Osteoporosis

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Fracture liaison services – Building stronger pathways for good or high quality osteoporosis care

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Learning Objectives

You will learn about:

- Factors that increase the risk for osteoporosis-related fracture
- How a fracture liaison service (FLS) approach optimises osteoporosis care
- How to facilitate the successful implementation of a FLS
- The challenges to improving fragility fracture and osteoporosis care in Africa
- Lessons learned in establishing a FLS pilot in South African clinical practice.

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Introduction

Osteoporosis, an asymptomatic condition where bones become porous and lose their strength, is often referred to as the 'silent disease'; even after breaking a bone, approximately 80% of patients remain undiagnosed and untreated for osteoporosis. Globally, osteoporosis-related fractures affect one in three women and one in five men older than 50 years, with the most commonly occurring fractures being of the hip, spine and wrist.

Fortunately, a healthy lifestyle and pharmacological interventions are of significant benefit in the management of osteoporosis and reduction of fracture risk.[1]

The focus of this sixth and final module of the National Osteoporosis Foundation of South Africa (NOFSA) 2024 Masterclass, in collaboration with IOF Capture the Fracture, considers international and local perspectives on effective fracture liaison services (FLSs) for co-ordinated fragility fracture care.

What are the risk factors for osteoporosis-related fracture?

Women are at greater risk of developing osteoporosis due to their having a lower peak bone mass, which occurs at approximately 30 years of age, and a higher life expectancy than men. Further increasing the risk for osteoporosis, women also undergo a period of accelerated bone loss following menopause.[1]

Fracture risk is also strongly related to age, with the incidence of vertebral fracture (VF) and fractures of the hip and wrist increasing with older age. VF is the most common osteoporosis-related fracture across all age groups and, importantly, two-thirds of these fractures are undiagnosed because many are asymptomatic.[2]

An initial low-trauma fracture increases the risk for subsequent fracture, particularly the first two to three years after the initial fracture, the so-called 'imminent fracture risk'. Australian data reflect that women are at higher risk of an initial low-trauma fracture than men; however, the risk for subsequent fracture is similar in both men and women. A greater incidence of comorbidities, greater consumption of alcohol and poorer nutrition in men are among the likely reasons contributing to the increased risk for subsequent fracture compared with risk for initial fracture.[3]

Optimising osteoporosis care – the important context of FLSs

FLSs are multidisciplinary, co-ordinator-based, secondary fracture prevention services implemented by healthcare systems for the treatment of osteoporotic patients.

The goals of FLSs are to identify fragility fracture patients aged 50 years and older, investigate and assess fracture risk, initiate personalised treatment and monitor for treatment adherence.

Make the first break the last – low availability of FLSs is an unmet need

A global concern is reflected in the view of Professor Peter Ebeling: *"There is a significant gap in osteoporosis care, and our hospitals are becoming revolving doors for fracture patients being sent home and returning with new fractures, rather than being properly assessed and treated for osteoporosis."* These words are particularly apt considering an increasing lifespan that is being observed across the world; the International Osteoporosis Foundation (IOF) expects the incidence of fragility fractures to increase by 23% between 2017 and 2030.[4]

The availability of and access to FLSs is limited, even in high-income countries, and this is of particular concern in the developing world. Challenges to improving fragility fracture and osteoporosis care in Africa are listed in Table 1. The IOF has recognised an urgent need for South African-specific fracture statistics to successfully lobby for improved availability of and access to FLSs; *"In a country where diseases such as HIV/AIDS, tuberculosis and malnutrition are rife and currently responsible for the most deaths, osteoporosis still has a long way to go before it is recognised as a serious disease.*

The myth also still exists that this is a disease of old white women and a normal part of ageing, whereas an unexpected finding was that black women have similar bone densities and, in fact, fracture their vertebrae at the same rate as white women."[5,6]

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Table 1. Challenges to improving fragility fracture and osteoporosis care in Africa[6]

Population-level challenges	• Rapidly growing ageing population in resource-poor settings • Increase in non-communicable diseases, often leading to multimorbidity • HIV as a chronic disease of ageing • Rapid urbanisation • Double and triple burdens of malnutrition • Changing physical activity patterns and workplace environments • Climate change.
Health system challenges	• Low levels of public and stakeholder awareness of bone health • Historic focus on and funding for infectious diseases • Historically isolated models of healthcare • Multiple competing healthcare priorities • Poor access to specialist training and too few specialists in bone health • Few validated tools for fracture risk assessment • Poor access to dual-energy X-ray absorptiometry (DXA) scanning services • Medical pluralism.

