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RAPID REFERRAL ANEMIA CLINICS

REDUCING INAPPROPRIATE TRANSFUSION AND OPTIMIZING PATIENT CARE

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ORBCON

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CIHR IRSC Canadian Institutes of Health Research

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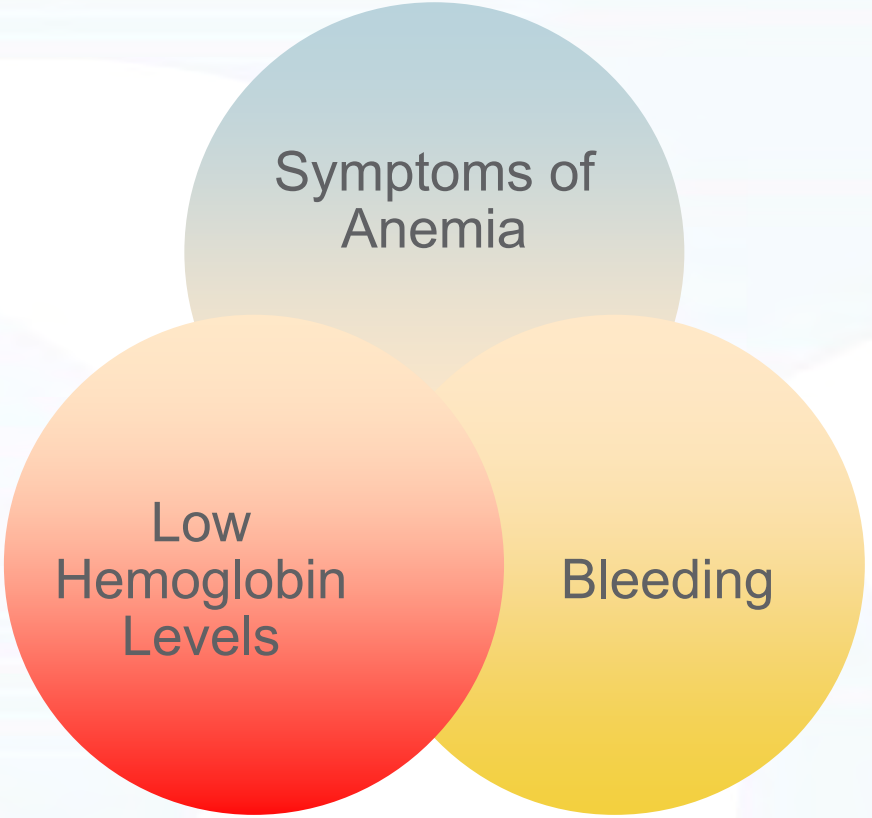
OBJECTIVES

1. Review rationale for rapid referal anemia clinics
2. Understand the potential causes of anemia presenting to Emergency Department
3. Review the role of intravenous iron to reduce uneeded transfusions and improve patient satisfaction.

ANEMIA AND TRANSFUSIONS IN THE EMERGENCY DEPARTMENT

- Referrals from GP
- Symptomatic patients

- **ANEMIA IS A COMMON PROBLEM IN THE EMERGENCY DEPARTMENT**



PATIENT PERSPECTIVE

1. Long waits in Emergency Department
2. Many patients do not meet criteria for transfusion
3. Underlying etiology of anemia not addressed if chronic anemia
4. Most appropriate therapy not given in Emergency Department

PHYSICIAN PERSPECTIVE

1. GP have limited resources / options for acute treatment of severe anemia
2. Many patients in ED do not meet criteria for transfusion
   - Transfused inappropriately
   - Sent back to GP with no treatment
3. Prolonged stay for transfusion in ED taxes over burdened area
4. ED has limited capacity for follow-up
5. Referrals to specialty clinic for urgent assessment

EMERGENCY DEPARTMENT VISITS FOR ANEMIA

COMMON OUTCOMES

- Patients transfused inappropriately
  - Not symptomatic
  - Receive more RBCs than needed
- Underlying cause for anemia not treated
  - Sent back to GP with no transfusion
  - Return to ED for additional transfusion
- Refered to hematology
  - No investigations
  - No treatment

RAPID REFERRAL ANEMIA CLINIC

Hematology clinic to see patients with moderate - severe clinics

- Referrals from ED and GPs

- Reduce transfusions in ED
- Receive most appropriate therapy for anemia in ED
- Alternative to ED for assessment and mangement of anemia

RAPID REFERRAL ANEMIA CLINIC

- Emergency Department

EMERGENCY DEPARTMENT

- Algorithm for management of anemia
  - Appropriate workup
  - Appropriate therapy
- Criteria for referral to Rapid Referral Anemia clinic
  - Appropriate patients
- Assurance of rapid follow-up
  - Timely
  - Appropriate therapy

RAPID REFERRAL ANEMIA CLINIC - THE PLAN

ALGORITHM FOR MANAGEMENT ANEMIA IN ED

- Guidelines for RBC transfusion
  - Thresholds
  - Number of units
- Administration of iron
  - IV
  - PO

AABB RBC TRANSFUSION GUIDELINES

The AABB recommends a restrictive RBC transfusion threshold which the transfusion is not indicated until the hemoglobin level is

- 70 g/L for hospitalized adult patients who are hemodynamically stable, including critically ill patients (strong recommendation, moderate quality evidence).
- 80 g/L for patients undergoing orthopedic surgery or cardiac surgery and those with preexisting cardiovascular disease, (strong recommendation, moderate quality evidence).

