Guidelines on the Screening, Diagnosis, and Treatment of Osteoporosis

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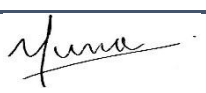
Signature		**Signature**	
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Contents

1. Acronyms

ALP	Alkaline phosphatase
BMD	Bone Mineral Density
BMI	Body mass index
BP	Blood pressure
BW/day	Body weight per day
CBC	Complete blood count
CKD	Chronic kidney disease
cm	Centimeter
COPD	Chronic obstructive pulmonary disease
CRP	C-reactive protein
DEXA	Dual-energy X-ray absorptiometry scan
DGSMC	Directorate General of Specialized Medical Care
ESR	Erythrocyte sedimentation rate
ESRD	End-stage renal disease
FAMCO	Family And Community Medicine Clinic.
FRAX	The Fracture Risk Assessment Tool
GCs	Glucocorticoid
GFR	Glomerular filtration rate
GP	General physician
HRT	Hormone replacement therapy
HT	Hormone therapy
IU	International unit
IV	Intravenous
LFT	Liver function tests
mcg	Micrograms
MOF	Major osteoporotic fracture
MOH	Ministry of Health

PCP	Primary care physician
PTH	Parathyroid hormone
RA	Rheumatoid arthritis
RFT	Renal function test
SC	Subcutaneous injection
TFT	Thyroid Function Test
VFA	Vertebral fracture assessment
WHI	Women Health Initiative
WHO	World Health Organization

3. Definitions

3.1. Fracture risk assessment (FRAX): A tool for estimating the risk of developing a hip fracture or other major fracture in the next 10 years, especially if it is osteoporosis. It is used for ages 40 to 90, either with or without BMD values , as indicated.

3.2. Fragility fracture: A fracture resulting from a fall from standing height or less. These fractures, which most commonly occur at the hip, spine, or wrist, indicate that an underlying illness has weakened the body's bones.

3.3. Menopausal transition stage: Includes 2 to 3 years pre- and post-menopause. It is often between 45 and 55 years of age.

3.4. Menopause: Is a point in time twelve months after a woman's final menstrual period. It is a retrospective diagnosis.

3.5. Osteopenia: A condition in which there is a decrease in bone density, but less severe than in osteoporosis (T-score of -1 to **–** 2.5).

3.6. Osteoporosis: is a disease that is characterized by low bone mass, deterioration of bone tissue, and disruption of bone microarchitecture: it can lead to compromised bone strength and an increase in the risk of fractures.

CHAPTER ONE

4. Introduction

Osteoporosis is a skeletal disorder described as a decline in bone density, leading to a reduction in mechanical strength of the bone and therefore increased propensity to fracture. The most common forms of osteoporosis seen in clinical practice are postmenopausal and age-related.

Osteoporosis represents a major risk to healthy aging as it is associated with an increased risk of fractures, particularly spine and hip fractures. Consequently, it represents a main risk to senior citizens' mobility and general health. In Oman and with the increase in the elderly population, osteoporosis cases and related complications has increased. Therefore, special attention has to be given to this issue.

This guideline will provide a reference on the management of osteoporosis in MoH institutions, including the best practices for screening, diagnosis, and treatment of osteoporosis.

5. Purpose

5.1. Establish standard procedures for assessing, diagnosing, and treating osteoporosis, including strategies to prevent fragility fractures in postmenopausal women (**≥** 50 years) and men **≥** 60.

5.2. Improve all facets of the osteoporosis screening pathway and guide more consistent referrals.

5.3. Ensure the population receives safe and high-quality care, as well as timely referrals for diagnosis and/or treatment of osteoporosis.

6. Scope

These guidelines apply to all MoH healthcare professionals and institutions that participate in providing services related to the management of osteoporosis.

CHAPTER TWO

7. Procedure

7.1. Indications for screening and treatment accordingly:

- Postmenopausal women age ≥ 50 years and men ≥ 60 years.
- Early menopause (i.e., less than 45 years of age).
- Patient on long-term use of glucocorticosteroids (>3 months) more than 7.5 mg of prednisolone or equivalent. **(Appendix.1)**.
- Presence of an underlying disease that causes secondary osteoporosis **(Appendix.2).**

7.2. Screening and diagnosis for Osteoporosis (to be started at the primary care):

7.2.1. Diagnosis:

- History and physical examination.
- Screening with the FRAX Tool Test, which accepts ages 40 to 90 by selecting any GCC population via the online link **(https://frax.shef.ac.uk/frax/)** or **by using the QR code.**
- If FRAX 10-year risk scores (result):

