



# e-Network Forum

## CALIFORNIA BLOOD BANK SOCIETY

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### ***How long may a primed ECLS/ECMO circuit run without a patient connected?***

**An inquiring colleague from the Pacific Northwest** observed an extra-corporeal life support (ECLS or ECMO) circuit being primed with packed red blood cells and FFP in anticipation of using the circuit for a post-operative cardiac patient who was very unstable. However, before connecting the patient to the primed ECLS circuit, the surgeons re-opened the patient's chest and performed an additional procedure, resulting in immediate improvement of the patient's condition. The primed ECLS circuit was never used for the patient, but one of the doctors wanted to keep the circuit 'running' without the patient connected for 24 hours, just in case the patient would require ECLS support. The colleague who observed this case did not allow the ECLS circuit to run for more than 4 hours without a patient connected, as the July 2002 Circular of Information for the Use of Human Blood and Blood Components states, "If the (blood component) container is entered in a manner that violates the integrity of the system, the component expires four hours after entry if maintained at room temperature...". Based on the above scenario, **several institutions that use ECLS circuits were surveyed to learn if other centers allow ECLS circuits to run for more than 4 hours without a patient connected to the circuit.** The inquiring colleague has received permission to share the following information, based on the feedback of the surveyed institutions.

#### **14 institutions responded:**

- 10 centers have a 4-hour limit
- 2 centers have a 4-hour limit, but will extend with MD/Medical Director approval
- 1 center primes with blood components, flushes the circuit with saline at 4 hours, maintains circuit at a slow rate for up to 24 hours and re-primed with blood components, if needed
- 1 center extends > 4 hours whenever needed

#### **Anecdotal comments:**

- 3 pumps were run for 8 hours with "significant deterioration" in laboratory values
- Have used several circuits primed > 4 hours but < 24 hours prior to initiating ECLS with no adverse effects.
- Circuit maintained for ~20 hours prior to initiating ECLS with no adverse effects
- Ran 1 pump for 8 - 10 hours; blood was very acidotic with very high K+ and Lactate
- Report of red blood cell damage and high potassium with extended use of circuit primed with blood components

#### **5 responses also included criteria for albumin:**

- 3 centers have a 4-hour limit
- 2 centers have a 24-hour limit

The e-network forum is encouraged to **share additional experiences** with ECLS/ECMO primed circuits and **how long** such a circuit is allowed to run without a patient connected.

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The following responses have been received.

1. **A colleague (also in the Pacific Northwest)** has a followup question related to the ECLS circuit and the survey findings reported above. Specifically, no one mentioned a concern about **bacterial contamination**. In her opinion, that is the intent behind a requirement for a 4-hour limit for holding blood at room temperature. She is wondering **if anyone performed cultures on the systems in operation greater than 4 hours.**

**ADDENDA** July 16, 2003

2. In response to the question raised in #1 above, **the original inquiring colleague** who provided the survey data has now indicated that the latest issue of the [Journal of Extra Corporeal Technology](#) contains a paper on the priming, and storage, of extracorporeal circuits with albumin and crystalloid solutions. The lead author is **Gao** and according to the responding colleague, the authors were

**unable to generate bacterial growth** in either classification of circuit for up to 72 hours. They reportedly used membranes made of polypropylene and standard circuits. They also performed functional studies on oxygenator performance, which demonstrated a decline in gas exchange over 72 hours.

**ADDENDA** Mar. 27, 2007

3. **The medical director of a hospital blood bank in Delaware** asks if it is acceptable to maintain an ECMO circuit primed with blood for greater than 4 hours without the patient connected? She wonders if there are any **data to justify** maintaining these disconnected blood primed circuits for as long as **24 hours (or even longer)**. She also wonders if there are **regulations specific to these situations**. Having asked the aforementioned questions, she wonders if anyone can argue against permitting disconnected blood primed circuits for extended periods, since ECMO circuits can be run for days to weeks when attached to a patient.

Please submit comments to the [e-Network Forum](#).



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**Posted:** July 9, 2003

**Addenda:** July 16, 2003;  
Mar. 28, 2007