BLOODY EASY

Hemoglobin	Recommendation
>90 g/L	Likely inappropriate except in exceptional circumstances.
70-90 g/L	Likely to be appropriate if there are signs or symptoms of impaired oxygen delivery (e.g., tachycardia, hypotension, cardiac ischemia, syncope, pre-syncope).
<70 g/L	Likely to be appropriate.
<60 g/L	Transfusion recommended[38] ◆ Young patients with low risk of ischemic cardiovascular disease can sometimes tolerate greater degrees of anemia. ◆ Patients with chronic iron deficiency may often be better managed with IV or PO iron alone. (PO iron works very well in children with iron deficiency anemia and Hgb level as low as 30 g/L in the absence of concerning symptoms of anemia and assurance of reliable follow-up.)

IRON THERAPY

Oral

- ***Advantages***: inexpensive (over the counter), available
- ***Disadvantages***: absorption only 10% of elemental Fe, takes a long time to correct anemia and replenish iron stores
- ***Adverse effects***: GI side effects -> non-compliance

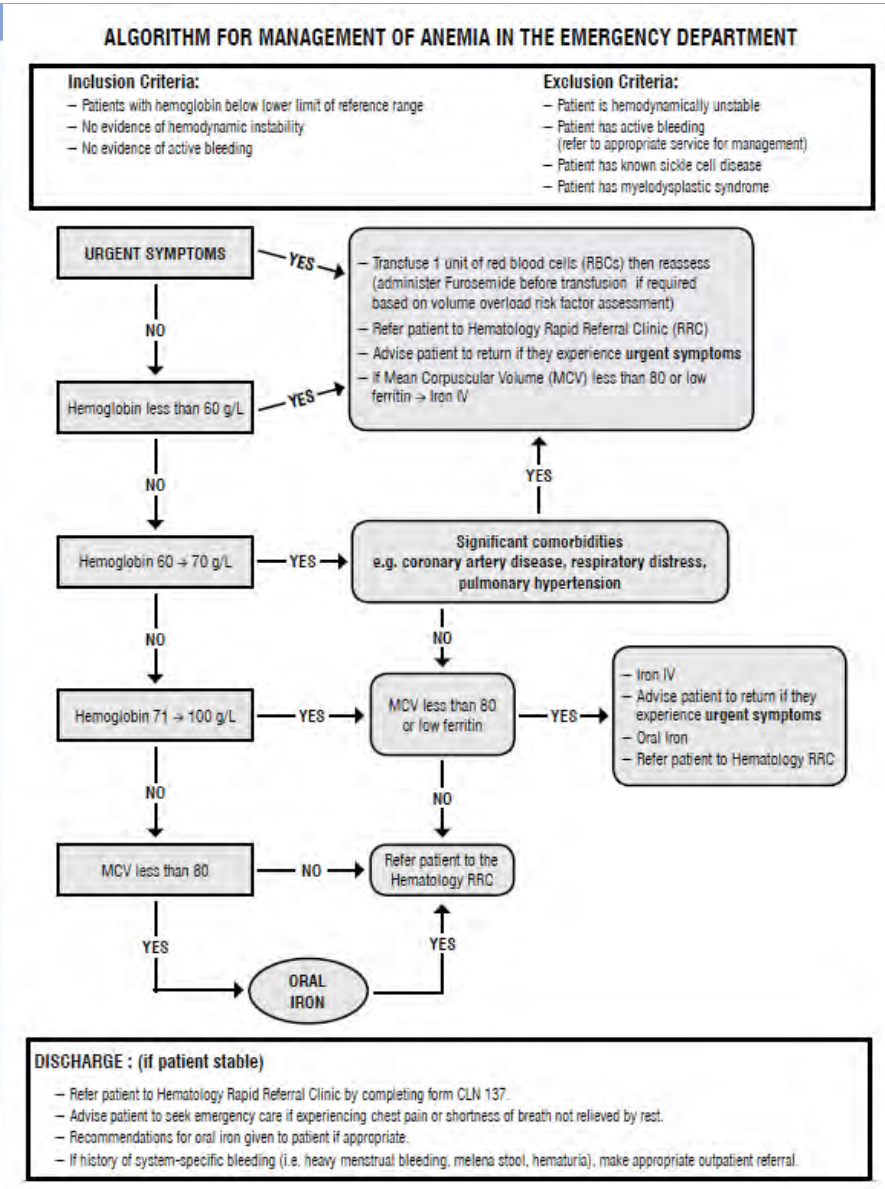
IV

- ***Advantages***: rapidly effective
- ***Disadvantages***: cost, availability, need for a hospital visit
- ***Adverse effects***: Allergic reaction, hypotension, metallic taste, headache, nausea, vomiting, diarrhea, abdo pain, back pain, muscle cramps, arthralgias, infusion site reactions

Oral iron supplement	Dose, mg	Elemental mg	Cost, $
Ferrous sulfate	300	60	0.06
Ferrous fumarate	300	100	0.12-0.21
Iron Polysaccharide (Feramax)	150	150	0.46
Heme Iron (Proferrin, Optifer)	398	11	0.50

