30-Day In-Hospital Mortality After Coronary Artery Bypass Graft (CABG) and Aortic Valve Replacement (AVR)

Name	30-Day In-Hospital Mortality After Coronary Artery Bypass Graft (CABG) and Aortic Valve Replacement (AVR)
Short/Other Names	CABG and AVR Mortality
Description	Risk-adjusted rate of all-cause in-hospital deaths occurring within 30 days for patients undergoing coronary artery bypass graft (CABG) and aortic valve replacement (AVR) surgery. For further details, please see the Cardiac Care Quality Indicators (CCQI) General Methodology Notes.
Interpretation	Lower rates are desirable.
HSP Framework Dimension	Health System Outputs: Appropriate and effective
Areas of Need	Getting Better
Geographic Coverage	All provinces/territories
Reporting Level/Disaggregation	National, Province/Territory, Facility
Indicator Results	https://www.cihi.ca/en/cardiac-care

Identifying Information

Name	30-Day In-Hospital Mortality After Coronary Artery Bypass Graft (CABG) and Aortic Valve Replacement (AVR)
Short/Other Names	CABG and AVR Mortality

Indicator Description and Calculation

Description	Risk-adjusted rate of all-cause in-hospital deaths occurring within 30 days for patients undergoing coronary artery bypass graft (CABG) and aortic valve replacement (AVR) surgery. For further details, please see the Cardiac Care Quality Indicators (CCQI) General Methodology Notes. The risk-adjusted rate for a facility is calculated by dividing the observed number of in-hospital deaths for each facility by the expected number of in-hospital deaths for the facility and multiplying by the Canadian average in-hospital death rate.
Calculation: Description	Unit of analysis: Episode of care An episode of care refers to all contiguous inpatient hospitalizations and same-day surgery visits. For episodes with transfers within or between facilities, transactions were linked regardless of diagnoses. For further details, please see the CCQI General Methodology Notes.
Calculation: Geographic Assignment	Place of service
Calculation: Type of Measurement	Rate - Rate - per 100
Calculation: Adjustment Applied	The following covariates are used in risk adjustment: Age, sex, urgent admission, shock, NSTEMI, previous acute myocardial infarction, previous cardiac surgery, cardiac dysrhythmias, multiple cardiac interventions, acute renal failure, Charlson Index For detailed definitions of covariates and the risk-adjustment methodology, please refer to the CCQI General Methodology Notes.
Calculation: Method of Adjustment	Logistic regression
	Description: Number of hospitalization episodes for patients age 18 and older who underwent a CABG and AVR surgery **Inclusions:** 1. Episodes that had a CABG (CCI code 1.IJ.76.^^) and AVR (CCI code 1.HV.90.LA-^^) during the same operating episode, where the interventions were not coded as out of hospital or abandoned (Out-of-Hospital Indicator not equal to Y and Intervention Status Attribute not equal to A) 2. Discharge date at the end of the episode between April 1 and March 31 of the fiscal year 3. CABG and AVR surgery date on or before March 1 of the fiscal year (to allow for a 30-day follow-up to capture deaths occurring in the

