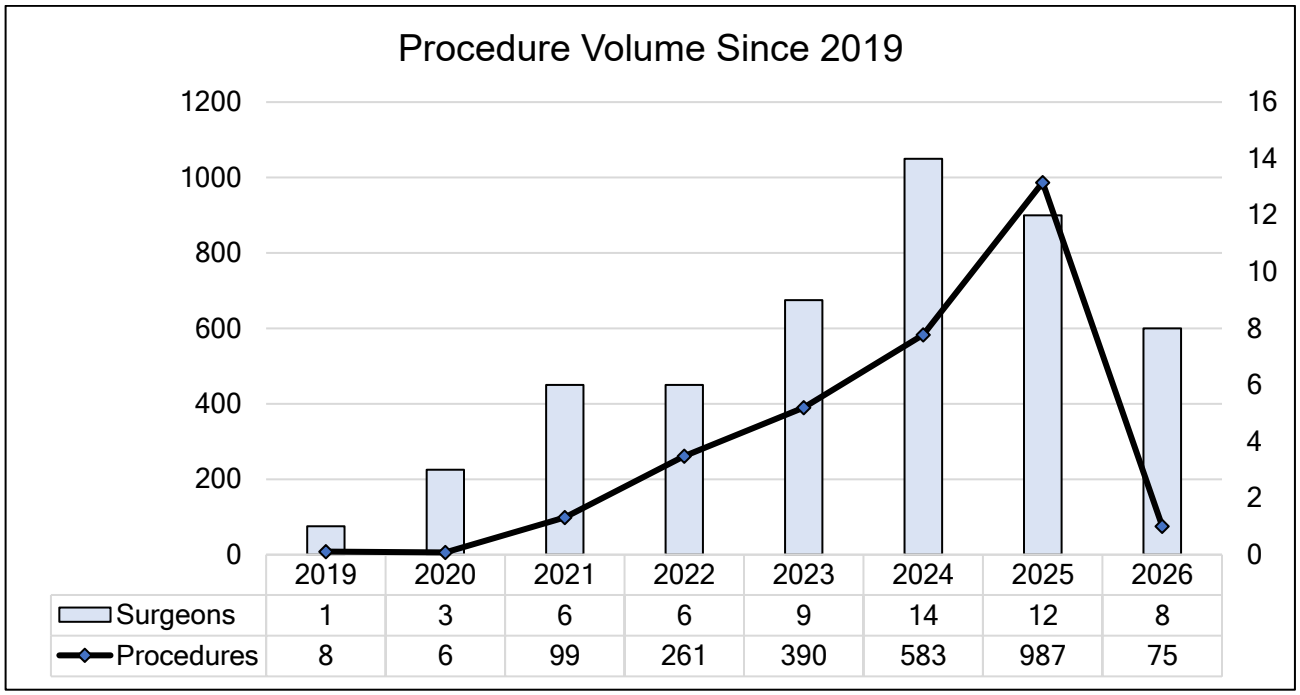


Figure 0.2: Annual case volumes and contributing surgeons

2. Patient Demographics

A total of 2,439 procedures has been included in this report. The missing data for patient demographic variables has been detailed in Table 2.1.

	Count of Missing Values	Percent Complete
Age	10	99%
BMI	1204	51%
Sex	0	100%
Dexterity	1169	52%

Table 0.1: Missing patient demographic data

Age

The majority of shoulder arthroscopy patients fell between 50 and 64 years of age, with the majority of patients (n=442) falling into the 55 – 59 age category (Figure 2.1). The mean age is 56.1 years.

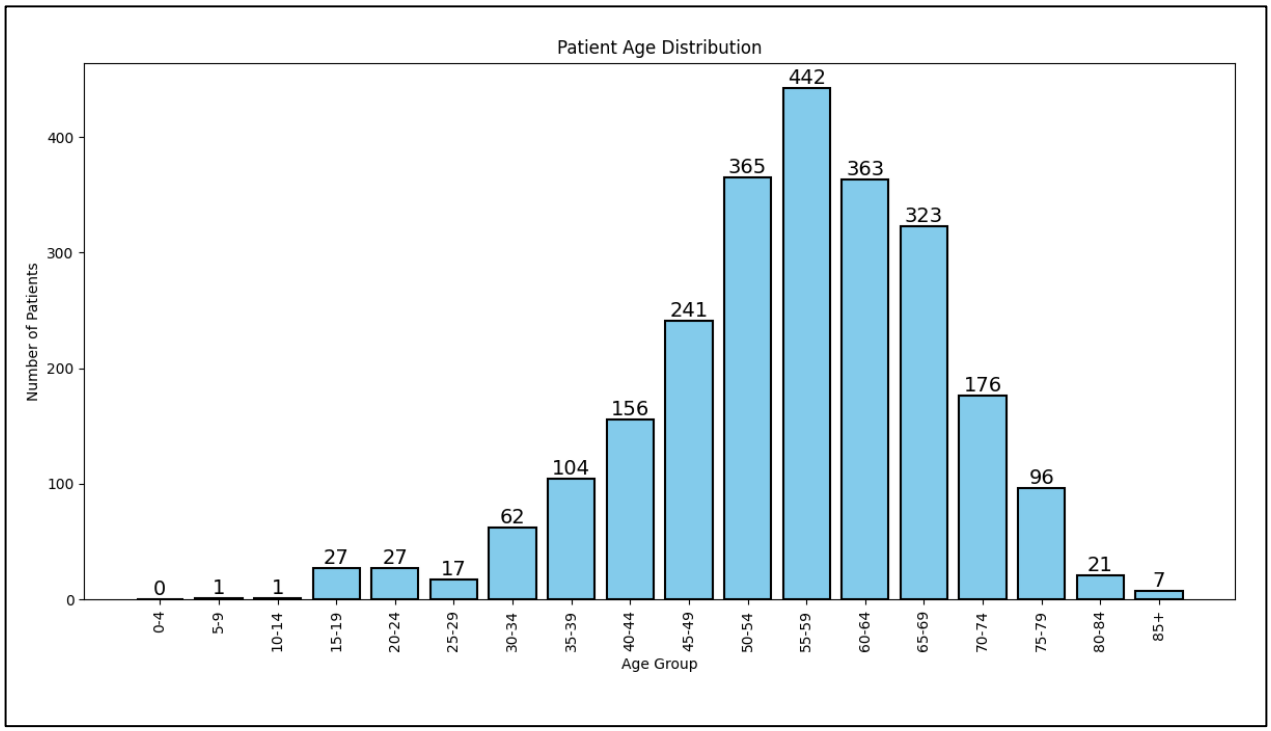


Figure 0.1: Patient age distribution

BMI

Of the 2,439 cases, there were 1,235 cases with complete BMI fields. However, 260 cases were excluded due to illogical data values such as a BMI of 90. Of this subset, the mean BMI was 29.2. Figure 2.2 depicts the majority of patients fall within the 25 – 30 BMI category, which would classify this group as overweight according to the Center for Disease Control [2]. The American

Academy of Orthopaedic Surgeons Shoulder & Elbow Registry also reported the majority of rotator cuff repair patients (34.7%) falling into this BMI category [3].

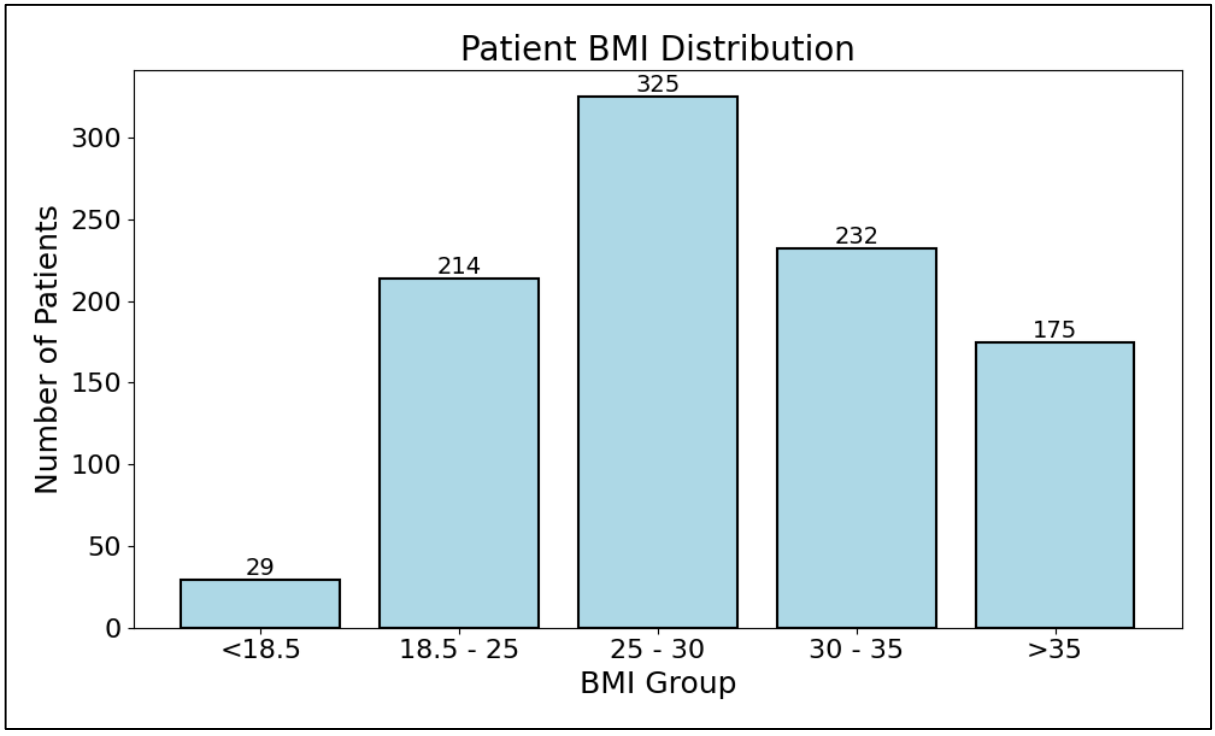


Figure 0.2: Patient body mass index distribution

Sex

Of the 2,439 patients, 52% (n=1,270) are male (Figure 2.3).

