This guidance is intended to remain in effect until November 7, 2023, unless superseded by a revised final guidance before that date. For further information, refer to 88 FR 15417, March 13, 2023, available at https://www.federalregister.gov/d/2023-05094.
Enforcement Policy for Extracorporeal Membrane Oxygenation and Cardiopulmonary Bypass Devices During the Coronavirus Disease 2019 (COVID-19) Public Health Emergency

Guidance for Industry and Food and Drug Administration Staff

April 2020

U.S. Department of Health and Human Services
Food and Drug Administration
Center for Devices and Radiological Health (CDRH)
Office of Product Evaluation and Quality (OPEQ)
Contains Nonbinding Recommendations

Preface

Public Comment

This guidance is being issued to address the Coronavirus Disease 2019 (COVID-19) public health emergency. This guidance is being implemented without prior public comment because the Food and Drug Administration (FDA or the Agency) has determined that prior public participation for this guidance is not feasible or appropriate (see section 701(h)(1)(C) of the Federal Food, Drug, and Cosmetic Act (FD&C Act) and 21 CFR 10.115(g)(2)). This guidance document is being implemented immediately, but it remains subject to comment in accordance with the Agency’s good guidance practices.

Comments may be submitted at any time for Agency consideration. Submit written comments to the Dockets Management Staff (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852. Submit electronic comments to https://www.regulations.gov. All comments should be identified with the docket number FDA-2020-D-1138 and complete title of the guidance in the request.

Additional Copies

Additional copies are available from the FDA webpage titled “COVID-19-Related Guidance Documents for Industry, FDA Staff, and Other Stakeholders” available at https://www.fda.gov/emergency-preparedness-and-response/mcm-issues/covid-19-related-guidance-documents-industry-fda-staff-and-other-stakeholders and the FDA webpage titled “Search for FDA Guidance Documents” available at https://www.fda.gov/regulatory-information/search-fda-guidance-documents. You may also send an e-mail request to CDRH-Guidance@fda.hhs.gov to receive a copy of the guidance. Please include the document number 20024 and complete title of the guidance in the request.

Questions

For questions about this document, contact Fernando Aguel, Assistant Director, Circulatory Support Devices at 301-796-6326 or fernando.aguel@fda.hhs.gov.
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Enforcement Policy for Extracorporeal Membrane Oxygenation and Cardiopulmonary Bypass Devices During the Coronavirus Disease 2019 (COVID-19) Public Health Emergency

Guidance for Industry and Food and Drug Administration Staff

I. Introduction

The Food and Drug Administration (FDA or Agency) plays a critical role in protecting the United States from threats such as emerging infectious diseases, including the Coronavirus Disease 2019 (COVID-19) pandemic. FDA is committed to providing timely guidance to support response efforts to this pandemic.

FDA is issuing this guidance to provide a policy to help expand the availability of devices used in extracorporeal membrane oxygenation (ECMO) therapy to address this public health emergency.

This policy is intended to remain in effect only for the duration of the public health emergency related to COVID-19 declared by the Department of Health and Human Services (HHS), including any renewals made by the HHS Secretary in accordance with section 319(a)(2) of the Public Health Service (PHS) Act.
Given this public health emergency, and as discussed in the Notice in the Federal Register of March 25, 2020, titled “Process for Making Available Guidance Documents Related to Coronavirus Disease 2019,” available at https://www.govinfo.gov/content/pkg/FR-2020-03-25/pdf/2020-06222.pdf, this guidance is being implemented without prior public comment because FDA has determined that prior public participation for this guidance is not feasible or appropriate (see section 701(h)(1)(C) of the Federal Food, Drug, and Cosmetic Act (FD&C Act) and 21 CFR 10.115(g)(2)). This guidance document is being implemented immediately, but it remains subject to comment in accordance with the Agency’s good guidance practices.

In general, FDA’s guidance documents, including this guidance, do not establish legally enforceable responsibilities. Instead, guidances describe the Agency’s current thinking on a topic and should be viewed only as recommendations, unless specific regulatory or statutory requirements are cited. The use of the word should in Agency guidance means that something is suggested or recommended, but not required.