FRAX result	Fracture risk	DEXA scan
< 20% MOF or **<** 3 % HIP	Low risk	Not required
≥ 20% MOF or **≥** 3 % HIP	High risk	Required
*** MOF: Major Osteoporotic Fracture.**		

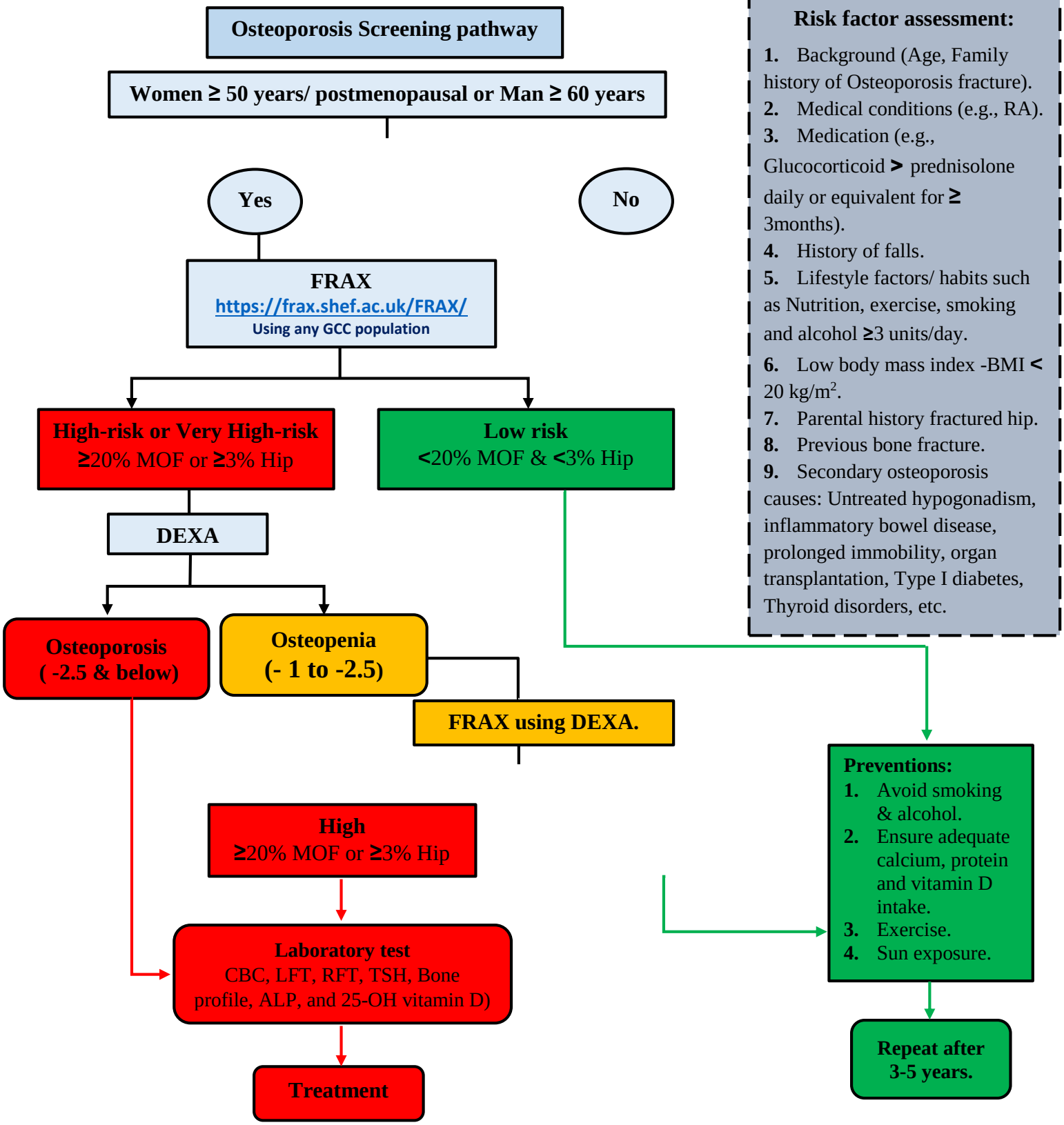
Table 1: FRAX 10-year risk scores

- **Indication of DEXA scan:**
  - FRAX: ≥ 20% MOF or/and ≥ 3 % HIP.
  - Age: Female or male age 65 and older.
  - Adults with a fragility fracture "a fracture caused by an injury that would be insufficient to fracture a normal bone (Hip, vertebral and distal radius).
  - Anyone being treated for low bone density to monitor treatment effects.

- Women discontinuing estrogen treatment (for early menopause) earlier than planned should be considered for bone density testing.