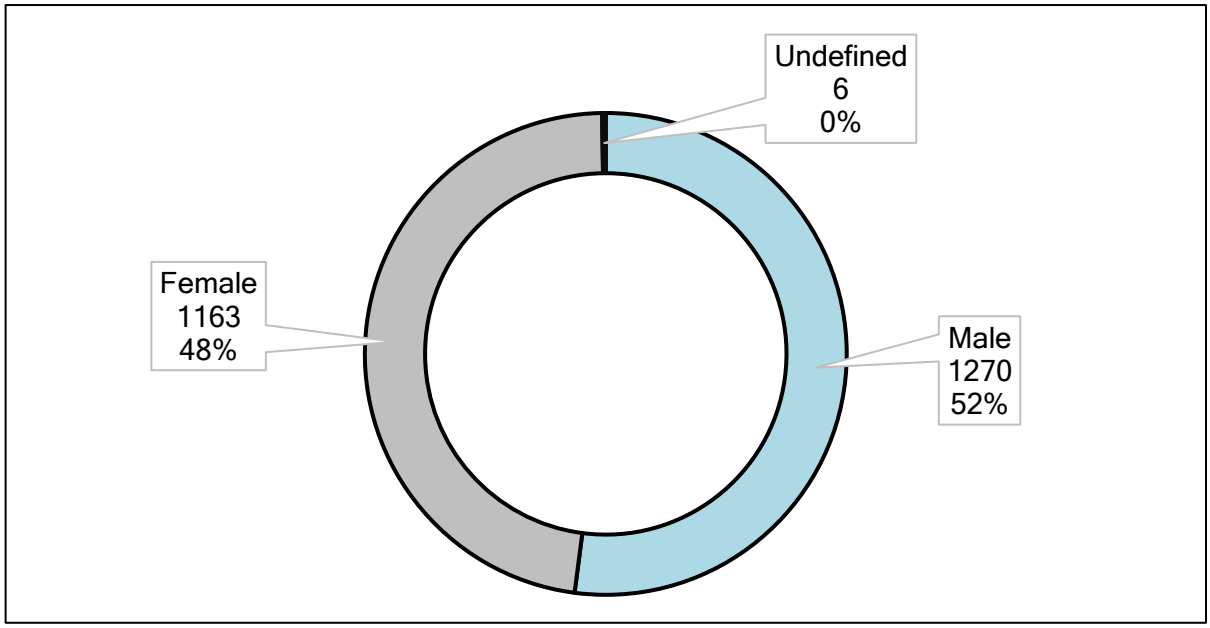


Figure 0.3: Patient sex distribution

Dexterity

Of the 1,270 complete records for dexterity, 91% (n=1,154) are right-handed, 8% (n=98) are left-handed and 1% (n=18) are ambidextrous (Figure 2.4).

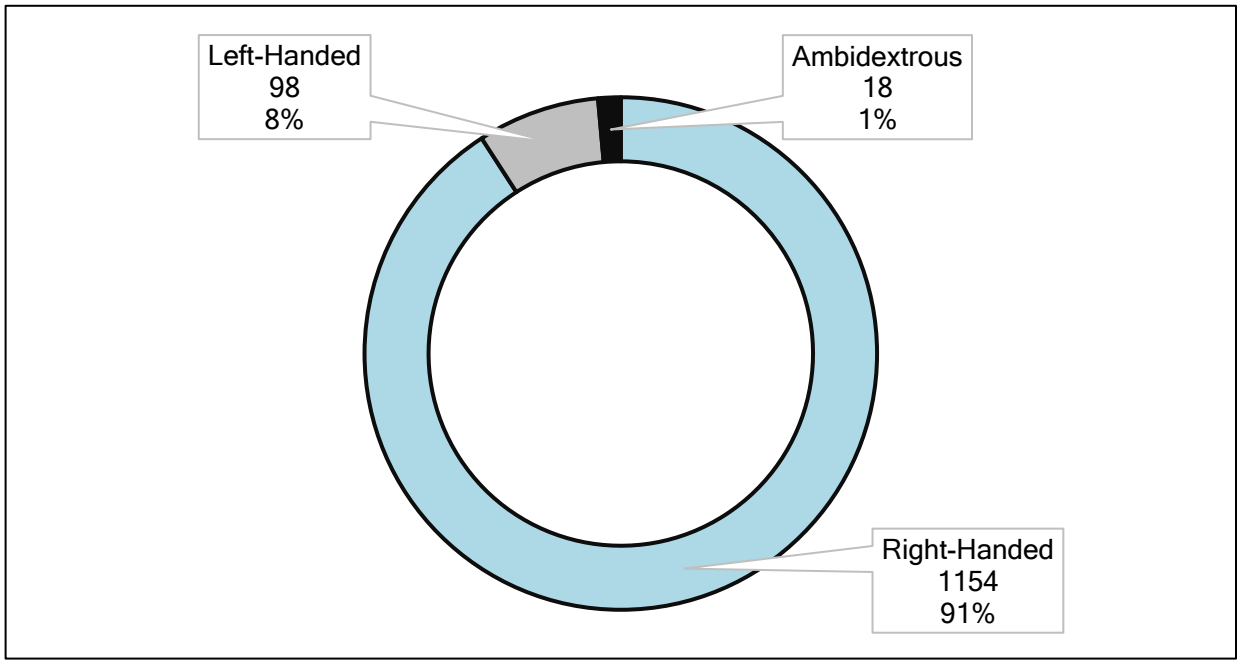


Figure 0.4: Patient dexterity distribution

Previous Non-Operative Interventions

Of the 2,439 patients, 445 (18%) underwent infiltration as a previous non-operative intervention and 396 (16%) underwent physiotherapy as a previous non-operative intervention (Figure 2.5).

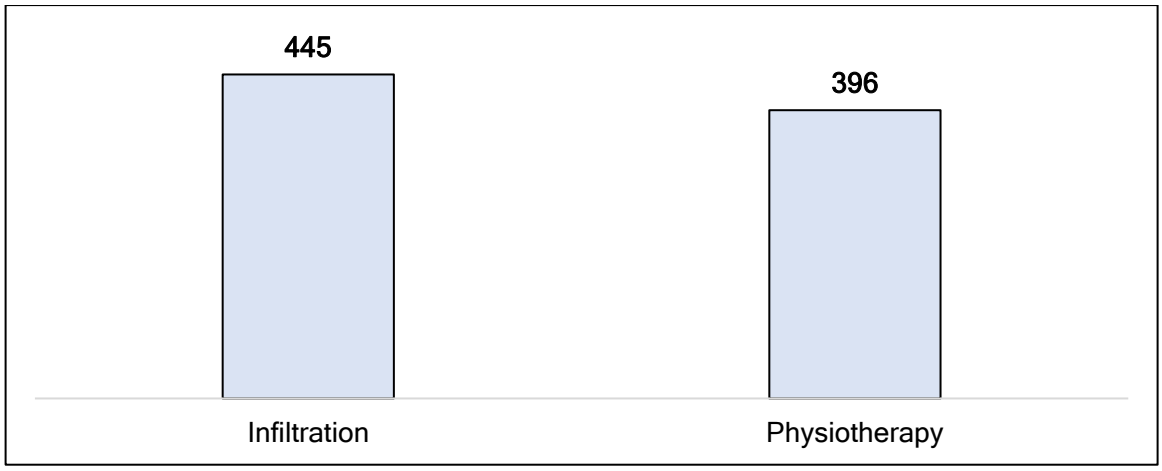


Figure 0.5: Previous non-operative intervention

3. Surgery, Anaesthetic and Implant Detail

The missing data for surgical variables has been detailed in Table 3.1.

	Count of Missing Values	Percent Complete
Primary or Revision	298	88%
Procedure	0	100%
Skin to Skin (Minutes)	618	75%
Anaesthetic	491	80%

Table 0.1. Missing data for surgical variables

Procedures

The majority of patients (96%) underwent primary shoulder arthroscopy (Figure 3.1). Of the 2,439 shoulder arthroscopy cases, there were 6,245 procedures listed due to patients undergoing multiple procedures in one case.

