

CONFERENCE PROCEEDINGS

Data Driven Surgery Conference proceedings

South Africa (SA)'s surgical systems face a persistent paradox. Surgical care is essential to universal health coverage, and can address a substantial proportion of the national burden of disease, yet surgical services are often poorly visible within routine health information systems and broader health system planning. The publication of the proceedings of the 2025 Data Driven Surgery Conference (DDSC) provides an opportunity to reflect on the growing importance of surgical data, not simply as a technical exercise in measurement, but as a strategic resource for improving access, quality, equity and accountability within the health system.

Globally, surgical system strengthening has increasingly emphasised the importance of measurement and routine health information systems. The Lancet Commission on Global Surgery and subsequent international consensus initiatives have proposed indicators such as perioperative mortality rate, surgical volume, workforce density and geographical access as tools to guide policy and planning.^[1,2] However, in many African contexts, including SA, the challenge is no longer merely defining indicators, but operationalising them within fragmented and resource-constrained systems.^[3]

The recently published surgical chapter in the *District Health Barometer* reflects a significant step forward in this regard.^[4] For perhaps the first time within a mainstream SA health systems reporting platform, surgical indicators are considered explicitly through the lens of district health systems, facility readiness, workforce constraints and routine health information systems. The chapter highlights both the promise and limitations of existing data systems. Caesarean section and cataract surgery rates demonstrate that routine surgical data are already being captured in SA, but also expose substantial variation between districts and provinces, raising important questions about equity, access, referral pathways and health system functionality.

Importantly, these developments coincide with growing recognition that data alone do not strengthen systems. Data become meaningful only when embedded within structures that support interpretation, feedback, implementation and learning. This theme emerged strongly throughout the 2025 DDSC proceedings. Across discussions on interoperability, referral intelligence, perioperative registries, patient-reported outcomes, artificial intelligence and ethical data stewardship, a coherent message emerged: trustworthy and contextually interpreted data are foundational to equitable surgical systems strengthening.

SA's current context presents both substantial barriers and important opportunities. Fragmented health information systems, uneven provincial digital maturity, limited routine patient-level operative data and the absence of formal surgical programme management structures continue to constrain progress. At the same time, the development of the National Health Insurance framework, renewed investment in digital health infrastructure and increasing collaboration between clinicians, researchers, health system managers and digital health

partners create an opportunity to reposition surgical care within broader health systems reform.

The concept of 'data driven surgery' should therefore not be interpreted narrowly as the digitisation of surgical services or the expansion of dashboards and indicators. Rather, it represents a broader systems approach in which data are used to make surgical care visible, measurable, governable and improvable across levels of care. This includes strengthening district hospital surgical services, improving referral co-ordination, supporting workforce planning, enabling benchmarking and quality improvement, and incorporating patient-reported outcomes into assessments of value and performance.

An important feature of this emerging movement in SA has been the development of collaborative networks across institutions and sectors. Initiatives involving academic institutions, Safe Surgery SA, the SA Safe Surgery Technical Working Group, the African Perioperative Research Group, and public-private digital health partners increasingly reflect a shared recognition that surgical systems strengthening cannot occur in isolation from broader health information system development and implementation science.

The challenge ahead is therefore not merely technological. It is organisational, operational and ethical. Surgical systems require interoperable infrastructure, clinically meaningful indicators, trusted governance mechanisms and learning environments capable of translating measurement into action. The publication of these conference proceedings should therefore be viewed not simply as a record of scientific presentations, but as evidence of a growing national and continental movement towards data-informed surgical systems strengthening.

Ultimately, the success of this agenda will not be measured by the number of indicators collected, but by whether surgical data improve decision-making, strengthen district and regional services, reduce inequities in access and contribute meaningfully to safer surgical care for patients across SA and the African continent.