II. Background

There is currently an outbreak of respiratory disease caused by a novel coronavirus. The virus has been named SARS-CoV-2 and the disease it causes has been named Coronavirus Disease 2019 (COVID-19). On January 31, 2020, HHS issued a declaration of a public health emergency related to COVID-19 and mobilized the Operating Divisions of HHS.1 In addition, on March 13, 2020, the President declared a national emergency in response to COVID-19.2

FDA believes the policy set forth in this guidance may help address these urgent public health concerns by helping to expand the availability of devices used for extracorporeal membrane oxygenation (ECMO) therapy during this public health emergency.

III. Scope

Extracorporeal circuits and accessories for long-term respiratory/cardiopulmonary failure, including devices used for ECMO therapy, are a system of devices and accessories regulated under 21 CFR 870.4100 that provide assisted extracorporeal circulation and physiologic gas exchange of the patient’s blood for more than 6 hours. Cardiopulmonary bypass devices are regulated under multiple other regulations also under 21 CFR Part 870, Subpart E – Cardiovascular Surgical Devices, but are only for uses less than or equal to 6 hours. The classification regulations and associated product codes are listed in Table 1 and Table 2:

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### Table 1 – ECMO devices

<table>
<thead>
<tr>
<th>Classification Regulation</th>
<th>Device Type</th>
<th>Product Code</th>
<th>Device Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 CFR 870.4100</td>
<td>Extracorporeal System for Long-Term Respiratory / Cardiopulmonary Failure</td>
<td>QJZ</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4100</td>
<td>Oxygenator, Long Term Support Greater Than 6 Hours</td>
<td>BYS</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4100</td>
<td>Dual Lumen ECMO Cannula</td>
<td>PZS</td>
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### Table 2 – Cardiopulmonary bypass devices, accessories, and components

<table>
<thead>
<tr>
<th>Classification Regulation</th>
<th>Device Type</th>
<th>Product Code</th>
<th>Device Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 CFR 870.4200</td>
<td>Accessory Equipment, Cardiopulmonary Bypass</td>
<td>KRI</td>
<td>I</td>
</tr>
<tr>
<td>21 CFR 870.4205</td>
<td>Detector, Bubble, Cardiopulmonary Bypass</td>
<td>KRL</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4210</td>
<td>Cannula, Arterial, Cardiopulmonary Bypass (CPB), Embolism Protection</td>
<td>NCP</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4210</td>
<td>Catheter, Cannula and Tubing, Vascular, Cardiopulmonary Bypass</td>
<td>DWF</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4210</td>
<td>Cardiopulmonary Bypass Catheter Kit</td>
<td>OEU</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4220</td>
<td>Console, Heart-Lung Machine, Cardiopulmonary Bypass</td>
<td>DTQ</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4230</td>
<td>Defoamer, Cardiopulmonary Bypass</td>
<td>DTP</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4240</td>
<td>Heat-Exchanger, Cardiopulmonary Bypass</td>
<td>DTR</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4240</td>
<td>Cardioplegia Solution Administration Kit</td>
<td>OET</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4250</td>
<td>Controller, Temperature, Cardiopulmonary Bypass</td>
<td>DWC</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4260</td>
<td>Filter, Blood, Cardiopulmonary Bypass, Arterial Line</td>
<td>DTM</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4270</td>
<td>Filter, Blood, Cardiotomy Suction Line, Cardiopulmonary Bypass</td>
<td>JOD</td>
<td>II</td>
</tr>
</tbody>
</table>