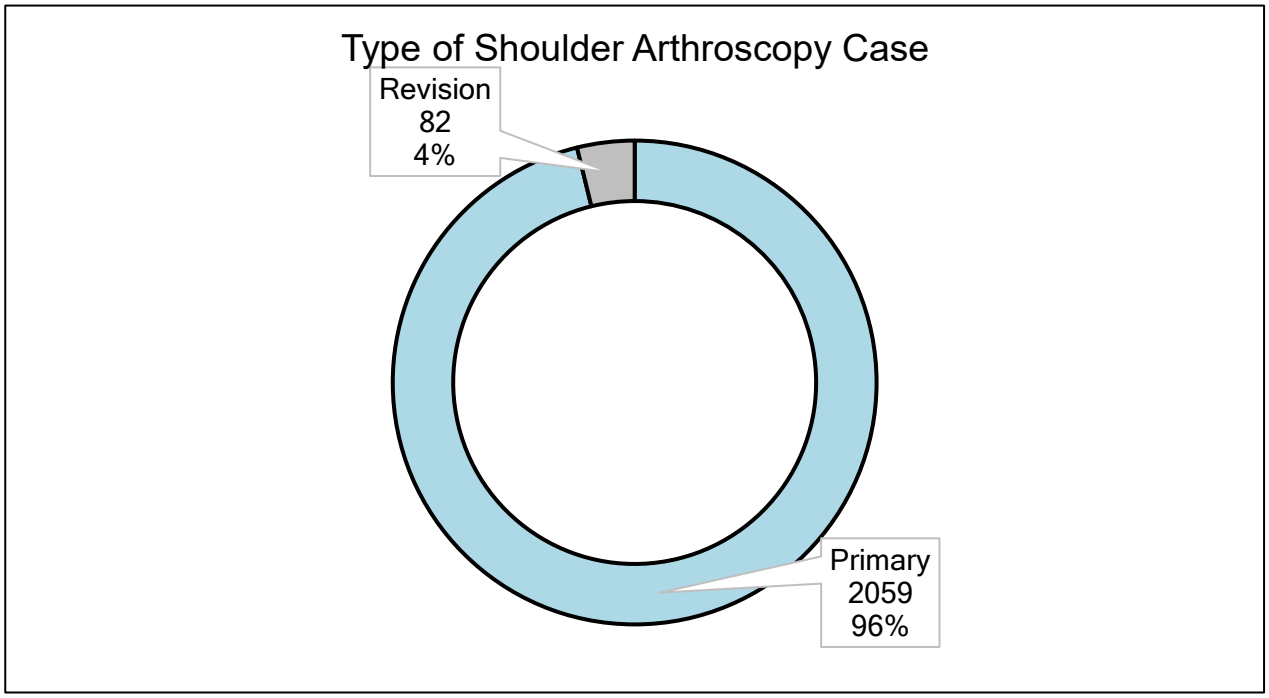


Figure 0.1. Distribution of type of shoulder arthroscopy case

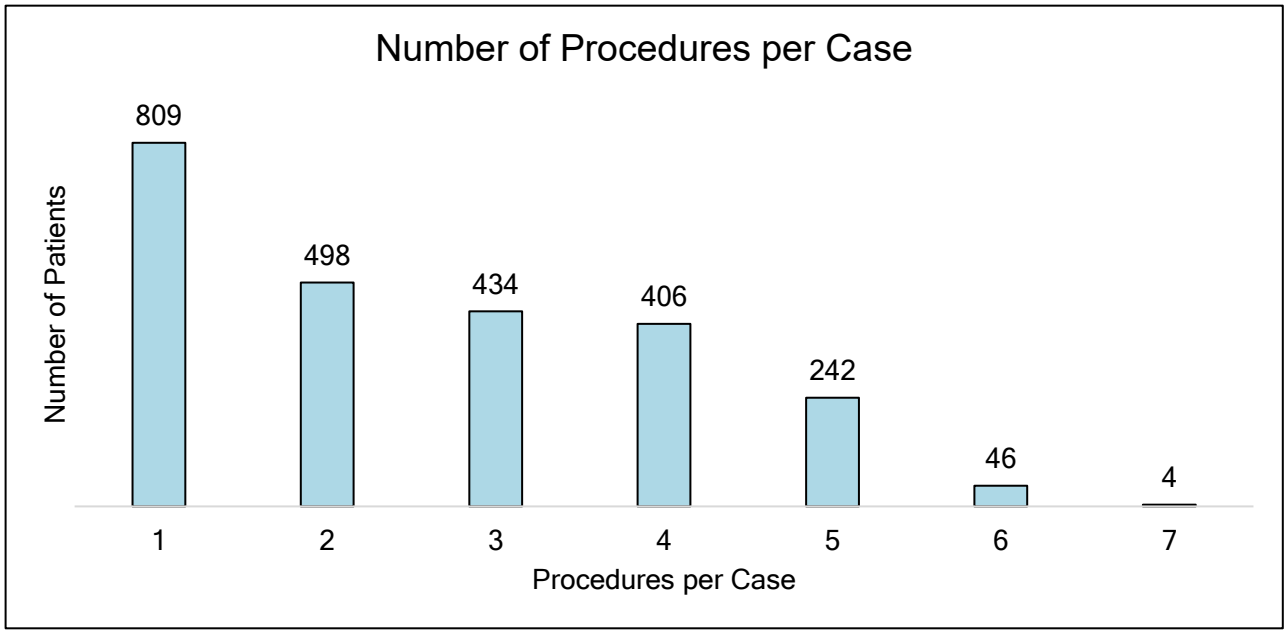


Figure 0.2. Number of procedures per case

The five most common procedures reported in the SAOR Shoulder Arthroscopy pathway are listed in Table 3.1. Subacromial Decompression and ACJ Resection was the most commonly reported procedure with 1,242 instances, making up 19.9% of all procedures reported and 50.9% of patients underwent this procedure. Subacromial Decompression and ACJ Resection was followed by Rotator Cuff Repair, Biceps Tendinosis, Rotator Cuff Debridement and Subscapularis repair of which 42.5%, 28.7%, 27.7% and 17.2% of patients underwent each procedure, respectively. A comprehensive list of the frequency of all procedures in the SAOR Shoulder Arthroscopy pathway can be found in Appendix A. The German Arthroscopy Registry reported the three most common shoulder procedures as subacromial decompression, bursectomy and rotator cuff repair [4].

Procedure	Count	Percentage of Procedures	Percentage of Patients
Subacromial Decompression and ACJ Resection	1242	19,9%	50,9%
Rotator Cuff Repair	1036	16,6%	42,5%
Biceps Tenodesis	701	11,2%	28,7%
Rotator Cuff Debridement	676	10,8%	27,7%
Subscapularis Repair	420	6,7%	17,2%

Table 0.2. Top five reported procedures in the South African Orthopaedic Registry Shoulder

Arthroscopy pathway

There were 1,690 values reported for surgical time (“Skin to Skin”). The mean surgical time was 67.6 minutes with a standard deviation of 31.04 minutes. Surgical times ranged from 11 to 210 minutes. The distribution of surgical time is depicted in Figure 3.3.

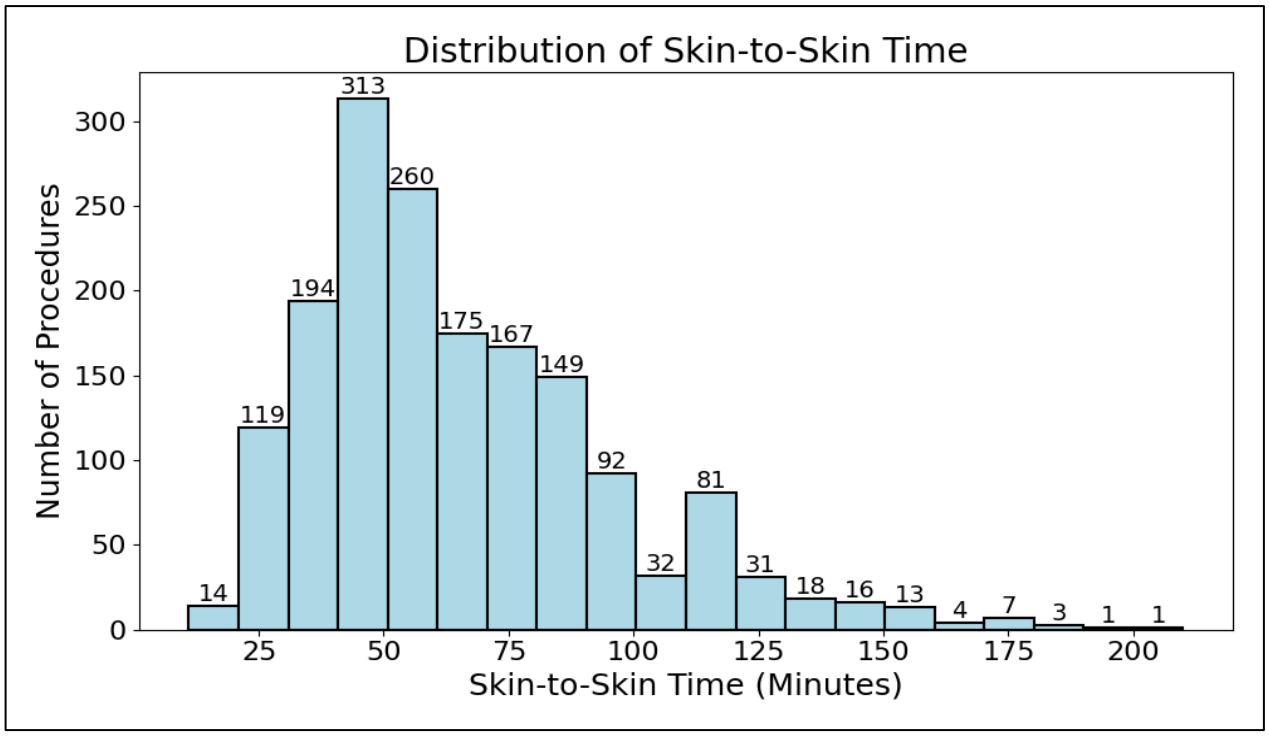


Figure 0.3. Distribution of surgical “Skin to Skin” time

Devices

The five most used devices in SAOR shoulder arthroscopy cases are listed in Table 3.2. A comprehensive list of devices used can be found in Appendix B.

Device	Count	Percentage of Total
Smith and Nephew HEALICOIL Knotless	293	16%
Smith and Nephew HEALICOIL PK	291	16%
Smith and Nephew HEALICOIL REGENESORB	243	14%
Arthrex FiberTak Soft Anchor	186	10%
Arthrex Bio-SwiveLock	120	7%

Table 0.3. Devices used in South African Orthopaedic Registry shoulder arthroscopy cases

Anaesthetic Modality

Figure 3.4 depicts the frequency of different anaesthetic modalities used in SAOR shoulder arthroscopy cases. A combination of general anaesthesia (GA) and a regional block is the most commonly used technique at 52% of cases.

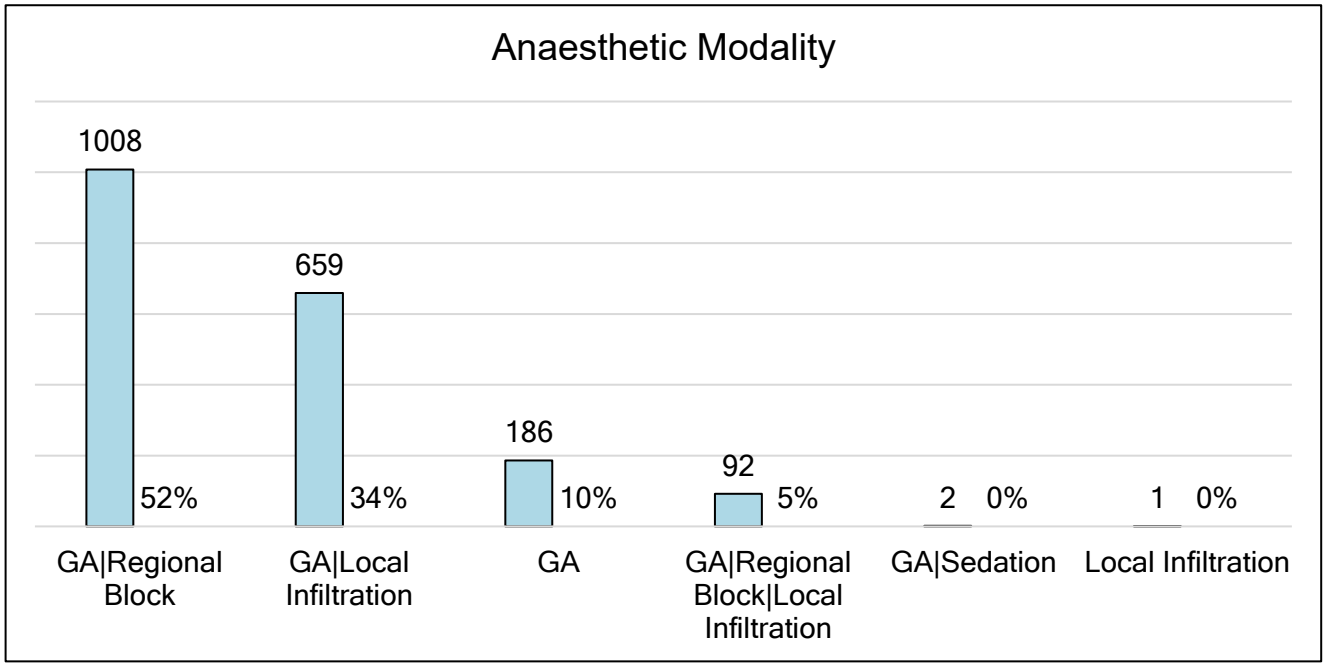


Figure 0.4. Anaesthetic modality used in shoulder arthroscopy cases

4. Patient-Reported Outcome Measures

Standardised outcome collection is imperative for benchmarking against national and international standards. The SAOR Shoulder Arthroscopy pathway measures EQ5D Health Visual Analog Score (VAS) and Index, VAS Pain and the Oxford Shoulder Score (OSS). Together these four patient-reported outcome measures (PROMs) assess a patient's overall health, quality of life and pain, as well as their pain and functionality associated with the affected joint.

