LAB TEST:

ERYTHROCYTE SEDIMENTATION RATE (ESR)

Test Description		
Test Name	Erythrocyte Sedimentation Rate (ESR)	
Rationale for Reducing Overuse	ESR is a non-specific inflammatory marker influenced by various factors including but not limited to anemia, pregnancy, and smoking.[1] In the first 24 hours of a disease process, the CRP will be elevated, while the ESR may be normal. If the source of inflammation is removed, CRP will normalize within a day or so, while ESR will remain elevated for days.[1-2] Only CRP should be used as a measure of systemic inflammation.[1-3] Use of ESR as a screening test to identify patients with serious disease or determine patient wellness is not supported by literature.[1-2, 5] Furthermore, recent studies show that where ESR and CRP are discordant, at least 92% were due to falsely positive ESRs.[5] ESR is often performed as a manual test in office and is vulnerable to technical errors e.g., tube tilting may artificially lower ESR.[1]	
Scope of the Issue		
☒ Inpatient Setting	☒ Outpatient Setting	☒ Emergency Department
Additional Details	Internal Medicine Surgery Family Medicine	
Recommendations		
Summary of Recommendations • Canadian recommendations • International recommendations	**Canadian Association of Medical Biochemists** Don't order an ESR to screen asymptomatic patients or as a general test to look for inflammation in patients with undiagnosed conditions[5]	
Additional Information	No negative impacts of reducing inappropriate ESR testing were shown in numerous studies[6-7]	
Summary of existing metrics/indicators for appropriate use (further details below) (e.g., PT/PTT, % time test conducted, if applicable)	Canadian initiatives have shown reductions in ESR test orders of 40-80%, as listed in the studies below	

Success Stories		
Highlights	**Summary of Implementation Strategy**	**Barriers to Change and Facilitators of Success**
London Health Sciences Centre, London, Ontario: decreased ESR ordering by 40%, and $11k per year of cost saving.[6]	• At a tertiary care hospital • Developed appropriateness criteria for ESR based on literature and potential for patient impact • PDSA1: Education bulletin, sent via email advising that CRP is preferable to ESR and that these tests are rarely needed together • PDSA2: Clinical decision support, where a forcing function was included so that ESR could not be entered without the clinician selecting the appropriate indication. (Figure 1) Educational posters were also disseminated. • PDSA3: Testing and Implementation, physician feedback was gathered to refine the clinical decision tool e.g., including ESR requirement for research	**Identified Barriers:** 1. Provider habit is a significant contributor to inappropriate ordering **Facilitators of Success:** 1. Stakeholder engagement prior to intervention and having decision leaders in each department to champion this cause 2. Post-implementation flexibility to deal with unexpected challenges 3. Computer decision support can be very effective when combined with forcing functions 4. Combining educational and systems-based interventions
North West Territories (NWT), Lab Information System, reduced redundant ESR and CRP orders by 80%.[7]	• Across 4 lab sites • A "hard-coded" intervention, blocking redundant ESR and CRP testing unless there was an appropriate exception implemented. • In situations where both ESR and CRP were performed only CRP was completed. ESR could still be ordered but must be done separately from CRP	**Identified Barriers:** 1. NWTs have 4 labs, each offering analysis of different tests, if a test is not locally available, duplicate/unnecessary testing on separate order forms 2. Outdated nursing clinical guidelines **Facilitators of Success:** 1. Robust communication when informing staff of changes increased intervention support and resulted in useful feedback
Sunnybrook Health Sciences Centre, Toronto, Ontario: reduced the ratio of ESR/CRP by 50% from 62% to 45%.[7]	• At a tertiary care hospital • Provided education on appropriate ESR test indications to healthcare professionals • Audited and provided feedback to the top ESR ordering clinicians, and provided targeted quarterly feedback on their use • Removed ESR from order sets and outpatient requisitions	**Identified Barriers:** Not described. **Facilitators of Success:** Not described.

Tips on Implementation	
Feasible tips or suggestions for [initiating] implementation (Per recommendation type, e.g., uncoupling, test reduction, etc.) - Most common effective strategy	• Forced function (e.g., removing ESR from order sets and out-patient requisitions) coupled with clinical decision support tool where orders for ESR required valid reasoning • Education of medical staff • Gathering stakeholder feedback
Choosing Wisely Canada Applicable Toolkits	N/A
Figures:	Figure 1

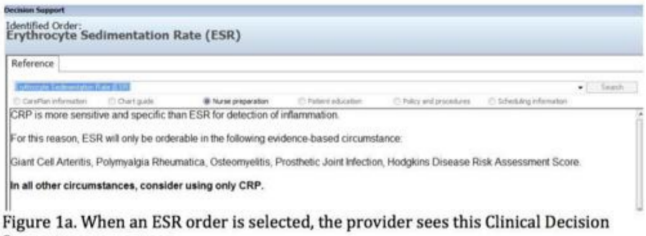

Figure 1a. When an ESR order is selected, the provider sees this Clinical Decision Support pop-up screen.

Figure 1b. Providers must choose one of the five evidence-based indications in order to complete the ESR order.

References:

1. Brigden, ML,. 1999. Clinical utility of the erythrocyte sedimentation rate. ***American Family Physician.*** 1999 Oct 1;60(5):1443-50. Accessed from: https://pubmed.ncbi.nlm.nih.gov/10524488/
2. Harrison, M., 2015. Abnormal laboratory results: Erythrocyte sedimentation rate and C-reactive protein. ***Australian Prescriber***, 38(3), pp.93-94. Accessed from: https://pubmed-ncbi-nlm-nih-gov.myaccess.library.utoronto.ca/26648629/
3. Assasi N., Blackhouse G., Campbell K., Hopkins RB., Levine M., Richter T., and Budden A., 2015. Comparative Value of Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP) Testing in Combination Versus Individually for the Diagnosis of Undifferentiated Patients with Suspected Inflammatory Disease or Serious Infection: A Systematic Review and Economic Analysis. ***Canadian Agency for Drugs and Technologies in Health***, (CADTH no.140). Accessed from: https://www.cadth.ca/sites/default/files/pdf/HT0006-OP0516_ESRandCRP_e.pdf
4. Canadian Society of Endocrinology and Metabolism, 2020. Five Things Patients and Physicians Should Question. ***Choosing Wisely Canada***. Accessed from: https://choosingwiselycanada.org/endocrinology-and-metabolism/
5. Colombet, I., Pouchot, J., Kronz, V., Hanras, X., Capron, L., Durieux, P. and Wyplosz, B., 2010. Agreement between Erythrocyte Sedimentation Rate and C-Reactive Protein in Hospital Practice. ***The American Journal of Medicine***, 123(9), pp.863.e7-863.e13. Accessed from: https://pubmed-ncbi-nlm-nih-gov.myaccess.library.utoronto.ca/20800157/
6. Gottheil, S., Khemani, E., Copley, K., Keeney, M., Kinney, J., Chin-Yee, I. and Gob, A., 2016. Reducing inappropriate ESR testing with computerized clinical decision support. ***BMJ Quality Improvement Reports***, 5(1), pp.u211376.w4582. Accessed from: https://bmjopenquality-bmj-com.myaccess.library.utoronto.ca/content/5/1/u211376.w4582
7. National Meeting of Choosing Wisely Canada, 2019. Taking Action Abstract Book. ***Choosing Wisely Canada***. Accessed from: https://choosingwiselycanada.org/wp-content/uploads/2019/05/Abstract-Book-1.pdf