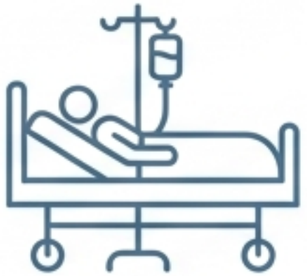
Premium Clinical Dossier Slide

Decoding Gait and Falls in Older Adults

A visual clinical pathway for assessment, diagnosis, and management.

Derived from Med2Date Australian Clinical Guidelines.



133,000

Annual hospitalisations for falls in Australians ≥65

$4.3 Billion

Direct annual healthcare cost

20–30%

12-month mortality following a hip fracture

The 6th Vital Sign

A gait speed <0.8 m/s strongly predicts mortality and functional decline.

The Sentinel Event

A single fall demands systematic evaluation. Reassurance is not an intervention. Up to 50% of fallers will fall again within 12 months.

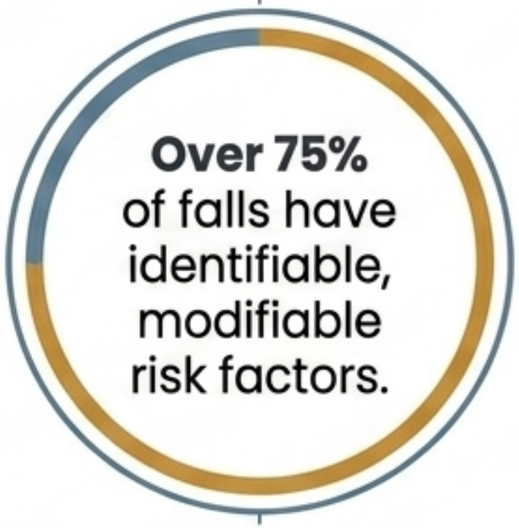
The Clinical Diagnostic Pathway

1. Structured Observation
Bedside gait analysis and TUG testing.

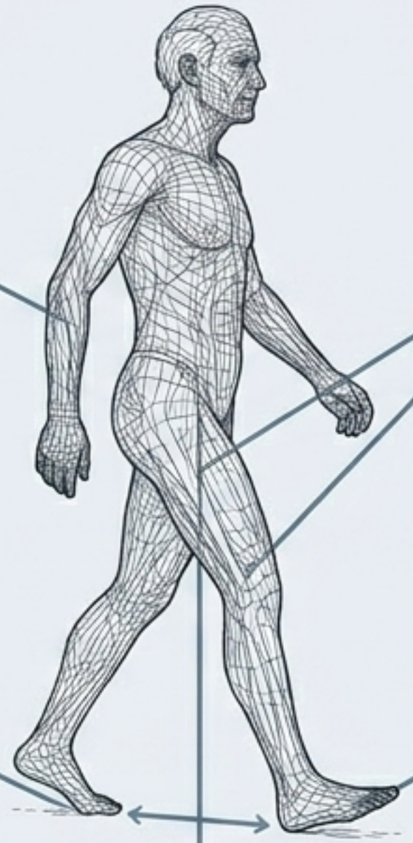
2. Multifactorial Assessment
Evaluating the 10 domains of intrinsic and extrinsic risk.

3. Differential Diagnosis
Splitting MSK vs. Neurologic pathways and identifying specific syndromes.

4. Targeted Management
Interventions, deprescribing, and risk stratification.



Structured Gait Observation



Arms (Arm Swing)

Reduced/absent unilaterally = early ipsilateral Parkinsonism.

Hips/Legs (Stride Length & Cadence)

Short shuffling steps = **Parkinsonian**, frontal, or MSK restriction.

Festination = involuntary acceleration.

Feet (Base Width)

Wide (>15cm) = Cerebellar/sensory **ataxia**.

Narrow (5-10cm) = Normal or Parkinsonism.

Feet (Floor Contact)

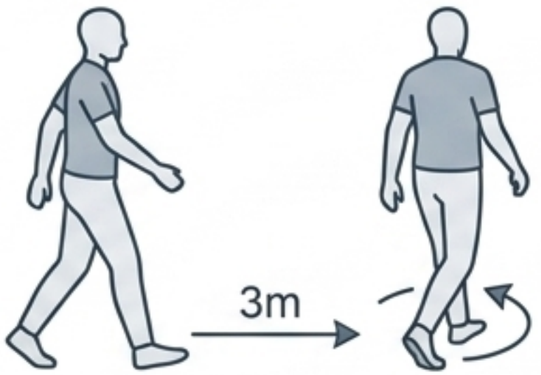
Foot flat/shuffling = Parkinsonism.