Can the fracture tsunami be averted? Act at the first fracture

A fragility fracture in a patient older than 50 years signals the need for further testing and possible treatment for osteoporosis. and these findings underscore the important benefits of diagnosing and treating underlying osteoporosis at the time of the initial fracture.[7]

Key to the provision of high-quality osteoporosis care are the following:

1. Reliable diagnostics being widely available, including DXA and VF assessment (VFA). Clinically proven osteoporosis treatments that have been shown to significantly reduce the risk of hip fracture, VF and other clinically apparent fractures being widely available; in South Africa, current available osteoporosis therapies include bisphosphonates, hormone replacement therapy, selective oestrogen receptor modulators, strontium ranelate, calcitonin and parathyroid hormone analogues.
2. Available and accessible FLSs to reduce subsequent fractures.

FLS programmes are effective for the evaluation and management of patients with osteoporotic fracture

To better meet the needs of fracture patients who are older than 50 years, a FLS assumes responsibility for fracture case-finding, assessing and performing diagnostic evaluations and making specific treatment recommendations for the secondary prevention of osteoporotic fractures (Figure 1).[8]

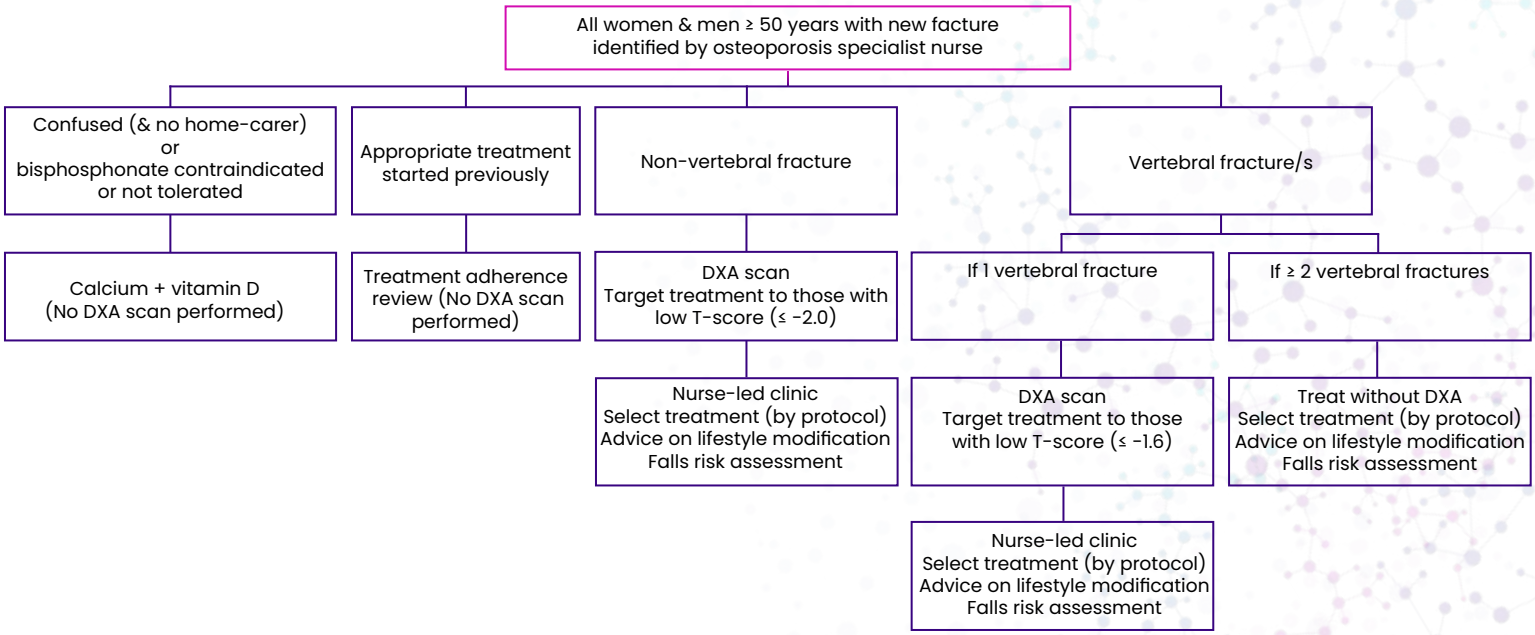


Figure 1. The FLS approach to the secondary prevention of osteoporotic fractures[8]