Denominator	same fiscal year). CABG and AVR surgeries performed prior to the fiscal year may be included if the discharge date at the end of the episode of care was in the following fiscal year. 4. First CABG and AVR within 30 days (i.e., repeat CABG and AVR surgeries within 30 days are excluded) **Exclusions:** 1. Episodes with other valve procedures (CCI codes 1.HS.^^ *Therapeutic Interventions on the Tricuspid Valve*, 1.HT.^^ *Therapeutic Interventions on the Pulmonary Valve*, 1.HU.^^ *Therapeutic Interventions on the Mitral Valve*, 1.HW.^^ *Therapeutic Interventions on the Annulus not elsewhere classified* and other aortic valve procedures not in the inclusion list: 1.HV.80.^^, 1.HV.90.ST-^^, 1.HV.90.GP-^^, 1.HV.90.GR-^^, 1.HV.90.WJ-^^) 2. Episodes with core concomitant procedures. Please see the CCQI General Methodology Notes for the detailed list of procedures and codes.
Numerator	**Description:** Number of hospitalization episodes in the denominator that resulted in an in-hospital death within 30 days of CABG and AVR surgery **Inclusions:** 1. In-hospital death (Discharge Disposition = 07) **Exclusions:** None
Background, Interpretation and Benchmarks	
Rationale	Considering that about 2.4 million Canadians are living with heart disease and that Canada's population is increasingly at risk,[1] it's important to examine the quality of cardiac care in order to support improvements in care and ultimately in the health of Canadians. CABG is a well-established procedure to treat coronary artery stenosis and AVR is a common procedure to treat aortic valve stenosis. An increasing number of people in the aging population suffer from the combination of coronary artery stenosis and aortic valve stenosis and are candidates for a combined CABG and AVR surgery. In most cardiac care centres, this is the third most frequent cardiac surgery (after isolated CABG and isolated AVR). Short-term mortality following CABG and AVR surgery has been identified as a key quality indicator for cardiac surgery care by the Canadian Cardiovascular Society.[2] Combined CABG and AVR surgery is considered to be high risk compared with isolated CABG and isolated AVR. The indicator can provide direction for quality improvement and can help hospitals identify peers to facilitate knowledge sharing around best practices of care.
Interpretation	Lower rates are desirable.
HSP Framework Dimension	Health System Outputs: Appropriate and effective
Areas of Need	Getting Better
Targets/Benchmarks	Not applicable
References	1. Government of Canada. Heart Disease in Canada. Accessed February 22, 2019. 2. Canadian Cardiovascular Society. *Quality Indicators for Cardiac Surgery*. 2015. 3. Donabedian A. *The Criteria and Standards of Quality*. 1982.
Availability of Data Sources and Results	
Data Sources	DAD, HMDB, NACRS
Available Data Years	**Type of Year:** Fiscal **First Available Year:** 2013 **Last Available Year:** 2017
Geographic Coverage	All provinces/territories
Reporting Level/Disaggregation	National, Province/Territory, Facility
Result Updates	
Update Frequency	Every year

Indicator Results	**Web Tool:** *Cardiac Care Quality Indicators Report* **URL:** https://www.cihi.ca/en/cardiac-care
Updates	Please refer to the CCQI General Methodology Notes.
Quality Statement	
Caveats and Limitations	• Cardiac care is delivered by many different health care professionals, and the resulting outcomes are a reflection of the whole system of care, rather than being attributable to a particular physician in a centre. Quality outcomes depend not only on a physician's technical skills, but also on the structure and care processes that are found in the environment in which health care is delivered.[3] • Some cardiac care centres are more specialized, perform interventions on more complex patients or accept higher-risk patients than average. CIHI is able to adjust for some of these differences across patient populations; however, the administrative data submitted is limited in its ability to capture and adjust for all differences associated with patient populations. Centres with more complex patients may have increased mortality and/or readmission rates because not all aspects of complexity can be adjusted for in the administrative data. • Transferring patients to a different hospital following a cardiac intervention is normal practice for many cardiac care centres. As such, there are potential learning opportunities beyond the centres included in this indicator. • Rates with wide confidence intervals should be interpreted with caution as they reflect a less-precise estimate. • Direct comparisons between cardiac care centres or provinces are discouraged. Comparisons with the Canadian average provide more meaningful information. • Indicator results do not provide a final conclusion about cardiac care performance and can be used as a first step in an improvement process to identify areas for follow-up and potential improvements. • Out-of-hospital deaths are not captured in CIHI's administrative databases.
Trending Issues	Not applicable This indicator belongs to a suite of Cardiac Care quality indicators (CCQI) that provide pan-Canadian comparable information on outcomes related to selected cardiac interventions. The goal is to support monitoring and quality improvement in cardiac care. More information on the CCQI Report is available on our Cardiac Care web page.
Comments	Publicly available indicator results are based on 3 years of pooled data. Indicator results based on 1 year of data are also available • In the Data Preview for Indicators Tool (https://www.cihi.ca/en/secure/health-system-performance/your-health-system-tools/data-preview-for-indicators) • By request.