

UNIVERSITY OF MICHIGAN HOSPITALS  
BLOOD BANK & TRANSFUSION SERVICE

**ENTERING PROFESSIONAL BILLING RESULTS**

Effective 8/15/01

C980-1

Revised 9/7/01, 7/19/04, 10/4/01, 10/30/0, 11/23/05

**Job Aid**

**To result:** PRE, enter accession #, TXRX CONS, Numlock P, type in code, edit text, Numlock F.

**Result Codes - TXRX CONS**

<b>Result Code</b>	<b>Reaction Type</b>
<b>Bacterial</b>	
RXBACTERIAL	Bacterial contamination of a blood component
<b>Urticarial:</b>	
RXURITC	Allergic Transfusion Reaction
<b>Febrile:</b>	
RXFNHTR	Febrile Nonhemolytic Transfusion Reaction
<b>Hemolytic:</b>	
RXHEMOLI	Acute, Immune Hemolytic Transfusion Reaction
RXDELHEM	Delayed Hemolytic Transfusion Reaction
RXANIH	Acute Nonimmune Hemolytic Transfusion Reaction
<b>Other:</b>	
RXTRALI	Transfusion Related Acute Lung Injury (TRALI)
RXHYP0	Hypotensive reaction.
RXVOL	Volume Overload
RXNOTRX	<b>Not a transfusion reaction:</b>
<b>Signatures:</b>	
RXRDD	Robertson Davenport Signature
RXLC	Laura Cooling Signature

**Result Codes - COMP CONS**

PLTCONS	Platelet Refractoriness
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Do NOT use the following outdated codes:

RXFEB  
RXFEBRIL  
RXHEMOL  
RXANA

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**Detailed Procedures**

**Purpose** Define the process for reporting professional patient care activities and billing.

**Applies to** **TXRX CONS** Consultation report and billing for transfusion reaction investigation

**BBANK CONS** Consultation report and billing for antibody related problems.

**COMP CONS** Consultation report and billing for services related to recommending component therapy.

**Background** Testing is profiled as a general laboratory test to accommodate electronic signatures.

**House Officer Entering Results Using PRE**

1. At the prompt, enter <b>PRE</b>
2. Press <b>RETURN</b> .
3. Enter the accession number for the specimen.
4. Enter the test code ( <b>TXRX CONS, COMP CONS, or BBANK CONS</b> )
5. The cursor will stop on the word <b>NO</b> .
6. Type <b>YES</b>
7. Press <b>RETURN</b> to open the window.
8. Enter a freetext comment or a phrase. To enter a phrase press <b>NUM LOCK</b> and then <b>P</b> . To obtain a list of phrases Press down the <b>Shift</b> key and then <b>F5</b> key together. Enter the first letter of the phrase if known, otherwise press <b>RETURN</b> . Select the line number of the desired phrase. To correct the phrase or free text, backspace to erase.
9. Enter <b>Y</b> to continue the verification step
10. To verify results, enter <b>00</b> and <b>RETURN</b> in the verify section. In the performed section enter <b>01 and 01</b> and <b>RETURN</b> through the tech identification field.
11. Continue Pressing <b>RETURN</b> to <b>PERFORM</b> the results.

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**Pathologist (Attending) Entering Initial Results and Verifying Using CIE**

1. At the prompt, enter <b>CIE</b>
2. Press <b>RETURN</b> .
3. Enter the accession number for the specimen.
4. Enter the test code ( <b>TXRX CONS, COMP CONS, or BBANK CONS</b> )
5. The cursor will stop on the word <b>YES</b> .
7. Press <b>RETURN</b> to open the window.
6. Enter a freetext comment or a phrase. To enter a phrase press <b>NUM LOCK</b> and then <b>P</b> . To obtain a list of phrases Press down the Shift key and then F5 key together. Enter the first letter of the phrase if known, otherwise press <b>RETURN</b> . Select the line number of the desired phrase. To correct the phrase or free text, backspace to erase.
7. Press <b>Num lock and F</b> to file the text.
8. To verify results, enter verify <b>01</b> through <b>01</b>
9. Enter <b>Y</b> to continue the verification step.
10. Continue Pressing <b>RETURN</b> to verify the results.