The effectiveness of the FLS approach for reducing mortality in older hip fracture patients has been demonstrated after two-year follow-up. Compared with pre-FLS implementation, key findings of a prospective cohort study undertaken in Spain include:[9]

- A 24% reduced mortality rate at year 1 and a 13% reduction at year 2 post-FLS implementation
- A 40% reduced mortality rate at year 1 and a 25% reduction at year 2 in patients receiving osteoporosis treatment post-FLS implementation
- A 35% reduction in subsequent fracture at year 2 post-FLS implementation.

Notably, 60-70% of the study cohort were found to have a vitamin D deficiency: this might be unexpected upon initial consideration, because Spain is a very sunny country but maybe there is so much sunshine that people avoid the sunshine; the same might be true for South Africa, although individuals with a black skin are less sensitive to vitamin D deficiency. This pre-post model Spanish retrospective study demonstrated a reduction in both fractures and mortality in those individuals who were not vitamin D deficient.

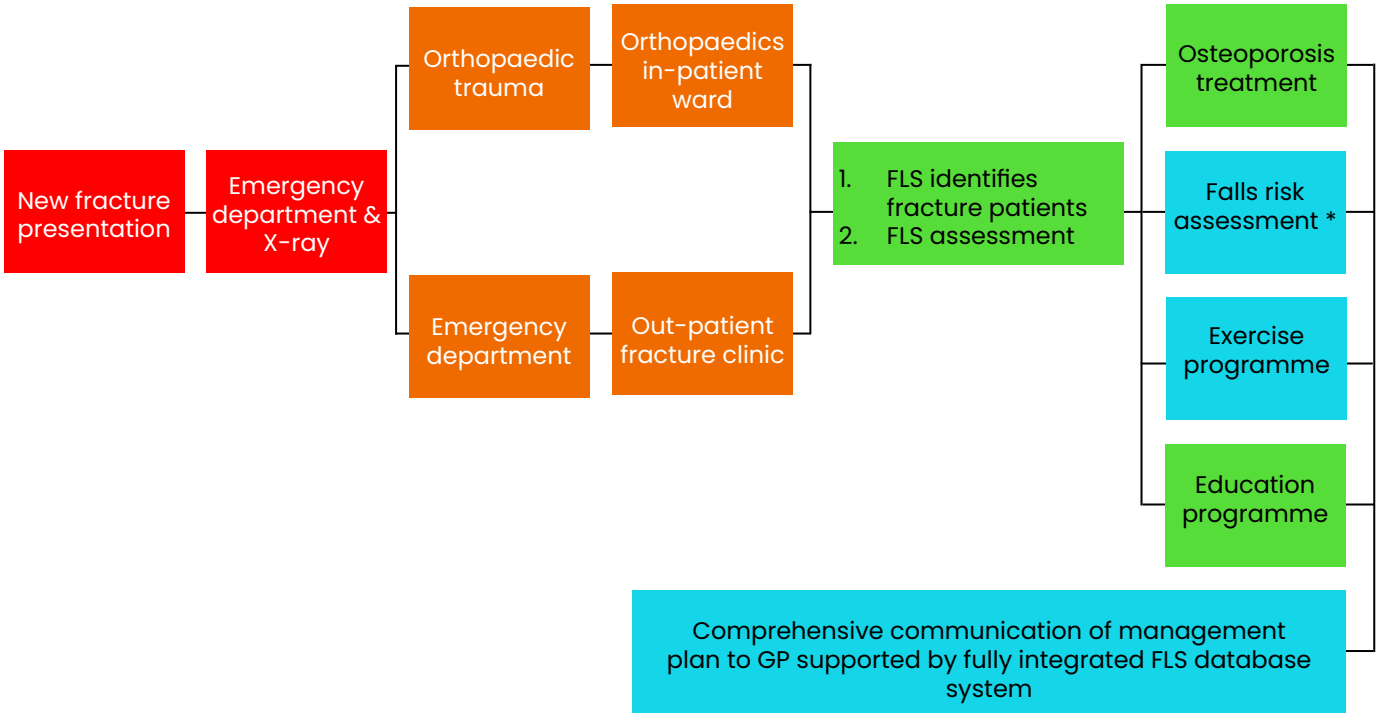
It is very relevant that these Spanish data have been confirmed in a three-year prospective follow-up. This survey of patients with a major osteoporotic fracture (MOF) or hip fracture has found that the introduction of a FLS decreased overall mortality by 60%; screening for osteoporosis often gave rise to the diagnosis of other comorbidities that had previously been untreated. The risk of subsequent MOF or hip fracture was significantly reduced by 33% as early as one year after initial fracture in patients attended by a FLS.[10] A meta-analysis investigating the impact of a FLS on subsequent fractures and mortality further reinforced the findings of the abovementioned studies.[11]