Hyla Kluyts 

Professor and Head, Sefako Makgatho Health Sciences University Bophelo Unit for Equity, Intelligence and Learning; Department of Anaesthesiology, Sefako Makgatho Health Sciences University and Dr George Mukhari Academic Hospital, Ga-Rankuwa, South Africa

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Proceedings of the 2nd Data Driven Surgery Conference (DDSC 2025)

I Kleinhans,^{1,2} H Duvenage,^{1,3} H Kluyts,^{1,3} on behalf of the Conference Organising Committee as the proceedings writing group

¹ Bophelo Unit for Equity, Intelligence and Learning, School of Medicine, Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

² Department of Anaesthesiology, School of Medicine, Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

³ Safe Surgery South Africa, Johannesburg, South Africa

Corresponding author: I Kleinhans (inge.kleinhans@smu.ac.za)

Background. Surgical systems strengthening requires data that are reliable, interpretable and actionable. Across many settings, surgical information remains fragmented throughout facilities, levels of care and sectors, limiting planning, quality improvement and equity monitoring. The 2nd Data Driven Surgery Conference convened clinicians, public health leaders, researchers and digital health partners to examine how national infrastructure, interoperable systems and clinically meaningful measurement can close the gap between data generation and implementation.

Methods. Proceedings were compiled from conference session summaries developed from recorded presentations and discussions. Content was edited for clarity, and organised into individual presentation synopses with stated aims, key messages, and system implications.

Results. Presentations covered themes including the importance of interoperable infrastructure for equity, and the need to embed data within decision-making processes by ensuring that knowledge translates into action. Sessions examined interoperability, registries and referral intelligence, risk-adjusted benchmarking, patient-reported measures, and ethical data stewardship as practical mechanisms to operationalise this agenda.

Conclusion. A coherent agenda emerged: data become transformative when they are interoperable, trustworthy, ethically stewarded and embedded in feedback loops that convert measurements into learning and improvement, particularly for district and regional surgical services where constraints most directly shape equitable access and outcomes.

Keywords: surgical systems, data driven surgery, health information systems, digital health, interoperability, perioperative data, data stewardship, equity

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Health systems require trustworthy data systems to plan services, allocate resources, and monitor quality and equity. In surgical systems, data are particularly critical for tracking access, volume, outcomes, workforce distribution and service constraints across levels of care. However, data fragmentation, uneven implementation capacity and variable governance arrangements often constrain the use of data for decision-making and improvement. The 2nd Data Driven Surgery Conference (DDSC) sought to move beyond problem description towards practical system design, implementation and cross-sector collaboration, particularly within the South African (SA) and broader low- and middle-income countries (LMICs) context.

The DDSC 2025 was co-hosted by Sefako Makgatho Health Sciences University and Safe Surgery South Africa NPC, at the Council for Scientific and Industrial Research's International Conference Centre (CSIR ICC) and online (Zoom) on 5 and 6 December 2025.

The conference centred on building systems for equity and transforming knowledge into action, uniting innovators, clinicians and researchers to advance data-driven surgical systems for better patient outcomes. Conference sessions were structured according to two main themes:

Day 1: Infrastructure for Equity

Day 2: Knowledge to Action.

DAY 1 SESSION 1

Facilitators: Thifhelimbilu Luvhengo,¹ Nonkululeko Boikhutso²

¹ University of the Witwatersrand, Johannesburg, South Africa

² Nelson Mandela Children's Hospital, Johannesburg, South Africa

The emerging National Health Information System (NHIS) in South Africa

Marlien Herselman

Council for Scientific and Industrial Research, Pretoria, South Africa

The presenter described SA's emerging national digital health approach as a set of interdependent building blocks, developed in collaboration with the National Department of Health over the years, positioned within a broader eGovernment context. This transition was positioned as both a critical opportunity and a complex systems challenge, shaped by historical fragmentation, inequities, and increasing service delivery demands, with progress remaining incremental across provinces, districts and clinics.

A central theme was fragmentation: provinces developed parallel systems under pressure, resulting in inequities such that some provinces advance faster than others. Within this context, the electronic medical record (EMR) was described as an integrating 'mother ship' within a broader digital health ecosystem, linking radiological, pharmaceutical and e-prescribing systems, but dependent on robust patient identification and registration mechanisms. The importance of a verified unique patient identifier linked to the national registration systems was emphasised as foundational to system integrity, preventing duplication as well as inappropriate reuse of services across facilities, and strengthening trust in digital records.

