




Insulin pens are a necessity, not a luxury: Addressing inequitable access to diabetes treatment in South Africa's public sector

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Diabetes is a growing public health crisis in South Africa (SA), driven by urbanisation, sedentary lifestyles, poor dietary habits and an ageing population. The country has one of the highest diabetes prevalence rates in sub-Saharan Africa, with millions affected, many of whom remain undiagnosed. The disease disproportionately impacts low-income communities, where limited healthcare access and late diagnoses lead to severe complications and economic strain. While insulin pens improve glycaemic control and patient adherence, they remain largely inaccessible in the public sector owing to high costs and restrictive procurement policies. Government reliance on vials and syringes exacerbates treatment disparities, increasing the risk of medication errors and poor health outcomes. Addressing these barriers requires policy reform, expanded subsidies and improved procurement strategies to ensure equitable access to insulin pens. By prioritising patient-centred diabetes care, SA can reduce hospitalisations, enhance treatment adherence and alleviate the broader economic and healthcare burden of diabetes.

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Diabetes is a growing public health crisis in South Africa (SA), with increasing prevalence driven by urbanisation, sedentary lifestyles, poor dietary habits and an ageing population.^[1] The International Diabetes Federation (IDF) reports that SA has one of the highest diabetes prevalence rates in sub-Saharan Africa, affecting millions, many of whom remain undiagnosed.^[2] This burden is particularly severe in low- and middle-income communities where limited healthcare access, inadequate patient education^[3] and delayed diagnoses contribute to severe complications such as cardiovascular disease, kidney failure and amputations.^[1] The economic impact is substantial, straining individuals and the healthcare system through frequent hospitalisations, lost productivity and increased mortality rates.^[4] The World Health Organization (WHO) recommends that all people living with diabetes have uninterrupted access to affordable human insulin, especially in low-resource settings, yet in SA and many sub-Saharan African or low- and middle-income countries (LMICs), insulin provision is often inconsistent owing to supply chain barriers, cost issues and weak health infrastructure.^[5] Despite national efforts to improve diabetes care, challenges such as medication shortages, insufficient healthcare personnel and disparities in treatment access persist.^[6]

Economic disparities between the private and public healthcare sectors exacerbate inequalities in diabetes management.^[7] While private sector patients benefit from advanced insulin delivery systems such as insulin pens, those in the public sector rely on vials and syringes, which are less user-friendly and more prone to dosing errors.^[8] The IDF estimated that 4.2 million South Africans had diabetes in 2021,^[2] with projections indicating further increases. Statistics South Africa reported a 36.5% rise in diabetes-related deaths between 2008 and 2018,^[2] making diabetes the second leading cause of natural death in the country.^[9] Nearly 45% of cases remain undiagnosed, compounding the disease burden.^[2] Mortality rates vary across racial and socioeconomic groups, with the highest

age-standardised mortality rate recorded among Indian/Asian populations, at 91.4 per 100 000, compared with 25.6 per 100 000 among whites,^[9] while in a systematic review by Pheiffer *et al.*^[10] it was reported that the pooled prevalence for black South Africans was 11.8%.

The economic burden of diabetes extends beyond healthcare costs, affecting workplace productivity and mental health.^[3] An IDF study found that >80% of South Africans living with diabetes experience anxiety, depression, or burnout, underscoring the need for integrated mental health support.^[11] Research has also highlighted how the accessibility of effective insulin delivery systems can significantly impact adherence and glycaemic control.^[12] A 2024 circular from SA's National Department of Health (NDoH) reported nationwide shortages of insulin pens, forcing many public sector patients to revert to vials and syringes.^[13] Doctors Without Borders (MSF) SA noted that this transition led to increased medication errors, patient discomfort and reduced adherence.^[14] Although insulin pens enhance dosing accuracy, ease of use and adherence, they remain financially out of reach for most patients in the public sector owing to cost and procurement policies.^[13,14]

Insulin pens v. traditional delivery methods

Insulin pens have transformed diabetes management, offering advantages over traditional vial-and-syringe methods.^[15] They enhance dosing accuracy, simplify insulin administration and improve adherence.^[16] Studies indicate that insulin pens significantly reduce dose variability, leading to more stable blood glucose control, particularly in children and adolescents.^[17] Although initial costs may be higher, long-term benefits justify the investment, particularly in low-resource environments where diabetes management challenges are amplified^[18] (Table 1).

