



Community Physicians

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Last N/A

Approved

Effective Upon Approval

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Next Review 2 years after approval

Owner Karen Wagner:  
Chemistry Tech  
Specialist

Area Chemistry

Applicability Community  
Physician

## Pseudohyperkalemia

### PURPOSE

Beyond hemolysis, leukocytosis or elevated white blood cells, can be a possible cause of pseudohyperkalemia. Significant leukocytosis is seen in numerous disease states such as chronic lymphocytic leukemia (CLL). It is thought that WBC production in the setting of CLL may contribute to increased cellular fragility that is more prone to mechanical stress. This hypothesis is difficult to evaluate and attempts to quantitatively correlate WBC elevation with pseudohyperkalemia suggest the effect is multifactorial. Analysis of potassium results collected in a gold top/SST can be a viable confirmation of the true potassium value if pseudohyperkalemia is suspected.Δ

### SCOPE

CP Labs (Moorland Reserve, Drexel Town Square, Town Hall, West Bend Health Center, North Hills) performing hematology on the Beckman Coulter and chemistry on the Roche analyzers in CP using lithium heparin plasma samples.

### POLICY

- A. The Beckman Coulter will flag all WBC results that are  $>50 \times 10^3/uL$  with the following statement:
  - 1. "WBC >50 can falsely elevate K results, stop AV on Chem orders"
- B. When this alert appears on the Coulter:
  - 1. The **Hematology tech** will check if a potassium is ordered (check for potassium test

within an electrolyte panel, renal panel, BMP, or CMP). After the  $>50 \times 10^3/\mu\text{L}$  WBC count is final verified, a hold on chemistry AV, and a comment will populate on the potassium result automatically in Beaker. Neither of these will occur if the WBC count is not final verified.

- a. If **WBC result is not going to be final verified immediately after specimen analysis**, the Hematology tech must manually place an AV hold on the Chemistry sample to ensure the .PSEUDOK comment is added prior to final verification of the potassium. To Prevent Autoverification (see WBC $>50$  PseudoK attachment for detailed instructions.) The .PSUEDOK comment on the potassium states, *"This patient's plasma potassium result may be erroneously high due to an elevated white blood cell count. Please collect a serum separator tube (gold top), or lithium heparin syringe for a whole blood sample, for future potassium orders."* Refer to the attachment, "Pseudohyperkalemia Flag Tech Instructions".
2. The **Hematology tech** will add an **FYI flag** to the patient record in Epic regarding future chemistry draws that may have a potassium. The FYI flag will change the chemistry tube type from a PST (mint) to an SST (gold) automatically on future draws.
  - a. *FYI Flag: "Pseudohyperkalemia-Collect SST (gold top) for potassium testing due to WBC  $>50 \times 10^3/\mu\text{L}$ "*
3. The **.PSEUDOK** comment will be automatically added onto to the potassium result (regardless of value) in Beaker following final verification of the WBC  $>50 \times 10^3/\mu\text{L}$ . This is why the AV hold is placed on the current chemistry sample once a  $>50 \times 10^3/\mu\text{L}$  WBC count is identified.
  - a. *.PSEUDOK comment: "This patient's plasma potassium result may be erroneously high due to an elevated white blood cell count. Please collect a serum separator tube (gold top), or lithium heparin syringe for a whole blood sample, for future potassium orders."*
4. Future chemistry orders (that contain a potassium test) will have a "Special Instructions" section on the collection label so the phlebotomist is alerted that the chemistry sample will need to be collected in an SST/gold top tube due to WBC count being  $>50 \times 10^3/\mu\text{L}$ .