A practical step underway was the evaluation of existing provincial platforms for scalability, sustainability and functional integration into a national approach, recognising technical and political sensitivities. The discussion acknowledged institutional investment in provincial systems, and the complexity of integrating or transitioning these into a unified national architecture. Core NHIS components highlighted included infrastructure (connectivity, data centres, cloud), standards-based interoperability, governance and cybersecurity aligned with legislative and strategic frameworks, shared data dictionaries, health information exchange, and analytics/dashboards for operational decision-making.

The presentation positioned national digital health infrastructure as foundational for continuity of care and equitable planning, including surgery-relevant data integration. It enables access to accurate patient data, improved co-ordination, and continuity across the peri-operative pathway, with implications for safety and outcomes.

Key messages: Interoperable national building blocks are essential; fragmentation undermines equity; governance, privacy/security, and shared definitions enable trustworthy analytics and planning; digital health is foundational to modern surgical care and health system resilience.

International perspective: Strengthening trauma and perioperative systems

Cherinet Osebo^{1,2}

¹Department of Medicine, Stanford University School of Medicine, USA

²Department of Surgery, Montreal General Hospital, McGill University, Canada

The presenter framed injury and trauma as a major, under-recognised global health burden in LMICs, with substantial mortality, disability and economic impacts, arguing that organised trauma systems can reduce avoidable deaths. Trauma registries were emphasised as fundamental tools for understanding epidemiology, targeting resources, driving quality improvement, modelling outcomes and supporting advocacy. A central example described a web-based platform (Amber) designed for constrained settings through offline use with later synchronisation, enabling bedside data capture and potential extension into operating theatre contexts. Implementation was described as capacity-building-oriented, with training for local clinicians and staff. Importantly, the talk stressed that data should trigger action: registry insights identifying weak triage and delays in care informed the development of a simulation-based trauma and disaster team response course. This program used a train-the-trainer model tailored to low-resourced settings, with a focus on teamwork and communication. Follow-up evaluation demonstrated knowledge decline over time without refresher training, underscoring the need for sustained institutional support rather than one-off interventions.

Key messages: Trauma registries are essential for systems development and advocacy; offline-capable tools enable data capture where infrastructure is limited; data-driven measurement must inform targeted interventions alongside sustained local training capacity.

From data to decisions: Establishing the surgical workforce

Zane Farina

Department of Anaesthesiology, University of KwaZulu-Natal, Durban, South Africa

The speaker provided an overview of common global surgery indicators (access, volume, outcomes, workforce density), and cautioned that headline targets can mislead without systems thinking. Workforce density was described as insufficient unless interpreted as balanced teams across surgery, anaesthesia and obstetrics. A key concept was the 'rate-limiting step': surgical systems often fail at the bottleneck, and managerial responses that assume waiting lists automatically reflect surgeon shortages may worsen mismatches if the constraint lies elsewhere (e.g. anaesthesia capacity, nursing support, theatre time, equipment, or scheduling systems). The talk highlighted that waiting lists can reflect recording practices and service functionality; poorly functioning hospitals may report zero lists, while tertiary hospitals report large lists, illustrating why numbers alone can misrepresent need. Participants were urged to interrogate constraints rather than accept generic explanations, and to support district-level diagnosis and problem-solving. The speaker also raised risks of over-reliance on single multi-skilled clinicians in smaller hospitals, and argued for structured skills development alongside adequate staffing and supporting systems. The discussion also highlighted how referral delays, late presentation and limited district-level operative capacity contribute to preventable morbidity and mortality, reinforcing the need to align workforce planning with referral pathways and local procedural scope.

Key messages: Balanced teams matter more than single-cadre expansion; waiting lists require interpretation through constraints and data quality; district surgical strengthening requires diagnostic leadership and system support.