On 5 February 2026 when the data was extracted from the registry, 2,232 patients were due a 3-month follow-up, 1,980 patients were due a 6-month follow-up, 1,448 patients were due a 1-year follow-up and 828 patients were due a 2-year follow-up. The PROM follow up rates are detailed in Table 4.1.

	Timepoint	Complete	% Complete
EQ5D Health VAS	Baseline	686	28%
	3 Months	371	17%
	6 Months	384	19%
	1 Year	214	15%
	2 Years	109	13%
EQ5D Health Index	Baseline	686	28%
	3 Months	371	17%
	6 Months	384	19%
	1 Year	214	15%
	2 Years	109	13%
VAS Pain	Baseline	658	27%
	3 Months	398	18%
	6 Months	382	19%
	1 Year	212	15%
	2 Years	105	13%
Oxford Shoulder Score	Baseline	636	26%
	3 Months	404	18%
	6 Months	367	19%
	1 Year	155	11%
	2 Years	103	12%

Table 0.1. Patient-reported outcome measure follow up rates

Baseline PROM collection rates ranged between 26 – 28%. Follow ups PROMs were collected at 3 months, 6 months, 1 year and 2 years postoperatively and follow up rates ranged between 11 – 19%. The German Arthroscopy Registry reported follow up rates for PROMs from 6 months to 2 years ranging

between 32 – 45.7% [4]. Private practice electronic health records report a 51% and 52% follow up rate for shoulder arthroscopy PROMs, respectively [5]. PROM compliance rates can be improved by a more targeted collection method such as telephone calls to patients [6,7].

EQ5D Health VAS

EQ5D Health VAS provides an indication of the patient's perception of their overall health[8]. The SAOR shoulder arthroscopy patients rated their baseline overall health relatively highly at 73.8. This score improved to 79.9 (6.1-point improvement) at 3 months post-operatively where scores then plateaued from 6-months onwards (Figure 4.1).

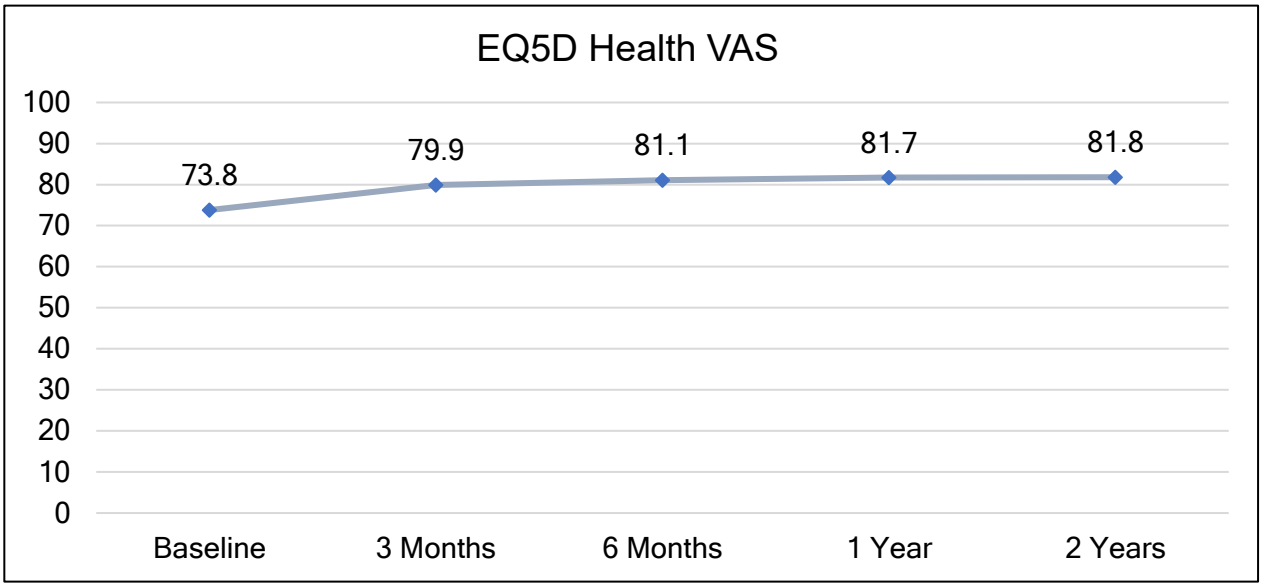


Figure 0.1. EQ5D Health Visual Analog Scale scores over time

EQ5D Health Index

The EQ5D Health Index allows a patient to describe their health on a five-point scale in five different aspects namely, mobility, self-care, usual activities, pain and discomfort, and depression and anxiety [8]. The patient cohort reported a baseline EQ5D Health Index of 0.61, which improved to 0.75 at 3-months post-operatively and plateaued from 6-months onwards (Figure 4.2).

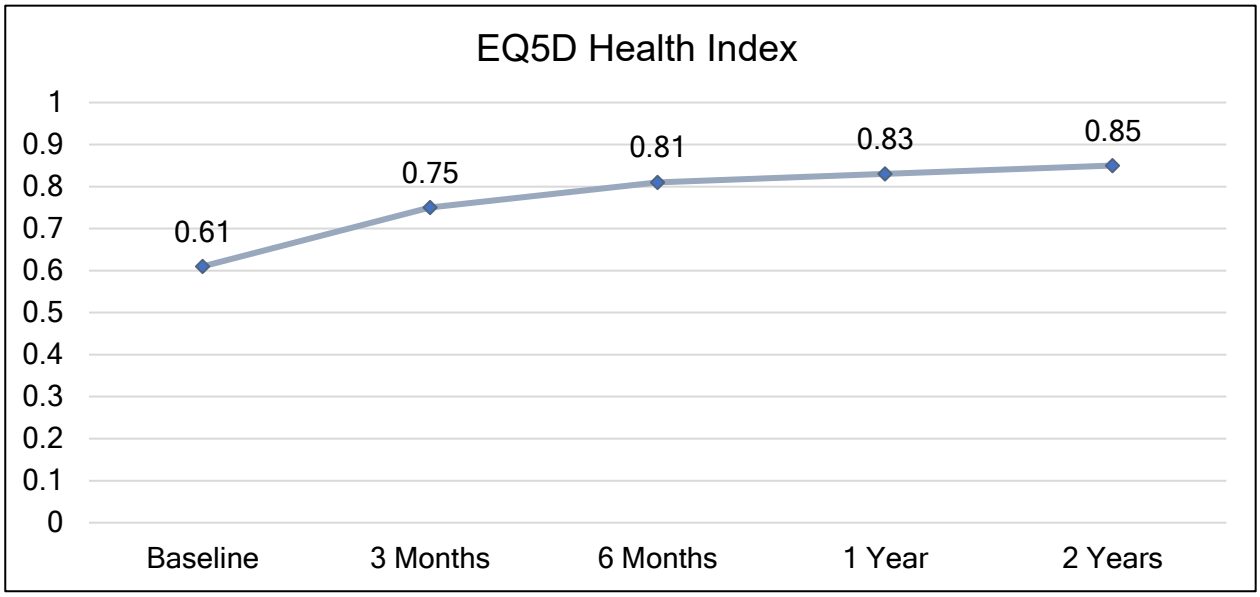


Figure 0.2. EQ5D Health Index scores over time

Oxford Shoulder Score

The OSS assesses the pain and functionality of the affected shoulder and ranges from 0 to 48, with 48 being the best outcome [9]. The SAOR shoulder arthroscopy patients reported a baseline OSS of 28.2 which improved to 36.5 and 40.5 at 3 and 6-months post-operative, respectively. Scores plateaued around 42 from 1-year post-operatively (Figure 4.3).

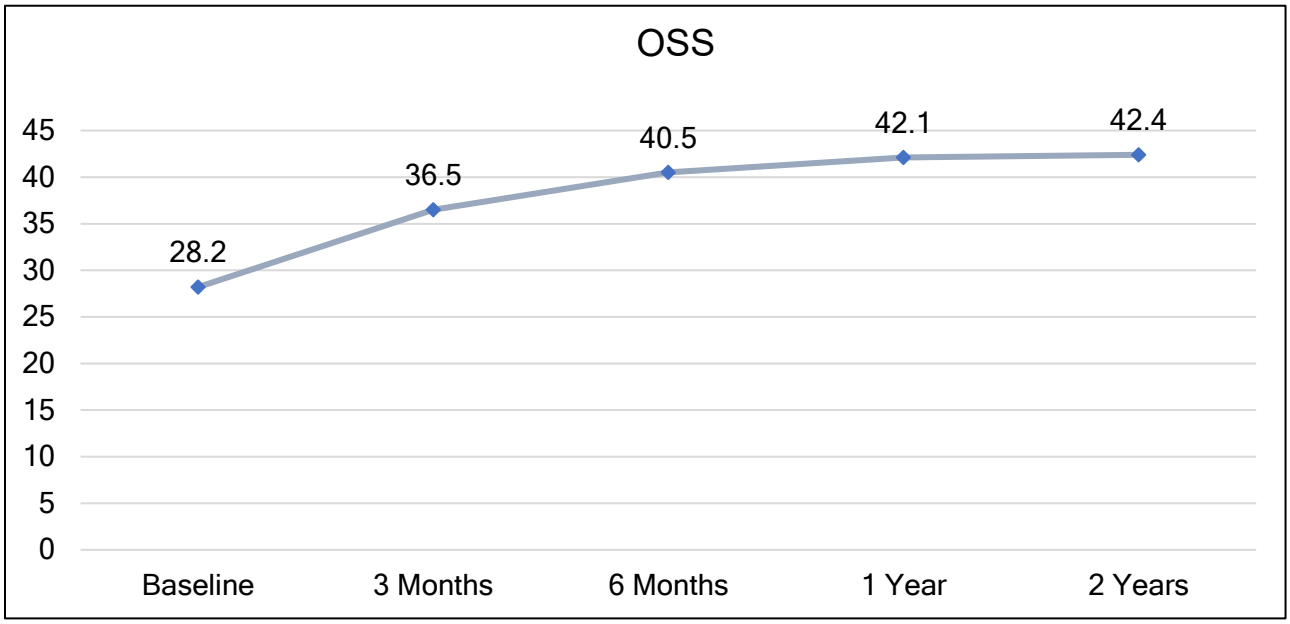


Figure 0.3. Oxford Shoulder Scores over time

VAS Pain

Patients complete the VAS pain score by marking their level of pain on a scale of 0 to 100 millimetres, with 100 being the worst pain possible [10]. SOAR arthroscopy patients reported a drastic decrease in pain by 3-months postoperative from 58.5 at baseline to 24.2. These scores decrease steadily over time to 18.9, 18 and 14.5 at 6-months, 1-year and 2-year postoperative periods (Figure 4.4).