High-stepping/slapping = **Foot drop** (L5 radiculopathy, peroneal neuropathy).

Whole Body (Turning)

En bloc (>3 steps as a unit) = Parkinsonism or balance impairment.

The Timed Up and Go (TUG) Test

1	Rise	2	Walk 3m & Turn	3	Return and Sit
					

<10s	10–12s	12–20s	>20s
Normal mobility	Acceptable	Increased fall risk	High fall risk; mandates comprehensive specialist assessment

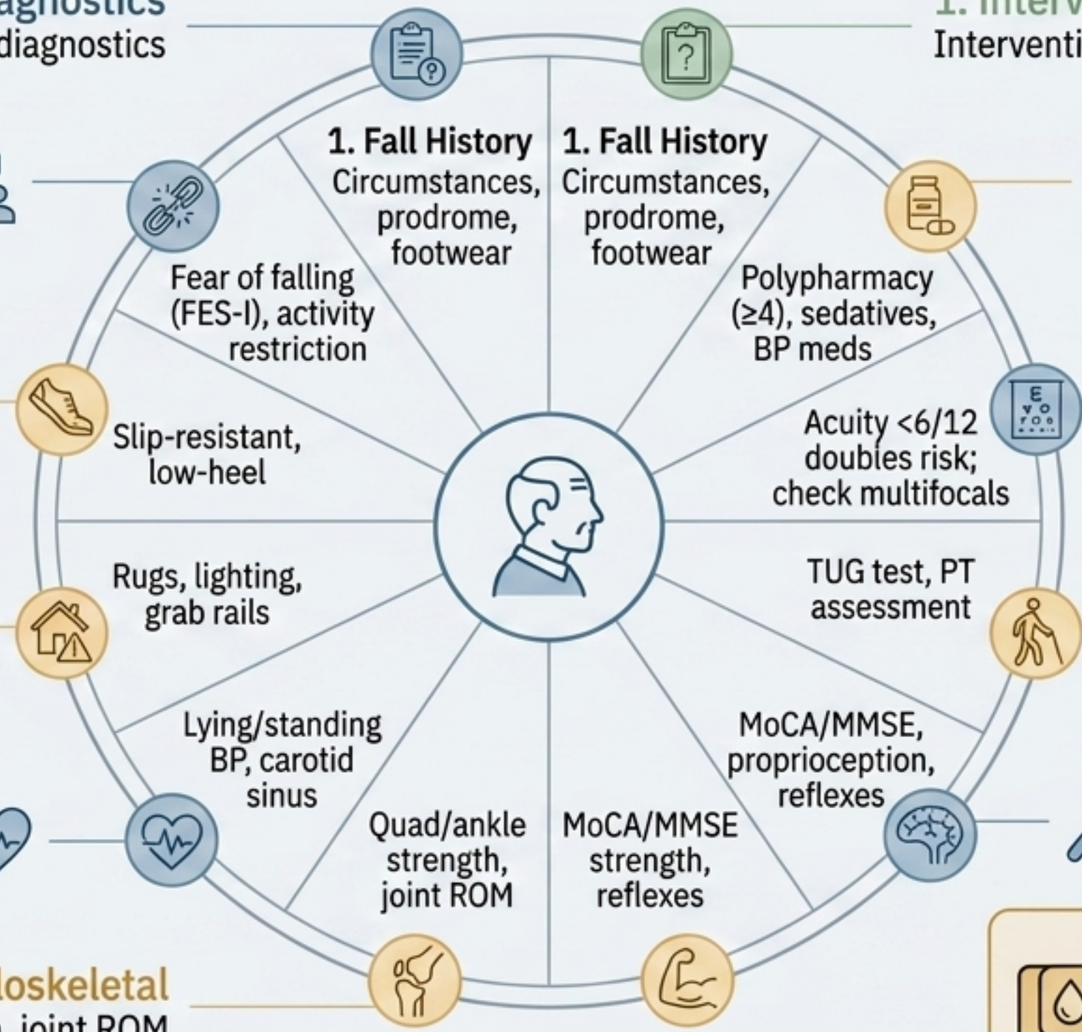
Diagnostic Anchor

A cutoff of ≥14 seconds carries ~87% sensitivity for predicting falls.