Table 1. Key clinical and practical differences between insulin pens and vial-and-syringe insulin delivery

Attribute	Insulin pen	Vial-and-syringe
Dosing accuracy	Higher	Lower
Ease of use	Easier	More complex
Injection pain	Lower	Higher
Patient adherence	Higher	Lower
Risk of dosing errors	Lower	Higher
Training required	Less	More
Up-front cost*	Higher	Lower
Long-term cost complications	Lower	Higher

*Higher up-front device costs are usually offset by lower long-term complication costs.

Accurate insulin dosing is critical for preventing severe complications such as diabetic ketoacidosis, nerve damage and organ failure.^[17] A study by Aanstoot *et al.*^[19] found that insulin pens minimised dosing inconsistencies, reducing the risk of hypoglycaemia and hyperglycemia. Insulin pens reduce measurement mistakes by offering pre-set, precise dosing mechanisms, minimising the human error associated with vials and syringes. They also use ultra-fine needles, reducing injection pain and anxiety, which enhances adherence. Research confirms that insulin pens lead to better glycaemic control, lower hospitalisation rates and improved quality of life.^[6,8] Additionally, their use is linked to reduced long-term healthcare costs, particularly in low-resource environments, despite higher upfront costs.^[20]

A national audit of primary healthcare facilities found that nearly 60% of patients relying on vials and syringes had uncontrolled blood glucose levels, whereas only 35% of patients in facilities implementing insulin pen pilot programmes experienced similar outcomes.^[6] Individuals using insulin pens experienced notably greater satisfaction with their treatment, and were less likely to miss doses.^[8] Additionally, the study recorded a 25% improvement in quality-of-life ratings among pen users compared with those administering insulin with vials and syringes.^[8]

A 2023 cross-sectional study of 737 adults with type 2 diabetes found that pen users had significantly lower simplicity, convenience and safety scores (that is, more favourable), and a non-significant trend toward lower median HbA1c than syringe users, despite shorter disease duration (8.7% v. 8.9%; $p=0.607$).^[21] Meta-analytical data pooling 5 randomised controlled trials ($n=1\ 216$) reported a mean HbA1c reduction of -0.21% (95% confidence interval $-0.33 - -0.09$) favouring pens, and 28% fewer documented hypoglycaemic events.^[22] No formal SA pen-implementation trial has been published to date; this evidentiary gap highlights the need for prospective local studies.

Potential drawbacks include the plastic waste generated by single-use pens, and the need for staff retraining. A UK quality improvement project estimated that switching 80% of eligible patients to reusable pens could avert 1 863 kg CO₂-equivalent annually, underlining the importance of sustainable device choices.^[23]

Transition programmes must therefore budget for provider education, disposal or recycling schemes and clear protocols to guide when vials remain preferable (e.g. for inpatient intravenous insulin infusions or severe visual impairment without audible-dose pens).

Psychological and practical benefits for vulnerable populations

The psychological and practical benefits of insulin pens should also be taken into consideration, particularly among vulnerable populations, including children,^[17,24] the elderly^[16] and individuals with disabilities.^[15] For children, insulin pens reduce injection-

related distress, facilitate discreet administration and promote independence in diabetes management.^[17] Among elderly patients, they improve handling for those with arthritis or visual impairments, reduce dosing errors and enhance self-sufficiency. Individuals with disabilities benefit from simplified insulin administration, improving both adherence and caregiver support.^[15,16]

Despite their clear advantages, insulin pens remain inaccessible to many South Africans in the public healthcare system. Governments and global health organisations should prioritise access to insulin pens to improve diabetes care across Africa.^[15,25] Addressing this disparity requires policy interventions, cost-regulation strategies and expanded government support to ensure that insulin pens become a standard component of diabetes care.^[26] Equitable access to insulin pens is essential for not only improving individual health outcomes but also alleviating the broader economic and healthcare burden of diabetes in SA.^[7]

Barriers to insulin pen accessibility in the public sector

Several systemic barriers contribute to inequitable access to insulin pens, including high costs,^[26] government procurement policies that favour cheaper alternatives^[27] and challenges in pharmaceutical pricing and local manufacturing.^[15] Addressing these issues is crucial to ensuring that all diabetes patients receive the most effective treatment options available.

