



دائرة الصحة
DEPARTMENT OF HEALTH

Extra-corporeal membrane oxygenation (ECMO) Jawda Guidance

Version 1

Extra-corporeal membrane oxygenation (ECMO) Service JAWDA Performance Indicators

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Executive Summary

The Department of Health– Abu Dhabi (DOH) is the regulatory body of the healthcare sector in the Emirate of Abu Dhabi and ensures excellence in healthcare for the community by monitoring the health status of its population.

The Emirate of Abu Dhabi is experiencing a substantial growth in the number of hospitals, centers and clinics. This is ranging from school clinics and mobile units to internationally renowned specialist and tertiary academic centers. Although, access and quality of care has improved dramatically over the last couple of decades, mirroring the economic upturn and population boom of Emirate of Abu Dhabi, however challenges remain in addressing further improvements.

The main challenges that are presented with increasingly dynamic population include an aging population with increased expectation for treatment, utilization of technology and diverse workforce leading to increased complexity of healthcare provision in Abu Dhabi. All of this results in an increased and inherent risk to quality and patient safety.

DOH has developed dynamic and comprehensive quality framework in order to bring about improvements across the health sector. This guidance pertains to the quality indicators that the Department of Health (DOH) is requiring for quarterly reporting by healthcare facilities operating Extracorporeal Membrane Oxygenation healthcare services in the Emirate of Abu Dhabi.

The guidance sets out the full definition and method of calculation for patient safety and clinical effectiveness indicators. For enquiries about this guidance, please contact jawda@DoH.gov.ae

This document is subject for review and therefore it is advisable to utilize online versions available on the DOH at all times.

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Extra-corporeal membrane oxygenation (ECMO) Service JAWDA Performance Indicators

About this Guidance

The guidance sets out the definitions and reporting frequency of JAWDA Extracorporeal Membrane Oxygenation performance indicators. The Department of Health (DoH), with consultation from local and international experts, has developed Extracorporeal Membrane Oxygenation Performance Indicators that are aimed for assessing the degree to which a provider competently and safely delivers the appropriate clinical services to the patient within the optimal period of time.

This Jawda KPI guidance includes measures to monitor morbidity and mortality in patients undergoing Extracorporeal Membrane Oxygenation procedure. Healthcare providers are the most qualified professionals to develop and evaluate quality of care for Extracorporeal Membrane Oxygenation ECMO patients; therefore, it is crucial that clinicians retain a leadership position in defining performance among Extracorporeal Membrane Oxygenation healthcare providers.

Who is this guidance for?

All DoH licensed healthcare facilities providing Extracorporeal Membrane Oxygenation healthcare services in the Emirate of Abu Dhabi.

How do I follow this guidance?

Each provider will nominate one member of staff to coordinate, collect, monitor and report ECMO indicators data as per communicated dates. The nominated healthcare facility lead must in the first instance e-mail their contact details (if different from previous submission) to JAWDA@doh.gov.ae and submit the required quarterly quality performance indicators through Jawda online portal.

What are the Regulation related to this guidance?

- Legislation establishing the Health Sector
- As per DoH [Policy for Quality and Patient Safety](#) issued January 15th 2017, this guidance applies to all DOH Licensed Healthcare Facilities in the Emirate of Abu Dhabi in accordance with the requirements set out in this Standard
- [DOH Standard for Centers of Excellence in the Emirate of Abu Dhabi issued March 2019](#)