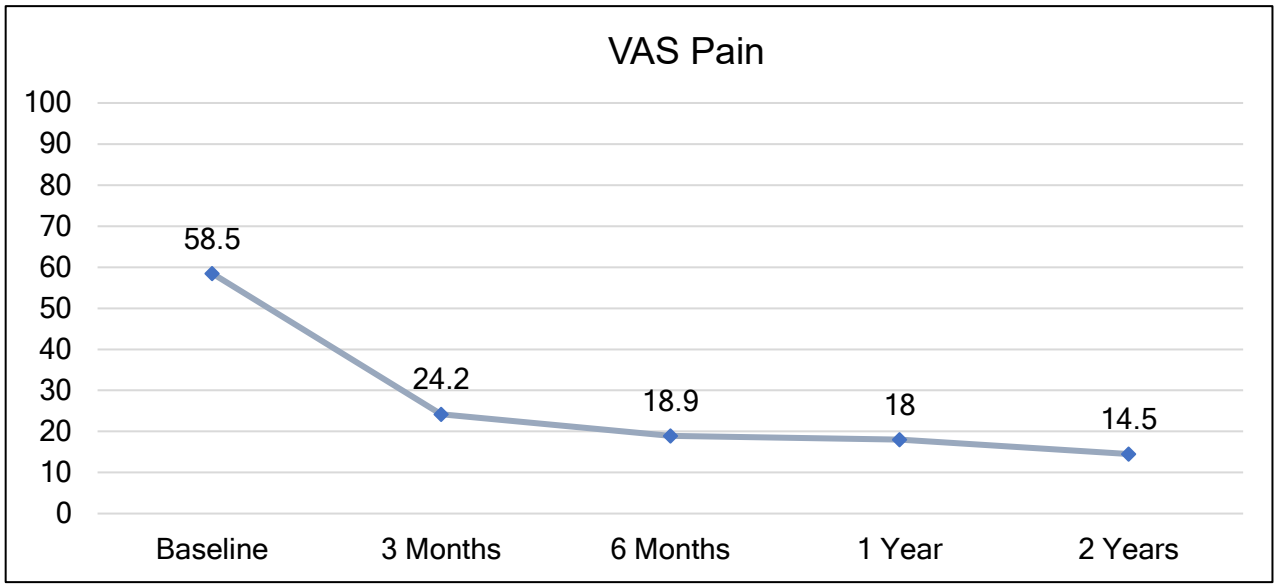


Figure 0.4 Visual Analog Scale scores for Pain over time

Conclusion

The South African Orthopaedic Registry (SAOR) Shoulder Arthroscopy Pathway represents an important step toward establishing a national benchmark for shoulder arthroscopy outcomes. Analysis of 2,439 procedures demonstrates clear and consistent improvements in patient-reported outcomes, with meaningful gains observed across all PROMs. Patients reported improved overall health status (EQ5D VAS and Index), enhanced shoulder function (Oxford Shoulder Score), and a substantial reduction in pain (VAS Pain), with the most pronounced improvements occurring within the first three months postoperatively and sustained over time. These findings support the clinical effectiveness of shoulder arthroscopy within the South African context.

Incomplete data capture and the limited number of surgeons who submit data remain limitations. Follow-up rates for PROMs (11–19%) are notably lower than international benchmarks, underscoring the need for improved longitudinal data-collection strategies. Addressing these gaps will be critical to reducing bias, strengthening the interpretation of outcomes, and enabling more robust comparisons both locally and internationally. Notwithstanding these limitations, the registry demonstrates strong foundational data quality in key areas, including procedure classification, surgical detail, and consistent trends in outcome measures across timepoints.

In conclusion, the SAOR Shoulder Arthroscopy Pathway provides valuable real-world evidence of positive patient outcomes following shoulder arthroscopy in South Africa. Continued efforts to improve data completeness and more participating surgeons will further strengthen the registry's capacity to inform clinical practice, support benchmarking, and drive quality improvement across the orthopaedic community.

Reference List

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Appendices

Appendix A: Procedure Counts and Frequencies

Procedure	Count	% of Procedures	% of Patients
Subacromial Decompression and ACJ Resection	1242	19,9%	50,9%
Rotator Cuff Repair	1036	16,6%	42,5%
Biceps Tenodesis	701	11,2%	28,7%
Rotator Cuff Debridement	676	10,8%	27,7%
Subscapularis Repair	420	6,7%	17,2%
Acromioplasty	374	6,0%	15,3%
Subscapularis Debridement	362	5,8%	14,8%
Debridement of the Shoulder	254	4,1%	10,4%
ACJ Resection	219	3,5%	9,0%
Resection of Calcific Deposit from Rotator Cuff	214	3,4%	8,8%
Biceps Tenotomy	154	2,5%	6,3%
Subacromial Decompression	110	1,8%	4,5%
Calcium Deposit Removal	70	1,1%	2,9%
Capsular Release of Shoulder	65	1,0%	2,7%
Repair and Augmentation of Rotator Cuff	32	0,5%	1,3%
Bankart Repair	30	0,5%	1,2%
Labral Debridement	29	0,5%	1,2%
Other Surgery	22	0,4%	0,9%
Resection of Calcific Deposit and Cuff Repair	19	0,3%	0,8%
Washout of Shoulder Joint	18	0,3%	0,7%
Shoulder Synovectomy	18	0,3%	0,7%
Resection of Osteophyte from the Shoulder	17	0,3%	0,7%
Os-acromionale Resection	16	0,3%	0,7%
Anterior Labral Repair	12	0,2%	0,5%
Synovial Biopsy	12	0,2%	0,5%
MUA of the Shoulder	10	0,2%	0,4%
Release of Soft Tissue Contractures	9	0,1%	0,4%
Posterior Labral Repair	8	0,1%	0,3%
Diagnostic Evaluation	6	0,1%	0,2%
Release of Entrapment of a Peripheral Nerve	6	0,1%	0,2%
Distal Clavicle Excision	6	0,1%	0,2%
Decompression of the Subscapula Bursa	5	0,1%	0,2%
Subcoracoid Decompression	5	0,1%	0,2%
Microfracture Chondroplasty	4	0,1%	0,2%
Removal of Foreign Body from Shoulder	4	0,1%	0,2%
Removal of Metalwork from the Shoulder	4	0,1%	0,2%
Remplissage Procedure	4	0,1%	0,2%
Anterior Shoulder Stabilisation	3	0,0%	0,1%

Cartilage Biopsy	3	0,0%	0,1%
Anterior Capsular Reconstruction	3	0,0%	0,1%
Removal of Loose Body from Shoulder	3	0,0%	0,1%
Osteocapsular Release (CAM Procedure)	3	0,0%	0,1%
SLAP Repair of the Shoulder	3	0,0%	0,1%
Removal of Anchor from Humerus	2	0,0%	0,1%
Needling of Calcium Deposit	2	0,0%	0,1%
Comprehensive Arthroscopic Management (CAM Procedure)	2	0,0%	0,1%
Reattachment of Greater Tuberosity	2	0,0%	0,1%
Re-attachment of Os-acromionale	2	0,0%	0,1%
Latissimus Dorsi Tendon Transfer	2	0,0%	0,1%
Abrasion Chondroplasty	2	0,0%	0,1%
Suprascapular Nerve Decompression	1	0,0%	0,0%
Coracoid Transfer Shoulder Stabilisation	1	0,0%	0,0%
Resection of a Ganglion from the Shoulder	1	0,0%	0,0%
Removal of Metalwork from the Clavicle	1	0,0%	0,0%
Tendon Transfer around the Shoulder	1	0,0%	0,0%
ACJ Decompression	1	0,0%	0,0%
Release of Hourglass Biceps from Bicipital Groove	1	0,0%	0,0%
ACJ Reconstruction (Weaver - Dunn)	1	0,0%	0,0%
Injection Subacromial Space	1	0,0%	0,0%
Biopsy from the Upper Limb	1	0,0%	0,0%
Co-Plaining of Distal Clavicle	1	0,0%	0,0%
Brachial Plexus Decompression	1	0,0%	0,0%
Reconstruction of Coraco-clavicular Ligament	1	0,0%	0,0%
Resection of a Bone Lesion in the Humerus	1	0,0%	0,0%
Acute ACJ Stabilisation with Lars Ligament	1	0,0%	0,0%
Biceps Re-routing	1	0,0%	0,0%
Acute ACJ Stabilisation	1	0,0%	0,0%
Isolated Bioconductive Repair of Rotator Cuff	1	0,0%	0,0%
Deltoid Reattachment	1	0,0%	0,0%
Superior Capsular Reconstruction	1	0,0%	0,0%

Appendix B: Medical Device Usage

Device	Count	Percentage of Total
Smith and Nephew HEALICOIL Knotless	293	16%
Smith and Nephew HEALICOIL PK	291	16%
Smith and Nephew HEALICOIL REGENESORB	243	14%
Arthrex FiberTak Soft Anchor	186	10%
Arthrex Bio-SwiveLock	120	7%
Arthrex Corkscrew FT (Fully Threaded)	92	5%
Linvatec POPLOK (Knotless)	87	5%
Other	49	3%
Anika Draw Tight Suture-Based Anchor	48	3%
Rejoin GripLoc Knotless Anchor PEEK	39	2%
Smith and Nephew FOOTPRINT PK	39	2%
Arthrex SwiveLock SP	36	2%
Arthrex PEEK SwiveLock SP	25	1%
Arthrex SutureTak	22	1%
Arthrex PushLock SP	18	1%
DePuy Mitek HEALIX ADVANCE BR	17	1%
Arthrex PEEK PushLock SP	16	1%
Arthrex PEEK Corkscrew FT (Fully Threaded)	15	1%
Smith and Nephew Q-FIX	14	1%
DePuy Mitek HEALIX ADVANCE PEEK	11	1%
Arthrex Pushlok	11	1%
Stryker ReelX STT	10	1%
Arthrex PEEK SwiveLock	10	1%
Anika Twist Knotless PEEK Screw-In Suture Anchor	9	1%
Arthrex Bio-Corkscrew FT (Fully Threaded)	8	0%
DePuy Mitek HEALIX KNOTLESS BR	7	0%
Arthrex PEEK SutureTak	6	0%
Stryker ICONIX 2	5	0%
Anchor Cut Out	5	0%
Smith and Nephew (Arthrocare) Q-Fix	4	0%
DePuy Mitek HEALIX ADVANCE Self Punch	4	0%
DePuy Mitek BIOKNOTLESS BR	4	0%
Rejoin JoinFix All Suture Anchor	3	0%
DePuy Mitek HEALIX BR	3	0%
DePuy Mitek PANALOK RC Dual	2	0%
Corin - LARS Ligament	2	0%
Rejoin Healfix Anchor	2	0%
Arthrex Bio-PushLock	2	0%
Arthrex FiberTak DR Anchor	2	0%
Biomet JuggerKnot	2	0%