What are the costs of implementing a FLS?

A barrier to the introduction and development of a FLS is the cost of diagnosis in patients older than 50 years with a recent fracture and treatment of anti-osteoporosis drugs for those with a high fracture risk. However, this strategy can effectively prevent subsequent fractures, thereby saving the costs of treating subsequent fractures that have been prevented. While the implementation of a FLS is not cost-saving, it is cost-effective for improving quality of life in patients at risk of osteoporosis-related fracture and represents a step forward in both fracture and mortality reduction.[12,13] Approximately 1 100 FLS are mapped at the IOF Capture the Fracture website and accredited as being gold, silver or bronze status depending on the extent of their fulfilling certain key performance indicators (KPIs), thereby demonstrating the quality of the service offered and enabling further improvements.

How does the FLS model work?

A best practice framework to break the fragility fracture cycle, incorporating a FLS, is depicted in Figure 2.[14] The IOF Capture the Fracture Working Group has developed a set of patient-level key performance indicators to measure the effectiveness of a FLS and guide quality improvement (Table 2).[15] A four-step diagnostic model is referred to on occasion: DXA, VFA, falls risk evaluation, and laboratory testing for secondary osteoporosis.



*Older patients, where appropriate, are identified and referred for falls assessment

Figure 2. A best practice framework to break the fragility fracture cycle[14]

Table 2. How to measure if a FLS is working[15]

Referral to FLS at time of fracture	KPI 1: Non-spine fractures KPI 2: Spine fractures
At 12 weeks	KPI 3: Fracture risk KPI 4: DXA scan/VFA KPI 5: Falls risk KPI 6: Anti-osteoporosis medication (AOM) recommendation
At 16 weeks	KPI 7: Follow up KPI 8: AOM initiation KPI 9: Strength/balance initiation
At 52 weeks	KPI 10: AOM persistence
Throughout	KPI 11: Data completeness

Assessing falls risk

Professor Lems emphasises the importance of assessing the risk of falls; a three-year observational study assessing the association between incident falls and subsequent fractures in patients attending a FLS after an index fracture indicated that patients with an incident fall had an eight- to nine-fold increased risk of subsequent fracture compared to patients without an incident fall.[16] Therefore, all patients visiting an FLS should be evaluated for an increased risk of falls, with the most relevant question being the number of falls in the previous year; ≥2 falls in a year is associated with an increased risk of fracture.

Relatively simple measures such as stopping alcohol or sleeping pills, cataract surgery, or physical therapy for those with unstable walking patterns may sometimes be adequate to reduce the risk of falls. In very severe cases, a referral to a geriatric outpatient clinic for falls risk evaluation and intervention might be indicated.