IV Iron Supplement	Iron sucrose (Venofer)	Iron gluconate (Ferrlecit)
MW (kDa)	43	289-440
Plasma ½ life	6	1
Dose	200-300 mg	62.5 - 125 mg
Administation	30 -120 min	30-60 min
Cost	$37.50 (100mg)	
Life threatening ADE	0.6 per 10^6	1.1 per 10^6

RAPID REFERRAL ANEMIA CLINIC - THE PLAN



ONE UNIT RBC TRANSFUSION

- Recent RCTs evaluating RBC thresholds in inpatients mandated 1 unit
- Increased no. of units associated with TACO
- 1 unit transfusions decrease overall exposure
- Increases time to next transfusion

http://www.transfusion.ca/CSTM/media/images/

ONE UNIT RBC TRANSFUSION

- Recent RCTs of inpatients evaluating RBC thresholds
- mandated 1 u
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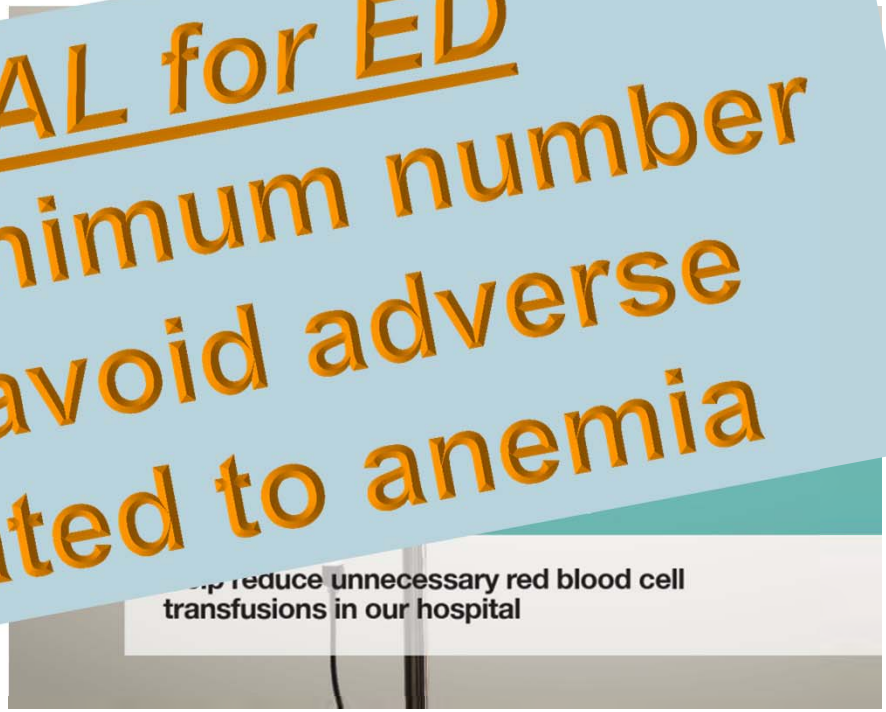
OUR GOAL for ED

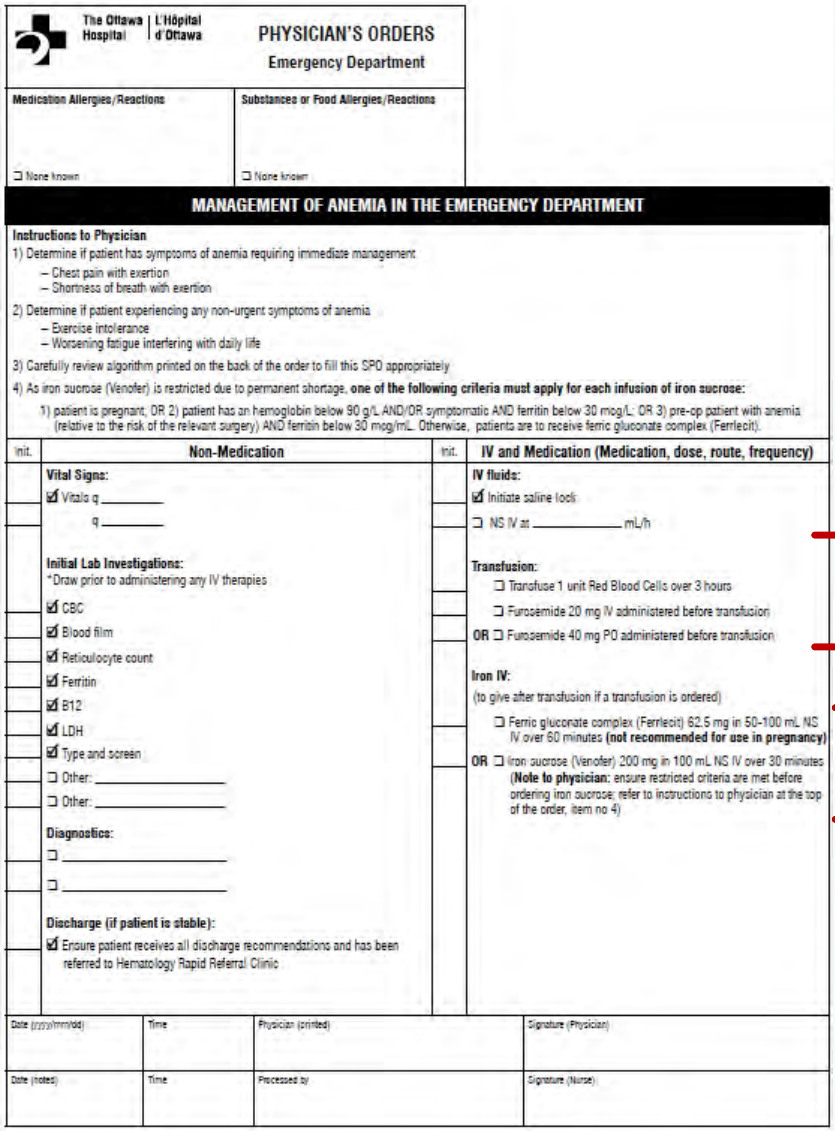
Transfuse minimum number of units to avoid adverse events related to anemia