One of the most significant obstacles to widespread insulin pen use in SA's public sector is their high cost compared with traditional vial-and-syringe methods.^[26] SA relies heavily on imported insulin pens, with multinational pharmaceutical companies setting prices based on global market dynamics rather than local affordability. Without strong government intervention, these high prices persist, making insulin pens unattainable for most public sector patients.^[7] Unlike some essential medicines that receive full or partial government subsidies, insulin pens are not widely subsidised in SA's public health system. This means that while patients in private healthcare can access pens through medical aid coverage, those relying on government hospitals and clinics are left with the more affordable but less precise vial-and-syringe option. Additionally, the SA healthcare system is already burdened by competing priorities, including HIV/AIDS, tuberculosis and maternal health.^[27] This financial strain makes it difficult for the government to justify additional spending on insulin pens, despite their long-term benefits in reducing diabetes-related complications and hospitalisations.^[7]

Government procurement policies play a crucial role in determining which medical products are available in the public healthcare system.^[27] In SA, tender-based procurement prioritises cost over efficacy, leading to a preference for lower-cost insulin delivery methods.^[27] Owing to budgetary constraints, the government tends to procure insulin in vials rather than prefilled pens or cartridges.^[20] While vials are significantly cheaper upfront, they come with increased risks of dosing errors, poor adherence and patient dissatisfaction – factors that can ultimately lead to higher long-term healthcare costs.^[16] A year's supply of insulin pens (excluding needles and monitoring supplies) in SA costs around USD111 (~ZAR2 000),^[28] whereas annual dialysis costs can exceed USD12 000 (~ZAR220 000) per patient.^[29] This stark contrast underscores the economic rationale for expanding access to insulin pens to prevent diabetes-related complications such as kidney failure. Since government-funded clinics and hospitals can only offer the insulin delivery methods available through public sector tenders, physicians have little flexibility in prescribing the most appropriate option for their patients.^[27] This lack of choice disproportionately affects low-income individuals who rely on public healthcare.^[7] The

continued reliance on vial-and-syringe insulin administration also requires more extensive patient education, as users must manually measure doses and manage multiple injection supplies.^[18] This creates additional strain on already overburdened healthcare providers.^[27]

The high cost of insulin pens is also influenced by pricing strategies set by pharmaceutical companies, and SA's limited local production capacity. Unlike other essential medicines, SA does not have a strong domestic insulin manufacturing industry. This forces the country to rely on expensive imports, with little room for price negotiation. Encouraging local production of insulin pens could significantly reduce costs and improve accessibility. Multinational pharmaceutical companies set insulin pen prices based on profit-driven models rather than affordability for lower-income populations.^[15] These pricing structures disproportionately affect developing countries, where public health systems struggle to absorb high costs.^[15] Many insulin pen products remain protected under patents that limit competition, preventing the introduction of more affordable biosimilar alternatives. Until these patents expire, or the government negotiates better pricing agreements, insulin pens will remain prohibitively expensive for the public sector.^[20]

Negotiating lower list prices for insulin pens remains a complex challenge. A multi-country price-component analysis by Ball *et al.*^[30] revealed that wholesale and retail mark-ups can increase cartridge costs by up to 67% above factory prices in LMICs. In SA, the fragility of the supply chain was highlighted in a 2024 NDoH circular addressing pen shortages. During a 4-month stock-out, health officials were forced to ration insulin pens, prioritising children, the elderly and visually impaired patients.^[31] Despite such challenges, there are promising examples from comparable middle-income settings. Kenya, for instance, successfully added reusable insulin pens to its 2023 Essential Medicines List (EML), and coupled the policy change with volume-based tenders, demonstrating that technical committees can drive reform by prioritising long-term savings over immediate unit costs.^[32] Encouragingly, manufacturers are beginning to respond. In 2024, Sanofi publicly committed to implementing tiered pricing for insulin pens in SA, signalling a positive shift toward more constructive public-private negotiations.^[33]

