

## Use of Platelets Stored at Refrigerator Temperature (“Cold-Stored Platelets”)

“Cold-stored platelets” are an additional product being produced by Carter BloodCare under an FDA variance for use in bleeding patients. The FDA variance specifically allows us “to store apheresis platelets at 1-6°C for up to 14 days without agitation. The cold-stored platelet products will be used to treat actively bleeding patients when conventional platelet products are not available, or their use is not practical.”

Data shows that cold-stored platelets have benefits beyond the logistical ones of longer storage time and no need for agitation in the blood bank. While cold storage preserves platelet metabolic function and prevents bacterial growth, cold-induced platelet activation can, in fact, contribute to an increased hemostatic potential in bleeding patients.<sup>1</sup> Early data showed that cold-stored platelets actually improved bleeding times better than room temperature-stored platelets.<sup>2</sup> This phenomenon of platelet activation (and subsequent clearance) after refrigeration is actually one of the main reasons why platelets have been, historically, stored at room temperature. Other early studies showed that cold-stored platelets have decreased post-transfusion *in vivo* lifespan compared to room temperature-stored platelets.<sup>3</sup> Therefore, storage at room temperature was ultimately chosen as the industry standard for years in order to improve the post-transfusion lifespan of transfused platelets.

Recently, the importance of cold-stored platelet activation has become more appreciated as we better understand how it promotes clot formation.<sup>4</sup> Numerous *in vitro* studies (ROTEM, TEG, etc.) have shown that laboratory measurements of clot formation are significantly better in cold-stored platelets compared to room temperature-stored platelets.<sup>1</sup> Animal studies have shown that labeled, cold-stored platelets (in whole blood) contribute to clot formation on pathologic assessment.<sup>5</sup> Furthermore, a randomized clinical trial in Norway showed that the use of cold-stored platelets results in less post-operative chest tube bleeding than the use of room temperature-stored platelets.<sup>6</sup>

Cold-stored platelets are intended to be used, as described by the FDA, only in bleeding patients. Non-bleeding, thrombocytopenic patients who require prophylactic transfusion should continue to receive the standard, room temperature-stored platelets in order to maximize post-transfusion platelet survival.

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3. Murphy S, Gardner FH. Platelet preservation - effect of storage temperature on maintenance of platelet viability - deleterious effect of refrigerated storage. *New England Journal of Medicine*. 1969; 280: 1094-1098.
4. Getz TM. Physiology of cold-stored platelets. *Transfusion and Apheresis Science*. 2019; 58: 12-15.
5. Wu X, Darlington DN, Montgomery RK *et al.* Platelets derived from fresh and cold-stored whole blood participate in clot formation in rats with acute traumatic coagulopathy. *Br J Haematol* 2017; 179: 802–10.

6. Strandenes G, Kristoffersen EK, Bjerkvig CK *et al.* Cold stored platelets for treatment of postoperative bleeding in cardiothoracic surgery. Orlando, FL: American Association of Blood Banks, 2016.