http://www.transfusion.ca/CSTM/media/images/

PRE-PRINTED ORDERS

- Start work-up for anemia
- Treatment of anemia and iron deficiency



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PHYSICIAN'S ORDERS
Emergency Department

Medication Allergies/Reactions	Substances or Food Allergies/Reactions
❑ None known	❑ None known

MANAGEMENT OF ANEMIA IN THE EMERGENCY DEPARTMENT

Instructions to Physician

1) Determine if patient has symptoms of anemia requiring immediate management
   – Chest pain with exertion
   – Shortness of breath with exertion
2) Determine if patient experiencing any non-urgent symptoms of anemia
   – Exercise intolerance
   – Worsening fatigue interfering with daily life
3) Carefully review algorithm printed on the back of the order to fill this SPO appropriately
4) As iron sucrose (Venofer) is restricted due to permanent shortage, **one of the following criteria must apply for each infusion of iron sucrose:**
   1) patient is pregnant, OR 2) patient has an hemoglobin below 90 g/L AND/OR symptomatic AND ferritin below 30 mcg/L; OR 3) pre-op patient with anemia (relative to the risk of the relevant surgery) AND ferritin below 30 mcg/mL. Otherwise, patients are to receive ferric gluconate complex (Ferrlecit).

Init.	Non-Medication	Init.	IV and Medication (Medication, dose, route, frequency)
	Vital Signs: ☑ Vitals q _____ q _____		**IV fluids:** ☑ Initiate saline lock ❑ NS IV at _____ mL/h
	Initial Lab Investigations: *Draw prior to administering any IV therapies		**Transfusion:** ❑ Transfuse 1 unit Red Blood Cells over 3 hours ❑ Furosemide 20 mg IV administered before transfusion **OR** ❑ Furosemide 40 mg PO administered before transfusion
	☑ CBC		
	☑ Blood film		
	☑ Reticulocyte count		
	☑ Ferritin		**Iron IV:** (to give after transfusion if a transfusion is ordered)
	☑ B12		❑ Ferric gluconate complex (Ferrlecit) 62.5 mg in 50-100 mL NS IV over 60 minutes **(not recommended for use in pregnancy)**
	☑ LDH		**OR** ❑ Iron sucrose (Venofer) 200 mg in 100 mL NS IV over 30 minutes (**Note to physician:** ensure restricted criteria are met before ordering iron sucrose; refer to instructions to physician at the top of the order, item no 4)
	☑ Type and screen		
	❑ Other: _____		
	❑ Other: _____		
	Diagnostics: ❑ _____		
	❑ _____		
	Discharge (if patient is stable): ☑ Ensure patient receives all discharge recommendations and has been referred to Hematology Rapid Referral Clinic		

Date (yyyy/mm/dd)	Time	Physician (printed)	Signature (Physician)
Date (noted)	Time	Processed by	Signature (Nurse)

Production
Hemolysis
Iron / B12

Transfusion orders

Iron orders

RAPID REFERAL ANEMIA CLINIC

- Stable, non-bleeding patients with Hemoglobin <100 g/L
  - Not already followed by TOH physician for anemia or related conditons
- Seen in clinic within 2 weeks
  - Stable patients only
  - First dose of IV iron in ED
- Referals to other specialists initiated in ED