3 For more information see the Product Classification Database at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPCD/classification.cfm.
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<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Code</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 CFR 870.4280</td>
<td>Filter, Prebypass, Cardiopulmonary Bypass</td>
<td>KRJ</td>
<td>II, exempt</td>
</tr>
<tr>
<td>21 CFR 870.4290</td>
<td>Adaptor, Stopcock, Manifold, Fitting, Cardiopulmonary Bypass</td>
<td>DTL</td>
<td>II, exempt</td>
</tr>
<tr>
<td>21 CFR 870.4300</td>
<td>Gas Control Unit, Cardiopulmonary Bypass</td>
<td>DTX</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4310</td>
<td>Gauge, Pressure, Coronary, Cardiopulmonary Bypass</td>
<td>DXS</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4320</td>
<td>Generator, Pulsatile Flow, Cardiopulmonary Bypass</td>
<td>JOR</td>
<td>III</td>
</tr>
<tr>
<td>21 CFR 870.4330</td>
<td>Monitor, Blood-Gas, On-Line, Cardiopulmonary Bypass</td>
<td>DRY</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4340</td>
<td>Monitor and/or Control, Level Sensing, Cardiopulmonary Bypass</td>
<td>DTW</td>
<td>II, exempt</td>
</tr>
<tr>
<td>21 CFR 870.4350</td>
<td>Oxygenator, Cardiopulmonary Bypass</td>
<td>DTZ</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4360</td>
<td>Pump, Blood, Cardiopulmonary Bypass, Non-Roller Type</td>
<td>KFM</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4370</td>
<td>Pump, Blood, Cardiopulmonary Bypass, Roller Type</td>
<td>DWB</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4380</td>
<td>Control, Pump Speed, Cardiopulmonary Bypass</td>
<td>DWA</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4390</td>
<td>Tubing, Pump, Cardiopulmonary Bypass</td>
<td>DWE</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4400</td>
<td>Reservoir, Blood, Cardiopulmonary Bypass</td>
<td>DTN</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4400</td>
<td>CPB Check Valve, Retrograde Flow, In-line</td>
<td>MJJ</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4400</td>
<td>Valve, Pressure Relief, Cardiopulmonary Bypass</td>
<td>MNJ</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4400</td>
<td>Reservoir, Blood, Cardiopulmonary Bypass, Exempt</td>
<td>PTN</td>
<td>II, exempt</td>
</tr>
<tr>
<td>21 CFR 870.4410</td>
<td>Sensor, Blood-Gas, In-Line, Cardiopulmonary Bypass</td>
<td>DTY</td>
<td>II</td>
</tr>
<tr>
<td>21 CFR 870.4420</td>
<td>Sucker, Cardiotomy Return, Cardiopulmonary Bypass</td>
<td>DTS</td>
<td>II, exempt</td>
</tr>
<tr>
<td>21 CFR 870.4430</td>
<td>Suction Control, Intracardiac, Cardiopulmonary Bypass</td>
<td>DWD</td>
<td>II, exempt</td>
</tr>
</tbody>
</table>

This guidance is limited to devices in Table 1 and Table 2 that are intended to pump blood or oxygenate blood by:
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1. Moving the blood to a component that pumps/oxygenates the blood;
2. Controlling pump speed;
3. Controlling or monitoring gas flow for the circuit; or
4. Controlling the temperature of the blood.

This guidance does not apply to devices intended only for extracorporeal carbon dioxide removal because such devices may not oxygenate the blood at clinically meaningful levels. Manufacturers of such devices may, however, consider requesting an Emergency Use Authorization (EUA)\(^4\) described in section IV.B of this document.

IV. Policy

As a sudden acute respiratory syndrome, COVID-19 can trigger acute respiratory failure and/or acute cardiopulmonary failure. Under such conditions, long-term extracorporeal oxygenation (i.e., extracorporeal oxygenation for greater than 6 hours) can be an important tool for treating patients, and FDA recognizes the importance and utility of increased availability of extracorporeal oxygenation devices for patients during the COVID-19 public health emergency. The FDA-cleared or FDA-approved cardiopulmonary bypass devices identified in Table 2 are technologically capable of being used for ECMO therapy, providing extracorporeal oxygenation for longer than 6 hours. Therefore, to facilitate expanded availability of devices to perform ECMO therapy to treat COVID-19 patients, FDA does not intend to object to limited modifications to the indications, and design of FDA-cleared or FDA-approved ECMO devices and cardiopulmonary bypass devices listed in Table 1 and Table 2 during the declared public health emergency where such modification does not create an undue risk, as described in more detail below, without prior submission of a premarket notification under section 510(k) of the FD&C Act and 21 CFR 807.81\(^5\) or submission of a Premarket Approval Application (PMA) Supplement under section 515 of the FD&C Act and 21 CFR 814.39.\(^6\) As a general best practice, because cardiopulmonary bypass circuit systems might incorporate multiple components, it is recommended that compatibility between components (e.g., flow rates, coatings, intended patient population) be considered prior to configuring the circuit for clinical use.