Advanced Options

Mini-BESTest: <19/28 = risk (balance subsystems)
DGI: ≤19/24 = predictive of falls (dynamic gait)

The Multifactorial Assessment Wheel



1. Diagnostics
diagnostics

1. Interventions
Interventions

10. Psychosocial
Fear of falling (FES-I), activity restriction

2. Medications
Polypharmacy (≥4), sedatives, BP meds

9. Footwear
Slip-resistant, low-heel

3. Vision
Acuity <6/12 doubles risk; check multifocals

8. Home Environment
Rugs, lighting, grab rails

4. Mobility
TUG test, PT assessment

7. Cardiovascular
Lying/standing BP, carotid sinus

5. Neurological
MoCA/MMSE, proprioception, reflexes

6. Musculoskeletal
Quad/ankle strength, joint ROM

Crucial Bedside Rule:
Sustained drop of ≥20 mmHg systolic or ≥10 mmHg diastolic within 3 mins of standing is diagnostic for orthostatic hypotension. Check ALL older fallers.

High-Risk Medication Deprescribing Matrix

Drug Class	Mechanism of Fall Risk	Actionable Intervention
Benzodiazepines / Z-drugs	Sedation, ataxia, delayed reaction	Gradual taper per RACGP; avoid abrupt stop.
Antihypertensives (Prazosin, Frusemide)	Orthostatic hypotension, volume depletion	Relax targets in frail ≥80 yrs; check standing BP.
Antidepressants (SSRIs, TCAs)	Orthostasis, hyponatremia, anticholinergic	Minimise dose; avoid TCAs entirely.
Opioids	Sedation, dizziness, cognitive impairment	Multimodal analgesia; paracetamol first-line.
Antipsychotics	Extrapyramidal symptoms, orthostasis	Deprescribe if used for BPSD without clear indication.
Anticholinergics	Confusion, blurred vision	Calculate burden score; substitute alternatives.

The Great Divide: Differentiating Gait Etiology

Neurologic Gait

Musculoskeletal Gait

Neurologic Gait		Musculoskeletal Gait
Irregular, freezing, festinating	**Stride**	Regular but shortened/antalgic on painful side
Often painless, even with severe impairment	**Pain Profile**	Directly linked to weight-bearing
Reduced/absent	**Arm Swing**	Preserved or increased for compensation
Highly variable—wide in ataxia, narrow in PD	**Base Width**	Normal or slightly widened for stability
Improves with visual/auditory cues	**Response to Cues**	Unaffected by cues, limited by mechanics/pain
Tremor, rigidity, reflex changes	**Associated Signs**	Joint swelling, crepitus, local wasting

Neurologic Gait Decoder

Parkinsonian

Short shuffling, reduced swing, en bloc turns, freezing. (PD, Vascular parkinsonism, DLB).

Cerebellar Ataxic

Wide-based, lurching, irregular, truncal instability. (Stroke, MS, alcohol, SCA).

Sensory Ataxic

Heavy foot-stomping, worsens with eyes closed (Romberg +). (B12 deficiency, diabetic neuropathy).

Frontal / Magnetic

Short steps, wide base, feet "stuck," poor dual-tasking. (NPH, Vascular dementia, tumour).

Spastic

Circumduction, stiff-legged, scissoring. (Stroke, MS, cord compression).

Steppage

High-stepping to clear foot drop. (Common peroneal palsy, L5 radiculopathy).

Diagnostic Showdown: Parkinsonian vs. Frontal Gait

Idiopathic Parkinson's Disease

Features:

- Asymmetric onset, resting tremor, good levodopa response.

Gait:

- Narrow base, shuffling, festination.

Action:

- DaTSCAN if doubt; Neurology referral ideally within 6 weeks.

Normal Pressure Hydrocephalus (NPH)

Features:

- Hakim's Triad (Gait disturbance, cognitive decline, urinary incontinence).

Gait:

- Wide base, "magnetic" feet, preserved arm swing.

Action:

- CT/MRI (Evans >0.3); large-volume LP (tap test); Neurosurgery referral within 4 weeks.

Urgent Referral Red Flags

<48 hours

⚠ Unexplained falls with frontal signs (Urgent CT).