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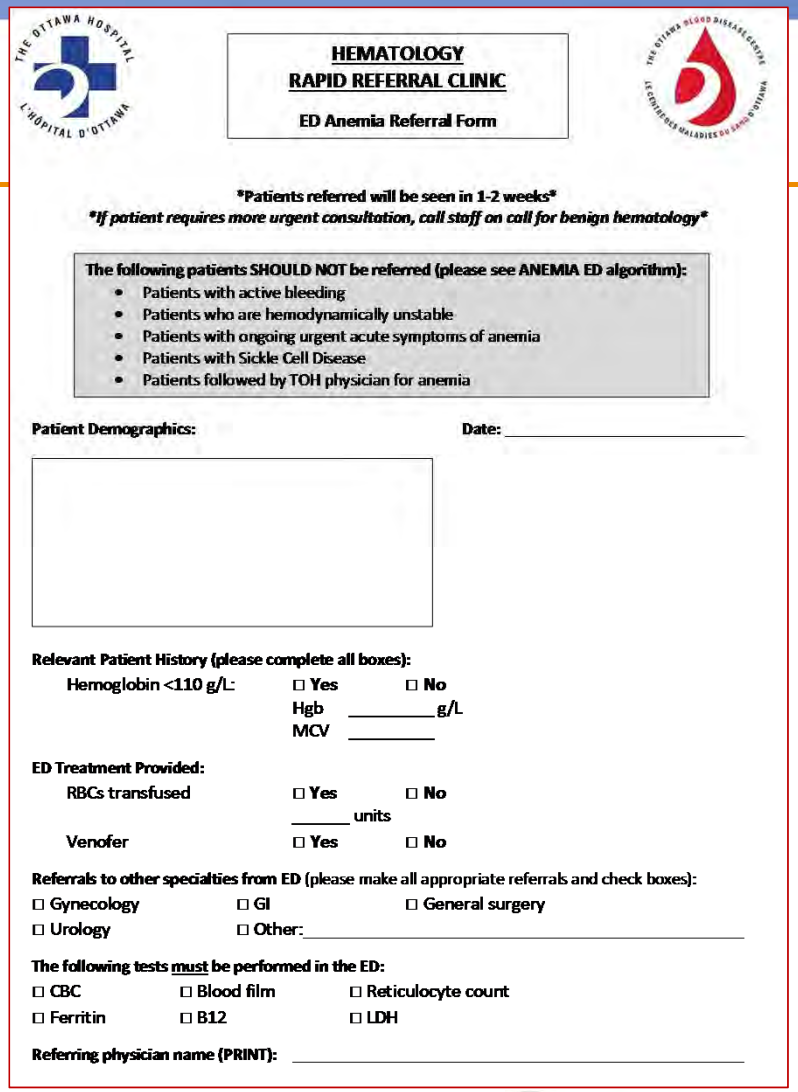

HEMATOLOGY
RAPID REFERRAL CLINIC
ED Anemia Referral Form

Patients referred will be seen in 1-2 weeks
****If patient requires more urgent consultation, call staff on call for benign hematology****

The following patients SHOULD NOT be referred (please see ANEMIA ED algorithm):
- Patients with active bleeding
- Patients who are hemodynamically unstable
- Patients with ongoing urgent acute symptoms of anemia
- Patients with Sickle Cell Disease
- Patients followed by TOH physician for anemia

Patient Demographics: **Date:** _____

Relevant Patient History (please complete all boxes):
Hemoglobin <110 g/L: ☐ Yes ☐ No
Hgb _____ g/L
MCV _____

ED Treatment Provided:
RBCs transfused ☐ Yes ☐ No
_____ units
Venofer ☐ Yes ☐ No

Referrals to other specialties from ED (please make all appropriate referrals and check boxes):
☐ Gynecology ☐ GI ☐ General surgery
☐ Urology ☐ Other: _____

The following tests must be performed in the ED:
☐ CBC ☐ Blood film ☐ Reticulocyte count
☐ Ferritin ☐ B12 ☐ LDH

Referring physician name (PRINT): _____

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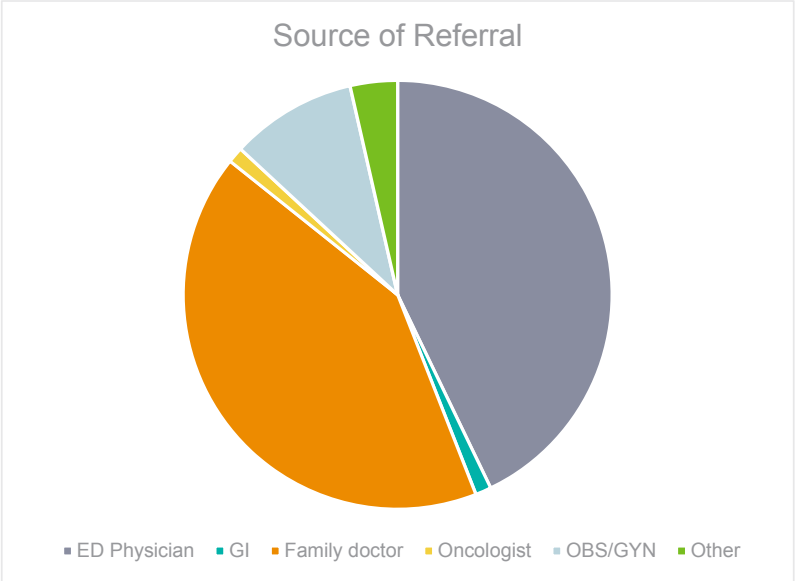
RAPID REFERRAL ANEMIA CLINIC - PILOT

- 6 month pilot program
- 84 patients
  - Referrals from ED
  - Regular Hematology referals
- Patients with Hgb < 100

Referal	Number
ED Physician	36
GI	1
Family doctor	35
Oncologist	1
OBS/GYN	8
Other	3
	84