Extra-corporeal membrane oxygenation (ECMO) Service JAWDA

Performance Indicators

Type: ECMO Quality Indicator

Indicator Number: ECM001

KPI Description (title):	ECMO Survival Rate at discharge from the hospital
Domain	Effectiveness
Indicator Type	Outcome
Definition:	<p>Percentage of ECMO support patients who survive at discharge from the hospital after ECMO support.</p> <p>This KPI reflects the short-term outcomes and quality of care provided by the ECMO program</p> <p>Venovenous (VV) ECMO: Used primarily for respiratory support. Blood is drawn from a vein, oxygenated, and returned to a vein</p> <p>Venoarterial (VA) ECMO: Provides both cardiac and respiratory support. Blood is drawn from a vein, oxygenated, and then pumped back into the artery</p>
Calculation:	<p><u>Numerator:</u> Total number of ECMO support patients in the denominator who survive at discharge from the hospital after ECMO support.</p> <p><u>Denominator:</u> Total number of ECMO support patients (pediatric and adults) who are discharged from the hospital after ECMO support.</p> <p><u>Denominator Inclusions:</u></p> <ul style="list-style-type: none"> All patients who received ECMO support during the accrual period Patients with documented reasons for ECMO initiation (e.g., ARDS, cardiac failure). Day of ECMO initiation is considered day "0". Both the types of Venovenous (VV) ECMO and Venoarterial (VA) ECMO are included. <p><u>Denominator Exclusion:</u></p> <ul style="list-style-type: none"> Patients who were on ECMO for less than 24 hours.
Reporting Frequency:	Quarterly
Unit of Measure:	Percentage of patients surviving at discharge.
International comparison if available	<p>Functional status of pediatric patients after extracorporeal membrane oxygenation: A five-year single-center study - PMC</p> <p>Extracorporeal Membrane Oxygenation in Adults - StatPearls - NCBI Bookshelf</p>
Desired direction:	<p>Survival Rate at Discharge- VVCOM-Pediatrics-73% Adults -76%</p> <p>Survival Rate at Discharge -VACOM-Pediatrics-75% Adults -</p> <p>Overall Survival rate at Discharge-Pediatrics -67% Adults-58 %</p>
Data sources and guidance:	<p>-Patient medical record</p> <p>-Hospital administrative data</p>

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Performance Indicators

Type: ECMO Quality Indicator

Indicator Number: ECM002

KPI Description (title):	Neurological complications rate in ECMO Patients
Domain	Effectiveness
Indicator Type	Outcome
Definition:	<p>The proportion of ECMO patients who develop neurologic complications at long-term(≥ 6 months) follow up.</p> <p>Venovenous (VV) ECMO: Used primarily for respiratory support. Blood is drawn from a vein, oxygenated, and returned to a vein</p> <p>Venoarterial (VA) ECMO: Provides both cardiac and respiratory support. Blood is drawn from a vein, oxygenated, and then pumped back into the artery</p>
Calculation:	<p><u>Numerator:</u> The total number of patients who received ECMO support and develop long-term neurologic complications that include neuropsychiatric symptoms, neurocognitive and functional impairment and favorable neurologic outcomes at discharge or at long-term (≥ 6 months) follow-up.</p> <p>Common neuropsychiatric symptoms: Pain/discomfort-(R52, G89.18, G89.28) Anxiety-(F41.1, F41.3, F41.8, F41.9) Depression-(F32.0, F32.1, F32.2, F32.3, F32.4, F32.5, F32.81, F32.89, F32.9, F33.0, F33.1, F33.2, F33.3, F33.40, F33.41, F33.42, F33.8, F33.9) Posttraumatic stress disorder [PTSD]- (F43.10, F43.11, F43.12) Sleep disturbance-(G47.00, G47.01, G47.09, G47.8, G47.9)</p> <p>Common neurocognitive impairment: Memory- (R41.3, R41.2, R41.1, R41.0) Attention- (R41.840) Reasoning- (F30)</p> <p>Common functional impairment Daily activities- (Activities of Daily Living (ADL) scale, Instrumental Activities of Daily Living (IADL) scale) Physical activity/mobility- (Timed Up and Go (TUG) test, Six-Minute Walk Test (6MWT) Personal/self-care)- (Functional Independence Measure (FIM)</p> <p><u>Denominator:</u> Total number of ECMO support patients (pediatric and adults) who are discharged in the previous 6 months from the hospital after ECMO support or who are discharged from the hospital during the reporting quarter after ECMO support.</p> <p><u>Denominator Exclusion:</u></p> <ul style="list-style-type: none"> Patients who were on ECMO for less than 24 hours. Patients with pre-existing severe neurological impairments (e.g., cerebral palsy, significant developmental delays).