VF is a predictor of subsequent fracture

The presence of VF is another predictor of subsequent VF, and represents an approximately four-fold increased risk compared with patients who have not had a VF; the risk of hip fracture is doubled in these patients. Diagnosing a VF is more difficult than diagnosing a peripheral fracture. VFs are often overlooked on X-ray and the diagnosis of VF may be overlooked due to the presence of a different diagnosis such as malignancy, pneumonia or the presence of a peripheral fracture, and a lack of knowledge regarding the clinical relevance of diagnosing VF. Table 3 compares the characteristics of VF and non-vertebral fractures.[16-19]

Table 3. Characteristics of VF and non-vertebral fractures[18]

VF	Non-vertebral fracture
• Usually without trauma • Two-thirds are asymptomatic • Gradual • Recurrence at same location • Chronic deformation	• Nearly always following trauma • Very painful • Local recurrence very unusual • Acute deformation and swelling

Indications for VFA

Ideally, DXA-VFA is recommended in all patients with an indication for DXA examination. Many factors support this recommendation: two-thirds of VFs are subclinical; VF reflects the presence of more severe microarchitectural deterioration, which is associated with increased VF and non-vertebral fracture risk; the presence of VF may modify fracture risk category and the therapeutic approach (e.g. starting anabolic agents in patients with very high fracture risk); and a baseline VFA will enable discrimination between incident new VF and prevalent VF.[17]

In situations where DXA-VFA is not available, comparing the patient's actual height with their height at the start of osteoporosis treatment can be informative. Usually, a height loss of 3-4cm is sufficient to diagnose VF.

Fracture risk reduction

A recent meta-analysis of all available osteoporosis therapies demonstrated that each treatment reduces VF relative to placebo; anabolic treatments are more effective than bisphosphonates for the prevention of VF and non-vertebral fractures.[20]

Consensus recommendations for long-term osteoporosis care

A clear consensus among experts throughout the world supports the integration of many key features of a FLS with primary healthcare as the most appropriate setting for long-term osteoporosis care.[21,22]

Facilitating a successful FLS

Factors contributing to the successful establishment of a FLS include:

- An awareness of the growing incidence of osteoporosis and fractures in the general population
- Reliable, available techniques to measure BMD
- Consensus regarding diagnosis of osteoporosis (T-score <-2.5)
- Insight to perform a VFA in all patients in which a DXA is indicated
- Available, effective and relatively safe antiresorptive drugs such as alendronate, risedronate, denosumab and zoledronic acid
- Available anabolic drugs such as teriparatide and romosozumab for patients at very high risk of fracture
- Local and national osteoporosis and FLS guidelines, and engagement with the IOF Capture the Fracture programme (https://www.capturethefracture.org/).

Barriers to establishing a successful FLS

- A lack of awareness of osteoporosis in the general population
- A lack of awareness of osteoporosis among general practitioners (GPs) and specialist physicians
- Fear of treatment side effects
- Overburdened/understaffed primary care practice/clinics
- No continuation of treatment once osteoporosis has been diagnosed, poor/no adherence to drug therapy
- Lack of regional and national collaboration between the FLS and primary care.

Progress report – Establishing a FLS pilot in South African practice

Dr Thompson is in the process of establishing a FLS pilot programme in a Johannesburg general practice affiliated with a hospital. She has a special interest in osteoporosis and geriatrics. She recognises that although South African guidelines for the treatment of osteoporosis are well-established, there is a need for these local recommendations to be integrated into an efficient system for preventing fragility fractures and to retain patients in the treatment loop rather than risking losing them to follow-up.

Data supporting the effectiveness of a FLS in fracture and mortality risk reduction are compelling. The FLS should enable early identification of the patient at high risk of fracture or refracture and initiation of the appropriate pharmacological therapy and non-pharmacological interventions to prevent the fracture cascade. Dr Thompson and her team have have a proposed structure for a pilot FLS in the private medical sector of South Africa and have also identified some of the obstacles faced in pursuit of this aim.

Capture the fracture

A FLS should be designed to IDENTIFY patients at high risk of fracture or refracture, EARLY, and to initiate the appropriate pharmacological and other therapy. Fracture patients are an especially important group due to their significantly increased risk of subsequent fracture, especially within the 12 months following the index fracture. Fracture patients present to casualty or radiology and may be referred to an orthopaedic surgeon; historically, most will remain undiagnosed and untreated for osteoporosis thereafter.