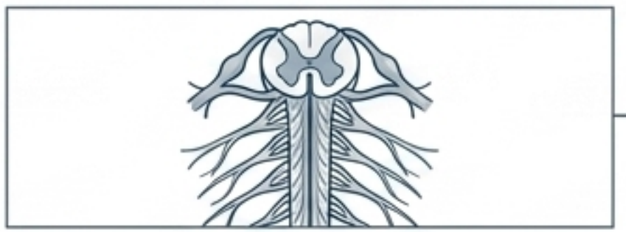
<2 weeks

⚠ Atypical parkinsonism (early falls, gaze palsy suggests PSP).

Pathophysiology of the Freeze

1. The Source (Substantia Nigra)

>60–80% dopamine depletion decreases thalamo-cortical excitation.



2. The Relay (Central Pattern Generators)

The automatic internal cueing for step length in the spinal cord is lost.

3. The Disconnect

Inability to switch between locomotion and postural control.

4. The Trigger (Environmental Demand)

Occurs when approaching doorways, turning, or dual-tasking.

Clinical Insight: Non-dopaminergic pathways are involved, which is why freezing of gait responds poorly to Levodopa therapy alone.

Hierarchical Investigation Pathway

First-Line (GP/ED)

Bloods:
- B12, Folate, Vit D (25-OH), TFTs, UEC, HbA1c.

Hemodynamics:
- Lying/standing BP (Diagnostic if ≥20/10 mmHg drop).

Imaging:
- Non-contrast CT Brain (first line for new onset, trauma, or suspected NPH).

Specialist Investigations

MRI Brain:
- For white matter disease, midbrain atrophy (PSP 'hummingbird sign'), cord compression.

DaTSCAN (SPECT):
- Differentiates degenerative parkinsonism from vascular/drug-induced.

Lumbar Puncture Tap Test:
- Remove 30-50mL CSF; ≥20% TUG improvement confirms NPH shunt viability.

Evidence-Based Interventions for Falls Prevention

Structured Exercise

Otago Program or Tai Chi (≥2 hrs/week). Must challenge balance. Yields 20–30% fall reduction.

Home Modification

OT assessment (grab rails, lighting, trip hazards). Yields 25–35% reduction, especially with visual impairment.

Medication Review

Formal HMR/RMMR to reduce psychotropics and polypharmacy. Yields 15–25% fall reduction.

Vitamin D

800–1000 IU cholecalciferol daily. Modest risk reduction (~10-15%); highly recommended for housebound/institutionalised patients.

Visual Acuity Note: Correcting vision reduces falls, but patients should avoid multifocal glasses while walking.

Mobility Aid Decision Tree

Mild unilateral weakness

Fatigue & long community distances

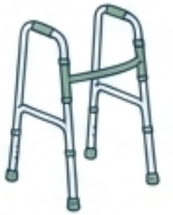
Significant bilateral weakness

Parkinson’s Freezing

CONTRAINDICATED: Standard Four-Wheel Walkers (4WW) are strictly contraindicated for festinating gait. The patient's center of gravity accelerates faster than the feet, turning the walker into a major trip hazard.

Single Walking Stick (used in contralateral hand).

Rollator with seat (requires reliable hand brakes).



Non-wheeled Pick-up Walker (slowest, max stability, requires upper limb strength).

Laser-line cueing devices (projects horizontal line to step over).

Pharmacotherapy Blueprint

Parkinsonian Therapy

Levodopa/Carbidopa
Lifelong foundation. Start low, titrate to effect.

Ropinirole (Dopamine Agonist)
Start 0.25 mg TDS. Warning: 15-20% risk of severe impulse control disorders (gambling, hypersexuality). Screen at every visit.

Amantadine
Modest benefit for freezing/dyskinesia. Renal dose adjustments required.

Orthostatic Hypotension Therapy

Fludrocortisone (Mineralocorticoid)
0.1 mg mane. Monitor UEC (hypokalemia) and supine hypertension.

Midodrine (Alpha-1 agonist)
2.5 mg TDS. Last dose strictly before 6 PM.

Regulatory & Compliance: Fitness to Drive

Medicolegal Obligations (Austroads Guidelines)

Clinicians have a strict duty to advise patients with Parkinson's disease or moderate-to-severe gait disorders about fitness to drive.

The 3 Patient Directives

1. Do not drive until formally assessed.
2. The licensing authority must be notified of a PD diagnosis.
3. Ongoing restrictions depend on medication response and symptom severity.

Commercial Licenses

Truck/bus operators face immediate and highly stringent specialist assessment pathways.

Clinical Overlays for Special Populations

The Elderly (≥80 yrs) & RACF

Sarcopenia drives instability. Dual-task impairment (walking while counting) flags future dementia. Hip protectors have mixed evidence.