**Pathologist (Attending) Verifying Performed Results Using CIE**

1. At the prompt, enter <b>CIE</b>
2. Press <b>RETURN</b> .
3. Enter the accession number for the specimen.
4. Enter the test code ( <b>TXRX CONS, COMP CONS, or BBANK CONS</b> )
5. The cursor will stop on "Results Correct".
6. Change the Y to N and press RETURN.
7. Select the line to view existing comments type in the line number ( i.e. <b>01</b> )
7. Press <b>RETURN</b> to open the window.
6. To correct the phrase or free text, backspace to erase. Enter a freetext comments or a phrase To enter a phrase Press <b>NUM LOCK</b> and then <b>P</b> . To obtain a list of phrases Press down the Shift key and then F5 key together. Enter the first letter of the phrase if known, otherwise press <b>RETURN</b> . Select the line number of the desired phrase. Add electronic signature.
7. Press <b>Num lock and F</b> to file the text.
8. To verify results, enter verify <b>01</b> through <b>01</b>
9. Enter <b>Y</b> to continue the verification step.
10. Continue Pressing RETURN to verify the results.

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**To correct Results previously entered**

These instructions are valid for test results that are in the patient's current admission.

1. At the prompt, enter ECR
2. Press RETURN.
3. Enter the accession number for the specimen.
4. Enter the test code (TXRX CONS, COMP CONS, or BBANK, CONS)
5. The cursor will stop on the word NO.
6. Type in YES to open the window.
7. To correct the phrase or free text, backspace to erase end edit as needed. Add electronic signature if needed.
8. When the editing is complete, press NUM LOCK and P to file the report
9. Continue pressing RETURN to verify the results.

**To view outstanding tests**

1. Enter the WCP
2. Enter 430 for workstation and press REUTRN
3. Enter 430 for test site. Press RETURN.
4. Press RETURN through PROC and the outstanding tests will be displayed.
5. Press F7 to print the screen to printer P201 (RL) or P200 (front of lab)

**To view Results**

**Once Verified**, test results may be viewed in Care Web. However, there will be a delay as the results pass through the hub and into the data repository.

**To View Results Using RIA**

1. Enter RIA and press RETURN
2. Enter the accession number (i.e. 01-123-1111) and press RETURN.
3. Select the line to be viewed (i.e. 01) and press RETURN.
4. Use the Page Up and Page down keys to move through the display.
5. Press the * key on the number key pad to exit the program.

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Instructions for use of the templates: Information **highlighted in yellow** are instructions and are not a part of the template. The words with a **grey background** should be replaced with specific patient information.

**Code: RFXNHTR**

**History and Laboratory Findings:** **(Brief patient's pertinent Medical History and reasons for current admission).** On **(date)**, the patient was transfused with **component**.

The patient **was/was not** premedicated with **(medications)** prior to transfusion. After transfusion, the patient became febrile **with/without** chills, rigors, dyspnea, hypotension, tachycardia. The patient's vital signs pre-transfusion were **BP=, P=, T=, RR=**. Post-transfusion vital signs were **BP=, P=, T=, RR=**. **Include any other pertinent physical exam or laboratory studies. Was the patient treated with clinical resolution).**

**Laboratory evaluation:** Transfused **component** were prestorage leukoreduced and ABO compatible with the patient. There were no clerical errors. The ABO type of the patient was reconfirmed. A post-transfusion direct Coombs and visual check for hemolysis were **negative/positive**. The patient had an appropriate rise in **hemoglobin** following transfusion. **(If available, note the pre and post-Hgb or platelet count (PLT)).**

**Impression: FEBRILE NONHEMOLYTIC TRANSFUSION REACTION**

The patient's symptoms are most consistent with a febrile nonhemolytic transfusion reaction (FNHTR). FNHTR are most commonly the result of passive transfusion of inflammatory mediators, which accumulate during blood storage. FNHTR may also be immune-mediated due to either anti-leukocyte or anti-platelet alloantibodies present in either patient or donor plasma. For future transfusion, premedication with an antipyretic (Tylenol) is recommended.