The proposed pilot FLS has a two-pronged approach to identifying at-risk patients: hospital databases and outreach to a referring group of GPs. This approach is in response to a prior failure to integrate a FLS into the casualty and radiology departments of the affiliated hospital, despite ensuring the availability of administrative capacity and simplification of data capture and patient follow-up processes.

At-risk patients are identified using two simple criteria:

- Age ≥60 years
- ICD code for fracture.

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Engage the at-risk patient

The initial engagement of the pilot FLS with an at-risk patient identified in the hospital database could be a brief and simple email or WhatsApp message thus worded: "*You have been diagnosed with a broken bone (insert date) and you are older than 60 years. This may mean that you have OSTEOPOROSIS and are thus at higher risk for further fractures. It is recommended that you contact your healthcare provider to investigate this further and receive the necessary treatment to help prevent further fractures. FLS (insert name of hospital/ location and contact information).*"

This initial engagement is ideally followed up with a brief phone call to assist with any queries.

Outreach to referring GPs

Many at-risk patients are likely to already be under the care of referring GPs in the catchment area of the proposed FLS clinic. Outreach to these GPs is to ensure that comprehensive osteoporosis care can be provided, comparable to the management of other common chronic conditions such as hypertension and type 2 diabetes.

Support and education

Long-term management of osteoporosis in primary care can be enhanced through CPD-accredited educational programmes and the provision of supportive educational brochures. The pilot FLS has developed two brochures: the *Osteoporosis Diagnosis and Treatment Card* and *FALLS: a Guide for the Over 60s*, both of which include the dedicated FLS contact number.

The dedicated FLS contact number is staffed by a receptionist who is trained to direct a patient to their GP for treatment or provide them with other forms of support, and guide GPs on how/where to access any support they need to manage osteoporosis in their practice.

Dr Thompson's view is that the FLS contact number is not intended to redirect the care of the patient away from their usual healthcare provider, but rather to ensure that the patient will consult with a healthcare practitioner of their choice to provide prompt attention to their possible underlying osteoporosis. This brochure is designed to accommodate record-keeping of patient information such as when the patient is due for their annual infusion, as an example. It also serves as a guideline and prompt for the healthcare practitioner, providing information as to which DXA readings are significant, relevant blood tests and formalising of the osteoporosis treatment plan.

Overcoming obstacles to establishing a FLS in South Africa

Among the real and perceived obstacles encountered during the ongoing establishment of the pilot FLS are:

- The hitherto inability of stakeholders, including healthcare providers, patients, hospital groups, radiology and casualty departments, and medical funders/insurance to mobilise and commit resources to fracture prevention
- Inertia in adopting something 'new'
- Legal considerations, especially in terms of the Protection of Personal Information Act
- Consideration for the doctor managing the index fracture
- Perceptions that the FLS is seeking to divert patient care away from the patient's usual healthcare provider, and that the FLS approach may be costly and increase the administrative burden of clinical practice.

To advance improvements in the service offering, the pilot FLS will continue to address these real and perceived obstacles and pursue growth of the participating clinical network and continuing education and awareness among healthcare practitioners. The possibility of piloting another FLS within a different hospital group is also being considered.

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Key learnings

- VF is the most commonly occurring osteoporosis-related fracture and almost two-thirds of VFs are asymptomatic; an index fracture increases the risk of subsequent fracture
- Even after fracture, most patients with osteoporosis remain undiagnosed and untreated
- The FLS approach is cost effective with proven benefit in respect of fracture reduction and a favourable effect on mortality; in essence, the FLS approach meets the goals of identifying fragility fracture patients, investigating and assessing fracture risk, initiation of personalised treatment and monitoring of treatment adherence
- Collaboration between fracture nurses, primary care practitioners and medical specialists, including endocrinologists, rheumatologists and geriatricians, is urgently needed
- Getting mapped with the IOF Capture the Fracture programmed demonstrates the quality of the work of a FLS, and the accreditation process may further improve the service offering of an FLS
- Numerous population-level and health system challenges limit the improvement of fragility fracture and osteoporosis care in Africa; key to the provision of high-quality osteoporosis care are wide availability of reliable diagnostics, clinically proven osteoporosis treatments and an accessible FLS to reduce subsequent fractures
- DXA-VFA is recommended in all patients with an indication for DXA examination.

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