Renal & Hepatic Impairment

Uraemic neuropathy causes sensory ataxia. Intradialytic hypotension spikes fall risk. Hepatic encephalopathy causes frontal-type gait.

Pregnancy

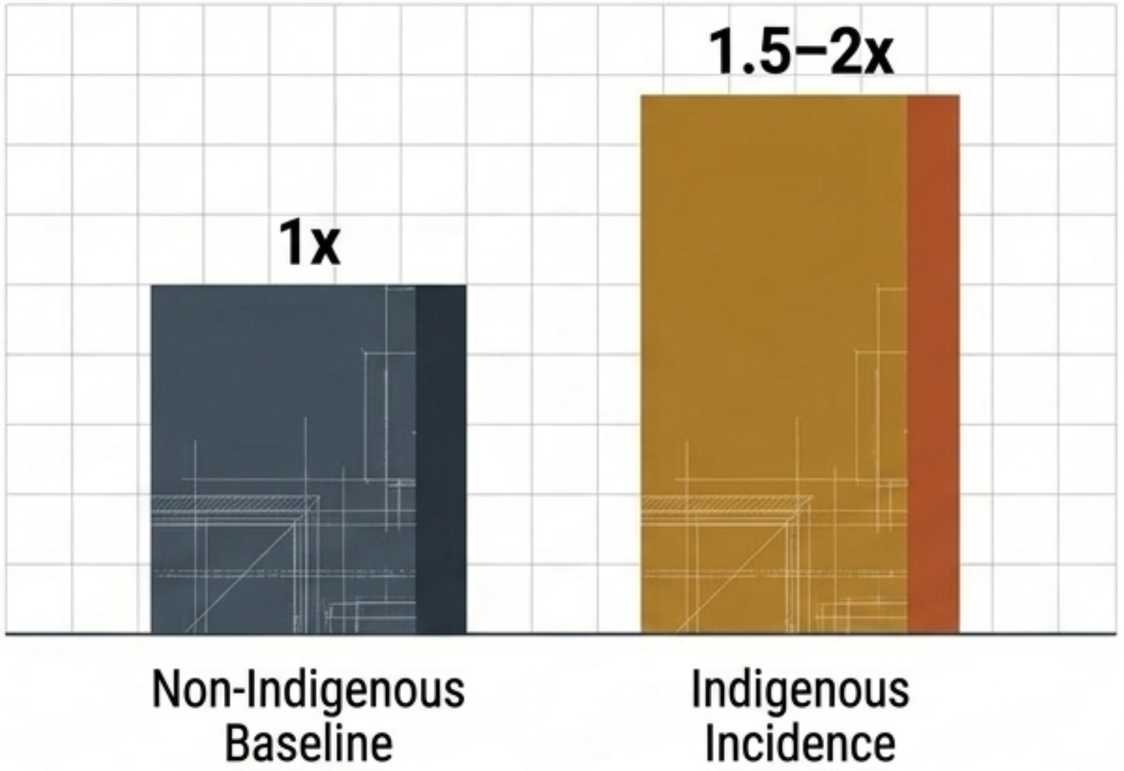
25-30% fall rate. Pelvic girdle laxity causes waddling. Amantadine is teratogenic (Cat D).

Immunocompromised

Low threshold for imaging/LP. Gait changes may precede overt meningitic signs in CNS infections. Calcineurin inhibitors can cause ataxic neurotoxicity.

Aboriginal & Torres Strait Islander Considerations

Epidemiology: 1.5–2x higher incidence rate



Falls occur at 1.5–2x the rate of non-Indigenous Australians, with earlier onset and higher hospitalisation rates due to earlier onset of chronic disease (e.g., diabetic neuropathy).