C. Instructions when the WBC count is  $<50 \times 10^3/\mu\text{L}$ :

1. If there is an FYI flag on the patient, and current WBC result is  $<50 \times 10^3/\mu\text{L}$ , this will trigger an automatic hold for chemistry and will instruct techs to remove Patient flag as it's no longer needed. SST (yellow top) will revert back to a PST (mint top).
  - a. The Chemistry tech will remove the FYI Flag from the patient for future draws as they will see the red banner: *"WBC now  $<50$ . Remove Pseudohyperkalemia flag on patient."* Chemistry results will not AV.
  - b. Once FYI flag is removed from the patient, future chemistry draws will revert back to PST (mint-top) automatically.

## REFERENCES

- A. "What Is Pseudohyperkalemia and What Should Labs Do About It?", **Author:** Steven Cotten // **Date:** OCT.23.2019 // **Source:** Scientific Shorts

## Attachments

[Pseudohyperkalemia Flag Tech Instructions.docx](#)

[WBC>50 PseudoK: AV Hold for Chem](#)

## Approval Signatures

Step Description	Approver	Date
Medical Directors	Steven Kroft: Medical Director	Pending
Medical Directors	Nathan Ledebor: Associate FH System Medical Lab Director	08/2024
Medical Directors	Patrick Gardner: Medical Director	08/2024
Medical Directors	Robert Nerenz: Co-Director of Clinical Chemistry	08/2024
CP Managers and Director	Tina Bogner: CP Director	08/2024
CP Managers and Director	Karen Kundinger: Lab Manager	07/2024
CP Managers and Director	Emery Smith: Lab Manager	07/2024
CP Managers and Director	Mary M Cypert: Lab Manager	07/2024
Technical Specialist	Karen Wagner: Chemistry Tech Specialist	07/2024
Policy Owner	Karen Wagner: Chemistry Tech Specialist	07/2024

## Applicability

Community Physician

# Standards

No standards are associated with this document

COPY

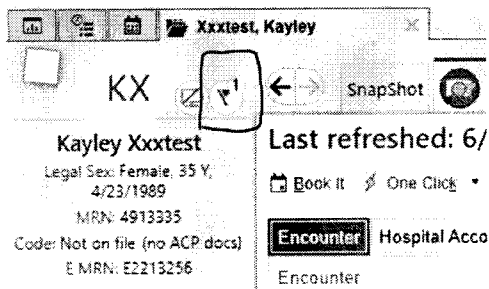
## Pseudohyperkalemia Flag

Steps included in this process are below:

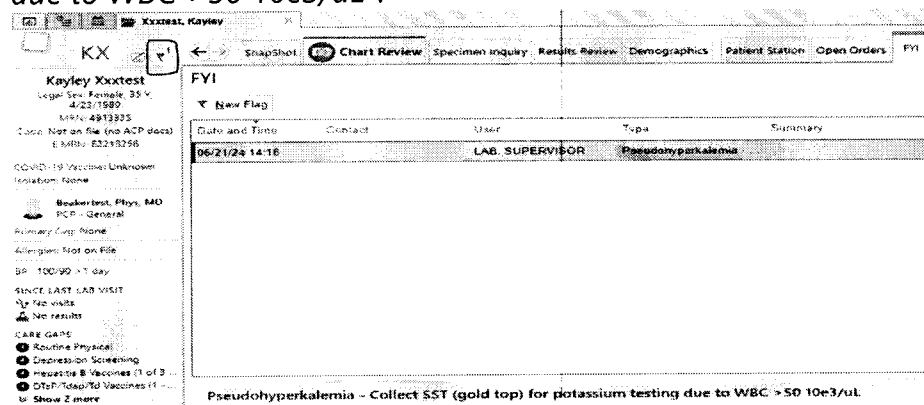
Here's how the Pseudohyperkalemia flag/comment/hold works:

Patients not identified as having a previous >50,000 WBC count. Heme/Chem drawn:

- Hematology sample is processed, and **if the WBC count is >50,000**, the Beckman Coulter will flag WBC results that are >50,000 with the following statement: **"WBC >50 can falsely elevate K results, stop AV on Chem orders"**
- The **heme tech** will add an FYI Flag to the patient for future draws:



- **FYI Flag:** "Pseudohyperkalemia-Collect SST (gold top) for potassium testing due to WBC >50 10e3/uL":



- **Chemistry:** Due to the >50 WBC count, Beaker will automatically place an AV hold on the chemistry sample if a potassium (BMP, CMP, Renal and Lytes) is ordered. A comment is added to the potassium result: **"This patient's plasma potassium result may be erroneously high due to an elevated white blood cell count. Please collect a serum separator tube (gold top), or lithium heparin syringe for a whole blood sample, for future potassium orders."**

- **Due to FYI flag**, future chemistry draws that contain a potassium will be changed from a green top tube to a gold top tube (the FYI flag drives the tube type):

**Requisition Entry**

Submitter [1] Requisition Number Patient MRN 4913335 Auth. & Ord. Provider [2] Split Provider Address

Affiliated Clinical Services RQ20585 XXXTEST.KAYLEY GARDNER, PATRICK M

Demographics Edit Bill To [4] Client Bill Patient Bill Additional Information [5]

SSN Legal Sex Address  
 xxx-xx-2313 Female 123 test CHOCTAW OK 73020  
 DOB Alias  
 4/23/1989

PATIENT COMMUNICATION NUMB...  
 Home P...  
 Work P...

Orders and Diagnoses [5] Show: Specimen Info Billing Info Expand order-level diagnoses

Z69.00 - Encounter for general adult medi... X

Procedure	Specimen	Status	Specimen Type	Priority	Specimen Source	Dx	Q	C	B	H	L
1 COMPLETE BLOOD COUNT [LAB2001]	24MR-170HE0001	Ordered	Blood	Routine	Blood Venous						
2 Basic Metabolic Panel [LAB5016]	24MR-170CH0001	Ordered	Blood	Routine	Blood Venous						

Specimen Container Coll Date Coll Time Collector External ID Draw Type A/C

24MR-170HE0001	Lavender top tube (EDTA)	6/18/2024	0812	WAGNER, KAREN		
24MR-170CH0001	Serum Separator Tube (SST)	6/18/2024	0812	WAGNER, KAREN		

- **WBC result (>50,000) and tube type collected for potassium** (or any panel that contains potassium) controls if the [PSEUDOK] comment drops. If a PST (mint tube) is collected, the comment will fire automatically on final verification.
  - [PSEUDOK] comment states: "This patient's plasma potassium result may be erroneously high due to an elevated white blood cell count. Please collect a Serum Separator Tube (gold top), or lithium heparin syringe for a whole blood sample, for future potassium orders."

Xxxtest, Kayley  
 MRN 4913335  
 F, 35 years, 4/23/1989

24TH-173CH0004  
 Blood, Blood Venous

Collected 06/21/2024 1413  
 Received 06/21/2024 1413

Instrument ID 10122924  
 Requisition RQ20639  
 Submitter Affiliated Clinical Se...

**Electrolytes** Routine  
 Instrument ID: 10122924

Chart	Component	Value	Ref Range & Units
<input checked="" type="checkbox"/>	Sodium	140	136-145 mmol/L
<input checked="" type="checkbox"/>	Potassium	5.2	3.4-5.1 mmol/L
<input checked="" type="checkbox"/>	Chloride	100	98-107 mmol/L
<input checked="" type="checkbox"/>	CO2, Total	26	22-28 mmol/L
<input checked="" type="checkbox"/>	Anion Gap	14	7-15 mmol/L

This patient's plasma potassium result may be erroneously high due to an elevated white blood cell count. Please collect a Serum Separator Tube (gold top), or lithium heparin syringe for a whole blood sample, for future potassium orders

Resulting Lab: TOWN HALL HEALTH CENTER LAB - CP Test method: TH Roche C501 Status: Resulted

### Future Draw Labels for potassium (or panels with potassium) in an SST:

- While the FYI flag is in place, phlebotomy staff will be asked to collect a gold top/SST for any test/panel containing potassium. The collection labels will have “Special Instructions” for gold top/SST collection.
- If there is an **FYI flag** on the patient, **and current WBC result is <50,000**, this will trigger a hold for chemistry and will instruct techs to remove Patient flag as it's no longer needed. SST (yellow top) will revert back to a PST (mint top).
  - The **Chemistry tech** will remove the FYI Flag from the patient for future draws as they will see the red banner: *“WBC now <50. Remove Pseudohyperkalemia flag on patient.”* Chemistry results will not AV.
  - Once FYI flag is removed from the patient, future chemistry draws will revert back to PST (mint-top) automatically.