The case for policy reform

Addressing these barriers requires a multi-pronged approach. Government intervention in pharmaceutical pricing is essential to regulate insulin pen costs and negotiate better procurement deals with manufacturers.^[7] Incentivising local production of insulin pens would reduce dependence on costly imports. Expanding government subsidies to include insulin pens as an essential diabetes treatment would ensure that they are as accessible as vial-and-syringe options.^[7] Additionally, procurement policies should be reformed to prioritise both cost-effectiveness and patient outcomes, rather than solely focusing on immediate cost savings.^[27]

The SA government plays a central role in determining which medicines and medical devices are accessible through the public healthcare system.^[27] However, the current procurement framework prioritises cost-saving over long-term patient benefits, resulting in vial-and-syringe insulin being the default option, despite its drawbacks. Several key interventions could address this imbalance. The government should negotiate price caps on insulin pens with pharmaceutical companies, ensuring that costs reflect actual production expenses rather than inflated market rates. This could be done through bulk purchasing agreements, or by leveraging SA's participation in global health initiatives for better pricing.^[7] Instead of selecting insulin delivery methods based solely on the lowest immediate cost, the government should incorporate long-term health benefits and cost-

effectiveness into procurement decisions.^[27] Given that insulin pens reduce hospital admissions, prevent complications and improve adherence, they should be prioritised in government tenders.^[16] Public healthcare facilities frequently experience medication shortages owing to poor supply chain management.^[34] A dedicated distribution strategy for insulin pens would help to ensure consistent availability, preventing stock-outs that disrupt diabetes management.^[34,35]

A major reason why insulin pens remain inaccessible in SA's public healthcare system is their exclusion from the EML, which determines which medications are available at public clinics and hospitals. Including insulin pens in the EML would ensure public sector availability, reduce financial barriers for patients and enhance equity in diabetes treatment.^[27] Many people living with diabetes in SA cannot afford insulin pens out-of-pocket.^[26] Expanding government subsidies would make these devices affordable or free at public health facilities, removing financial barriers to optimal diabetes care.^[7] Currently, only patients with medical aid coverage or financial means can access insulin pens, creating a two-tier healthcare system where public sector patients are left with outdated and less effective treatment methods. Integrating insulin pens into the EML would help to bridge this gap and ensure that all South Africans – regardless of income – receive the best possible care.^[27]

Public-private partnerships can play a vital role in expanding access to insulin pens, leveraging resources from government, pharmaceutical companies and non-governmental organisations to improve affordability and distribution.^[27] The SA government should negotiate with manufacturers to lower prices through volume-based purchasing agreements or tiered pricing models based on income levels.^[7] This strategy has been successfully implemented in other countries to improve access to essential medications.^[36] Encouraging domestic production of insulin pens through partnerships with local pharmaceutical companies can reduce import costs, create jobs and improve supply chain resilience. Incentives such as tax breaks and research funding could promote local development and lower overall costs. Organisations such as the WHO, IDF and MSF could assist in funding pilot programmes, supporting community education and advocating for policy changes that prioritise insulin pen accessibility.^[14]

Conclusion and call to action

The benefits of insulin pens extend beyond just convenience – they directly improve health outcomes, reduce dosing errors and enhance the overall patient experience. For children, the elderly and individuals with disabilities, insulin pens are not a luxury but a necessary tool for effective diabetes management. Ensuring equitable access to insulin pens within SA's public healthcare system would significantly improve treatment adherence, reduce complications and enhance the quality of life for thousands of diabetes patients. By implementing the described measures, SA can take meaningful steps toward ensuring equitable access to insulin pens, improving diabetes management and ultimately enhancing the health and quality of life of thousands of patients. In addition, more research is needed to provide evidence-based recommendations for healthcare providers and policy-makers to support patient-centred, safe and effective use of insulin delivery systems in the public sector.

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