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**Code: RXURITC**

**History and Laboratory Findings:** (Brief patient's pertinent Medical History and

reasons for current admission). On (date), the patient was transfused with (component).

The patient (was/was not) premedicated with (medications) prior to transfusion. After

transfusion, the patient complained of (symptoms). The patient's vital signs pre-

transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=,

RR=. Include any other pertinent clinical and laboratory findings such as rales, )2

saturation, etc. How was the patient treated?).

**Laboratory evaluation:** Transfused (component) was ABO compatible with the patient.

There were no clerical errors. The ABO type of the patient was reconfirmed.

**Impression: ALLERGIC TRANSFUSION REACTION**

The patient's symptoms are most consistent with an allergic, nonhemolytic transfusion

reaction. Allergic reactions most commonly reflect sensitization to transfused plasma

proteins or soluble substances in plasma. Allergic reactions to platelets have also been

linked to the accumulation of RANTES, a chemokine present in platelet alpha granules.

Anaphylactic reactions can occur in patients with hereditary deficiencies of IgA and

haptoglobin. Premedication with diphenhydramine (Benadryl) is recommended prior to

future transfusion. If the patient continues to have severe allergic reactions despite

appropriate premedication, please contact the blood bank resident.

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**Code: RXHEMOLI**

**History:** (Brief patient's pertinent Medical History and reasons for current admission). On (date), the patient was transfused with (component). The patient (was/was not) pre-medicated with (medications) prior to transfusion. After transfusion, the patient complained of (symptoms). The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR= . The post-transfusion hemoglobin= mg/dL and hematocrit= %. Pertinent laboratory findings included a LDH= IU/L, total bilirubin= mg/dL, indirect bilirubin= mg/dL, haptoglobin= mg/dL, and a serum hemoglobin= mg/dL. (Include results of peripheral smear and urinalysis if available). These results are consistent with hemolysis. (Note whether there is evidence of DIC or renal failure as a result of transfusion rxn).

**Laboratory evaluation:** The patient types as ABO/Rh on pre- and post-transfusion samples. A pre-transfusion antibody screen was negative/positive. (If positive, not the specificity of the antibody). Transfused (component) were ABO/Rh type and ABO compatible with the patient. There were no clerical errors. A post-transfusion visual check for hemolysis was positive. A post-transfusion direct Coombs was positive/negative with polyspecific/IgG/C3 reagents. A post-transfusion antibody screen was negative/positive (note antibody specificity). An eluate of the patient's red cells was positive/negative. Serologic typing of transfused RBC showed they were (antigen type). In a full Coombs crossmatch, transfused RBC were in/compatible with the patient.

**Impression: ACUTE, IMMUNE HEMOLYTIC TRANSFUSION REACTION.**

The patient has evidence of an acute hemolytic transfusion reaction due to (antibody). A urine output of 100cc/hr should be maintained by hydration with normal saline and the use of diuretics, if necessary. If the patient has evidence of bleeding and DIC, please contact Hematology regarding the possible use of heparin in this patient. In some patients, a Nephrology consult may be required for management of electrolytes and fluid balance.

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**CODE: RXANIH**

**History:** (Brief history and reason for admission). On (date), the patient was transfused with (component). The patient (was/was not) pre-medicated with (medications) prior to transfusion. After transfusion, the patient complained of (symptoms). The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR=. The post-transfusion hemoglobin= mg/dL and hematocrit= %. Pertinent laboratory findings included an LDH= IU/dL, total bilirubin= mg/dL, indirect bilirubin= mg/dL, haptoglobin= mg/dL, and serum hemoglobin=. (Include urinalysis if available). These results are consistent with hemolysis.