Outstanding List - Scanned - 1 out of 1

Views | Comm Log | Pig | Remove group from list | Show this test | Labels | Quality Control

Outstanding Scanned Recent Planned

Xxxtest, Kayley  
 MRN: 4913335  
 F, 35 years, 4/25/1989

24TH-172HE0001  
 Blood: Blood Venous

Collected: 06/20/2024 1613  
 Received: 06/20/2024 1614

Instrument ID: 10122741  
 Requisition: RQ20625  
 Submitted: Affiliated Clinical Se...

P	H	A	R	P	MPI	Name	Test	Received
✓					106387	Xxxtest, Kayley	Complete Bloo	06/20/24

**Complete Blood Count**  
 Instrument ID: 19122741

Component	Value	Ref Range & Units
WBC	46.0	3.5-10.5 x 10 <sup>9</sup> /L
RBC	4.00	3.70-5.20 x 10 <sup>6</sup> /µL
Hemoglobin	12.0	11.0-15.0 g/dL
Hematocrit	36.0	35.0-45.0 %
MCV	90.0	80.0-100.0 fL
MCH	28.0	26.0-34.0 pg
MCHC	33.0	32.0-36.0 g/dL
RDW	12.0	11.4-14.3 %
Platelet Count	169	130-400 x 10 <sup>3</sup> /µL
MPV	10.0	6.5-13.0 fL

Ref: Single | TOWNS HALL HEALTH CENTER LAB - CP | Test method: TH Beckman Coulter DXP 600 | Resulted

Outstanding List - Scanned - 1 out of 1

Views | Comm Log | Pig | Remove group from list | Show this test | Labels | Quality Control

Outstanding Scanned Recent Planned

Xxxtest, Kayley  
 MRN: 4913335  
 F, 35 years, 4/25/1989

24TH-172CH0001  
 Blood: Blood Venous

Collected: 06/20/2024 1613  
 Received: 06/20/2024 1614

Instrument ID: 10122740  
 Requisition: RQ20625  
 Submitted: Affiliated Clinical Se...

P	H	A	R	P	MPI	Name	Test	Received
✓					106387	Xxxtest, Kayley	Electrolytes	06/20/24

