1. Introduction

1a: Target Population:

- Adult secondary care in-patients and outpatients who present with dizziness, light-headedness, or syncope.
- Patients over the age of 60 who present to UHL with falls.

1b: Overview of OH:

OH is common, prevalent in up to 30% of people over 70 years of age. It is an independent risk factor for increased mortality, falls, myocardial infarction, stroke, heart failure, and atrial fibrillation (AF). It results from an inadequate physiological blood pressure (BP) response to postural changes giving rise to ***symptoms of orthostatic intolerance***:

- light-headedness
- dizziness
- blurred vision
- syncope
- falls
- Atypical presentations include difficulty mobilising, fear of falling and unexplained 'coat-hanger distribution' headache

OH is usually a contributor or risk factor rather than the sole cause of presenting symptoms such as falls. Remember most falls in frail older people are multi-factorial.

Asymptomatic OH is common in the elderly. Treatment is not indicated in the absence of symptoms. Be cautious about making a diagnosis of ***'OH related fall'*** if there is a competing, more likely diagnosis. In the event of a patient presenting with a fall on a background of symptoms of orthostatic intolerance the diagnosis is more readily applied if symptoms are reproduced when OH is demonstrated.

OH will be present predictably in many acute medical presentations where there is infection, dehydration, or acute physiological disturbance. In this case OH is secondary to the acute illness not a primary diagnosis. Treatment is directed to the underlying medical condition and correcting any physiological disturbance.

1c: Causes of OH:

- Idiopathic
- Autonomic dysregulation (e.g. in Parkinson's Disease, Diabetic Autonomic Neuropathy, Multisystem Atrophy)
- Loss of circulatory volume (blood loss, dehydration & endocrine conditions including Addison's disease)
- Iatrogenic (Antihypertensives, Anti-anginals, Diuretics, Anti-depressants, Analgesics, Anticholinergics, Alpha blockers etc.)

2.Guideline Standards and Procedures

2a: Definition

Orthostatic hypotension (postural hypotension) is defined as a sustained reduction of systolic blood pressure of at least 20 mmHg and /or diastolic blood pressure of 10 mmHg within 3 minutes of standing. It is a clinical sign and must be correlated with reproducible symptoms.

2b: Diagnosis: measurement of lying and standing BP at the Bedside: (Appendix 1)

Considerations:

- If possible measure first thing in the morning for highest diagnostic yield.
- Patient should rest supine (<70^{o}) at least 5 min before first measurement
- A manual sphygmomanometer is more accurate (especially in Atrial Fibrillation) if available and if staff are competent in its use.
- Ensure correct cuff size.
- Ensure patient is able to stand with minimal or no support. (If not, consider lying & sitting BP). If supported, avoid holding the cuff arm.

Measure & record:

	BP	HR	Symptoms: (Y/N & describe)
Supine (after 5' rest)			
Immediate stand (0')			
1 min stand			
2 min stand (if possible)			
3 min stand			

Postural Orthostatic Tachycardia Syndrome (POTS).

POTS is diagnosed if there is an excessive HR increase during the first 10 min of standing with symptoms of dizziness and increased respiratory rate. It is a rare diagnosis and specialist advice should be sought after discussion with the patient's lead clinician.

The Tilt Table Test

OH is a bedside diagnosis; Tilt table testing is rarely required, and only after specialist advice.

2c: Management:

Treatment of OH should be individually tailored. The aim of intervention is to improve functional capacity and quality of life and to reduce the frequency of injurious falls.

First-line treatment: Non-pharmacological:

1. Postural changes:

- Advise slow postural changes (supine to sit, sit to stand).
- Raise awareness of increased susceptibility in warm/hot environments.
- Physical counter manoeuvres (PCMs) (e.g. above knee leg crossing, tensing leg
- muscles, clenching before standing).

2. Patients who have reproducible warning symptoms of orthostatic intolerance should be advised to sit or lie down immediately on experiencing symptoms.
3. Other treatments which can be considered:
    - Compression stockings (caution in peripheral vascular disease or skin problems)
    - Raise head of bed 10° (decreases nocturnal polyuria and thus nocturnal hypertension)
    - Fluid intake:
        - 2-3 litres a day (adjusted for comorbidities)
        - Rapid cool water ingestion: some (limited) evidence
    - Salt intake: Increase salt intake to 7-10 grams daily (not advised in heart failure, chronic kidney disease, hypertension or Cushing's syndrome)

<u>Pharmacological Treatment:</u>

1. Review medications in all patients, especially Antihypertensives, Anti-anginals, Diuretics, Anti-depressants, Analgesics, drugs for urinary outflow obstruction (e.g. Tamsulosin), Anticholinergics (e.g. Amitriptyline, Oxybutinin and other drugs for overactive bladder).
    - Check indication and dose for all medications & adjust appropriately.
    - Management of hypertension: aim to strike a balance between supine BP control and symptomatic OH. For some patients, a higher supine BP target may have to be accepted. Seek specialist advice.

2. Pharmacological Treatments for OH
    - These are rarely required in the acute setting. Seek specialist advice (from Geriatrician, Cardiologist or Neurologist).