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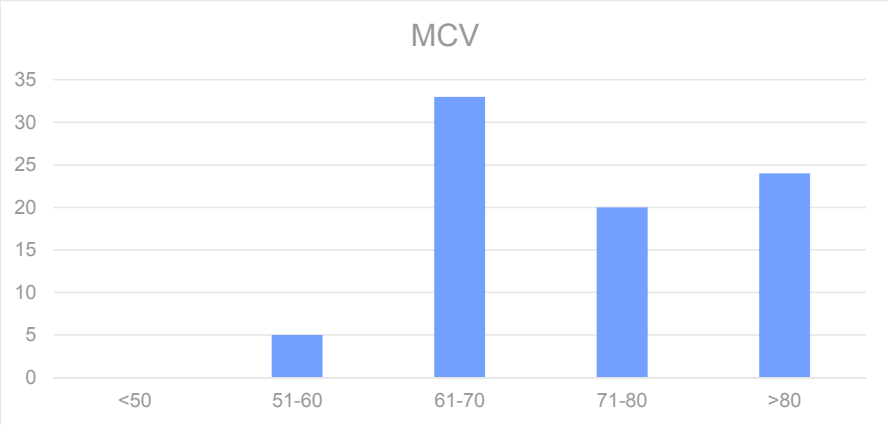
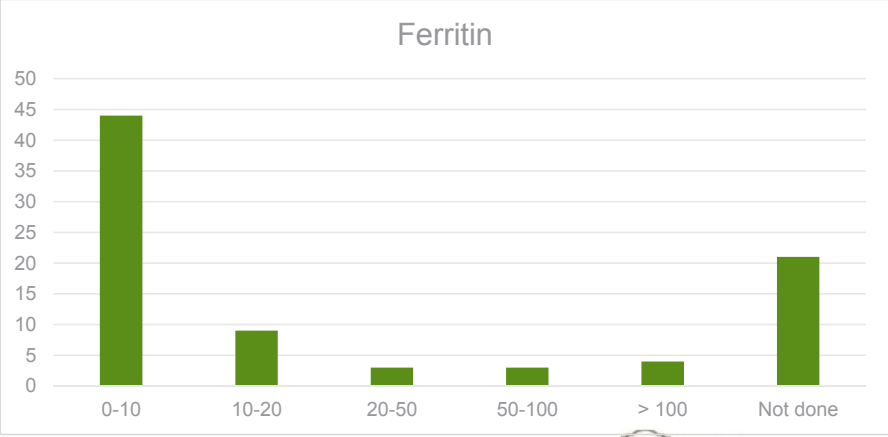
RAPID REFERRAL ANEMIA CLINIC - PILOT

- Mean Hgb 76 g/dl (45-101)
- Median MCV 71 fl (53-106)
- Median ferritin = 5 umol/l (0-2269)





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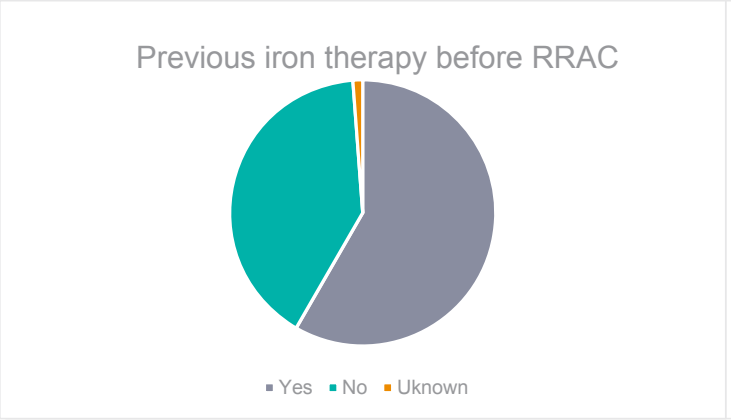
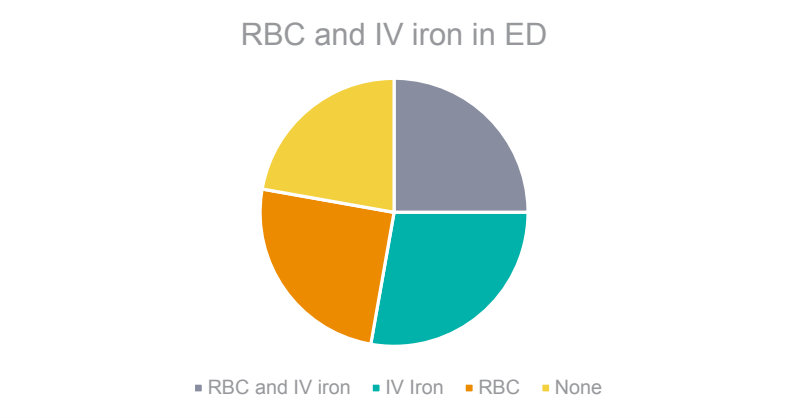
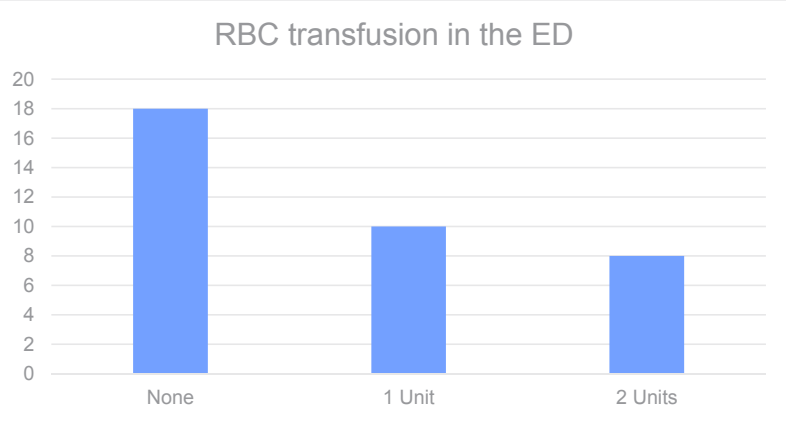
ED REFERRALS