Anchor Cut Out|Suture Snapped	2	0%
Stryker Omega Knotless 4.75	2	0%
DePuy Mitek HEALIX	2	0%
Suture Snapped	1	0%
Arthrex PEEK PushLock	1	0%
Anchor Misplaced	1	0%
Anchor Misplaced|Other	1	0%
1 Anchor	1	0%
Arthrex Bio-SwiveLock SP	1	0%
DePuy Mitek VERSALOCK PEEK	1	0%
Linvatec Y-KNOT RC ALL-SUTURE ANCHOR SYSTEM	1	0%
Rejoin Fusion Loc	1	0%
DePuy Mitek BIOFASTIN	1	0%
Rejoin RealLoc Anchor PEEK	1	0%
Stryker ICONIX 25	1	0%
Rejoin JoinFix Plus	1	0%
Arthrex FASTak Ti	1	0%
Arthrex Bio-FASTak	1	0%
Biotek FiberKnot Ligament Anchor	1	0%
Rejoin Healfix Plus Anchor	1	0%
Anika Twist PEEK Screw-In Suture Anchor	1	0%
Linvatec REVO	1	0%
Arthrex Corkscrew FT Ti (Fully Threaded)	1	0%
Anika X-Twist Biocomposite Suture Anchor	1	0%
Anika X-Twist PEEK Suture Anchor	1	0%
DePuy Mitek HEALIX KNOTLESS PEEK	1	0%
Arthrex SwiveLock SP Ti	1	0%

South African Orthopaedic Registry (SAOR) Shoulder Arthroplasty Pathway

JP du Plessis, Archie Rachuene & Leon Rajah

1. Introduction

National arthroplasty registries have become indispensable tools for monitoring outcomes, benchmarking practice, and guiding quality improvement initiatives. Mature registries such as the Australian (AOANJRR), UK NJR, and Dutch arthroplasty registry have demonstrated the value of comprehensive national arthroplasty surveillance.[1–3] The SAOR Shoulder Arthroplasty Pathway represents an evolving platform for shoulder arthroplasty surveillance within South Africa.The increasing use of shoulder arthroplasty reflects both expanding surgical indications and local surgical skill sets, and advances in implant design and perioperative care.[4,5]

2. Methods

A retrospective descriptive registry analysis was performed using SAOR primary shoulder arthroplasty data. Variables collected included demographics, indications for surgery, procedural details, implant usage, perioperative variables, PROMs, and complications. Registry completeness and data quality were assessed throughout the analysis.

3. Results and Discussions

3.1 Demographic Data

This report analyses 1,071 primary shoulder arthroplasty procedures extracted from 1,221 registered SAOR pathway entries. Reverse total shoulder arthroplasty (RTSA) accounted for approximately 80% of all procedures recorded. While 1,221 cases were registered within the pathway, only 656 contained sufficiently detailed information to permit more comprehensive analysis.

A total of 39 surgeons contributed data, with 19 of them providing complete datasets for detailed analysis. Case volume was highly skewed, with two high-volume surgeons contributing approximately 60% of cases. averaging 34.5 cases per surgeon (median n= 12 cases per surgeon). Sex was one of the most consistently captured variables, with females comprising 62.7% of the cohort. In contrast, other key demographic variables were incompletely recorded. Body mass index (BMI) was missing in 45.2% of cases.

Medical comorbidity data were similarly inconsistent. Among recorded cases, the most common conditions included hypertension, arthritis, and hypercholesterolemia, with smaller contributions from diabetes and endocrine disorders. A small proportion of patients were recorded as having no comorbidities. ASA grading was available in just over half of the cohort, with the majority classified as ASA I or II. While this suggests a predominantly low-risk surgical population, incomplete data capture precludes definitive interpretation.

3.2 Indications for Surgery

Diagnostic data were available in approximately three-quarters of cases. Cuff tear arthropathy was the dominant indication, accounting for over 40% of procedures. Osteoarthritis represented the second most common indication, followed by smaller contributions from other indications as shown in figure 1. These trends are comparable to other national registries.

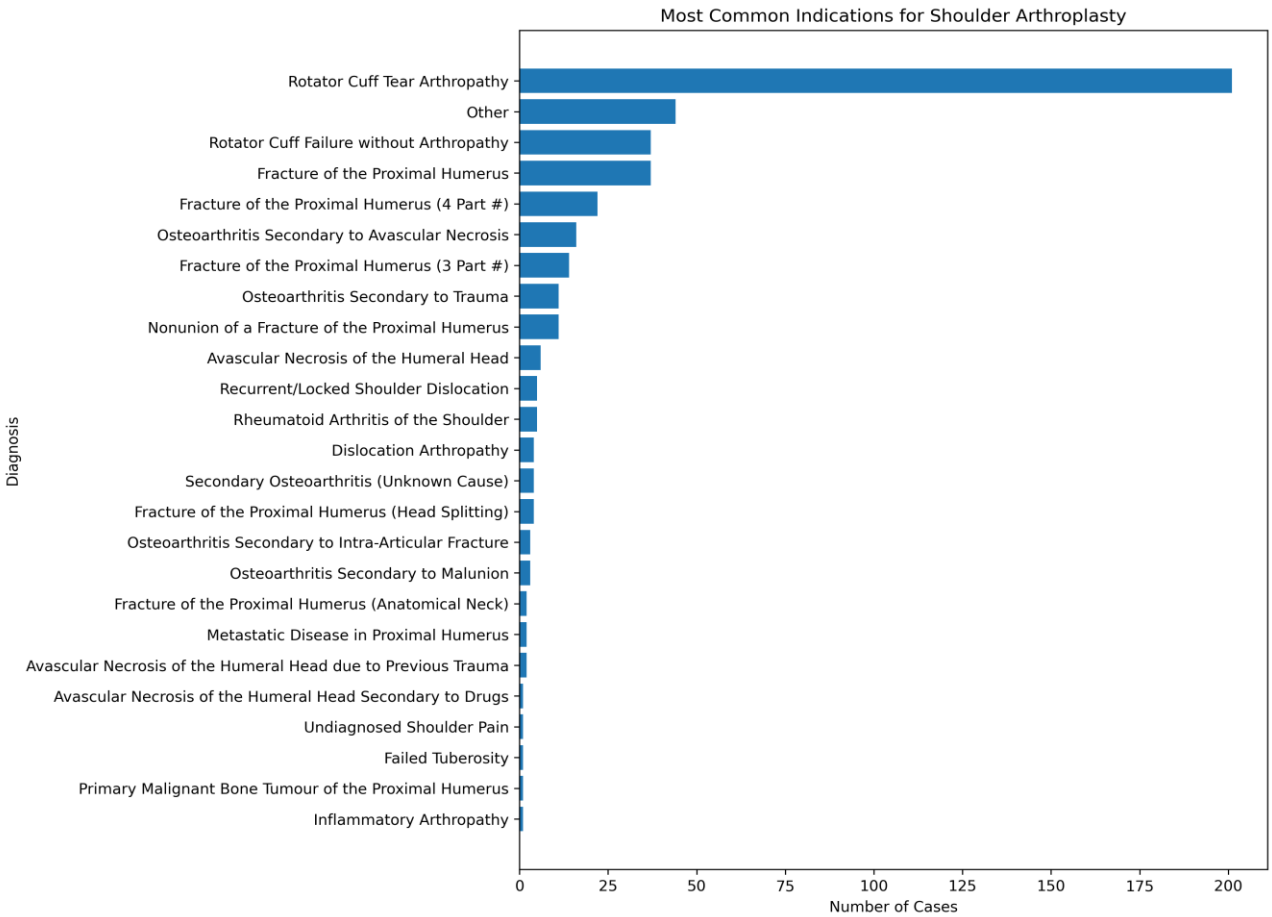


Figure 5:Indications for shoulder arthroplasty procedures.

3.3 Surgical Practice

When looking at the contribution from private institutions and state institutions, only two state hospitals contributed data to the shoulder primary arthroplasty pathway. Both hospitals were in Gauteng and contributed 13 cases while private hospitals across the country contributed 684 cases (Fig. 2).
The volume of cases was assessed over the 27 contributing hospitals. 16 hospitals recorded less than 10 cases with another 8 recording between 10 and 49 cases. Three hospitals recorded more than 50 cases, accounting for 70% of all recorded cases.

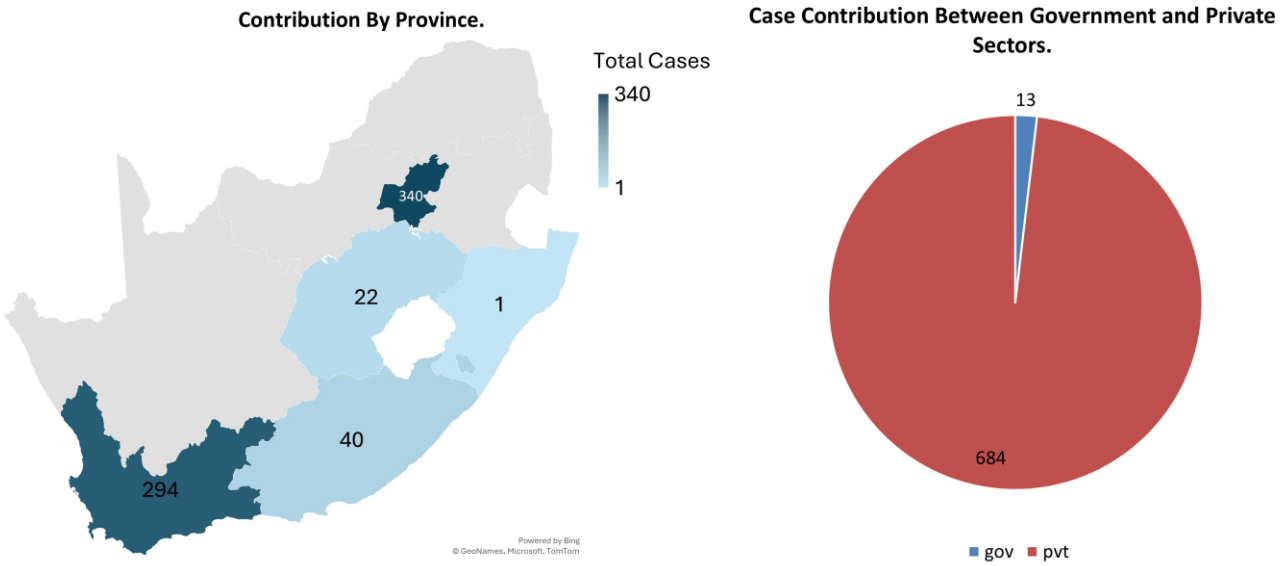


Figure 6: Details of the number of cases recorded per hospital and province. Pvt - Private hospital; gov government hospital.