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\(^5\) For further guidance on modifications that trigger the requirement that a manufacturer submit a new premarket notification (510(k)) to FDA, refer to “Deciding When to Submit a 510(k) for a Change to an Existing Device: Guidance for Industry and Food and Drug Administration Staff,” https://www.fda.gov/regulatory-information/search-fda-guidance-documents/deciding-when-submit-510k-change-existing-device.

\(^6\) For further guidance on modifications that trigger the requirement that a manufacturer submit a PMA supplement to FDA, refer to “Modifications to Devices Subject to Premarket Approval (PMA) - The PMA Supplement Decision-Making Process,” available at https://www.fda.gov/regulatory-information/search-fda-guidance-documents/modifications-devices-subject-premarket-approval-pma-pma-supplement-decision-making-process.
A. Modifications to FDA-cleared or FDA-approved Indications or Design

For the duration of the public health emergency, FDA does not intend to object to modifications to the indications or design of FDA cleared or approved devices listed in Table 1 and Table 2 without prior submission of a premarket notification or premarket approval application supplement where the modification does not create an undue risk in light of the public health emergency. FDA currently believes a modification does not create such undue risk in the following scenarios:

1. For cardiopulmonary bypass devices, changes to the device’s indications to include use of the device in an ECMO circuit to treat patients who are experiencing acute respiratory failure and/or acute cardiopulmonary failure;
2. For cardiopulmonary bypass devices, changes to the device’s indications regarding use of the device for longer than 6 hours in an ECMO circuit; or
3. For both cardiopulmonary bypass devices and ECMO devices, changes to the dimension(s) of cannulae, tubing, filters, connectors, or other accessories to support use in an ECMO circuit that do not affect the flow rate of blood throughout the circuit.

FDA currently believes that modifications like the ones described below would create an undue risk:

1. Changes to the coating of a device; or,
2. Other changes that might negatively impact the gas transfer/exchange properties of the cleared device such as:
   a) Changes to the dimension of the fiber used for gas exchange;
   b) Changes to the type of fiber or membrane used for gas exchange; or,
   c) Changes to the surface area of the fiber mat.

FDA recommends that labeling for modified devices include the following elements, where these elements are not already required by regulation. FDA is making these labeling recommendations to help users better understand the device modifications:

1. A clear description of the available data on the device’s new indications or design characteristics related to ECMO, including:
   a) Device performance (e.g. flow rates for which the device is compatible and pressure drop information (if applicable));
   b) Summary of durability testing;
   c) Summary of animal and clinical performance, if available; and
   d) Potential risks.
2. A prominent and exhaustive list of clinical signs or observations that suggest device change-out is necessary regardless of the time the device has been in use;
3. Information on use conditions;
4. A clear distinction delineating FDA-cleared or FDA-approved indications from those that
5. A general statement about changes that have not been cleared or approved by FDA.

FDA recommends any modifications be designed, evaluated, and validated in accordance with FDA recognized standards, including (as applicable):

- ISO 18242: 2016: Cardiovascular Implants and Extracorporeal Systems – Centrifugal Blood Pumps

Manufacturers must document changes to their device in their device master record and change control records and make this information available to FDA, if requested, consistent with 21 CFR 820.30 and 21 CFR 820.180.

For the current edition of the FDA-recognized standard(s) referenced in this document, see the FDA Recognized Consensus Standards Database. For more information regarding use of consensus standards in regulatory submissions, refer to FDA guidance titled “Appropriate Use of Voluntary Consensus Standards in Premarket Submissions for Medical Devices.”

**B. FDA’s Intended Approach for EUAs for Cardiopulmonary Bypass/ECMO Devices**

FDA recommends that healthcare personnel use devices that are FDA-cleared for delivering ECMO therapy under 21 CFR 870.4100 (Table 1) when available, followed by devices designed for cardiopulmonary bypass and cleared or approved by FDA under the regulations referenced in Table 2. FDA recognizes that there may be concerns about the availability of such devices during the

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COVID-19 pandemic, and therefore, to help support the wider availability of devices for patients in need of ECMO in the United States for the duration of the public health emergency, FDA is interested in interacting with manufacturers of ECMO devices, or manufacturers of cardiopulmonary bypass devices seeking indications greater than 6 hour use to be used for ECMO, that are not currently legally marketed in the U.S. FDA intends to work interactively with these manufacturers through its EUA process.