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	<ul style="list-style-type: none"> Patients who did not survive to discharge.
Reporting Frequency:	Quarterly
Unit of Measure:	Percentage of patients develop neurologic complications in ECMO patients.
International comparison if available	Long-Term Neuropsychiatric, Neurocognitive, and Functional Outcomes of Patients Receiving ECMO Neurology Frontiers The effects of ECMO on neurological function recovery of critical patients: A double-edged sword Neurological Complications of Veno-Arterial Extracorporeal Membrane Oxygenation: A Retrospective Case-Control Study - PMC
Desired direction:	Neuropsychiatric symptoms - 41% Neurocognitive impairment - 38% Functional impairment - 52%
Data sources and guidance:	-Patient medical record -Hospital administrative data

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Performance Indicators

Type: ECMO Quality Indicator

Indicator Number: ECM003

KPI Description (title):	Average length of stay for ECMO Patients
Domain	Effectiveness
Indicator Type	Outcome
Definition:	<p>The average length of stay for patients (pediatric and adults) who received Extracorporeal Membrane Oxygenation (ECMO) support.</p> <p>Venovenous (VV) ECMO: Used primarily for respiratory support. Blood is drawn from a vein, oxygenated, and returned to a vein</p> <p>Venoarterial (VA) ECMO: Provides both cardiac and respiratory support. Blood is drawn from a vein, oxygenated, and then pumped back into the artery</p>
Calculation:	<p><u>Numerator:</u> Total number of days that all patients (both pediatric and adult) spent on ECMO support during the reporting quarter.</p> <p><u>Denominator:</u> Total number of patients (both pediatric and adult) who were discharged from the hospital after receiving ECMO support during the reporting quarter.</p> <p><u>Denominator Inclusions:</u></p> <ul style="list-style-type: none"> All patients who received ECMO support. <p><u>Denominator Exclusion:</u></p> <ul style="list-style-type: none"> Patients transferred to another facility before discharge. Patients who were on ECMO for less than 24 hours.
Reporting Frequency:	Quarterly
Unit of Measure:	Average duration of stay for patients who received ECMO support
International comparison if available	<p>Long term outcome after respiratory ecmo and length of ecmo treatment - PMC</p> <p>Parameters associated with successful weaning of veno-arterial extracorporeal membrane oxygenation: a systematic review - PMC</p> <p>https://pmc.ncbi.nlm.nih.gov/articles/PMC5339999/</p>
Desired direction:	Lower is better
Data sources and guidance:	<p>-Patient medical record</p> <p>-Hospital administrative data</p>

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Performance Indicators

Type: ECMO Quality Indicator

Indicator Number: ECM004

KPI Description (title):	Complication Rates in ECMO
Domain	Effectiveness
Indicator Type	Outcome
Definition:	<p>The percentage of patients who experience one or more of the following complications during ECMO support</p> <p>Venovenous (VV) ECMO: Used primarily for respiratory support. Blood is drawn from a vein, oxygenated, and returned to a vein</p> <p>Venoarterial (VA) ECMO: Provides both cardiac and respiratory support. Blood is drawn from a vein, oxygenated, and then pumped back into the artery</p>
Calculation:	<p><u>Numerator:</u> Total number of patients who received ECMO support and develop complications like bleeding, infection, thromboembolic events, or acute limb ischemia within the first 30 days after ECMO or before hospital discharge.</p> <p><u>Denominator:</u> Total number of ECMO support patients (both pediatric and adult) who are discharged from the hospital after ECMO support during the reporting period.</p> <p><u>Denominator Inclusions:</u></p> <ul style="list-style-type: none"> All patients who received ECMO support. <p><u>Denominator Exclusion:</u></p> <ul style="list-style-type: none"> Minor oozing at cannulation sites not requiring intervention. Bleeding, infection, thromboembolic events or acute limb ischemia before ECMO initiation Pre-existing bleeding disorders unless exacerbated by ECMO. Patients who were on ECMO for less than 24 hours.
Reporting Frequency:	Quarterly
Unit of Measure:	Percentage of patients who received ECMO support and developed complications
International comparison if available	<p>Vascular Complications Based on Mode of Extracorporeal Membrane Oxygenation R1WC: 388/4108 - PMC</p> <p>Thrombosis and bleeding in extracorporeal membrane oxygenation (ECMO) without anticoagulation: a systematic review - PMC</p> <p>Major Bleeding in Adults Undergoing Peripheral Extracorporeal Membrane Oxygenation (ECMO): Prognosis and Predictors - PMC</p>
Desired direction:	Lower is better
Data sources and guidance:	<p>-Patient medical record</p> <p>-Hospital administrative data</p>