DAY 1 SESSION 2

Facilitators: Noluthando Ndlovu,¹ Risenga Chauke²

¹Health Systems Trust, Durban, South Africa

²Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

From readiness to recovery: Using analytics and machine learning to transform surgical care

Rami Riman

InterSystems, Windsor, UK

The presentation used a common perioperative scenario to illustrate how fragmented data contribute to late risk identification and cancelled surgery. The speaker further argued that high-quality and connected data across the patient journey are foundational for safer, more efficient care, and for any credible AI/analytics. Examples of potential value included readmission prediction, procedure duration forecasting to improve theatre scheduling reliability, endoscopy-supported machine learning (ML) for lesion detection, and emerging concepts such as digital twins for simulation and postoperative deterioration alerts. Across examples, the essential prerequisite was making data 'visible' and connected through consolidation or high-quality integration before scaling algorithms. The discussion also spoke to the challenges in validation and maintaining of algorithms, particularly within different contexts and subsets of data, and highlighted continuous testing and training as important factors for a changing landscape.

Key messages: Integration precedes intelligence; analytics/ML can improve planning and quality only with trustworthy, connected data; perioperative benefits depend on longitudinal visibility.

Data insights: Surgical referral patterns

William Mapham

Vula, Cape Town, South Africa

Using a 'dragonfly' analogy (high-resolution sensing and responsive action), the speaker argued that improving data fidelity and stewardship supports better decisions at the right place and time. A central claim was that Africa remains 'digitally invisible' when data are not generated, stored, respected, or used at scale, and that informal channels may export patient information outside national systems. Referral-platform data (Vula) was presented as a systems performance lens with scale and reach. Vula is used by >44 000 health workers and >2 400 health facilities in SA, with ~1 in 30 South Africans on the platform, providing a high-quality dataset. This enables measurement of referral flows, delays, cross-sector movement, and transport burdens. The talk suggested that measurement itself can drive improvement (a 'Hawthorne effect') by making responsiveness visible. Examples of data collected by health workers on Vula were presented, demonstrating how health systems can be improved. Referral datasets were positioned as tools for advocacy and resource allocation, moving beyond anecdote toward evidence.

The presentation further emphasised that referral data revealed substantial public-private interface in practice, challenging assumptions of two fully separate systems and highlighting the need for integrated planning.

Key messages: Referral data enable measurement of access constraints; governance is required to protect privacy and prevent unsafe informal practices; referral intelligence supports equitable planning and accountability.

Panel discussion: How can surgical data shape healthcare priorities?

Richard Crawford,¹ Shrikant Peters²

¹ Department of Surgery, School of Clinical Medicine, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

² Executive Management, Groote Schuur Hospital, and School of Public Health, Faculty of Health Sciences, University of Cape Town, South Africa

Richard Crawford

This presentation argued that health data should move beyond administrative reporting to support clinical intelligence and operational decision-making. The long lag between evidence and routine practice was highlighted to motivate learning systems that shorten translation cycles. Data-driven approaches were positioned as essential for priority setting: where to invest, which services are missing, and how to monitor progress, provided systems are built with usable design, interoperability and fit-for-purpose governance. The discussion highlighted persistent national data fragmentation, the absence of standardised surgical indicators and the risk that surgery remains under-prioritised without unified, clinically meaningful datasets linked to utilisation, outcomes and cost.

Key messages: Data should support decisions and learning, not only reporting; usability and governance determine impact; prioritisation benefits from interoperable, decision-ready information; surgical visibility requires standardised national measurement.

Shrikant Peters

The speaker emphasised that scale depends on (i) clinician-centred design aligned with workflow; (ii) modular interoperability rather than single-purpose tools that deepen fragmentation; (iii) explicit attention to inequities and uneven capacity across settings; and (iv) using data not only for management but also for advocacy and accountability.

Practical provincial examples illustrated how utilisation of data, transparency dashboards, and integrated clinical-administrative datasets can improve efficiency, support outreach redistribution and strengthen accountability – without necessarily increasing resources.

Key messages: Sustainable scaling requires workflow-integrated systems; data must be owned locally but aligned nationally; accountability mechanisms can drive responsiveness; linking volume, quality and cost is increasingly essential for policy relevance.

