

HOW DO I?

# How do I...perform therapeutic phlebotomy?

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**Abstract**

**Background:** Therapeutic phlebotomy (TP) is a well-established medical intervention that evolved from the historical practice of bloodletting.

**Methods:** Patients who require TP are not infrequently told by their health-care providers to “just go donate blood,” but TP should always be offered in the context of a prescribed course of therapy. Providers can prescribe a course of TP for a number of indications, including hereditary hemochromatosis, polycythemia vera, iron overload, and testosterone replacement therapy.

**Results:** A course of prescribed TP specifies that patients can be phlebotomized more frequently than volunteer blood donors and reassures patients that TP is being performed per the orders of their provider. Prescribed TP also facilitates two-way communication between the referring provider and the transfusion medicine (TM) physician overseeing the TP. The College of American Pathologists TM checklist describes several requirements regarding the documentation and performance of TP, and electronic medical record systems can be used to demonstrate compliance with these requirements.

**Conclusions:** TM physicians should discuss the advantages of prescribing TP with providers who mutually care for patients requiring this intervention.

**KEYWORDS**

transfusion service operations, regulatory and QA

## 1 | INTRODUCTION

Therapeutic phlebotomy (TP) is a well-established medical intervention that evolved from the historical practice of bloodletting. Ancient Egyptian papyri indicate that therapeutic ‘bleeding’ by scarification was an accepted procedure during that era. In the millennium that followed, phlebotomy was utilized around the globe for a variety of indications, including everything from headaches to evil spirits.<sup>1</sup> In the most recent century, modern medical knowledge has served to refine the indications for TP to now include hereditary hemochromatosis (HH), polycythemia vera (PV), iron overload, and testosterone replacement therapy, among others.

In this article, we describe our institutional approach to performing TP at our hospital-based blood donor

center, including how we demonstrate compliance with the College of American Pathologists (CAP) checklist requirements regarding the documentation and performance of TP.<sup>2</sup> We hope that the discussion that follows will highlight some of the ethical considerations that transfusion medicine (TM) physicians should consider when evaluating their own institutional policies and procedures regarding TP.

### 1.1 | Initiating TP for patients

Providers requesting TP for a patient must document their intended plan for TP. Per CAP checklist requirements, this includes a provider order that specifies the frequency of TP, volume of blood to be removed with

each TP, and laboratory values to monitor (Table 1). To demonstrate compliance with TRM.42305 and TRM.43210, our institution utilizes the ‘therapy plans’ feature of our electronic medical record system, Epic (Epic Systems Corporation, Verona, WI). Therapy plans are bundles of orders that are used during multiple outpatient encounters. Our TP therapy plan includes orders for preprocedure labs, the TP procedure itself, and postprocedure labs (Figure 1). At our institution, the TP therapy plan was built exclusively for outpatients in the blood donor center. To our knowledge, at our institution, no other service uses this therapy plan, nor would another service have the equipment and supplies required to execute the therapy plan. This ensures uniformity of TP practice across the institution.

Typically, the only preprocedure lab performed is a point-of-care (POC) hemoglobin. Within the TP procedure order, the referring provider must designate the frequency of TP, volume of blood to be removed with each TP, and a minimum hemoglobin below which TP should not be performed. With regard to HH and iron overload patients, no POC testing is available to measure ferritin when these patients present for TP. As such, ferritin is not used by the blood donor center staff to determine if

TP is appropriate on a given day. In contrast, ferritin and other iron studies are routinely measured over a course of TP, and the referring physician will use these values to advise the patient of his or her clinical progress and the need for further TP.

In addition, the referring provider must indicate if the patient has any high-risk conditions, such as ischemic cardiovascular disease, valvular heart disease, or heart failure. Each of these conditions are presented in a list with check boxes, and the referring provider must select the relevant diagnosis/diagnoses or ‘None.’ As discussed above, postprocedure labs can be ordered at the referring physician's discretion and typically include a complete blood count, iron and iron-binding capacity, and ferritin. Other laboratory testing may be added to the TP therapy plan based on the patient's underlying disease.