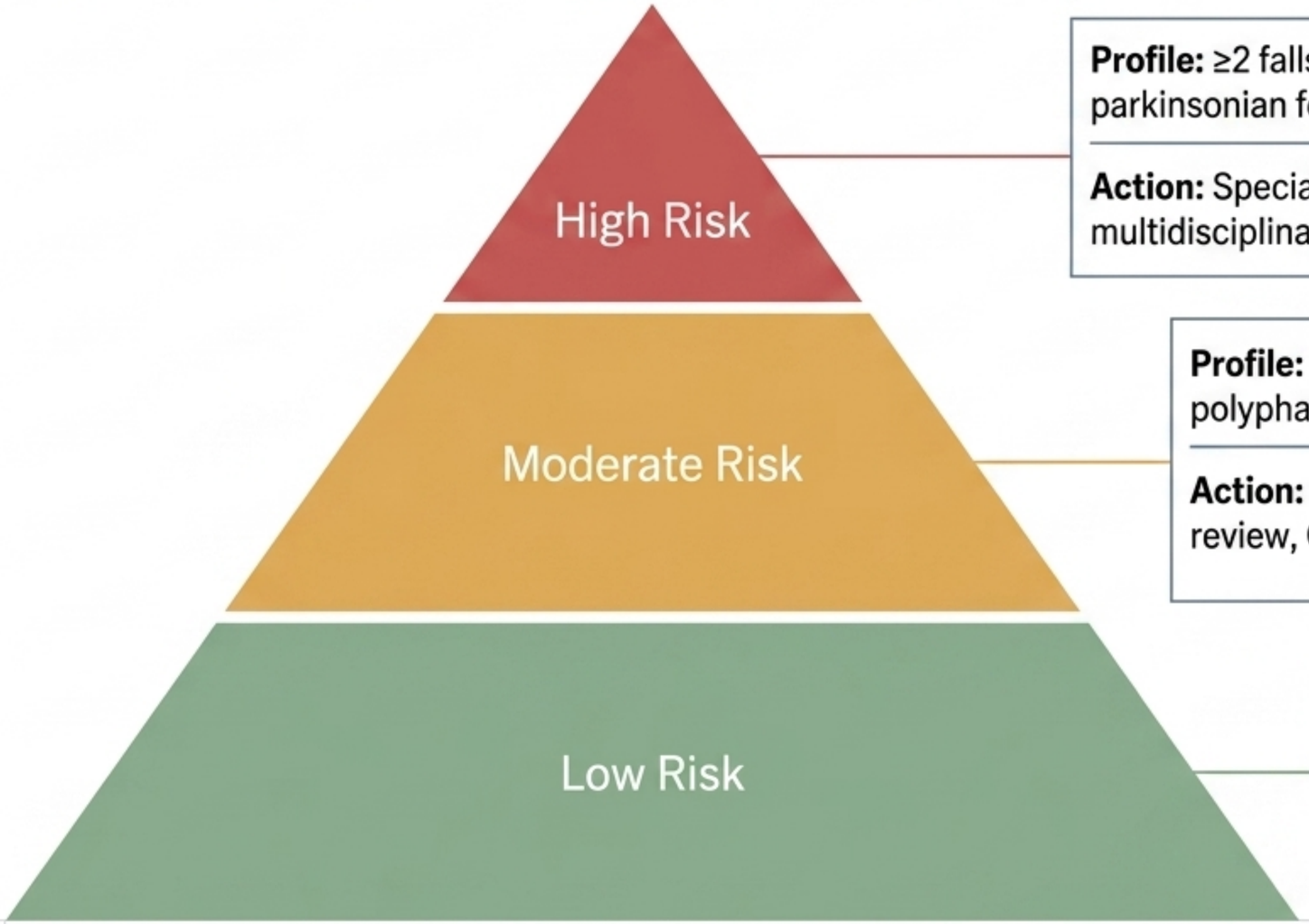
Clinical Adjustments

- **Screening Age:** Annual falls screening must commence at age ≥50, not 65.
- **Cultural Safety:** Standard risk tools may miss relevant factors (uneven community terrain, unlit outstations). Utilize Aboriginal Health Workers/Practitioners (AHWPs).

Systemic Navigation

- Leverage PBS Close the Gap (CTG) scripts to manage polypharmacy.
- Prioritize community-led prevention (e.g., AHWP-led Tai Chi, 'Deadly Moves') over isolated clinical referrals.

Risk Stratification & Action Matrix



Profile: ≥2 falls, OR fall-related fracture, OR TUG >20s, OR parkinsonian features, OR recurrent syncope.

Action: Specialist Geriatric/Neurology falls clinic referral, multidisciplinary intervention, urgent MRI/CT if new neuro signs.

Profile: 1 fall in 12 months, OR TUG 12-20s, OR polypharmacy (≥4 meds), OR orthostasis.

Action: GP comprehensive assessment, HMR medication review, OT home assessment, structured exercise (Otago).

Profile: No falls, TUG <12s, no polypharmacy.

Action: GP annual review, general exercise advice, Vit D (800-1000 IU) if housebound.