**Laboratory evaluation:** The patient types as (ABO/Rh) on pre- and post-transfusion samples. Transfused (component) was (ABO/Rh type) and ABO compatible with the patient. There were no clerical errors. A post-transfusion visual check for hemolysis was positive. A pre- and post-transfusion antibody screen were negative/positive. A pre- and post-transfusion direct Coombs was positive/negative with (polyspecific, IgG, C3) reagents. In a full Coombs crossmatch, transfused RBCs were compatible with the patient. An inspection of the IV tubing showed no/hemolysis. A review of the transfusion record shows that transfused RBCs were infused with saline/drug/ via gravity/an infusion pump/blood warmer.

**Impression: ACUTE, NONIMMUNE HEMOLYTIC TRANSFUSION REACTION**

The patient has evidence of a nonimmune acute hemolytic transfusion reaction due to (cause). A urine output of 100cc/hr should be maintained by hydration with normal saline and the use of diuretics, if necessary. If the patient has evidence of bleeding and DIC, please contact Hematology regarding the potential use of heparin in this patient. In some patients, a Nephrology consult may be required for the management of electrolytes and fluid balance.

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**CODE: RXDELHEM**

**History:** On (date), the patient was transfused with RBC for (reason). The patient's past transfusion history is significant for (history). (Note if the patient has a history of antibodies , past surgeries, pregnancies or transfusions).

**Laboratory evaluation:** At this time, the patient has a positive direct Coombs with (polyspecific, IgG, C3) reagents. An antibody screen is (negative/positive) for (antibody). An eluate of the patient's red cells was (positive/negative) for (antibody). Serologic typing of transfused RBC showed they were (antigen type). A current CBC shows a Hgb= mg/dL, Hct= %, RDW=, and reticulocyte count=. Other pertinent laboratory findings include an LDH= IU/L, a total bilirubin=mg/dL with indirect bilirubin= mg/dL, consistent with hemolysis. (Note if peripheral smear was done and whether spherocytes were present).

**Impression: DELAYED HEMOLYTIC TRANSFUSION REACTION.**

The patient has evidence of a delayed hemolytic transfusion reaction due to (antibody). The patient should be watched for a possible decrease in hemoglobin, hematocrit and renal function.

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**Code: RXVOLUME**

**History:** (Brief history and reason for admission). On (date), the patient was transfused with (component). The patient (was/was not) pre-medicated with (medications) prior to transfusion. After transfusion, the patient complained of (symptoms). The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR= with an O2 saturation= %. Physical exam findings were significant for (rales, coughing, increased JVD). A CXR showed (results). (Note risk factors associated with volume overload such as heart disease, renal disease, chronic anemia. Was the patient transfused with other components just before this transfusion?)

**Laboratory Evaluation:** Transfused (component) were prestorage leukoreduced and ABO compatible with the patient. There were no clerical errors. The ABO type of the patient was reconfirmed. A post-transfusion direct Coombs and visual check for hemolysis were negative. The patient's fluid intake/output prior to transfusion were in= cc/out= cc at 8 hrs and in= cc/out= cc at 24 hrs. A post-transfusion BNP was increased (pre-BNP= , post-BNP= ). The patient had an appropriate rise in hemoglobin following transfusion.

**Impression: VOLUME OVERLOAD**

There is no evidence of a transfusion reaction in this patient. The patient's symptoms are most consistent with volume overload. In susceptible patients, decreasing the rate of transfusion (1ml/kg body weight/hr) and decreasing the volume transfused may be necessary. Some patient's may require premedication with a diuretic (Lasix) prior to transfusion.