Synthetic data: Bridge to a sustainable African surgical registry?

Alwyn Kotze

National Health Service (NHS), United Kingdom

The speaker distinguished between registries and routinely collected data, arguing that this distinction shapes the research-to-practice gap. Registry data are purpose-built, whereas routine data are operational and often messy, since data are captured for different purposes. Data sparsity was described as limiting intervention design, evaluation and funding readiness, particularly in developing countries, including SA. Even in data-rich systems, key research variables are not natively structured for automated modelling. Synthetic datasets were proposed as a bridge to accelerate method development, build reproducible pipelines and support governance learning without direct exposure to sensitive patient records. The OpenSAFELY model was cited to illustrate the development of analysis code on dummy data, and its execution

securely on real data. The presenter stressed privacy and methodological caution, and positioned synthetic data as complementary to, rather than a replacement for, registries and routine datasets.

Key messages: Synthetic data can accelerate capacity-building; safeguards are essential; bridging approaches can support reproducible learning while routine systems mature.

DAY 2 SESSION 1

Facilitators: John Biggs,¹ Nadine Harran,² Brad Beira³

¹ Periopp, South Africa

² Colorectal surgeon, private practice, Johannesburg, South Africa

³ Chairperson, Africa Telehealth Collaboration, South Africa

The day was opened by Prof. Salome Maswime, chair of the SA Safe Surgery Technical Working Group (TWG) and head of global surgery at the University of Cape Town. She highlighted the TWG's establishment by the National Department of Health during the COVID-19 period to support and strengthen surgical systems and improve access to safe surgery across SA. Emphasising national collaboration across universities and provinces, she underscored that data are foundational to decision-making, intervention design and systems strengthening. Data enable measurement of outcomes, processes and structural indicators at facility and community level, support quality improvement and reveal inequities in access, including signals such as maternal mortality and adverse surgical outcomes. She noted the limited availability of reliable surgical data in SA and other LMICs, where proxy indicators such as caesarean section rates are often used. The address concluded with a call to strengthen surgical epidemiology through improved data generation and use, to advance equitable, safer surgical care.

Keynote: Interoperability meets AI – driving safety, efficiency and patient impact in surgery

Rami Rimani

InterSystems, Windsor, UK

This presentation explored how generative AI could be embedded into routine clinical work, rather than remaining a standalone innovation. Usefulness was framed as dependent on meeting clinicians within their workflow, and avoiding added documentation burden. The discussion linked AI enablement to foundational requirements: trustworthy capture, and interoperable access to longitudinal information across settings. The discussion highlighted the need for regulatory oversight, as technological advancement often outpaces policy processes, with transparency positioned as essential for both current and future governance. Safeguards, contingency planning and data protection were emphasised. Validation was described as critical: AI systems depend on high-quality clinician-entered data, grounding within defined clinical datasets, and testing against established standards to ensure accuracy and safe outputs. Unlike earlier discussions focused on operational predictive analytics, this address emphasised the governance, regulatory and workflow implications of embedding generative AI into routine clinical environments.

Key messages: AI must be workflow-integrated; interoperability is a prerequisite for context-aware augmentation; weak data foundations constrain safe AI adoption.

Expert talk: Data quality and interoperability

Matt Zylstra

Discovery Health Private Healthcare Information Standards Committee (PHISC), Johannesburg, South Africa

The presenter described the national interoperability direction, emphasising the fact that how systems communicate is more important than internal storage. Interoperability was described across foundational, structural and semantic levels, with semantic precision critical to preserving clinical meaning. Standards momentum (including fast healthcare interoperability resources (FHIR)-aligned exchange) was discussed, as was the transition from ICD-10 to ICD-11, characterised as moving from pre-co-ordinated to post-co-ordinated coding, with implications for electronic health record design and semantic consistency. AI-enabled coding and semantic mapping were presented as emerging supports, but the importance of correct code mapping was emphasised to preserve meaning for analytics and reimbursement. Risk adjustment was highlighted as essential for fair benchmarking, and for interpreting results across facilities and case mixes. The discussion linked accurate coding directly to value-based care, alternative reimbursement models and sustainability, while noting the importance of reducing clinician administrative burden through supportive tooling.