84 patients

- 36 patients from ED
  - 18 patients transfused
  - 19 received IV iron







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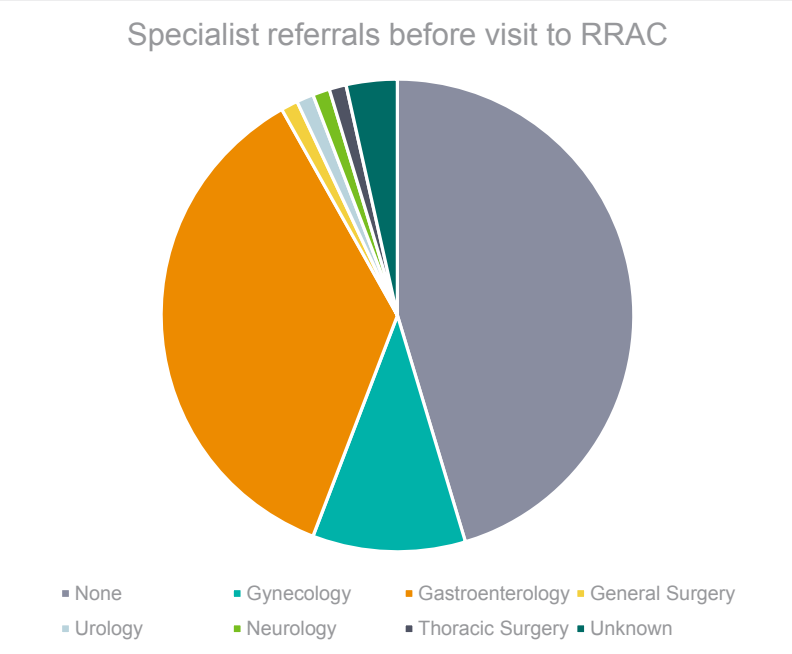
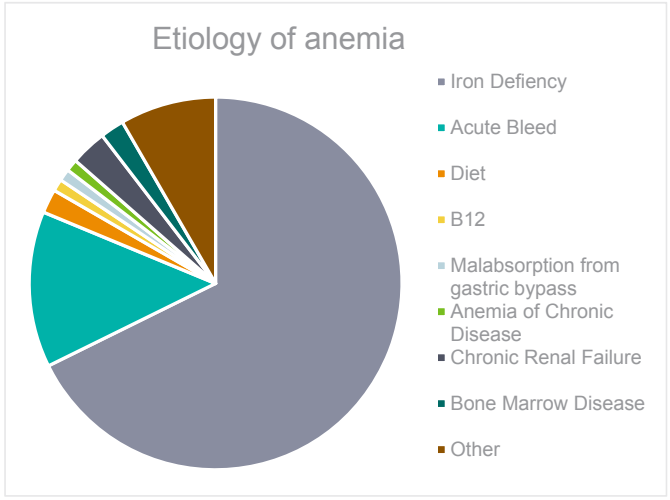
REFERRALS TO OTHER SPECIALISTS FROM ED

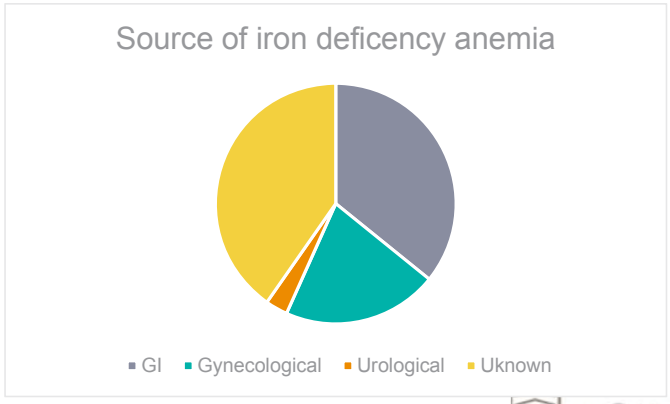
Referral BEFORE RRAC	Number
None	39
Gynecology	9
Gastroenterology	31
General Surgery	1
Urology	1
Neurology	1
Thoracic Surgery	1
Unknown	3