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**Code: RXTRALI**

**History and Laboratory Findings:** (Brief history and reason for admission.) On (date), the patient was transfused with (component). The patient (was/was not) pre-medicated with (medications) prior to transfusion. After transfusion, the patient complained of (symptoms). The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR= with an O2 saturation= %. A chest XRAY showed (findings). (Note treatment and clinical course. Also note whether patient is in the ICU, is pancytopenic, massively transfused in the past week, on growth factors, has risks for volume overload, or is currently infected – particularly pneumonia.)

**Laboratory evaluation:** Transfused (component) were prestorage leukoreduced and ABO compatible with the patient. There were no clerical errors. The ABO type of the patient was reconfirmed. A post-transfusion direct Coombs and visual check for hemolysis were negative /positive. A post-transfusion CBC showed a WBC= and Platelet=, which was unchanged/decreased compared to pre-transfusion. An HLA-antibody screen of the patient was (positive/negative, PRA=%). A pre- and post-BNP, to evaluate intravascular volume changes, showed (pre=, post=). Serologic testing of the donor(s) is still pending.

**Impression: TRANSFUSION RELATED ACUTE LUNG INJURY (TRALI)**

The patient's symptoms are most consistent with transfusion related acute lung injury (TRALI). TRALI is most commonly associated with passive transfusion of anti-leukocyte antibodies of donor origin which react with white cells in the recipient. TRALI can also occur in a subset of patients with predisposing risk factors, due to passive transfusion of neutrophil priming lipids present in stored blood. Historically, TRALI has been treated with high dose intravenous steroids, although recent studies have questioned their efficacy. During acute TRALI, diuretics are contra-indicated due to decreased intravascular volume. Because TRALI represents an idiosyncratic reaction to a single blood donor, no change in transfusion practice is necessary.

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**CODE: RXNOTRX**

**History and Laboratory Findings:** On (date), the patient was transfused with (component). The patient (was/was not) premedicated with (medications) prior to transfusion. After transfusion, the patient complained of (symptoms). The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR=. (Include any other pertinent history and laboratory findings such as a history of prior fever, positive cultures, CXR or other radiology studies suggesting infection, leukocytosis or neutropenia, etc.)

**Laboratory evaluation:** Transfused (component) were prestorage leukoreduced and ABO compatible with the donor. There were no clerical errors. The ABO type of the patient was reconfirmed. A post-transfusion direct Coombs and visual check for hemolysis were (negative/positive). The patient had an appropriate increase in hemoglobin following transfusion. (Note the pre- and post-HGB or platelet count if platelets were transfused.)

**Impression: NO TRANSFUSION REACTION.**

A review of the patient's history, clinical and laboratory findings do not support a transfusion reaction. The patient's symptoms are most likely due to the patient's underlying medical condition and coincidental to transfusion. No change in current transfusion practice is recommended.

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**CODE: RXHYPO**

**History and Laboratory Findings:** On (date), the patient was transfused with (component). The patient (was/was not) premedicated with (medications) prior to transfusion. After transfusion, the patient developed hypotension. The patient did/did not have fever, rash, dyspnea or oxygen desaturation. The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR= with an O2 saturation=%.

The patient was/was not on an ACE inhibitor. The patient was/was not receiving pressor support. (Note any conditions or medications contributing to vascular instability).

**Laboratory evaluation:** Transfused (component) was ABO compatible with the patient. There were no clerical errors. The ABO type of the patient was reconfirmed. A post-transfusion direct Coombs and visual check for hemolysis were negative.

**Impression: HYPOTENSIVE REACTION**

The patient's symptoms are most consistent with a hypotensive reaction. Hypotensive reactions are defined as a sudden drop in either systolic or diastolic blood pressure (>30 mm Hg) during transfusion, often accompanied by fever, rash, and decreased O2 saturation. Typically, the patient's blood pressure will recover within minutes of discontinuing the transfusion. Patients at risk for hypotensive reactions include those on ACE inhibitors, which block the breakdown of bradykinin.