In our experience, the majority of patients tolerate TP without adverse effect and do not require replacement fluids. Occasionally, the referring provider may request that replacement fluids be provided after TP. In these instances, we strongly encourage the use of oral replacement fluids in lieu of intravenous replacement fluids. As TP is largely an outpatient procedure, outpatients have no challenges consuming oral fluids, and they can follow

	Interval	Duration	Due
<b>Therapeutic Phlebotomy Q 1 MONTH</b> ⌵			
Nursing Orders ⌵			
✓ <b>Nursing communication</b> Order details If patient weighs less than 110 lbs, the amount drawn will be based on patient weight.	Every visit	🕒	Every visit
Pre-Procedure Labs ⌵			
✓ <b>POCT hemoglobin</b> Order details	Every visit	🕒	Every visit
Procedure ⌵			
✓ <b>Therapeutic Phlebotomy</b> Once, Starting when released, Routine Amount: One unit (485 mL) Minimum Hemoglobin: If a higher or lower hemoglobin is acceptable, please specify (g/dL) Other - Specify: minimum hgb 10 gm/dl Indicate if patient has any of the following HIGH RISK conditions: None	Every 30 days		Wed 8/26/2020
Post-Procedure Labs ⌵			
✓ <b>Complete Blood Count (CBC) and Differential</b> Clinic Collect, Blood, Venous, Blood	Every visit	🕒	Every visit
✓ <b>Iron and Iron Binding Capacity</b> Clinic Collect, Blood, Venous, Blood	Every visit	🕒	Every visit
✓ <b>Ferritin</b> Clinic Collect, Blood, Venous, Blood	Every visit	🕒	Every visit
✓ <b>Hepatic Function Panel</b> Clinic Collect, Blood, Venous, Blood	Every visit	🕒	Every visit

**FIGURE 1** Sample completed therapeutic phlebotomy therapy plan in Epic [Color figure can be viewed at wileyonlinelibrary.com]

**TABLE 1** Key College of American Pathologists (CAP) transfusion medicine checklist items related to therapeutic phlebotomy

CAP checklist item	Description	Evidence of compliance
TRM.42285	Therapeutic phlebotomy (TP) units for transfusion: if blood collected by TP is intended for transfusion without specific labeling, the patient/donor meets all criteria for allogeneic donation	Written procedure for using blood collected for TP for allogeneic donation, including inclusion criteria, AND records of patient/donor meeting the criteria
TRM.42290	TP responsibility: if TPs are performed by laboratory staff, the transfusion service medical director or qualified physician designee has accepted medical responsibility for the procedures.	Written policy defining responsibility for TP procedures and patient records/charts showing evidence of transfusion service medical director or qualified physician designee review
TRM.42305	Therapeutic plan: a designated physician has developed a therapeutic plan for patients undergoing TP, and the goals for the TP have been clearly stated.	Patient records indicating plan and timeline
TRM.42310	Physician order: the physician's order for TP includes, at a minimum, the frequency, the volume to be removed, and the laboratory values to be monitored.	Not defined
TRM.42315	Indications for TP review: the indications for TP are reviewed by the physician responsible for performance of TP prior to initiation and not less frequently than every 12 months thereafter.	Records of approval for TP

instructions on adequate fluid repletion. Furthermore, oral replacement fluids allow for a more efficient TP procedure, both from patient and staffing perspectives. Finally, as saline shortages have occurred in recent years, oral fluid replacement is preferred from a resource perspective.

## 1.2 | Role of TM physicians in TP

CAP checklist requirements state that if TP is performed by laboratory personnel, medical oversight is provided by the TM medical director or qualified physician designee. At our institution, TP is performed in the hospital-based blood donor center with medical oversight by the TM service. Informed consent for TP is obtained by the TM resident, fellow, or attending. Informed consent is obtained annually. The TM service also evaluates patients who experience adverse reactions during or after TP. To demonstrate compliance with TRM.42290, our standard operating procedure for TP states that the “Transfusion Medicine physician accepts all responsibility for all TP procedures performed in the Donor Center.”