ETIOLOGY OF ANEMIA

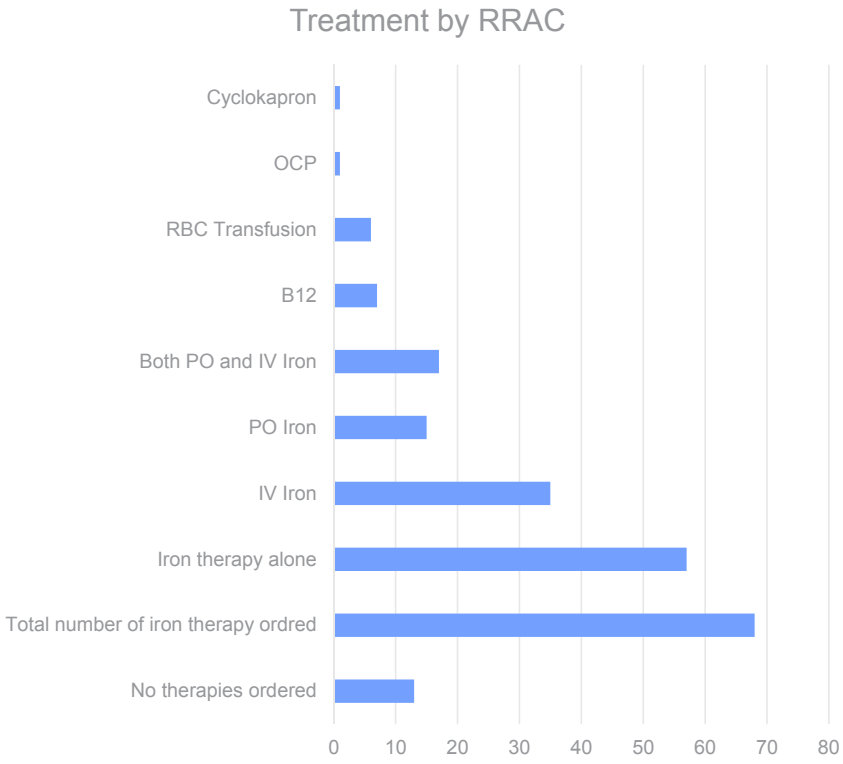
Etiology of Anemia	Number
Iron Defiency	65
Acute Bleed	13
Diet	2
B12	1
Malabsorption from gastric bypass	1
Anemia of Chronic Disease	1
Chronic Renal Failure	3
Hemolysis	0
Bone Marrow Disease	2
Other	8





TREATMENT INITIATED BY RRAC

Therapies ordered by RCC physician	Number
PO Iron	15
IV Iron	35
Both PO and IV Iron	17
B12	7
RBC Transfusion	6
OCP	1
Cyclokapron	1
Iron therapy alone	57
No therapies ordered	13
Total number of iron therapy ordred	68



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IV IRON THERAPY

- 10-14 days to see reticulocyte response
- Increased hgb by 10 g/L per week
- Either to to kickstart hematopoiesis
  - 1-3 doses of IV iron then oral iron
- "Full course" of IV iron
  - 1 gm over 5-8 treatments q1-2 weeks

Venofer (Iron sucrose)

- Limited supply in Canda. (resolved?)
- Larger dose - 200 mg over 30 min
- Fewer reactions
- Large experience in pregnant women
- 1 gm dose
  - $375, 5 visits

Ferrlecit (sodium ferric gluconate)

- Lower dose - 125 mg
- ? Need for test dose
- ? Increase minor reactions
- Not given to pregnant wone
- 1 gm dose
  - $268, 8-9 visits

WHAT DID THE PATIENTS SAY

PATIENT SATISFACTION SURVEY

Validated survey of ambulatory care patient experience was modified to reflect the nature of the RRAC clinic

- 23% had worsening symptoms while waiting for RRAC appointment
  - 13/84 sought further help from primary care MD or ED
- Only 84% of patients reported that RRAC doctor knew the important information about their medical history.
- > 90% felt information about their problem and treatment were clearly explained.
- 100% felt appointment was useful or somewhat useful in helping with health problems.
- 27% felt that time between identification of health problem and clinic visit was too long
- 91% oif patients rated experience with RRAC as 8 or higher on scale of 0-10 where 10 is the best experience possible

FOLLOW-UP IN RRAC

- 78% patients required at least 1 follow-up up in RRAC.
  - Assess response to iron therapy.
  - Follow-up on additional investigations / consults

IRON DEFICIENCY ANEMIA IN THE EMERGENCY DEPARTMENT

- 3 month retrospective study at Sunnybrook
  - 14,394 patients
  - 49 patients with Iron Deficiency Anemia
- 27 patients with IDA treated and discharged
  - 17 (63%) referred by primary care physician

Transfusions

  - 8 (30%) transfused
  - 1 treated with IV iron
  - 6 prescribed oral iron

Diagnose IDA:
Hb < 130 in men or
Hb < 120 in women
AND one of:
1) ferritin < 30 ug/L
2) MCV < 75 fL when previously normal

Table 3. Proportion of patients transfused in the ED distributed by hemoglobin levels

	Total		Admitted		Discharged	
Hemoglobin (g/L)	(n)	n (%) Transfused	(n)	n (%) Transfused	(n)	n (%) Transfused
<50	2	2 (100)	2	2 (100)	0	0
50-59	6	4 (67)	4	2 (50)	2	2 (100)
60-69	12	9 (75)	5	5 (100)	7	4 (57)
70-79	8	2 (25)	4	1 (25)	4	1 (25)
≥80	21	2 (10)	7	1 (14)	14	1 (7)

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Spradbrow et al. CJEM 2017: 19: 167

RAPID REFERRAL CLINIC

NEXT STEPS

1. Assess the effect of RRAC on transfusions in ED
   - Focus on patients discharged home form ED
2. Further reduce time between referral and clinic visit
   - Embed program into regular hematology clinics
3. Expand program to primary care MDs outside of ED
4. Reduce wait times for IV iron as outpatient
5. Expand program to surgical and medical specialists

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