**Electrolytes**  
 Instrument ID: 10122740

WBC now <50, remove Pseudohyperkalemia flag on patient

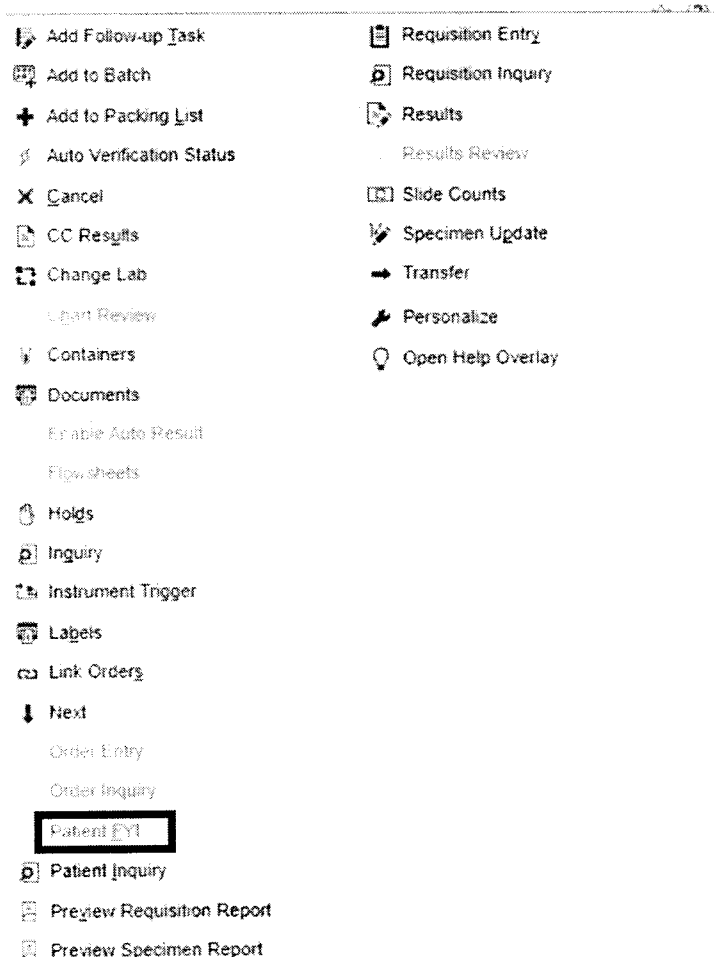
Component	Value	Ref Range & Units
Sodium	140	136-140 mmol/L
Potassium	5.2	3.4-5.1 mmol/L
Chloride	100	98-107 mmol/L
CO2, Total	23	22-28 mmol/L
Anion Gap	15	7-15 mmol/L

Ref: Single | TOWNS HALL HEALTH CENTER LAB - CP | Test method: TH Roche C501 | Resulted

## HEMATOLOGY

When WBC>50 result is present, Hematology analyzer sends message to **Stop AV on Chem orders**.

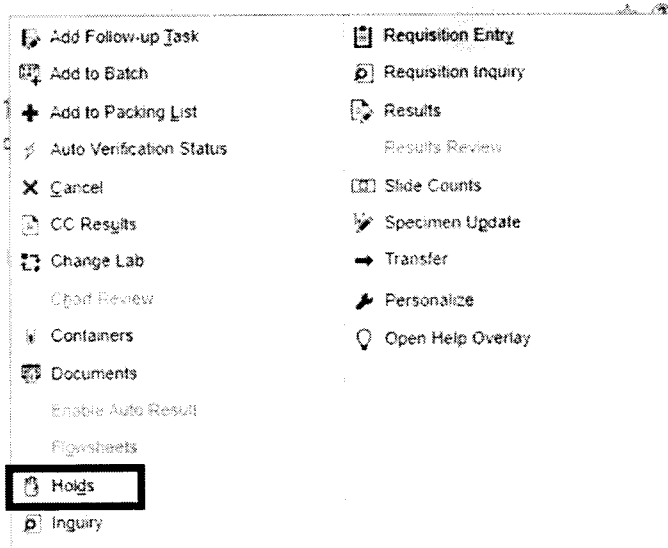
From the Outstanding List with specimen containing >50 WBC result selected, go to the More button, and select Patient Inquiry.



**Check for chemistry orders on same draw as Hematology order with >50 WBC. This includes Potassium by itself, Basic Metabolic Panel, Comprehensive Metabolic Panel, Electrolytes, Renal Panel.**

Click on the specimen ID number for the Chemistry order to go to specimen inquiry. Go to the More button, and select HOLDS.