Key messages: High-quality coding enables meaningful benchmarking; ICD-11 readiness has system consequences; risk adjustment is required for fair comparisons and value interpretation; semantic interoperability underpins trustworthy data exchange and value-based reform.

Data use case: Perioperative data sharing

Liza Street

Mammoth, Johannesburg, South Africa

A vignette illustrated fragmentation: perioperative documentation and discharge information may not translate into effective follow-up, even for routine procedures, demonstrating continuity failures across the surgical journey. The presentation advocated shared longitudinal records and the orchestration of health information exchange to enable safer transitions and connect surgical care with chronic care pathways. Particular emphasis was placed on the post-discharge period as the most vulnerable gap in monitoring, where complications and medication errors often go unseen across institutions. Patient-facing technologies were discussed as potential supports, with acknowledgement of operational constraints and the need for feasible response pathways. The discussion also highlighted sustainability and funding challenges for health information exchange in the SA private sector, including cost-sharing models and alignment with national digital infrastructure efforts.

Key messages: Perioperative care is longitudinal; exchange and governance enable safer transitions; implementation must align with capacity and workflow; sustainability requires shared incentives and trust across sectors.

DAY 2 SESSION 2

Facilitators: Bruce Biccard,¹ Brian Pandaram²

¹ University of Oxford, UK

² Dr George Mukhari Academic Hospital, Ga-Rankuwa, South Africa

Showcase: Registry models

Timothy Craig Hardcastle,¹ Elizabeth Schaafsma,² Phillip Webster³

¹ KwaZulu-Natal Department of Health, and Department of Surgery, Nelson R. Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa

² SA Heart, Johannesburg, South Africa

³ Orthopaedic surgeon, private practice, Johannesburg, South Africa

Tim Hardcastle

The presenter described trauma registries as practical tools for clinical decision-making, service planning, quality improvement and research, emphasising implementation realism. Themes included starting with a minimum dataset aligned to purpose, embedding capture into routine workflow, and sustaining engagement through rapid feedback and visible value. Governance and custodianship were stressed as necessary for credibility and controlled access. However, the central emphasis remained on implementation realism in high-burden trauma settings, where rapid feedback loops and visible clinical value are essential to sustain engagement. International models, including those of the American College of Surgeons, were cited as examples of registry-supported benchmarking and improvement cycles.

Key messages: Purpose defines datasets; workflow integration drives completeness; governance enables trust and usable learning; registries are foundational to system-level trauma improvement in high-burden settings.

Elizabeth Schaafsma

This case study described establishing a national transcatheter aortic valve implantation (TAVI) registry, and highlighted how sustainability depends on practical institutional architecture. Funding constraints were addressed through an appropriate legal vehicle to receive funds, when direct payment into a normal account was not feasible. Standardisation aligned to international reporting was used to support comparability, and a custodian model for data access was described, with proposal submission and approval processes enabling research while maintaining governance. The registry also functioned as a mechanism to improve funder decision-making speed, and to generate local evidence for high-cost technology adoption.

Key messages: Sustainability requires fit-for-purpose institutional design; standardisation enables benchmarking; transparent access to governance supports research and trust.

Phillip Webster

This presentation emphasised the 'hidden work' behind registry readiness: due diligence, ethical approvals, and compliance requirements. Patient ownership of data and association stewardship were framed as core trust principles. Patient-reported outcome measures (PROMs) integration was presented as central to moving beyond activity metrics towards outcomes that matter. The major barrier to uptake was the clinical time burden; mitigation strategies included enabling other role-players to enter data, and using automation/AI-assisted templates so that clinician input focused on verification. Lower participation from state-sector surgeons was noted as a persistent gap with equity implications, underscoring that registry representativeness is itself a structural equity issue rather than merely a technical participation challenge. Professional association ownership was positioned as key to maintaining autonomy and trust, particularly in negotiations with funders.