When patients are referred for TP, CAP checklist requirements specify that the overseeing TM physician reviews the indication for TP prior to the first procedure and at least once every 12 months. While many patients for whom TP is requested have HH or PV, patients with a variety of other diagnoses may be referred as well. When a new patient is scheduled for TP, a TM attending physician reviews the patient's records in Epic. This typically includes reading notes written by the referring provider and reviewing relevant labs. For this reason, all patients undergoing TP must have a referring provider within our health-care system who has access to Epic. To demonstrate compliance with TRM.42315, the TM attending physician writes a brief note in the patient's Epic chart prior to the first TP that states: “I have reviewed the patient's record/chart, and I agree with the initiation of therapeutic phlebotomy.” Every 12 months or upon subsequent presentation for TP following a 12-month period, a TM physician writes another brief note in the patient's Epic chart that states: “I have reviewed the patient's record/chart, and I agree with the therapeutic phlebotomy therapy plan.” Epic ‘smart phrases’ have been created to efficiently populate these messages in the notes.

## 1.3 | Handling ‘emergent’ inpatient TP requests

The majority of patients requiring TP are managed as outpatients. Anecdotally, we have been involved in a

handful of consultations for ‘emergent’ inpatient TP. In one case, a patient with known PV presented to the emergency department (ED) with a headache. A high patient census in the ED necessitated that the patient be roomed in a trauma bay bed. Imaging ruled out an acute cerebrovascular accident (CVA), but the patient’s hemoglobin and hematocrit were noted to be markedly elevated. The ED nursing staff declined to perform TP, citing a lack of ED nursing procedures, and the TM service was consulted for emergent TP. The TM service agreed to perform the emergent TP so as to facilitate patient discharge and improve utilization of the trauma bay.

Another patient admitted with a CVA was newly diagnosed on that admission with PV with a hematocrit of 53.6% (reference range: 42%–52%). Over the first few days of the admission, the patient’s hematocrit was unresponsive to hydration and hydroxyurea. As the patient failed to improve with first-line therapy, the TM service was consulted for inpatient TP with a target hematocrit of less than 45%. Four TPs were performed over 11 inpatient days, bringing the patient’s hematocrit down to 39.6%.

The decision to support TP on an ‘emergent’ inpatient basis should be determined by the TM service. For example, for staffing reasons, our TM service does not routinely perform inpatient TP. Rare requests for ‘emergent’ inpatient TP are vetted by the TM service medical coverage. If inpatient TP is determined to be appropriate, it is generally only performed by the TM service during regular business hours, again primarily due to staffing. If the patient’s clinical team desires that TP be performed more expeditiously, a TM physician will discuss options for how the patient’s clinical team may safely perform TP independent of our service.

## 1.4 | Erythrocytapheresis

Therapeutic erythrocytapheresis (TE) separates patient blood into components, selectively removing red blood cells and returning the rest of the blood components. According to the 2019 American Society for Apheresis guidelines, HH is a category I indication for TE, meaning that this procedure is considered first-line therapy.<sup>3</sup> Their recommendation is supported by three randomized controlled trials, which found that treatment duration and number of procedures to achieve the target ferritin level were significantly lower for patients undergoing TE compared to patients undergoing TP.<sup>4–6</sup> For patients with PV, TE is also considered first-line therapy, while for symptomatic secondary erythrocytosis, the optimal role of TE has not been established.<sup>3</sup> If TE is available, apheresis

practitioners should consider offering TE as an alternative to TP for patients with HH and PV.

One important consideration before initiating TE is the requirement for adequate vascular access. While large bore (16–18 gauge) steel needles are used for both TP and apheresis procedures, the flow rate during TE is quite high at approximately 50–100 ml/min.<sup>7</sup> Single-needle access can be utilized for TE if adapter kits are available; otherwise, two large bore peripheral needles are required for TE. If peripheral access is not a viable option for a patient requiring TE, central venous catheters (CVCs) may be used. However, CVCs confer a risk of infection, along with a host of other complications. In our opinion, in patients for whom peripheral access is not a viable option for TE, TP should be offered instead. We do not endorse CVC placement for TE.