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**CODE: RXBACTERIAL**

**History:** On (date), the patient was transfused with (component). The patient (was/was not) premedicated with (medications) prior to transfusion. After transfusion, the patient complained of (symptoms). The patient's vital signs pre-transfusion were BP=, P=, T=, RR=. Post-transfusion vital signs were BP=, P=, T=, RR=. Patient currently was/was not receiving antibiotic coverage with (medications).

**Laboratory evaluation:** Transfused (component) were prestorage leukoreduced and ABO compatible with the donor. There were no clerical errors. The patient's ABO type was reconfirmed. A post-transfusion direct Coombs and visual check for hemolysis were (negative/positive). A gram stain and culture of the unit was positive/negative. (If RBC, note the age of the unit and color of the unit. If platelets, age and pH of the unit.) A culture of the patient is positive/negative. The patient's WBC pre- and post-transfusion are (pre-WBC= , post-WBC= ). (Specifically note if there is a rise in WBO or drop in platelets, evidence of DIC, new onset renal failure.)

**Impression: BACTERIAL CONTAMINATION**

The laboratory and clinical findings suggest bacterial contamination due to (organism). The patient is receiving antibiotic coverage with (medications). (Add clinical follow-up as available).

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CODE: **COMP CONS**

**Platelet Transfusion Evaluation**

Code: {**PLTNR** (Not refractory)/**PLTIR** (Immune refractory)/**PLTNIR** (Non-immune refractory)/**PLTMR** (Mixed refractory)}

**History:** {patient name} is a {age} year-old {male/female} with a diagnosis of {diagnosis}. {Other pertinent history includes surgery/transplant/pregnancy /ITP/PTP/autoimmunity/other history}. {He/she} received {treatment history}. Pertinent medication history includes {medications}.

**Clinical findings:** The patient has been recently {febrile Tmax=/afebrile}. Estimated body size is BSA={body surface area}. Splenomegaly is {present/absent}. There {is/is not} {bleeding/ecchymosis/petechiae}. Imaging studies show {CXR/CT/MRI}.

**Laboratory findings:** Blood type is {type} with a {negative/positive} antibody screen. allo BMT: Current typing results are {cells/serum}. Peripheral blood findings are {WBC=/Hb=/ANC=/smear}. There {is/is not} evidence of hemolysis {LDH=/DAT=/UA=/haptoglobin=/bilirubin=}. Coagulation studies show {PT=/aPTT=/D-dimer=/fibrinogen=/other coag}. Renal function tests show {BUN=/Creatinine=}. Immunologic tests show {ANA/cyro/monoclonal}. Microbiologic tests show {cultures/virology/antigen tests}. Platelet crossmatch results are {compatible/incompatible} with {#} of {#}. Platelet antibody tests show {result}. HLA tests show {PRA=/HLA type/antibody ID}.

**Platelet transfusion results:** Transfusions with approximate 1-hour post counts show:

Date	ABO	Comp	Pre	Post	Dose	CCI
xx/xx/xx	X	XX	xx	xx	xExx	xx.x

Estimated platelet survival time is {estimate} {hours/days}.

**Impression:** {No evidence of platelet refractoriness at this time/Immune refractoriness/Non-immune refractoriness/Mixed immune and non-immune refractoriness}

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**Transfusion recommendations:** Transfusion of {component} is recommended for {indications}.

**Comments:** Factors negatively influencing platelet survival include {fever/infection/interventions/medications}. A dose of {number} at {time interval} is recommended because {reason}. {Apheresis/Crossmatched/HLA-matched} platelets {may be/are not likely to be} beneficial because {reason}. Please obtain 1-hour post transfusion platelet counts to monitor therapy.

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_  
Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_  
Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_  
Reviewed by: \_\_\_\_\_ Date: \_\_\_\_\_