Key messages: Governance and compliance are fundamental; reducing clinical burden improves completeness; PROMs broaden the value and accountability of registries; association-led stewardship protects professional credibility and leverage.

Panel discussion: Why data-driven practice matters in South Africa

Astrid Ellaya,¹ Ntuthuko Bhengu²

¹ Mediclinic Southern Africa, Stellenbosch, South Africa

² Alchemy Health Technologies, Johannesburg, South Africa

Panel reflections highlighted the potential of registry-linked pathways and PROMs to support benchmarking and measurable gains in efficiency and outcomes when embedded in care redesign, while reinforcing the need for governance, feasibility and equity in participation. Discussions further emphasised practitioner-led outcomes measurement, the importance of standardised datasets across institutions and the role of data not only in clinical improvement but also in pricing transparency, negotiation and sustainable reimbursement models. Concerns were raised regarding limited public-sector data visibility, and the need for multidisciplinary collaboration supported by regulatory reform and aligned incentives.

DAY 2 POSTER PRESENTATIONS

Mapping variations: Turning anatomical data into surgical insight

Sandy Hadebe^{1,2}

¹ Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

² Stellenbosch University, South Africa

A cadaveric study presented population-specific arterial variation relevant to reconstructive surgery and flap planning. Findings highlighted the potential absence of the subscapular artery and its associated branching patterns, alongside considerations of thoracodorsal morphometry. The work underscored the value of local anatomical datasets for safe operative planning and for reducing iatrogenic risk, motivating context-appropriate preoperative assessment and mapping, where feasible.

The role of clinical pharmacists in managing drug-therapy problems among surgical patients at a South African tertiary hospital

Covenant Ngomana

Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

A prospective interventional study reported a substantial burden of drug therapy problems among surgical admissions, and positive acceptance of pharmacist-led interventions by clinical teams. The presentation positioned clinical pharmacy integration into surgical ward teams as a pragmatic systems strategy to strengthen medication safety, reduce preventable harm and improve outcomes and efficiency.

Morphometric analyses of the carotid arterial system and its variations in a sample of South African cadavers

Onalerena Mabeba

Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

A cadaveric and histological study explored carotid geometry and arterial wall characteristics as potential contributors to atherosclerotic predisposition. High bifurcation of the common carotid artery (CCA) is more prevalent in the African population compared with the textbook type of bifurcation. The length of the CCA is directly proportional to the level of its bifurcation. The linguofacial trunk is the most common trunk formation in the African population. These results are of high importance in enhancing the accuracy of computed tomography angiography interpretation, surgical planning and risk reduction in emergent interventions. The work reinforced the role of locally generated morphometric evidence to inform long-term prevention and screening conversations, while noting the need for larger samples to strengthen inference.

DAY 2 SESSION 3

Facilitators: Gary Kantor,^{1,2} Nomsa Mtshali³

¹ Department of Anaesthesiology, University of Cape Town, South Africa

² Insight Solutions, Cape Town, South Africa

³ Rare Diseases South Africa, Johannesburg, South Africa

Real-world data: Regional variation in surgical volume and outcomes

Lizelle Steenkamp

Discovery Health Ltd, Johannesburg, South Africa

The presenter argued that variation is ubiquitous. It becomes meaningful when analysed with statistical rigour and interpreted through a shared measurement language. Variation analysis was positioned as a diagnostic tool for improvement that can reveal system pressure points and areas of excellence, provided that metrics are transparent and linked to feedback loops, enabling constructive action rather than blame. The presenter distinguished between warranted and unwarranted variation through structured risk adjustment, and highlighted the need for collaboration with clinical societies to validate and refine models. Public reporting was framed as a mechanism to stimulate system learning, with a recognition that absence of variation does not necessarily equate to optimal performance.

Patient perspective: It's not just the surgery

Charlé Steyl

Department of Anaesthesiology, Sefako Makgatho Health Sciences University, Ga-Rankuwa, South Africa

This presentation argued that surgical performance measurement should include the patient's voice. PROMs and patient-reported experience measures (PREMs) were presented as practical tools that illustrate the divergence between clinical assumptions and patients' lived experiences, and as potential perioperative 'safety nets' when actively reviewed and acted upon. The discussion emphasised challenges in resource-constrained public settings: collecting patient-reported data creates a responsibility to review and respond, requiring realistic workflows and capacity. The session also highlighted medicolegal and ethical implications, reinforcing the fact that measurement without feedback may erode trust.