3.4 Perioperative Data

3.4.1 Intraoperative Findings

Of the 804 recorded cases, 669 commented on the state of the long head of biceps tendon and 666 on the condition of the rotator cuff. In only 94 cases the management of the rotator cuff tendon documented with rotator cuff repair being performed in 84 of these cases. The state of the humeral articular cartilage was noted in 462 cases, and the state of the glenoid articular cartilage was noted in 465 cases. The gaps in reporting on these findings and management will hopefully improve with improved uptake of the registry but at present it brings into question the validity of this aspect of the registry.

3.4.2 Preoperative Planning and Intra-operative Execution

The information about preoperative imaging modalities is not captured. The use of computer-assisted surgery and patient specific instrumentation remains low. Of the 327 cases documenting computer-assisted surgery, only 13 (4%) made use of this facility. Of the 324 recorded cases documenting use of patient specific instrumentation, only 14 (4%) used these instruments.

3.4.3 Prosthesis Data and Cementing

Mirroring international trends, the stemmed reverse total shoulder arthroplasty (RTSA) continues to be the most performed procedure accounting for 80% of total arthroplasty cases reported (*Fig.* 3). The stemmed anatomic shoulder replacement is the next most frequently recorded arthroplasty procedure, accounting for 12.9% of cases. This trend has remained relatively constant since 2021 when registry use became more common. While other implant usage is recorded, their overall numbers remain extremely small in comparison. Only the stemmed hemiarthroplasty reported slightly higher usage accounting for 2.7% of cases. Cement was used in 277 primary arthroplasty cases. This constitutes 41% of cases in which adequate data was collected for analysis. Fracture cases accounted for approximately 13% of those collected with adequate data implying that a significant number of primary arthroplasty cases for other indications are still performed using cemented prostheses. One manufacturer accounted for 76% of all cemented cases with a relatively even split across another four. Figure 4 below outlines the types of bone cement used and list of suppliers.

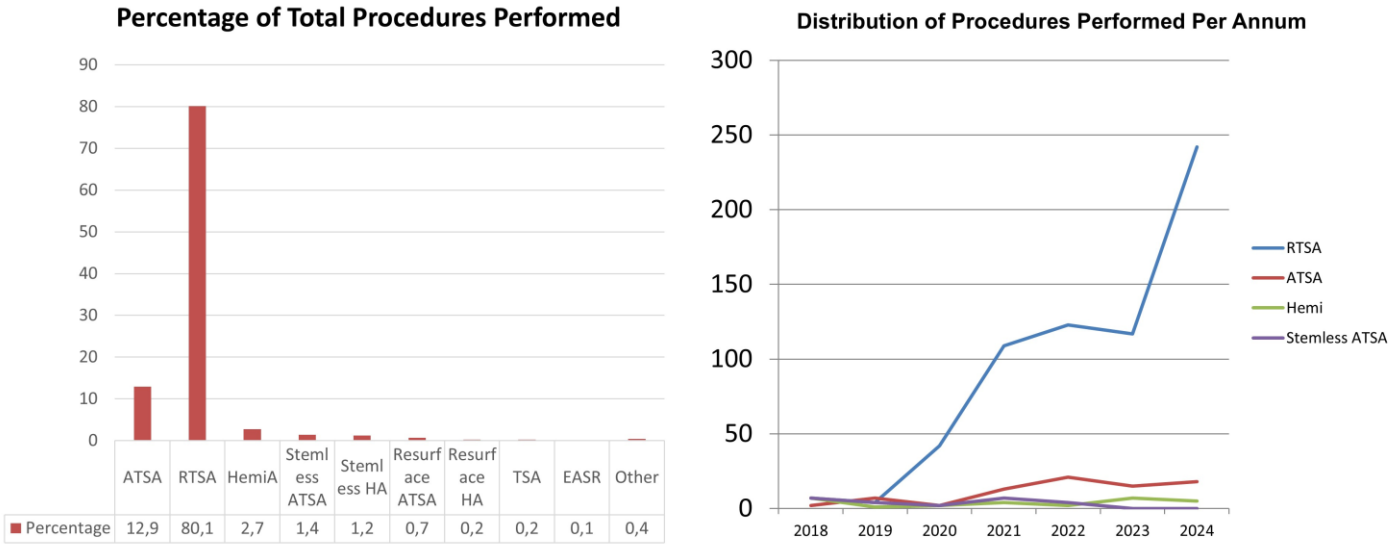


Figure 7: Percentage and distribution of shoulder arthroplasty procedures performed during the reported period.

Note: EASR – extended articular surface replacement; IA – Interposition arthroplasty; ATSA – Anatomic total shoulder arthroplasty; RTSA – Reverse total shoulder arthroplasty; Hemi – Hemiarthroplasty.

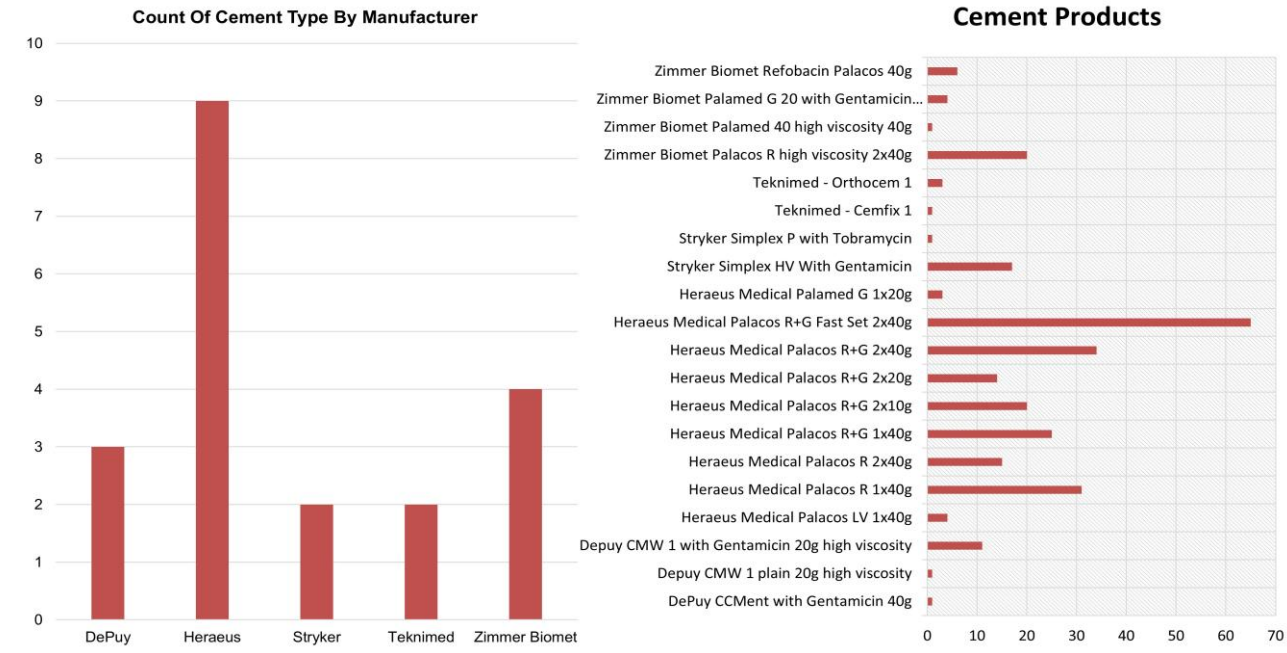


Figure 8: types of bone cement used and list of suppliers.

3.4.4 Glenoid Bone Loss Management

The use of bone graft was more consistently reported. Humeral bone graft was used in 62 of 697 recorded cases (9%). Glenoid bone graft was used in 94 of 691 recorded cases (14%). The form of bone graft was poorly reported with only 41 cases reporting on humeral graft (30 structural and 11 morcelised) and 52 on glenoid graft (47 structural and 7 morcelised). All grafts used were autografts with no documented use of allografts or synthetic bone grafts.

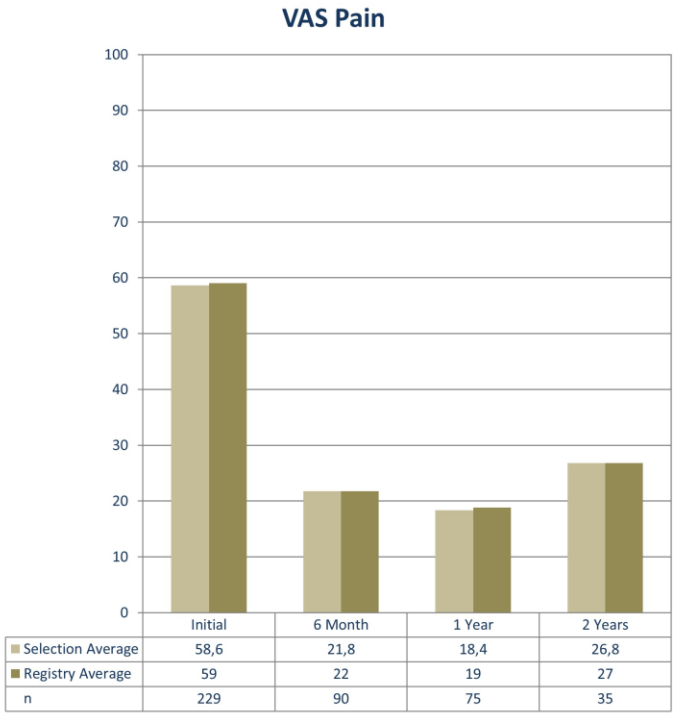
3.4.5 VTE Prophylaxis:

Prophylaxis for post-operative venous thromboembolism was relatively well documented with the most used chemical prophylaxis being LMW Heparin (352 cases) and the most used mechanical prophylaxis being intermittent pneumatic calf compression (328 cases). The presentation of the data did not allow easy determination of when a combination of different methods was used or when they were used in isolation. Of note, 150 patients received no chemical prophylaxis and 155 received no mechanical prophylaxis. It was not clear from the data however how many patients received no prophylaxis at all.