- **Laboratory and radiology investigation (Confirmed osteoporotic patient):**
  - CBC, RFT, LFT, Bone profile, ALP, TFT, and 25 OH vitamin D.
  - Other investigation, if indicated, for example:
    a) Gonadal hormones (e.g., Testosterone level -in younger men with low bone density).
    b) Celiac screen (gliadin antibodies or tissue-transglutaminase antibodies).
    c) PTH if calcium is elevated.
    d) Multiple Myeloma or malignancy screening if indicated.
  - Furthermore, when vertebral fractures are suspected, a spine x-ray is indicated.

7.2.2. Osteoporosis diagnostic and treatment algorithm:



7.2.3. Treatment:

7.2.3.1. For all patients:

- **Lifestyle changes:**
  - **a)** Adequate sun exposure.
  - **b)** Eat a healthy diet (ensure adequate intake of Vitamin D, calcium, and Protein).
  - **c)** Exercise regularly.
  - d) Fall prevention, counselling and strategies.
  - **e)** Quit smoking and alcohol.
- **Pharmacological:**
  - **a)** Treat vitamin D deficiency to achieve serum total 25-OH vitamin D > 50 nmol/l, followed by maintaining a daily requirement of 600-800 u/day.
  - **b)** Maintain a calcium intake of 1000-1200 mg/day, preferably through diet; If not, then through supplements (consult a nutritionist if needed).
  - **c)** One –Alfa should only be used in chronic renal impairment and hypoparathyroidism cases.

7.2.3.2. Classify patient risk and initiate treatment as below:

Risk category	Definition	1st line	Alternative
Low risk	❑ Age: postmenopausal ❑ No prior Fracture ❑ Osteopenia with FRAX probability **<** 20% MOF and **<** 3% hip	- Lifestyle as above (6.2.2.1.1). - Pharmacological treatment for all osteoporosis **(See Table 3)**.	-
High risk	❑ Postmenopausal with Prior Fragility Fracture or ❑ T-score **≤** −2.5 or ❑ T-score −1.0 to − 2.5 with FRAX probability of **≥** 20% MOF or **≥** 3% hip (after re-calculating FRAX with DEXA result)	**-** Lifestyle as above (6.2.2.1.1) **-** Pharmacological treatment for all osteoporosis **(See Table 3 & 4)** **-** Oral bisphosphonate (e.g., Alendronate)	**-** Zoledronic acid (Aclasta) **-** Denosumab (Prolia)
Very high risk	❑ Fracture within the past 12 months or ❑ Multiple Fractures or ❑ Fracture while on Osteoporosis drug treatment or ❑ Fracture while on medication harmful to bone or ❑ Very Low T-score **<**−3.0 or ❑ FRAX probability **>** 30% MOF, **>** 4.5 % hip	**Refer to Specialist.** - Lifestyle as above - Pharmacological treatment as for all osteoporosis **(See Table 3 & 4)** Anabolic agents; Teriparatide. (**Refer to the expert)**	- Denosumab (Preferably) - Zoledronic acid (alternative).

Table 2: Osteoporosis treatment

7.2.3.3. Medications used for all patients with osteopenia and osteoporosis:

Medication		Doses	Precaution	Contraindications
Vitamin-D	**Replacement for deficient patient**	- Cholecalciferol Vitamin D3- 50000 iu weekly (8weeks) followed by the supplement	-	-
	Supplement	- 800 - 1000 iu daily.	-	-
Calcium supplement		- 1000-1200 mg/day (if diet inadequate).	- Take it on an empty stomach as divided doses.	- Renal stone - Sarcoidosis

Table 3 : Medication used for all patient of osteopenia & osteoporosis.

7.2.3.4. Osteoporosis drugs:

	Medication	Doses	Precaution	Contraindications
Anti- resorptive drugs	**Alendronate** *Can be prescribed by Internists or Family Physician or Trained GPs.	• 70 mg/week for 5 years (Oral). • In high risk to continue for 10 years.	• Early morning, on empty stomach and to stay upright for at least 30 to 60 minutes.	• Active upper GI disorders. • GI symptoms. • Low GFR < 35 ml/min/1.73m^2. • Sleeve gastrectomy.
	Zoledronic Acid 5 mg injection *Can be prescribed by Internists or Family Physicians or trained GPs.	• 5 mg/every 18 months (IV) for total of 3 doses (4.5 Years). • In high risk to continue for 2 doses extra.	• Flu like symptoms, commonly with first dose of IV. • Rare cases of jaw osteonecrosis (ONJ) has been reported. Hence, a dental work-up is to be done before	• Hypocalcaemia. • Low GFR < 35 ml/min/1.73 m^2. • Low vitamin D < 30