Expert talk: Value in healthcare – the surgical use case

Victoria Barr

Independent health economist, Cape Town, South Africa

The presenter framed value as the outcomes achieved for the amount spent, and used international examples to illustrate how payment models can be redesigned to improve value, by incentivising providers to increase the cost efficiency of care delivery and improve patient outcomes. Discussion focused on the persistence of fee-for-service reimbursement, and the challenge of replacing it unless systems can measure meaningful outcomes and recognise team-based contributions. She emphasised that payment models should enable service redesign, rather than be thought of as ends in themselves, highlighting bundled payments and outcomes-linked incentives as mechanisms that align quality, prevention and cost control.

Conversation: Ethical data stewardship

Inge Kleinhans,¹ Brenda Kubheka²

¹*Bophelo Unit for Equity, Intelligence and Learning, Sefako Makgatho Health Sciences University Ga-Rankuwa, South Africa*

²*Health IQ Consulting, Roodepoort, South Africa*

The closing conversation described data stewardship as responsible management throughout the data lifecycle, including collection, storage, sharing and disposal, and positioned it as a subset of data governance. A core ethical lens highlighted that the importance of deliberately embedding ethics in the process, from defining the minimum data sets and designing systems for inclusion, to prevent bias and avoid widening inequalities. Inclusion should begin at the planning stage, where diverse voices and perspectives should be elevated, because ‘missing’ information indicates whose realities are not captured. This underscores the importance of designing minimum datasets with inclusive participation to avoid embedding bias or widening inequities. It is crucial to step back and ask why data are collected and how they are structured to foster understanding among managers, clinicians, society and others, thereby laying the foundation for a culture of data-driven decision-making. The discussion further highlighted the need to balance privacy with responsible data access, strengthen trust through transparent governance, and ensure that emerging technologies and AI are implemented ethically and contextually to reduce bias and safeguard patient interests.

Conclusion

Across sessions, the conference advanced a coherent pathway for translating knowledge into equitable, data-driven surgical systems: building interoperable national and perioperative foundations; treating coding quality and risk adjustment as clinical governance priorities; using registries and referral systems to make constraints visible and actionable; integrating PROMs/PREMs with feasible

response pathways; and embedding ethical stewardship so that measurement supports equity rather than exclusion. Collectively, these discussions reinforced the argument that infrastructure for equity extends beyond technical systems to encompass governance, trust, interoperability and accountability. Data are most powerful when they are reliable, contextually interpreted, and linked to improvement cycles at the point of care and across the broader healthcare system. The conference articulated a pragmatic framework for surgical systems strengthening in which innovation is anchored by trustworthy infrastructure capable of supporting implementation at scale. Ultimately, the discussions contributed to shaping a future of surgical care in which equity, innovation and accountability are grounded in trustworthy, data-driven systems.

Abbreviations:

AI = artificial intelligence; CCA = common carotid artery; COVID-19 = coronavirus disease 19; CSIR ICC = Council for Scientific and Industrial Research's International Conference Centre; DDSC = Data Driven Surgery Conference; EMR = electronic medical record; FHIR = fast healthcare interoperability resources; ICD = International Classification of Diseases; LMICs = low- and middle-income countries; ML = machine learning; NHIS = National Health Information System; PREMs = patient-reported experience measures; PROMs = patient-reported outcome measures; SA = South Africa; TWG = Technical Working Group; UKZN = University of KwaZulu-Natal.

Consent for publication. Conference registration included permission to record and disseminate the conference recordings and proceedings, with the option to opt out.

Data availability. All session recordings will be released publicly on 5 December 2026. Speakers' presentations are available in Supplement 2.

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The full Data Driven Surgery Conference 2025 programme is available [here](#), and the speaker biographies [here](#).