    - <u>Fludrocortisone</u> **Seek specialist advice before initiating**
        - First line, **not licenced**. Used 'off-label'
        - Dose range 100-500 micrograms daily
        - Caution in conditions of fluid overload. Effects (and side effects) may take up to 3 weeks to develop.
        - **Common S/Es: Supine hypertension, Peripheral oedema, hypokalaemia, Fluid overload, electrolyte imbalance.**

    - <u>Midodrine</u> **Seek specialist advice before initiating**
        - **Licenced in OH secondary to autonomic failure only**
        - **Used 'off-label' in other types of OH**
        - Dose: 2.5 – 5mg bd to tds
        - Avoid
            - 4 hours before recumbency (risk of hypertension)
            - In significant IHD, conduction abnormalities, recent stroke
        - Common S/Es: supine hypertension, piloerection, pruritus
        - **Uncommon but severe S/Es: bradycardia, coronary spasms, stroke**

4.**Monitoring Compliance**

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Measurement and management of OH in older patients admitted to UHL following a fall	Audit	Dr J Reid	Every 2 years	Falls steering committee lead
Measuring lying standing BP procedure	Audit	Dr J Reid	Every 2 years	Falls steering committee lead

5.**Supporting References**

1- Falls: Assessment and Prevention of Falls in Older People. Falls: Assessment and Prevention of Falls in Older People. NICE; Clinical guideline [CG161] 2013
2- Syncope (Guidelines on Diagnosis and Management of) European society of Cardiology Clinical Practice Guidelines, 2009 **(recommended for review of OH)**
3- Measurement of lying and standing blood pressure: A brief guide for clinical staff. Inpatient Falls Quality Improvement, RCP 2017.
4- NICE Guideline ESNM61: Orthostatic hypotension due to autonomic dysfunction: midodrine. October 2015
5- Nice Guidance ESUOM20: Postural Hypotension in Adults: Fludrocortisone
6- UHL Falls Management for Adult Patients Policy (Trust Ref B15/2014)

6.**Key Words**

Orthostatic hypotension – Postural hypotension – Lying and standing blood pressure – Fludrocortisone - Midodrine

CONTACT AND REVIEW DETAILS	
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Details of Changes made during review: Dr Dilesh Lakhani, Dr George Ghaly, Dr Tomo Hayakawa authored guideline. Comments received from Dr Peter Critchley, Dr Graham Fancourt, Dr Abhishek Mathur and Dr Alistair Sandilands	

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How to measure a lying and standing blood pressure (BP) as part of a falls assessment

1. Identify if you are going to need assistance to stand the patient and simultaneously record a BP.
2. Use a manual sphygmomanometer if possible and definitely if the automatic machine fails to record.
3. Explain the procedure to the patient.

Lying

0 min

Ask the patient to lie down for at least five minutes.

5 mins

Measure the BP.

Standing

0 - 1 mins

Ask the patient to stand up (assist if needed).

Measure BP after standing in the first minute.

3 mins

Measure BP again after patient has been standing for three minutes.

Repeat recording if BP is still dropping.

In the instance of positive results, repeat regularly until resolved.

If symptoms change, repeat the test.

Notice and document symptoms of dizziness, light-headedness, vagueness, pallor, visual disturbance, feelings of weakness and palpitations.

Advise patient of results and if the result is positive:

a. inform the medical and nursing team.
b. take immediate actions to prevent falls and/or unsteadiness.

A positive result is:

a. A drop in systolic BP of 20mmHg or more (with or without symptoms).
b. A drop to below 90mmHg on standing even if the drop is less than 20mmHg (with or without symptoms).
c. A drop in diastolic BP of 10mmHg with symptoms (although clinically less significant than a drop in systolic BP).

Orthostatic Hypotension- diagnosis and management

Symptoms on standing such as :
Light-headedness; dizziness; blurred vision; syncope; falls

Potential causative factors:

Volume depletion
- Dehydration/ AKI
- Bleeding
- Venous pooling (fever, hot environment etc.)
- Endocrine

Impaired cardiac output
- Arrhythmia
- Aortic stenosis
- Heart failure

Drugs
- Diuretics
- Vasodilators (inc. anti-anginals, antihypertensives, Tamsulosin)
- Psychoactive drugs (inc. antidepressants)

Neurological disorders
- Multisystem atrophy
- Pure autonomic failure
- Parkinson's
- Autonomic neuropathy

Check lying and standing BP:
Rest supine 5 minutes, check BP and Heart Rate (HR)
Stand patient, check BP and HR 0, 1, 2, 3 minutes and record symptoms

Investigations
- U&E, FBC for dehydration/ AKI/ hypovolaemia
- ECG- consider prolonged ECG if abnormal or other clinical indicators
- Tests for sepsis/ infection/ acute cardiopulmonary event if clinically indicated
- Do not routinely test for endocrine abnormalities unless known endocrine disorder
- Consider specialist advice before further investigations

Treatment: non pharmacological
- Educate and involve patients- individually tailored approach
- Lifestyle measures- Advise to sit and stand slowly. Physical counter measures such as leg crossing, tensioning leg muscles. Caution in hot environments; avoid large carbohydrate rich meals. Avoid excess caffeine.
- Elevate head of bed by 10-15 degrees
- Increase fluid (2-31) and salt (7-1Og) daily intake unless contraindicated
- Grade 2 compression hosiery (above knee) or abdominal bands may help if tolerated

Treatment: Pharmacological
- Medication review: Review clinical indications and stop culprit medications if possible
- If patient acutely unwell consider suspending antihypertensives+/- diuretics
- Rarely drugs such as Fludrocortisone or Midodrine may be indicated- seek specialist advice from Geriatrician, Neurologist, or Cardiologist as appropriate