FDA would find it helpful if such manufacturers (whether foreign or domestic) send FDA the following information to CDRH-NonDiagnosticEUA-Templates@fda.hhs.gov. FDA believes this information will be valuable in assessing whether the device would be able to meet the EUA requirements. FDA believes that companies may already have information available to help support an EUA request for ECMO or modified use of cardiopulmonary bypass, such as the information outlined below. FDA will expeditiously review this information, and other required information, to determine if an EUA can be issued.

For current ECMO device manufacturers or cardiopulmonary bypass manufacturers seeking to utilize their device for over 6 hours for ECMO whose product(s) are not currently marketed in the U.S., FDA recommends providing the following information:

a) General information such as your contact information, name and place of business, email address, and contact information for a U.S. agent (if any), in addition to general information about the device such as the proprietary or brand name, model number, and marketing authorization in your country (or region).

b) A copy of the product labeling.

c) Whether the device currently has marketing authorization in another regulatory jurisdiction such as the European CE Mark, Australian Register of Therapeutic Goods (ARTG) Certificate of Inclusion, Health Canada License, or Shonin approval from the Ministry of Health, Labour, and Welfare in Japan. When providing this information, you should include a copy of the marketing authorization letter or certificate and also include any relevant corresponding information such as the certificate of conformity.

d) A summary of performance data available for long term use of the device (e.g., gas exchange, reliability, thrombogenicity).

e) Whether the device has been designed, evaluated, and validated in accordance with the applicable FDA recognized standards identified in Section IV.A above.

f) Whether the device is manufactured in compliance with 21 CFR Part 820, ISO 13485: Medical Devices – Quality Management Systems – Requirements for Regulatory Purposes, or an equivalent quality system, and the manufacturer or importer has documentation of such.

g) Whether the device is designed with a power supply that is compatible with United States voltage, frequency, and plug type standards or is accompanied by an appropriate power supply adapter for use in the United States.

FDA will acknowledge receipt of the information provided and intends to work interactively with these manufacturers to facilitate distribution of their products through an Emergency Use
Authorization in the United States.\textsuperscript{10} In addition, where appropriate under the circumstances, FDA will notify the manufacturer that it does not intend to object to the distribution and use of the device while the manufacturer is preparing, and FDA is reviewing, the EUA request. Manufacturers who are unable to provide all the above information are still eligible for EUA consideration and should engage with FDA through the pre-EUA process.

For any ECMO or cardiopulmonary bypass device issued an EUA, FDA will include appropriate conditions of authorization in accordance with the mandatory conditions outlined in section 564 of the FD&C Act. Although this is a case-by-case determination, based on current information and experience, we will likely include the following conditions:

- **Appropriate conditions designed to ensure that health care professionals administering the device are informed**—
  - that FDA has authorized the emergency use of the device;
  - of the significant known and potential benefits and risks of the emergency use of the device, and of the extent to which such benefit and risks are unknown; and
  - of the alternatives to the device that are available, and of their benefits and risks.

- **Appropriate conditions designed to ensure that individuals to whom the device is administered are informed**—
  - that FDA has authorized the emergency use of the device;
  - of the significant known and potential benefits and risks of the emergency use of the device, and of the extent to which such benefit and risks are unknown; and
  - of the option to accept or refuse use of the device, of the consequence, if any, of refusing use of the device, and of the alternatives to the device that are available and of their benefits and risks.

- **Appropriate conditions for the monitoring and reporting of adverse events associated with the emergency use of the device.** FDA intends to include conditions that are consistent with those promulgated under 21 CFR Part 803.

- For manufacturers of the device, appropriate conditions concerning recordkeeping and reporting, including records access by FDA, with respect to emergency use of the device.

**C. Additional Helpful Resources**

The following online resources may be helpful for consideration when pursuing these design changes:

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- Guidance for Cardiopulmonary Bypass Oxygenator 510(k) Submissions; Final Guidance for Industry and FDA Staff


- Guidance for the Content of Premarket Submissions for Software Contained in Medical Devices – Guidance for Industry and FDA Staff

- Content of Premarket Submissions for Management of Cybersecurity in Medical Devices – Guidance for Industry and Food and Drug Administration Staff