At our institution, TE historically has not been offered even though the TM service runs both the apheresis program and the TP program. As part of the research for this article, we investigated the feasibility of introducing TE. For closer supervision by TM medical coverage and to facilitate apheresis nursing staff in maintaining competency for an infrequently performed procedure, we are planning to offer outpatient TE in our apheresis unit. Moving forward, our service will offer TE for inpatients for whom TP is requested outside of normal business hours.

## 1.5 | Telling patients to “just go donate blood”

Not infrequently, an individual presents to our blood donor center and tells the screener that they “need to give blood” or that “my doctor told me I need to give blood.” It is our policy to defer these individuals from volunteer blood donation because they have revealed that they are not donating altruistically but rather for therapeutic gain. We will always engage in a conversation with the individual, discussing why their provider recommended blood donation; asking if they have a known underlying medical condition that could be treated by TP; and suggesting that, instead, their provider write a prescription for TP.

There are many benefits of prescribing TP rather than simply telling patients to “just go donate blood.” From the patient’s perspective, a prescription recognizes TP as a therapeutic intervention. Prescriptions provide a clear therapy plan for the patient to follow, which we speculate may improve a patient’s compliance. Prescribed TP reassures patients that the procedure is being performed per the orders of their provider. A prescription also allows regular laboratory monitoring of the disease progress to

give feedback to the patient and his or her provider about how TP is benefitting their health.

A prescription for TP is also beneficial from the referring provider's perspective. A prescription provides documentation in the patient's medical record of what the intended plan is, including medical parameters within which TP should be performed. These parameters are often different from those of volunteer blood donation and allow for more personalized intervention for each patient. Providers can also request special accommodations not employed with volunteer blood donation, such as phlebotomizing a smaller volume or providing intravenous replacement fluids. Finally, prescribing TP identifies these individuals as patients, which permits two-way communication between the referring provider and the TM physician overseeing the procedure.

Blood suppliers also benefit from prescribed TP if TP is performed in their donor centers. Blood obtained from prescribed TP in patients with HH who meet all other volunteer blood donor criteria can be used for allogeneic transfusion, as described in the Code of Federal Regulations (CFR) and TRM.42285.<sup>2,8</sup> As of 2016, a variance is no longer required to use blood obtained from TP performed on patients with HH for allogeneic transfusion as long as three criteria are met: the patient meets all volunteer donor criteria, the patient has a prescription for TP, and the patient is not charged for TP. In addition, these patients may donate more frequently than every 56 days, as prescribed by their referring provider. The CFR also permits units obtained from TP to be used for allogeneic transfusion without special labeling if performed on patients with HH or whose "disease or condition will not adversely affect the safety, purity, and potency of the blood and blood components."<sup>8</sup> Finally, prescribed TP allows patients with HH who are ineligible for volunteer blood donation to benefit from TP without compromising the safety of the blood supply. Prescriptions for TP also save donor center staff time as patients prescribed TP by their provider will not need to be not screened as a volunteer blood donor.

## 2 | CONCLUSIONS

We acknowledge the significant heterogeneity across health-care settings in providing TP to patients. This publication serves to highlight our institutional practices and how we navigate providing and documenting TP. More importantly, this publication encourages dialog about how TP is handled across facilities. The heterogeneity of TP is ripe for further exploration and could be a subject of future research.

Regardless of how TP is delivered to patients, TM providers play an important role in TP for patients with a

number of diagnoses. Harnessing the electronic medical record may facilitate compliance with CAP checklist items. Institutions that perform TP should also consider how they can communicate the benefits of prescribed TP as a documented prescription for TP is optimal for the referring provider, the supervising TM physician, and—most importantly—the patient.

## CONFLICT OF INTEREST

The authors have no conflicts of interest.

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