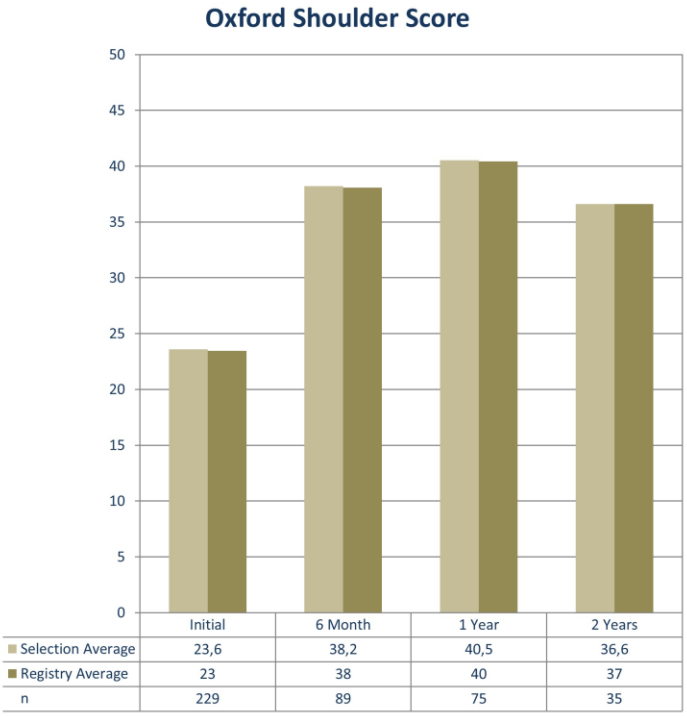
4. Procedure outcomes

4.1 Patient-Reported Outcomes

Registry data demonstrates a measurable improvement in patient-reported health status and functional outcomes following shoulder arthroplasty. Clinically meaningful improvements are evident by six months postoperatively and are largely sustained at one year follow-up. RSA demonstrated the most robust and interpretable outcome signal within the dataset (*Fig 4).* PROM data demonstrated clear improvement in both functional and quality-of-life measures following reverse shoulder arthroplasty. Among patients with paired data, the mean improvement in OSS was +17.2 points, while EQ-VAS improved by +7.2 points, indicating clinically meaningful benefit. However, PROM completion rates were low and declined substantially over time. While baseline data were available for approximately 180 patients, only 57 had 12-month follow-up, and fewer still had data beyond one year. This attrition significantly limits the ability to draw conclusions regarding longer-term outcomes. Outcome analysis for TSA was severely limited by missing follow-up data.



	Initial	6 Month	1 Year	2 Years
Selection Average	58,6	21,8	18,4	26,8
Registry Average	59	22	19	27
n	229	90	75	35



	Initial	6 Month	1 Year	2 Years
Selection Average	23,6	38,2	40,5	36,6
Registry Average	23	38	40	37
n	229	89	75	35

Figure 9: Shows improvement in PROMs at various intervals following RSA.

4.2 Complications

A limited number of intraoperative complications were recorded, with overall complication fields showing >98% missingness for surgical complications and near-complete underreporting of medical complications. A total of 26 intraoperative adverse events were documented, most commonly humeral shaft penetration (n=3) and intraoperative humeral fractures (n=5).

5. Executive Summary of the Findings (Appendix B)

The stemmed reverse total shoulder arthroplasty (RTSA) was the dominant procedure type, accounting for approximately 80% of all primary shoulder arthroplasties. PROM analysis demonstrated clinically meaningful improvements following RTSA, with improvements in both functional and quality-of-life metrics. However, long-term interpretation remains limited by substantial PROM attrition over time. Data completeness remains the major limitation of the registry. Missingness exceeded 45% for BMI and over 98% for complication reporting fields. In addition, registry participation remains heavily concentrated among a small number of surgeons and private institutions.

6. Registry Growth and Participation

The SAOR shoulder arthroplasty pathway has demonstrated progressive growth since its inception, with a marked increase in recorded procedures from 2021 onwards. Early registry activity was minimal, with only isolated cases captured prior to 2021. Thereafter, the number of recorded procedures more than doubled between 2021 and 2022 and remained relatively stable before increasing substantially again in 2025. This pattern likely reflects both recovery from the COVID-19 pandemic and improved registry adoption.

7. International Registry Comparison

The procedural dominance of RTSA within SAOR mirrors international registry trends observed in the AOANJRR and UK NJR. However, substantial differences remain regarding registry maturity, PROM capture, national participation, and revision linkage capability. Compared with mature registries, SAOR currently demonstrates substantial data missingness and reduced longitudinal follow-up capability. Nevertheless, PROM improvements within SAOR appear broadly consistent with these international outcome trends. The UK NJR demonstrated progressive improvements in RSA outcomes over time, including reductions in re-operation rates, mortality, and hospital length of stay. Similarly, the Dutch Arthroplasty Register demonstrated the importance of detailed baseline capture and PROM integration for advanced survivorship and predictive analyses.[2]

8. Summary

The SAOR Shoulder Arthroplasty Pathway provides valuable early insight into national shoulder arthroplasty practice within South Africa. The registry demonstrates procedural patterns broadly consistent with international trends. Future priorities include improved PROM integration, mandatory core data fields, enhanced public-sector participation, revision linkage capability, and improved complication reporting.

9. References

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10. Appendices

Appendix A: Cement type and manufacturer recorded on SAOR

Cement Name	No.
Heraeus Medical Palacos R 1x40g	46
Heraeus Medical Palacos R 2x40g	1
Heraeus Medical Palacos R+G 2x10g	22
Heraeus Medical Palacos R+G 2x40g	2
Heraeus Medical Palacos R+G 2x20g	4
Zimmer Biomet Refobacin Palacos 40g	7
Depuy CMW 1 with Gentamicin 20g high viscosity	9
Zimmer Biomet Palamed G 20 with Gentamicin high viscosity 20g	3
Zimmer Biomet Palacos R high viscosity 2x40g	22
Heraeus Medical Palacos R+G 1x40g	27
Heraeus Medical Palacos R+G Fast Set 2x20g	7
Heraeus Medical Palacos LV 1x40g	5
Depuy CMW 1 plain 40g high viscosity	1
Depuy CMW 1 plain 20g high viscosity	2
Depuy SmartSet GHV plain high viscosity 40g	1
Stryker Simplex HV With Gentamicin	18
Heraeus Medical Palacos R+G Fast Set 2x40g	65
Depuy SmartSet GHV with Gentamicin high viscosity 40g	1
Heraeus Medical Palamed G 1x20g	3
Zimmer Biomet Palamed 40 high viscosity 40g	6
Heraeus Medical COPAL G+C 1x40g	1
Heraeus Medical COPAL spacem 2x40g	1
Teknimed - Orthocem 1	3
Heraeus Medical Palacos LV G 1x40g	2
DePuy CCMent with Gentamicin 40g	1

Appendix B: Table summarizing the key findings from the SAOR Shoulder Arthroplasty Pathway

Metric	Finding
Total primary arthroplasty cases	1,071
Total registered pathway entries	1,221
Contributing surgeons	39
Surgeons with analysable datasets	19
Contributing hospitals	27
Public hospitals contributing	2
Female patients	62.7%
RTSA proportion	80%
Cemented arthroplasties	41%
Glenoid bone graft usage	14%
CAS usage	4%
PSI usage	4%
Mean OSS improvement	+17.2
Mean EQ-VAS improvement	+7.2

Appendix 1: Minimum Data Sets

Introduction

A **minimum dataset** (*Minimum Data Set – MDS*) is the smallest set of essential data fields that must be collected to achieve a specific purpose, such as analysis, reporting, compliance, or decision-making. It is the **core information that must be captured every time**, even if no other optional data is completed.

Why minimum datasets are used

- **Ensure consistency** – Everyone collects the same essential information.
- **Enable meaningful analysis** – Provides enough data to identify trends and outcomes.
- **Improve data quality** – Reduces missing critical information.
- **Support reporting and compliance** – Meets regulatory or organisational requirements.
- **Reduce data entry burden** – Avoids collecting unnecessary information.

There are over 100 fields that can be completed across the various forms. However, surgeons have the option to create and use default templates. These templates save time when completing forms for routine procedures, as they reduce the need to repeatedly enter the same information.

Please note that if too few fields — particularly those designated as minimum required fields — are completed, it becomes difficult to achieve the optimal dataset, and meaningful analysis cannot be performed. Conversely, if too many fields are included, this may negatively impact data entry compliance.

It is therefore important to maintain an appropriate balance in determining which fields are designated as minimum required fields on the forms.

These fields will be reviewed periodically, as they were originally agreed upon in 2019 and are currently included for completeness.

No.	Compulsory Fields - Hip Primary Arthroplasty
1	Hospital Name
2	Specialist Surgeon in Charge
3	Performing Surgeon
4	Funding
5	BMI
6	Weight
7	Height
8	Patient ethnicity
9	Country of treatment
10	Side
11	Diagnosis /Indications for Arthroplasty
12	Anaesthetic and Antibiotic Details
13	Antibiotic name
14	Surgery (Two Pathways if Bilateral)
15	Hip Arthroplasty
16	Procedure Details
17	Position
18	Robotic surgery used
19	Name of Robot
20	Bone Graft
21	Acetabular Graft used?
22	Acetabular Graft biological adjunct
23	Synthetic Bone Graft/Biological Adjunct Used
24	Femoral Bone Graft Used?
25	Synthetic Bone Graft/Biological Adjunct Used
26	Provider company of the Bone Graft
27	Surgical Complication
28	Adverse event
29	Description of adverse event
30	Reattachment of Abductors/Osteotomy
31	Re-attached with
32	Other re-attachment
33	Resurfacing Manufacturer
34	Manufacturer resurfacing THR
35	Type of Cement
36	Different cements
37	Surgical Time
38	Skin to Skin
39	Additional implants
40	Hip Related Implants

No.	Compulsory Fields – Knee Primary Arthroplasty
1	Hospital Name
2	Specialist Surgeon in Charge
3	Performing Surgeon
4	Funding
5	BMI
6	Weight
7	Height

8	Patient ethnicity
9	Anaesthetic and Prophylactic Antibiotics
10	Antibiotic name
11	Procedure details: Diagnosis / Indications for Implantation
12	Position
13	Surgery Details (Two Pathways if Bilateral)
14	Use of Tourniquet
15	Approach
16	Computer Assisted/Guided Surgery (CAS)
17	Patient Specific Instruments (PSI)
18	Robotic Surgery used
19	Name of Robot
20	Type of Arthroplasty
21	Cemented TKR
22	Cruciate Management
23	Endoprosthetic Implants
24	Endoprosthetic Femur
25	Endoprosthetic Tibia
26	Implant Details
27	Tibial Tray/Poly
28	Cruciates
29	Patella Resurfaced
30	Metal Augments
31	Femoral Augmentation
32	Tibial Augmentation
33	Bone Graft
34	Patella Bone Graft
35	Femoral Bone Graft used?
36	Tibial Bone Graft used?
37	Soft Tissue Release
38	Surgical Complications / Ligament Damage
39	Adverse event
40	Description of adverse event
41	Manufacturer/Model of New/Inserted Knee Implant
42	Cement Details
43	Additional Implant Details
44	Knee Related Implants