			starting anti-resorptive therapy if need to be done.	
	Denosumab *Can be prescribed by Internists or Family Physicians or trained GPs. In liaison with the osteoporosis expert in secondary or tertiary care (Documented verbal or Visit Consultation)	• 60 mg SC once every 6 months. • Drug of choice for patient eGFR <35 ml/min/1.73m^2 • Continue until the patient is no longer high risk 5-10 years. • Discontinuation of Denosumab therapy is linked to rebound increased vertebral fractures. Bisphosphonate therapy is strongly advisable after Denosumab withdrawal. • If to stop Denosumab, give Zoledronic acid (single dose) at the due Denosumab date.	• Low vitamin D and hypocalcaemia. • Repeat bone profile 48 - 72 hours post Denosumab injection in CKD or ESRD. • Rare cases of jaw osteonecrosis (ONJ) has been reported. Hence, a dental work-up is to be done before starting anti-resorptive therapy if needs to be done.	• Hypersensitivity • Hypocalcemia • Not willing to come every 6 months (missing appointment).

Anabolic drugs	**Teriparatide (Forteo)** *Prescribed by specialists (ONLY)	• 20 mcg/day injection for 24 months (SC) maximum. • Then sequential therapy with antiresorptive treatment.	• Orthostatic hypotension • Renal failure • Recent urolithiasis	• Hypercalcaemia • Hyperparathyroidism • Paget's disease • Radiation therapy • Skeletal malignancy

Table 4: Osteoporosis drugs

7.2.3.5. Treatment Monitoring

- Repeat DEXA scans at intervals of 2 -3 years on the same instrument or at least the same type (manufacturer and model type) of the instrument to improve the comparability of results in interpreting any change in BMD.
- Shorter intervals between repeat DEXA scans at intervals of one year in very high-risk individuals may be considered. If BMD is stable or improved, then DEXA scan measurement can be done every 2-3 years.
- Changes of < 5% at the lumbar spine or hip are within the precision error of most DEXA machines and, therefore, should be regarded as representing no significant change.
- Compare the BMDs and not T scores.
- Consider drug holiday if there is no recent fracture and T-score >-2.5 after 5 years of oral bisphosphonates or 3 doses of IV Zoledronic acid.
- Monitoring during the drug holiday.

  1) Continue preventive **(Table 3)**.

  2) Repeat BMD after 2 years.

  3) Consider Reinitiation of therapy:

     a) BMD T-score falls ≤ -2.5.

     b) BMD decreases greater than 5% at monitored sites.

     c) New fragility fractures occur.

7.2.3.6. Treatment failure:

- Declining BMD by more than 5%.
- Occurrence of ≥1 fragility fracture.

7.2.3.7. Referral to specialty care

- Very high risk.
- Inadequate response to therapy, despite good adherence**.**
- Experiencing serious or unacceptable adverse effects with the available medications.
- Continuing to fracture despite normal bone mineral density (BMD).
- History of fragility fracture below the age of 50 years.
- Early menopause (young females before the age of 45 years with medical or ovarian insufficiency): obstetrics & gynecology specialist to be consulted.
- Glucocorticoids induced Osteoporosis, to liaise with the treating physician**.**
- Atypical fracture, a side effect of Bisphosphonate.
- Secondary causes, according to the specialties. **(See Appendix.2)**.

CHAPTER THREE

8. Responsibilities

8.1. Healthcare professionals have a role in educating patients about osteoporosis, risk factors, and distinctive screening modalities.

8.2. Considered a primary intervention in the efforts to promote osteoporosis screening and prevention.

8.3. The responsibilities of a healthcare professional as shown in the table below:

<table>
<tr><th>Primary health care institution</th><th>Secondary/ Tertiary health care institution</th></tr>
<tr><td>Primary Care Physician (PCP) responsibilities:
- Compliance with screening guidelines.
- Assess patients for the risk of osteoporosis fracture using a DEXA Scan & FRAX.
- Health/Nutrition education.
- Management and monitoring.
- Refer to specialist when needed.</td><td>Specialist responsibilities:
- Compliance with screening guidelines.
- Assess patients for risk of osteoporosis fracture for a DEXA Scan.
- Health/Nutrition education.
- Management and monitoring.</td></tr>
<tr><td colspan="2">Nurse responsibilities:
- Check parameters: - Weight, Height, BMI, and Vitals: Blood pressure (BP), pulse, ..etc.</td></tr>
<tr><td colspan="2">Health educator responsibilities:
- Provide proper health education and support.</td></tr>
<tr><td colspan="2">Dietitian responsibilities:
- Provide proper information and nutritional assessment and advice.
- Participate in awareness activities related to osteoporosis nutrition.</td></tr>
<tr><td colspan="2">Pharmacist responsibilities:
- Counsel about pharmacological (drug) information and side effects and ensure medication compliance.</td></tr>
<tr><td colspan="2">Radiologist/bone densitometry technologist responsibilities:</td></tr>
</table>

- Perform, assist with, and ensure proper preparation, set-up, and completion of experimental tests and procedures utilizing specialized technical equipment and research techniques for bone density and mineral content study.
Laboratory Technician responsibilities:
- Receiving, labeling, and analyzing samples.