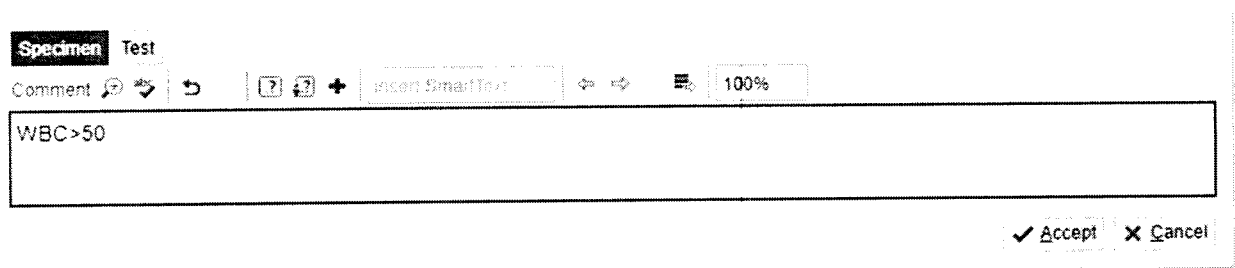




Add Hold: Select Prevent Autoverification.

Title	Number
Dilution needed	3
Hemolyzed	11
Incorrect specimen label	4
MDRO identified	40
Non-standard collection container	2
<b>Prevent Autoverification</b>	48
Specimen damaged	12
User FYI	13
Warning	10

Add comment "WBC>50". Click Accept and Close.



X Close

## CHEMISTRY

Alert flag on H column of outstanding list alerts user to Flags, Holds, & FYIs on the sample:

✓	⚠		106303	Xxctest, Wbcps...	Basic Metaboli.	06/07 11...	24MR-159C...
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Prevent Autoverification Hold and comment appear in Snapshot under Flags, Holds & FYIs.

**Xxctest,Wbcpsseudok**  
F, 74 years

**24MR-159CH0001**  
Blood, Blood Venous

Collected  
06/07/2024 1126

Received  
06/07/2024 1126

Instrument ID  
10120029

Requisition  
RQ20425

Submitter  
BKR MRHC Pr...

**Basic Metabolic Panel** Routine On Test

Blood Urea Nitrogen	mg/dL	6-23	N
Sodium	mmol/L	136-145	N
Potassium	mmol/L	3.4-5.1	N
Chloride	mmol/L	98-107	N

**Flags, Holds, & FYIs**

⚠ Prevent Autoverification on Specimen  
WBC > 50

It will also appear as an alert when trying to verify results.

**BKRAPPTEST, CPMaleOne**  
MRN 4867701  
M, 50 years, 4/24/1974

**24DX-159CH0001**  
Blood, Blood Venous, Venipun...

Collected  
06/07/2024 1013

Received  
06/07/2024 1013

Instrument ID  
10119996

**Basic Metabolic Panel** Routine

Instrument ID: 10119996

⚠ Prevent Autoverification  
WBC > 50

Acknowledged

Chart Component	Value	Ref Range & Units
<input checked="" type="checkbox"/> Blood Urea Nitrogen	8	6-23 mg/dL
<input checked="" type="checkbox"/> Sodium	140	136-145 mmol/L
<input checked="" type="checkbox"/> Potassium	5.6 <sup>▲</sup>	3.4-5.1 mmol/L
This patient's plasma potassium result may be erroneously high due to an elevated white blood cell count. Please collect a Serum Separator Tube (gold top), or a whole blood sample, for future potassium orders.		
<input checked="" type="checkbox"/> Chloride	100	98-107 mmol/L
<input checked="" type="checkbox"/> CO2, Total	23	22-29 mmol/L
<input checked="" type="checkbox"/> Anion Gap	17 <sup>▲</sup>	7-15 mmol/L
<input checked="" type="checkbox"/> Glucose	80	70-180 mg/dL
<input checked="" type="checkbox"/> Creatinine	0.80	0.70-1.30 mg/dL
<input checked="" type="checkbox"/> eGFR (CKD-EPI 2021)	108	>=60 mL/min/1.73 m <sup>2</sup>
<input checked="" type="checkbox"/> Calcium	10.0	8.6-10.2 mg/dL

Resulting Lab: DREXEL TOWN CENTER LAB - CP Test method: DX Roche Cobas 6000 Status: Resulted

Add “.psuedok” comment to the Potassium result. The comment is added regardless of result value.

Acknowledge the AV Hold and Final Verify results.