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Performance Indicators

Type: ECMO Quality Indicator

Indicator Number: ECM005

KPI Description (title):	Percentage of Patients Successfully Weaned from ECMO Support
Domain	Effectiveness
Indicator Type	Outcome
Definition:	<p>The percentage of patients who are successfully weaned from ECMO support</p> <p>Venovenous (VV) ECMO: Used primarily for respiratory support. Blood is drawn from a vein, oxygenated, and returned to a vein</p> <p>Venoarterial (VA) ECMO: Provides both cardiac and respiratory support. Blood is drawn from a vein, oxygenated, and then pumped back into the artery</p>
Calculation:	<p><u>Numerator:</u> Total number of patients from the denominator who successfully weaned from ECMO.</p> <p>Successful weaning from ECMO was defined using two criteria:</p> <ol style="list-style-type: none"> 1. Survival for 48 hours and 2. Independence from mechanical circulatory support (MCS) or heart replacement therapies within 30 days <p><u>Denominator:</u> Total number of ECMO support patients (both pediatric and adults) during the reporting period.</p> <p><u>Denominator Inclusions:</u></p> <ul style="list-style-type: none"> • All patients who received ECMO support. <p><u>Denominator Exclusion:</u></p> <ul style="list-style-type: none"> • Patients who died while on ECMO support.
Reporting Frequency:	Quarterly
Unit of Measure:	Percentage of patients who received ECMO support and successfully Weaned from ECMO Support
International comparison if available	<p>Incidence and predictors of weaning failure from veno-arterial extracorporeal membrane oxygenation therapy in patients with cardiogenic shock - PMC</p> <p>Unifying Weaning Success Criteria to Bridge the Extracorporeal Membrane Oxygenation Gap: Variations in Determinants Based on Definitions of Successful Weaning - Perfusion</p> <p>Predictors of successful weaning from Veno-Arterial Extracorporeal Membrane Oxygenation (V-A ECMO): A Systematic Review and Meta-analysis medRxiv</p>
Desired direction:	Higher is better
Data sources and guidance:	<p>-Patient medical record</p> <p>-Hospital administrative data</p>

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Performance Indicators

Type: ECMO Quality Indicator

Indicator Number: ECM006

KPI Description (title):	30-Day all cause unplanned readmission rate for ECMO Patients
Domain	Effectiveness
Indicator Type	Outcome
Definition:	<p>Percentage of unplanned readmissions for patients (both pediatric and adult) following ECMO support .</p> <p>Venovenous (VV) ECMO: Used primarily for respiratory support. Blood is drawn from a vein, oxygenated, and returned to a vein</p> <p>Venoarterial (VA) ECMO: Provides both cardiac and respiratory support. Blood is drawn from a vein, oxygenated, and then pumped back into the artery</p>
Calculation:	<p><u>Numerator:</u> Total number of unplanned readmissions to hospital following ECMO support. (If a patient has more than one unplanned readmission within 30 days of discharge following ECMO support, only the first is considered as readmission count for numerator)</p> <p><u>Numerator Exclusion:</u> Presence of at least one of the following:</p> <ul style="list-style-type: none"> • Readmission was for a planned procedure /treatment protocol. • Transfer admission from acute care <p><u>Denominator:</u> Total number of ECMO support patients (both pediatric and adult) who are discharged from the hospital after ECMO support during the reporting period.</p> <p><u>Denominator Inclusions:</u></p> <ul style="list-style-type: none"> • All patients who received ECMO support. <p><u>Denominator Exclusion:</u></p> <ul style="list-style-type: none"> • Patients who died during the index ECMO hospitalization • Patients who are discharged/left against medical advice (AMA)
Reporting Frequency:	Quarterly
Unit of Measure:	Rate per 100 ECMO support discharges
International comparison if available	Thirty-day readmissions among patients with cardiogenic shock who underwent extracorporeal membrane oxygenation support in the United States: Insights from the nationwide readmissions database - PMC
Desired direction:	Lower is better
Data sources and guidance:	<p>-Patient medical record</p> <p>-Hospital administrative data</p>