Table 5:Responsibilities of a healthcare professional

CHAPTER FOUR

9. Document History and Version Control

Version	Description	Review Date
1	Initial release	October 2026
2		
3		

10. References

Title of book/ journal/ articles/ Website	Author	Year of publication	Page
Textbook on Rheumatic Diseases – eular	BMJ group	2012	719,793 & 777
Article: American College of Rheumatology Guideline for the Prevention and Treatment of Glucocorticoid-Induced Osteoporosis	American College of Rheumatology	Aug.2017	
Article: Diagnosis and management of osteoporosis in postmenopausal women in Gulf Cooperation Council (GCC) countries: consensus statement of the GCC countries' osteoporosis societies under the auspices of the European Society for Clinical and Economic Aspects of Osteoporosis and Osteoarthritis (ESCEO) - https://link.springer.com/article/10.1007/s11657-020-00778-5	GCC countries	July.2020	

National Plan for Osteoporosis Prevention and Management in the Kingdom of Saudi Arabia - https://www.moh.gov.sa/en/Ministry/MediaCenter/Publications/Documents/NPOPM-2018.pdf	Kingdom of Saudi Arabia	April. 2018	
Kuwait Osteoporosis Guidelines 2022 - https://kops-kw.org/uploads/KOPS%20guidlines%202022-compressed.pdf	Kuwait	2022	
Osteoporosis Guideline for primary care	NHS- UK	June 2021	
Osteoporosis - www.nice.org.uk/guidance/qs149	NICE-UK	April. 2017	
Bisphosphonates for treating osteoporosis. - www.nice.org.uk/guidance/ta464	NICE-UK	Aug.2017	
DOH (Department of health) Guidelines on screening for Osteoporosis. - https://www.doh.gov.ae/-/media/D9596EA3C6B749B8ABF61FBD1DD7EF15.ashx	UAE	July.2019	
Clinical guideline for the prevention and treatment of osteoporosis - https://www.nogg.org.uk/full-guideline	NOGG-UK	Septemeber. 2021	

11. Appendix:

11.1. Appendix 1: Steroid Dose Equivalents:

Drug	Equivalent dose (mg)
Cortisone	**0.8**
Hydrocortisone	**1**
Prednisolone	**4**
Methylprednisolone	**5**
Triamcinolone	**5**
Betamethasone	**25**
Dexamethasone	**25**
Beclomethasone	**50**
Budesonide	
MP succinate for IV (Solu-Medrol) MP Na Acetate for IM/IA (Depo-Medrol)	

11.2. Appendix 2: Some causes of secondary osteoporosis:

Endocrine	Acromegaly
	Cushing's syndrome
	Hyperparathyroidism (frequent)
	Insulin-depended diabetes mellitus
	Thyrotoxicosis (frequent)
Hypo gonadal	Anorexia nervosa
	Bilateral oophorectomy or orchiectomy
	Hyperprolactinemia
	Hypogonadism
Drugs	Aromatase inhibitors (e.g. Tamoxifen), COC, Some anticonvulsant (e.g. Phenytoin)
	Glucocorticoids **>** 3months, Long time heparin use

Hematological disorders/malignancy	Haemophilia
	Mastocytosis
	Multiple myeloma (frequent)
	Thalassemia
Nutritional and gastrointestinal disorders	Celiac disease
	Gastrectomy
	Inflammatory bowel disease (frequent)
	Malabsorption
	Malnutrition
	Post Bariatric Surgery
Neurological disorders	Muscular dystrophy, Multiple sclerosis
	Parkinson's disease
	Stroke
Other disorders	Amyloidosis
	Ankylosing spondylitis (frequent)
	Chronic obstructive lung disease COPD (frequent)
	Chronic renal failure (frequent)
	Immobilisation
	Organ transplantation
	Rheumatoid arthritis (frequent)
	Sarcoidosis
	Systemic lupus erythematous

11.3. Appendix 3: Risk factors associated with fall: