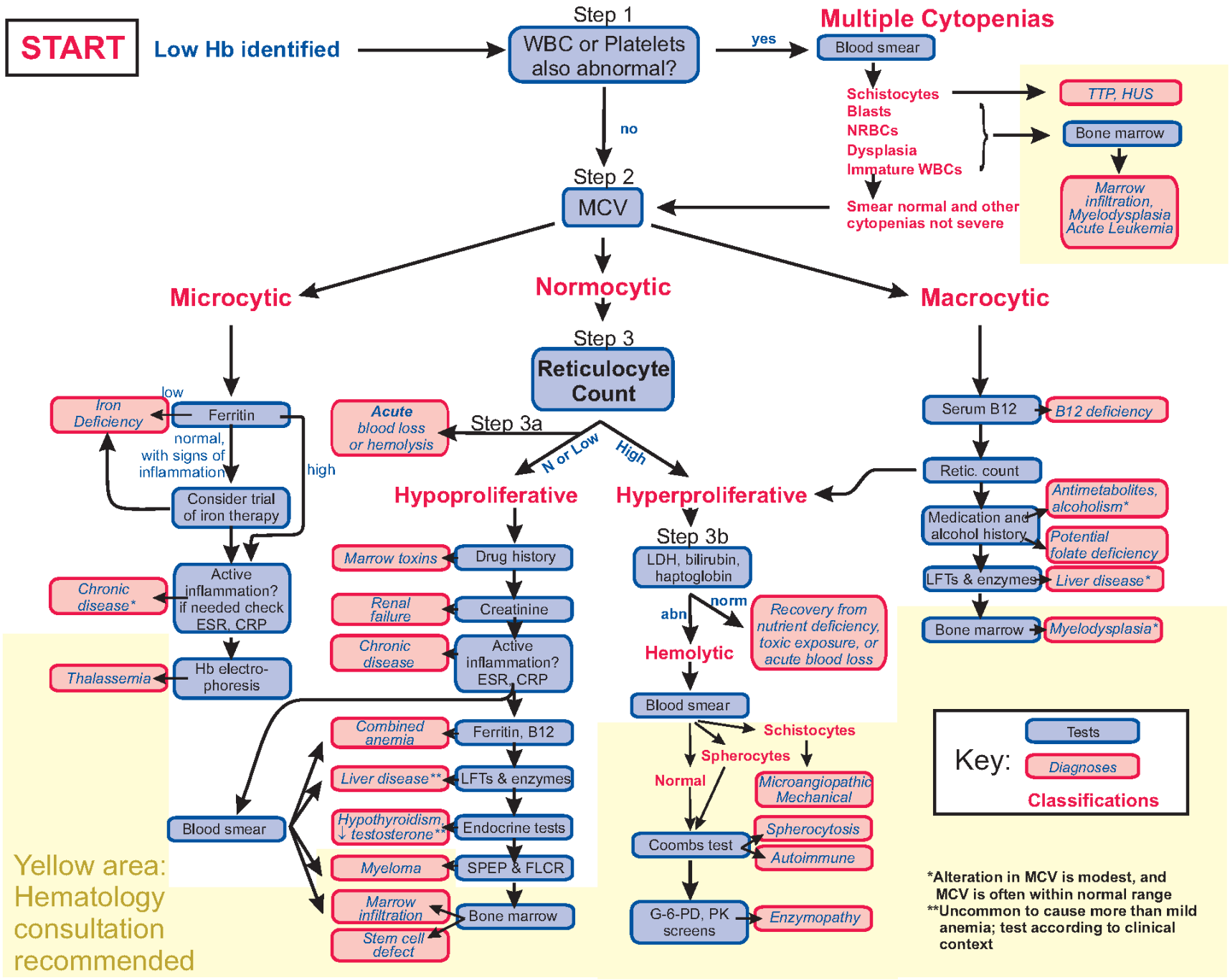
Work-Up of UNDIFFERENTIATED ANEMIA

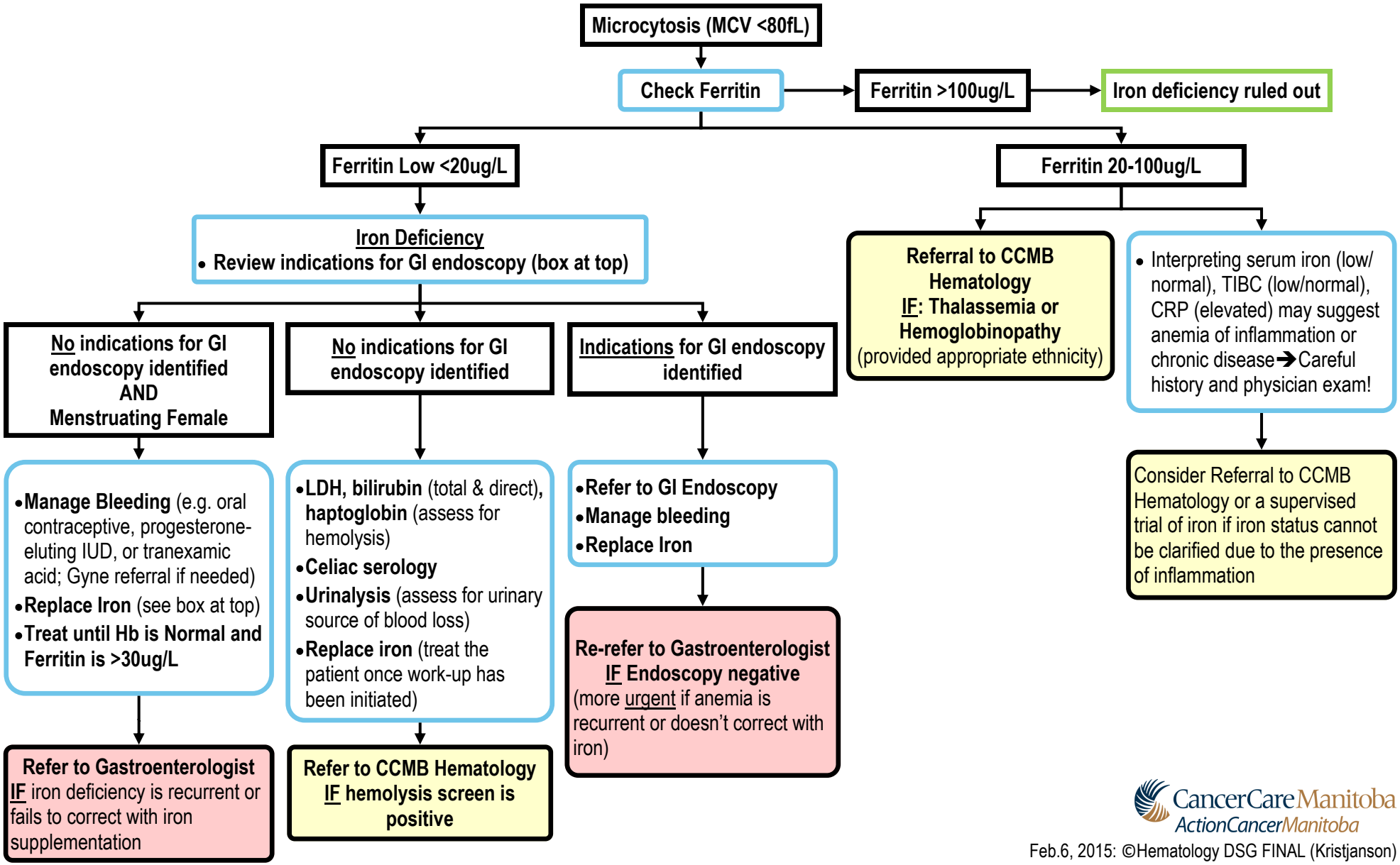


Pathways are subject to clinical judgment and actual practice patterns may not always follow the proposed steps in this pathway.

Work-Up of IRON DEFICIENCY ANEMIA in ADULTS

INDICATIONS FOR GI ENDOSCOPY: ●Adult males ●Post-menopausal females ●Unexplained weight loss ●Family history of GI cancer ●Any associated GI Symptoms such as: Dysphagia, Odynophagia, Dyspepsia, Abdominal pain, Melena, Hematochezia, Tenesmus, Altered bowel habit.

IRON REPLACEMENT: a) Control Blood Loss; b) Warn patients of GI side effects and start slow; c) Ferrous sulfate, gluconate, or fumarate or iron polysaccharide in doses that provide 150-200mg of elemental iron per day (e.g. ferrous sulfate 300mg TID)



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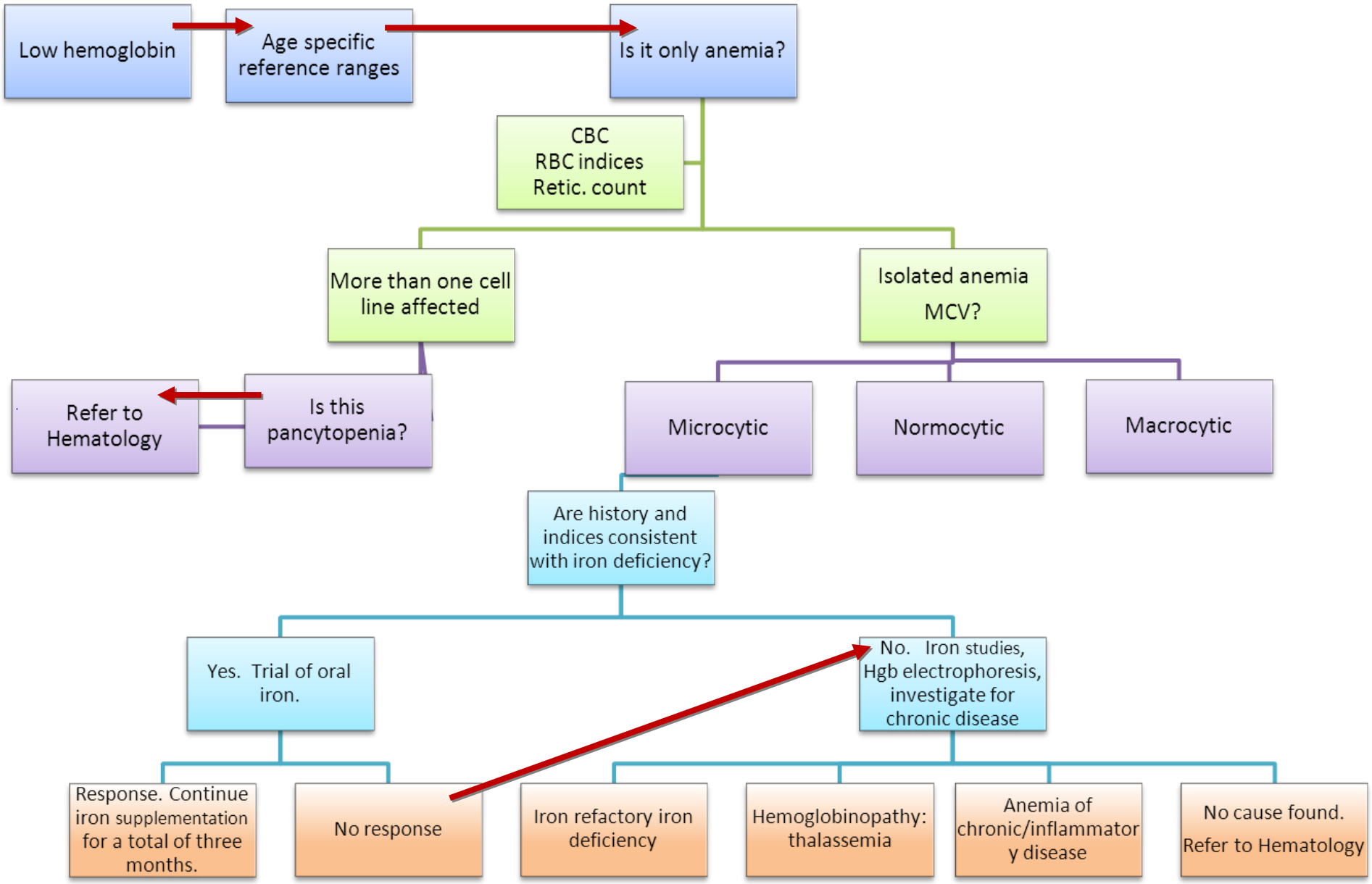
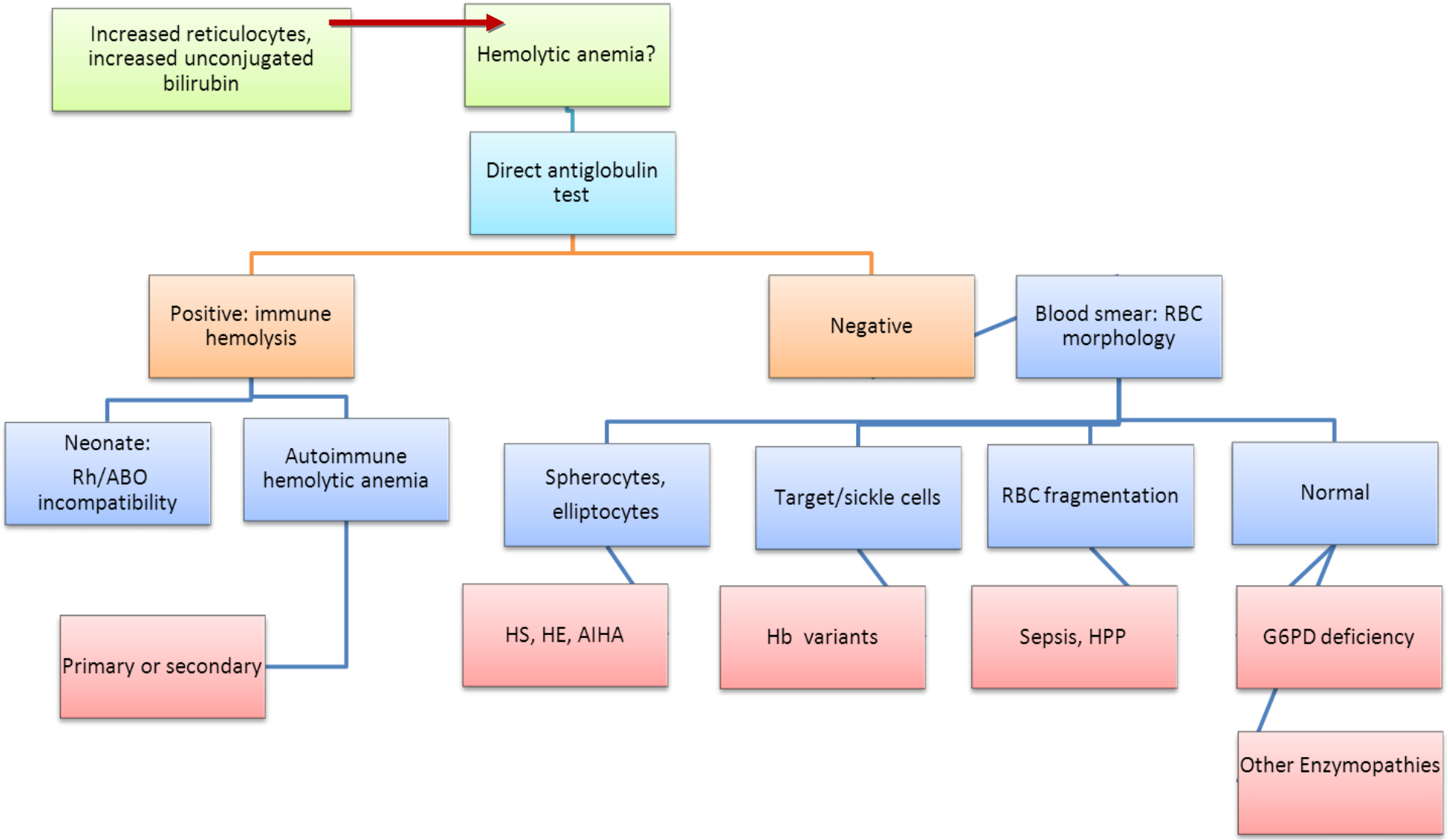
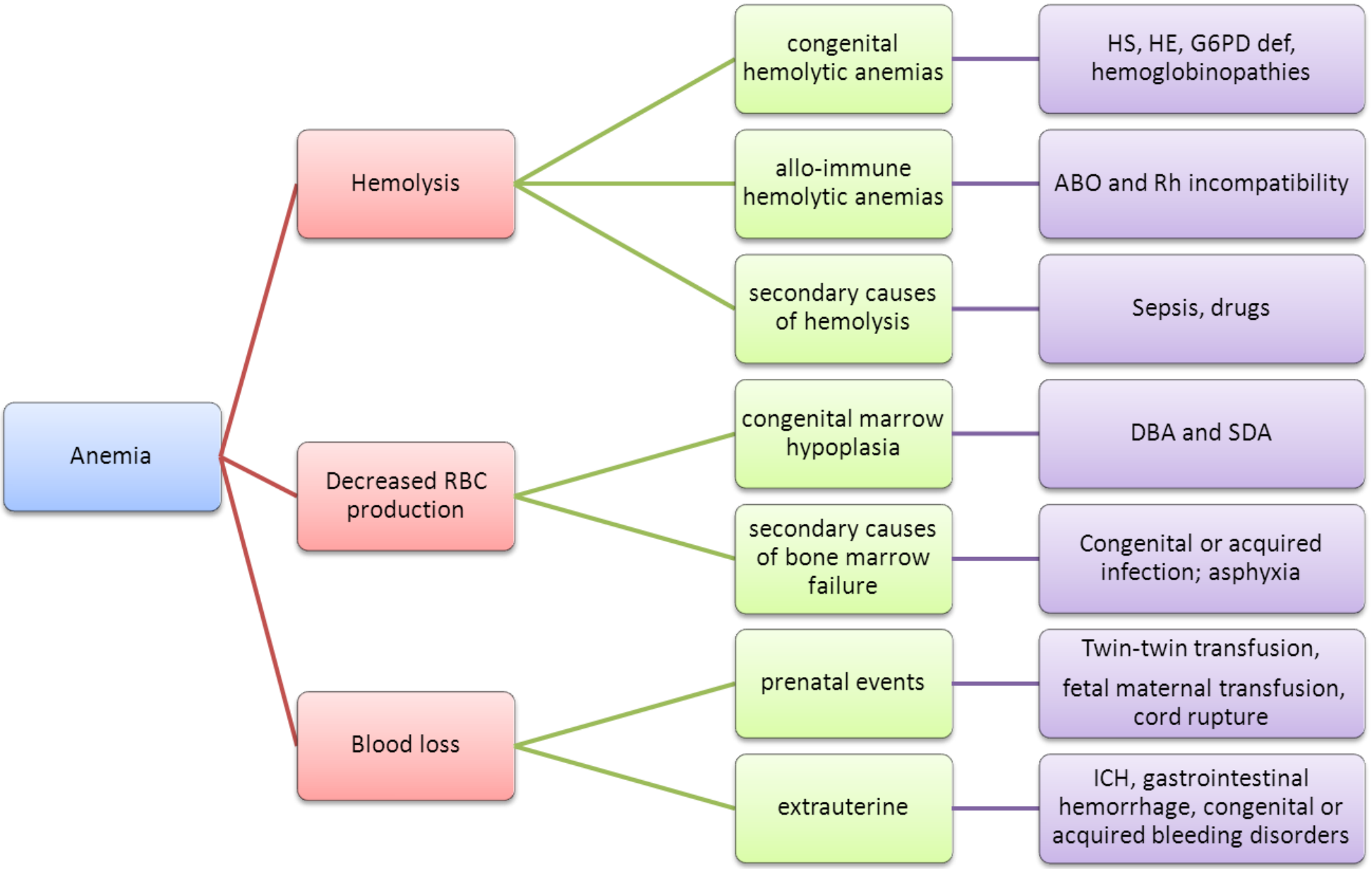
Work-up of MICROCYTIC ANEMIA in CHILDREN



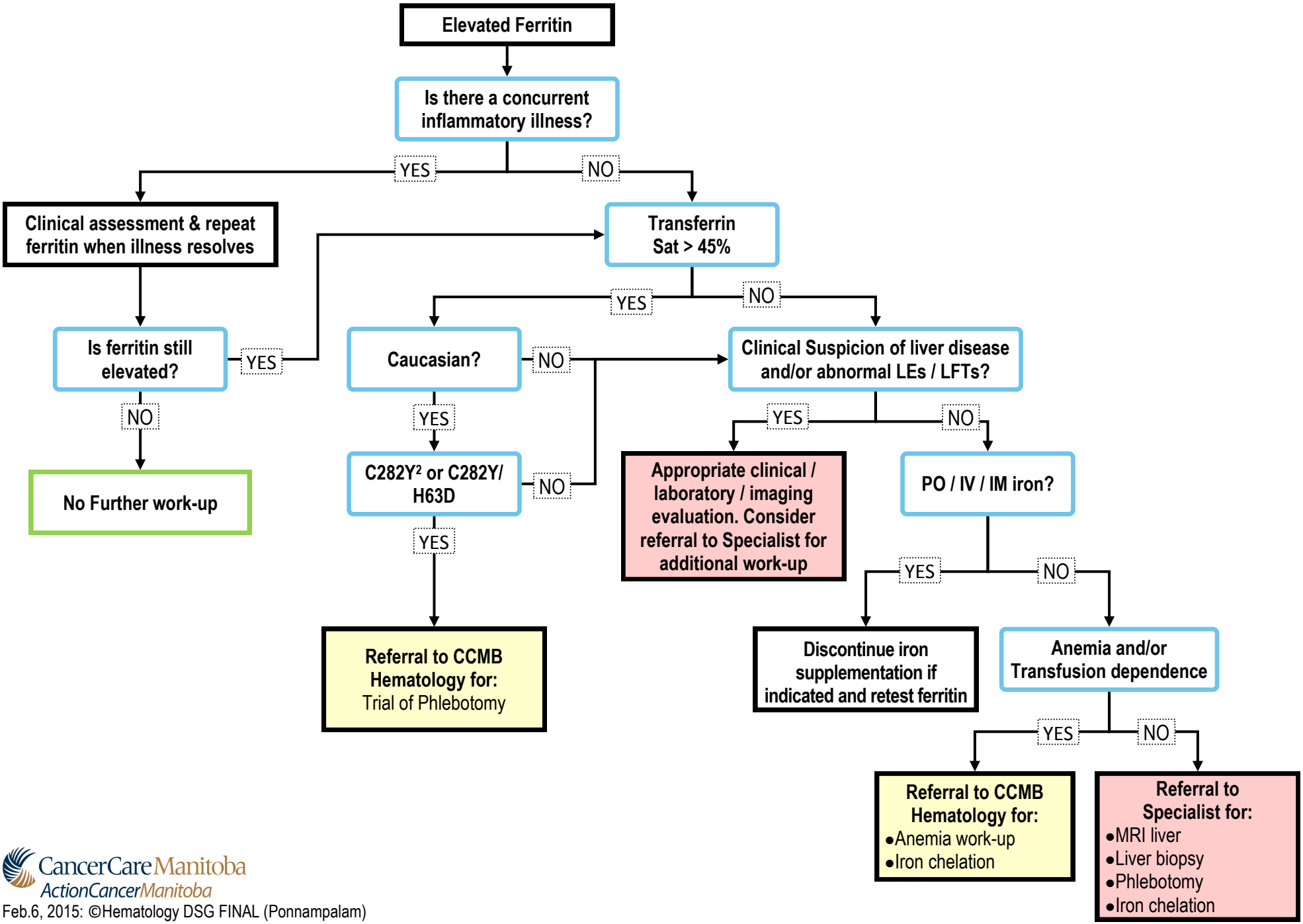
Work-up of HEMOLYTIC ANEMIAS in CHILDREN



Work-up of NEONATAL ANEMIAS



Work-Up of HIGH FERRITIN



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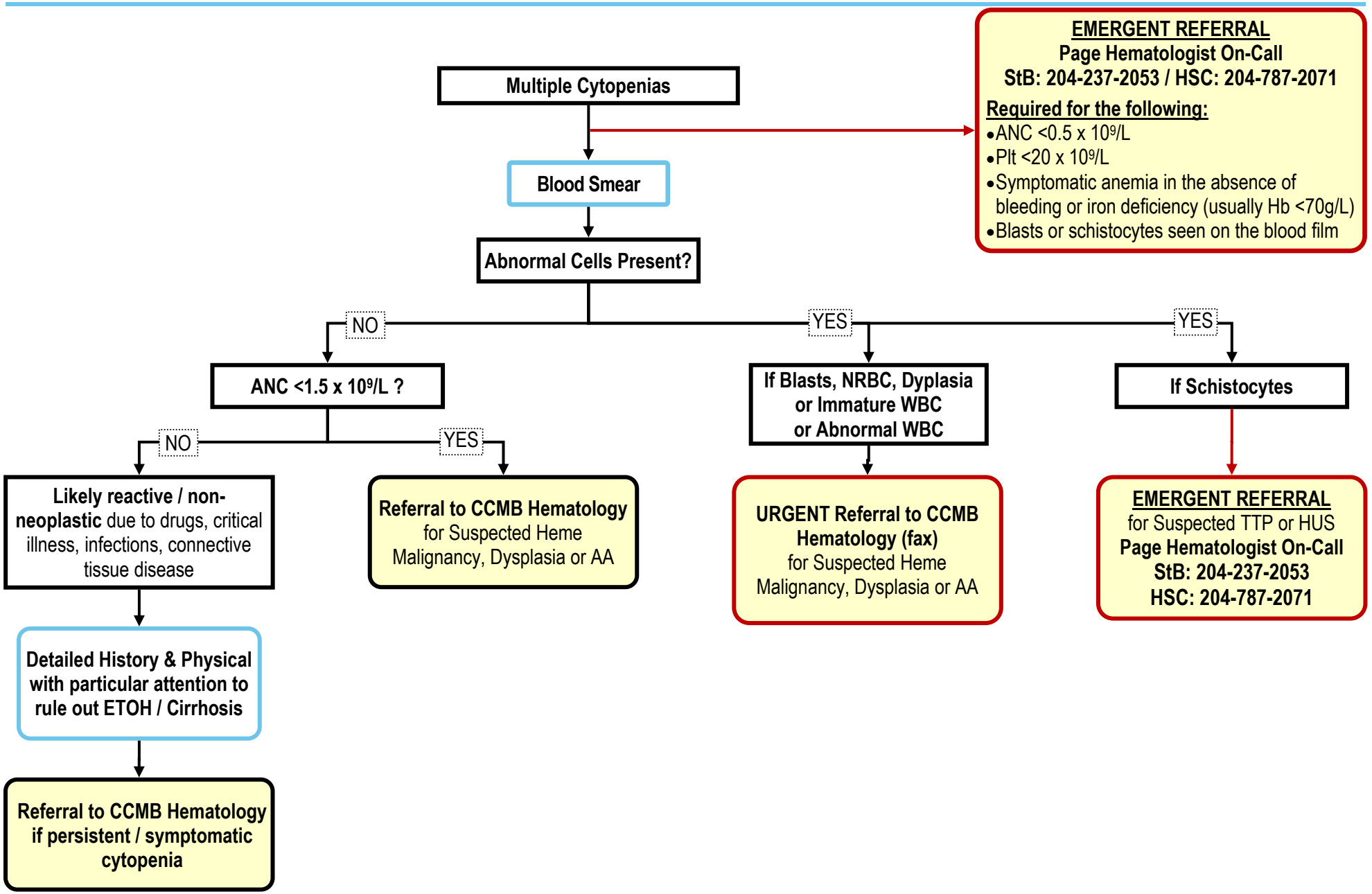
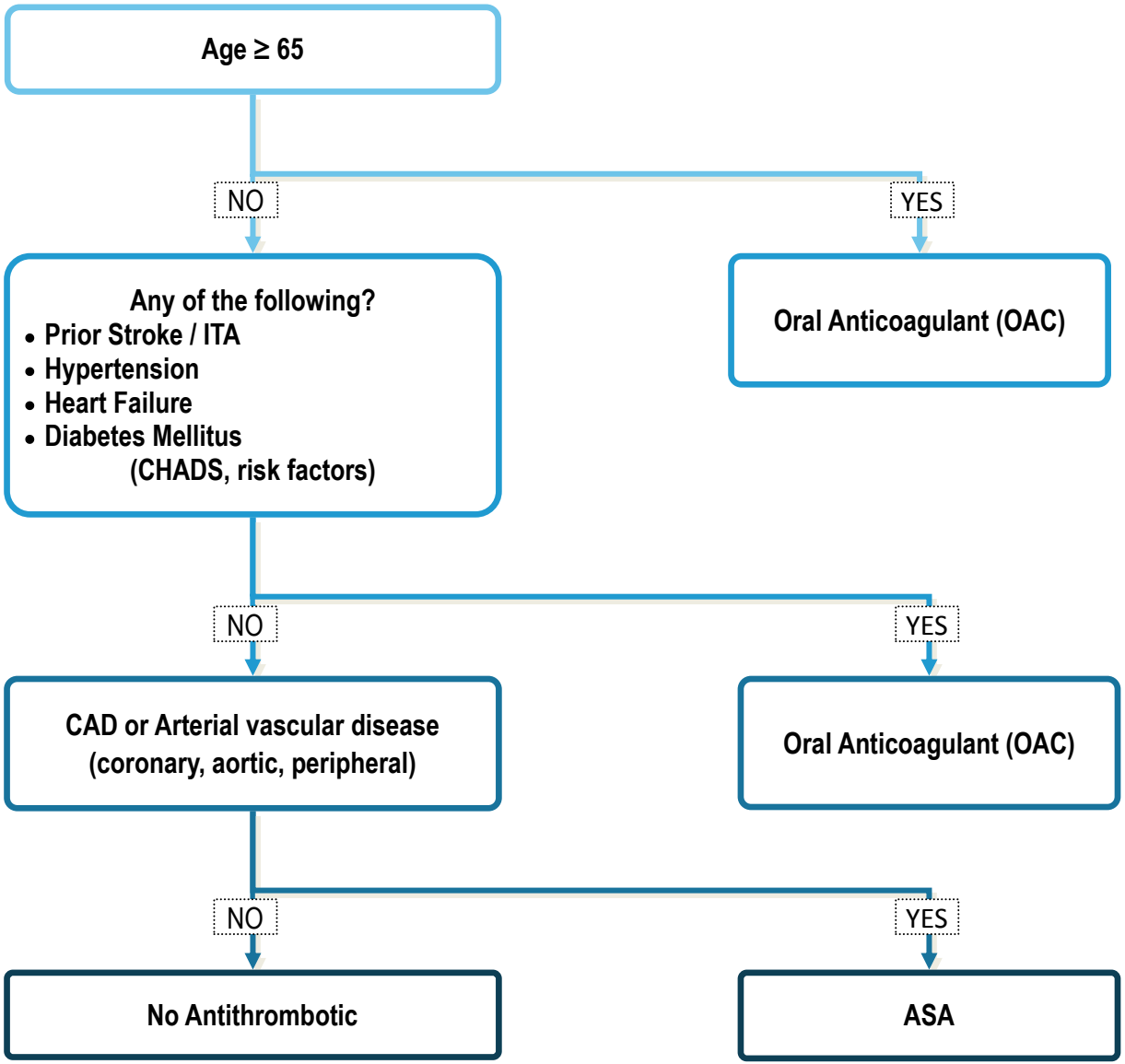
Work-up of PANCYTOPENIA



The "CCS Algorithm" FOR OAC Therapy in AF

PRACTICE POINTS: Consider and modify (if possible) all factors influencing risk of bleeding on OAC (hypertension, antiplatelet drugs, NSAIDs, excessive alcohol, labile INRs) and specifically bleeding risks for NOACs (low eGFR, age ≥ 75, low body weight)**



Adapted From: 2014 Focused Update of the Canadian Cardiovascular Society Guidelines for the Management of Atrial Fibrillation. Canadian Journal of Cardiology 30 (2014) 1114 -1130

When is THROMBOPHILIA TESTING (HYPERCOAGULABLE WORK-UP) Indicated?

PRACTICE POINTS: Thrombophilia testing = Hypercoagulable work-up (estimated cost $1000.)
Acquired: lupus inhibitor, antiphospholipid antibodies (IgG, IgM)=APLA, +/-high FVIII levels?
Inherited: Factor V Leiden, Prothrombin mutation, Protein C, S and antithrombin deficiency

WHEN IS THROMBOPHILIA TESTING INDICATED?

1. When the results will influence the management of the patients or their family **OR**
2. Patients' preference for knowledge (after informed consent.)

*Unprovoked or Idiopathic: indicates that no alternative explanation for clot AFTER appropriate history, physical and work up has been completed (depending on the clinical situation) – see examples of possible explanations/risk factors as listed below

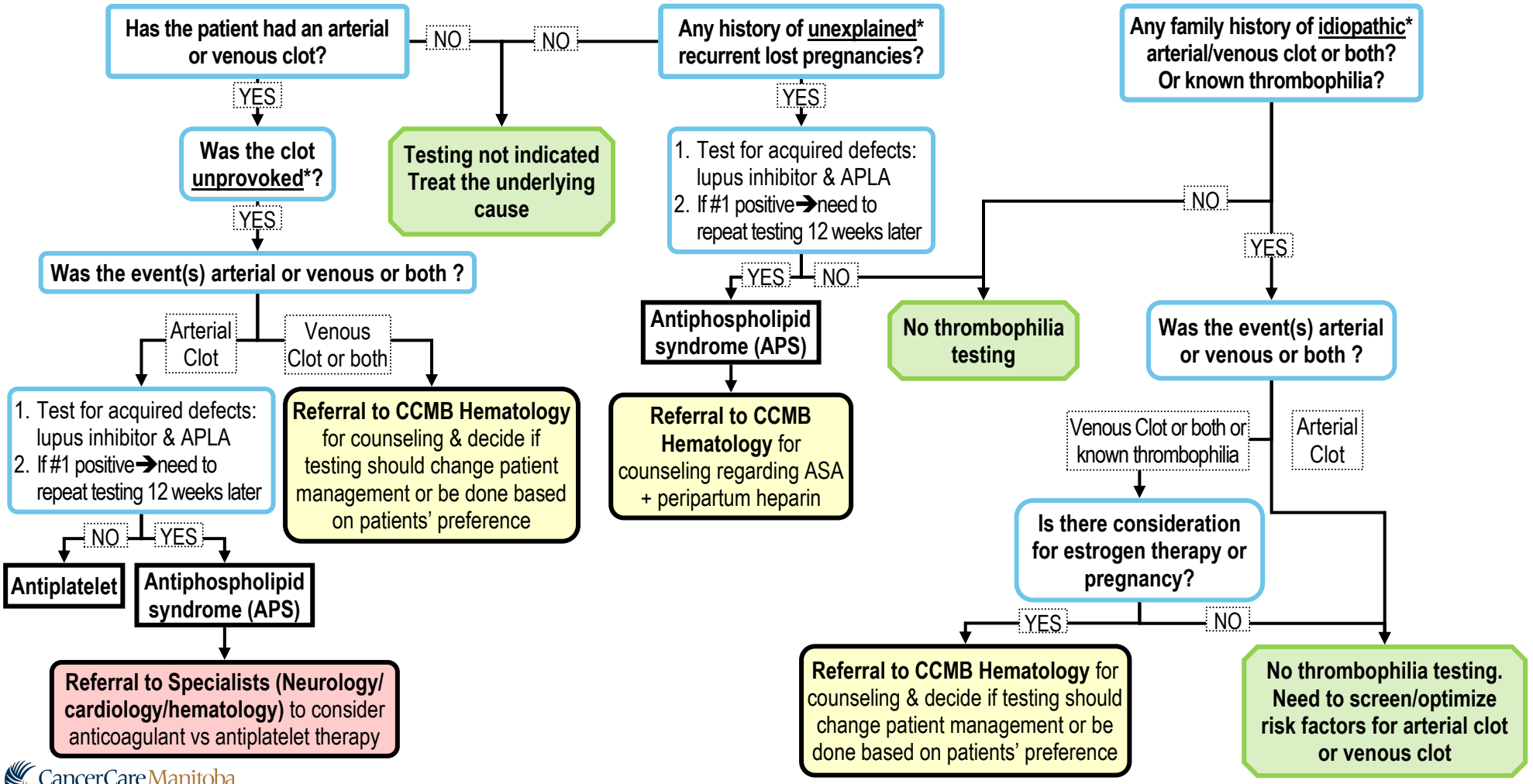
Recognized Causes of Arterial clot:

- atherosclerosis (age, smoking, hypertension, hypercholesterolemia, diabetes, calcified aorta etc)
- cardioembolic (arrhythmia, left ventricular clot, structural cardiac disease)
- Other secondary causes (heparin induced thrombocytopenia, paroxysmal hemoglobinuria, vasculitis, OCP, etc)

Recognized Causes of Venous clot:

-Major provoked events: post operative state or trauma (within 4 weeks), immobilization (casting, hospitalization, bed ridden), active cancer/ chemotherapy drugs (esp. estrogen containing contraception, HRT)

Recurrent pregnancies lost: >3 first trimester losses or 1 or more stillbirth (spontaneous, normal anatomy, no chromosomal anomalies or infection)



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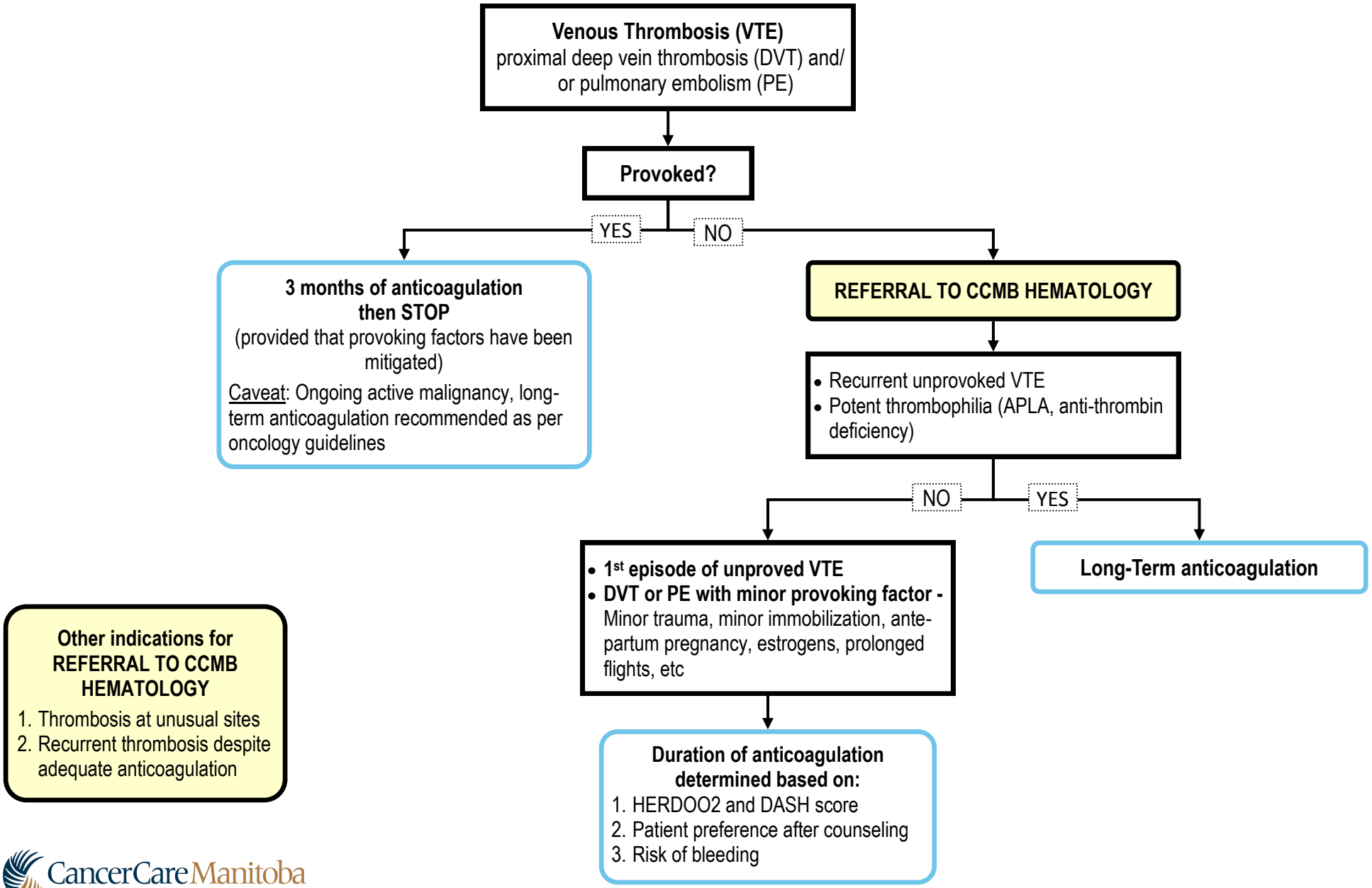
Duration of Anticoagulation after DVT/PE

PRACTICE POINTS: Typical Provoking factors ➔ ●a post operative state or trauma (within 4 weeks) ●immobilization >3 days (casting, hospitalization, bed ridden) ●active malignancy ●peripherally inserted central catheter (PICC) or central venous access device (CVAD)

Risk of major bleeding on anticoagulation ~0.9-2% per year



Other indications for REFERRAL TO CCMB HEMATOLOGY

1. Thrombosis at unusual sites
2. Recurrent thrombosis despite adequate anticoagulation

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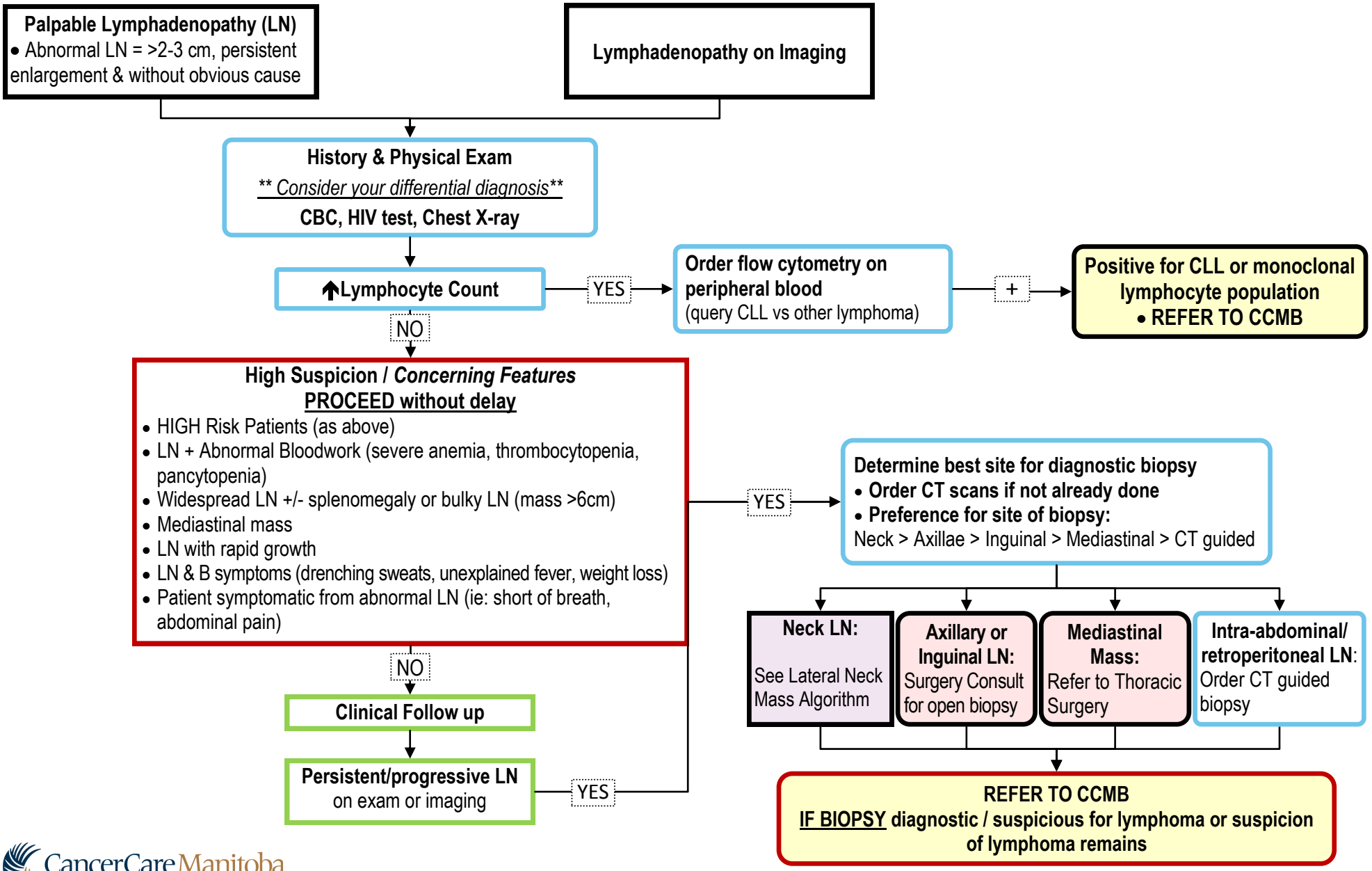
Work-Up of LYMPHADENOPATHY Suspicious for LYMPHOMA

RISK FACTORS: HIGH risk: immune deficiency (ie. HIV or organ transplant), autoimmune disease +/- immune suppressing medications, and history of lymphoma

PRACTICE POINTS: ***Consider your differential diagnosis*** including reactive LN due to infection/inflammation, metastatic malignancy, and autoimmune disease.



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When to ORDER SPEP and how to INTERPRET RESULTS

WHEN TO ORDER AN SPEP:

- Unexplained anemia, back pain
- Osteopenia, osteolytic lesions, spontaneous fractures
- Renal insufficiency with bland urinary sediment
- Heavy proteinuria or Bence Jones proteinuria
- Hypercalcemia with normal PTH
- Hypergammaglobulinemia
- Immunoglobulin deficiency
- Unexplained peripheral neuropathy
- Recurrent infections
- Elevated ESR or serum viscosity
- Peripheral blood smear showing rouleaux

If clinical suspicion remains high for plasma cell disorder and SPEP is negative ➔ obtain serum free light chain ratio (SFLCR)

CRAB SYMPTOMS:**

C – Ca2+ >2.8
R – creatinine >177 umol/L or GFR <40mL per min
A – hemoglobin <100g/L or 20g/L below normal
B – lytic lesions
**Attributable to plasma cell disorder

OTHER SPEP RESULTS

POLYCLONAL GAMMOPATHY (reactive)

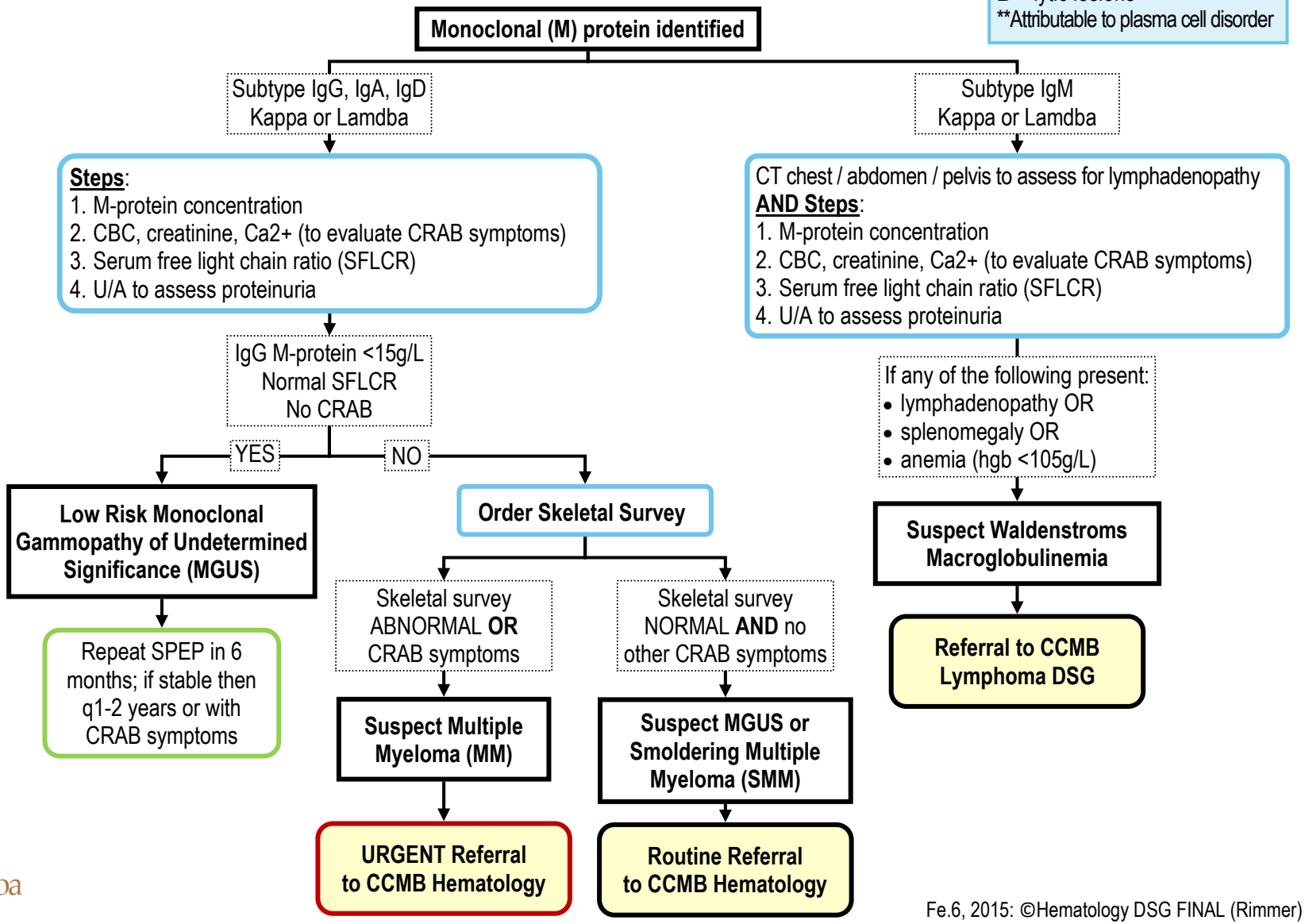
Investigate for other causes including:
- Liver disease
- Connective tissue disease I
- Infection

OLIGOCLONAL GAMMOPATHY (usually reactive)

Repeat test in 6 – 12 months if clinically indicated (see top box "When to order an SPEP")

ELEVATED FREE LIGHT CHAINS - NORMAL RATIO (reactive)

Investigate for other causes including:
- Kidney disease
- Liver disease
- Connective tissue disease
- Infection



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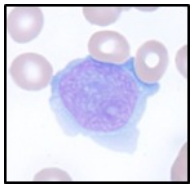
Work-Up of LEUKOCYTOSIS

Leukocytosis >11 (Repeated)

Blood Smear AND History & Physical Exam
include nodes and spleen

Blasts on Smear



EMERGENT REFERRAL
Page Hematologist On-Call
StB: 204-237-2053 / HSC: 204-787-2071

Lymphocytes ↑ >4 → **Refer to Lymphocytosis Pathway**

Myeloid Cells

Basophils↑

→ YES → **REFER TO CCMB HEMATOLOGY**

Monocytes↑

Concerning Features
- Count >2 or increasing, or persistent
- Not explained by infection
- Dysplasia
- Immature forms
- Anemia/thrombo-cytopenia
- Splenomegaly

NO → **Consider**
- Cancer
- Collagen VD
- Chronic infection
- Marrow recovery

NO → **REFER TO CCMB HEMATOLOGY**

YES → **Treat and Observe for recovery**

Neutrophils↑

Concerning Features
- Count >50
- Promyelocytes and myelocytes
- Dysplasia
- Basophilia
- Splenomegaly
- NOT associated with acute infection

NO → **Reactive causes**
e.g. Infection / inflammation, auto-immune, drugs esp. steroids

YES → **REFER TO CCMB HEMATOLOGY**

NO → **REFER TO CCMB HEMATOLOGY**

YES → **Treat and Observe for recovery**

Eosinophils↑

Concerning Features
- Count >2 or increasing or persistent
- Dysplasia
- Anemia
- New organ damage
- NOT explained by infection, allergies or collagen vascular disease

YES → **REFER TO CCMB HEMATOLOGY**

NO → **Consider**
- drugs
- Infections
- Allergies
- Collagen Vascular Disease

NO → **REFER TO CCMB HEMATOLOGY**

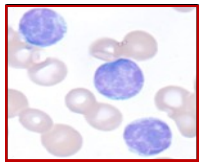
YES → **Treat and Observe for recovery**

George IT. Hematology, 475-484, 2012 (Adapted) Feb.6, 2015: ©Hematology DSG FINAL (Johnston)

Work-Up of LYMPHOCYTOSIS

Lymphocytes >4 (repeated)

Any of these Concerning Features
- Lymphocytes >30
- Hgb <100
- Night sweats/ weight loss
- Splenomegaly



Flow Cytometry

AND

REFER TO CCMB HEMATOLOGY

Asymptomatic

Flow Cytometry

IF Persistent

Normal / Polyclonal

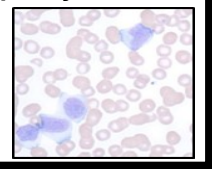
Rule out secondary causes
- Immunization
- Viral (eg. Hepatitis, CMV, EBV, adeno)
- Bacteria
- Drugs (eg. Steroids)
- Autoimmune
- Smoking
- Endocrine (eg. Myxedema, Addison's, hypopituitarism)

Abnormal / Clonal
- B Cells
- T Cells
- NK Cells

REFER TO CCMB HEMATOLOGY

"Reactive" Lymphocytes

Patient symptoms of infection or acute illness



Work-up for secondary causes
- Immunization
- Viral (eg. Hepatitis, CMV, EBV, adeno)
- Bacteria
- Drugs (eg. Steroids)
- Autoimmune
- Smoking
- Endocrine (eg. Myxedema, Addison's, hypopituitarism)

George IT. Hematology, 475-484, 2012 (Adapted) Feb.6, 2015: ©Hematology DSG FINAL (Johnston)