2024 Pay for Performance Measure Specifications
Adult Cardiac Surgery

2024 Collaborative-wide Quality Initiative:
Isolated CABG – Initial Ventilator Hours <6

Description
Percentage of patients undergoing isolated CAB with less than 6.0 initial postoperative ventilation hours.

Rationale
Evidence has shown that early extubation offers a range of benefits, including a reduced risk of ventilator-associated complications, faster recovery, decreased ICU costs, lower risk of delirium and enhanced patient satisfaction [1-3]. While early extubation focuses on immediate postoperative benefits, it may also contribute to improved long-term outcomes.

Measurement Time Period
January 1, 2024 – December 31, 2024

Inclusion Criteria
All Isolated CABG cases

Exclusion Criteria
- Patients who expired in the OR

Variables used in Numerator
Total Postop Initial Vent Hours (#6587) <6.0 (includes patients #6585 Extubated in OR = Yes)

2024 Value-Based Reimbursement Measurement Specifications
Adult Cardiac Surgery

2024 Value-Based Reimbursement Measure #1:
Multiple Arterial Grafting for Patients <70 Years Old

Description
Percentage of patients less than 70 years old undergoing isolated CAB who receive two or more distal anastomoses using an arterial conduit.

Rationale
Evidence has shown that multiple arterial grafting using the internal mammary and radial arteries during coronary artery bypass surgery improves long-term survival [4]. Patients receiving arterial grafts experience lower rates of recurrent angina, lower rates of myocardial infarction, and lower rates for the need for repeat revascularization. Current guidelines from U.S. and European societies encourage the use of multiple arterial grafting in patients who have anticipated long-life expectancy [5-8].

Measurement Time Period
January 1, 2024 – September 30, 2024

Inclusion Criteria
All Isolated CAB cases less than 70 years old

Exclusion Criteria
- Patients with previous CAB (#670)
- Patients with one bypass graft (#2770)
- Emergent and Emergent Salvage case status (#1975)
- IMA was not used for one of the following reasons: (#2629)
    - Subclavian stenosis
    - Previous cardiac or thoracic surgery
    - Previous mediastinal radiation
    - Emergent or Salvage procedure
    - No LAD disease
- Patients with total number of distal anastomoses with arterial conduits missing (#2631)

Variables used in Numerator
Total Number of Distal Anastomoses with Arterial Conduits (#2631) (>=2)

2024 Value-Based Reimbursement Measure #2:
Intraoperative Glucose Management

Description
Percentage of all risk adjusted procedure patients whose highest intraoperative glucose is <180 mg/dl.

Rationale
Acute hyperglycemia in the perioperative period is known to increase the incidence of wound infections, overall mortality, length of stay, acute kidney injury, and delayed wound healing.[9-16,19] Use of insulin to correct perioperative hyperglycemia decreases the risk of hospital complications and mortality in cardiac and general surgery patients.[16,17] The American Association of Clinical Endocrinologists and American Diabetes Association recommend a treatment threshold of 180 mg/dL in critically ill hospitalized patients and a preprandial blood glucose goal of 140 mg/dL in non-critically hospitalized ill patients.[18]

Measurement Time Period
January 1, 2024 – September 30, 2024

Inclusion Criteria
All Risk Adjusted Procedures

Exclusion Criteria
- Patients with missing intraoperative highest glucose (#2320)

Variables used in Numerator
Highest Intra-Op Glucose (SEQ #2320) (<180)

2024 Value-Based Reimbursement Measure #3:
Assessment and Documentation of Clinical Frailty Score for All Non-Emergent Cardiac Surgery Patients

Description
Percentage of all non-emergent cardiac surgery patients with a documented Clinical Frailty Score (CFS).

Rationale
Frailty has been associated with a higher likelihood of experiencing mortality, morbidity, functional decline, and MACCE following cardiac surgery [25]. Use of a validated Clinical Frailty Score [26] may provide additional insight into the relationship between frailty and cardiac surgery outcomes, leading to the development of interventions to improve outcomes for frail patients [19]. CFS-guided care may reduce healthcare costs by identifying and addressing frailty early, thereby preventing complications, readmissions, and the need for prolonged care [20].

Measurement Time Period
January 1, 2024 – September 30, 2024

Inclusion Criteria
- All STS elective and urgent status cardiac surgery patients (#1975)

Exclusion Criteria
- Patients with emergent or emergent salvage operative status (#1975)
- Patients undergoing a transcatheter procedure (#3400, #3501, #3610, #3637, #3652, #3695, #4953)

Variables used in Numerator
Clinical Frailty Score (CFS) documented in the medical recorded, captured, and submitted to MSTCVS QC.
https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html

REFERENCES

1. Landoni, G., et al. (2010). "Early Extubation After Cardiac Operations: A Prognostic Factor for Lower Costs?" *The Annals of Thoracic Surgery*, 89(5), 1551-1556.
2. Harrois, A., et al. (2014). "Early Extubation Combined with Multimodal Analgesia as Part of a Fast-Track Cardiac Anesthesia and Surgery Program is Associated with Reduced Postoperative Morbidity and Mortality." *Journal of Cardiothoracic and Vascular Anesthesia*, 28(6), 1621-1627.
3. Brooks-Brunn, J. A. (2000). Predictors of Postoperative Pulmonary Complications Following Abdominal Surgery. Chest, 118(5), 1383-13894. Thuijs, D. J. F. M., Davierwala, P., Milojevic, M., Deo, S. V., Noack, T., Kappetein, A. P., Serruys, P. W., Mohr, F. W., Morice, M. C., Mack, M. J., Ståhle, L. E. G. E., Verberkmoes, N. J., Holmes, D. R., & Head, S. J. (2021). Long-term survival after coronary bypass surgery with multiple versus single arterial grafts. *European Journal of Cardio-Thoracic Surgery*, *61*(4), 925–933. https://doi.org/10.1093/ejcts/ezab392
4. Aldea, G. S., Bakaeen, F. G., Pal, J., Fremes, S., Head, S. J., Sabik, J., Rosengart, T., Kappetein, A. P., Thourani, V. H., Firestone, S., & Mitchell, J. D. (2016). The Society of Thoracic Surgeons Clinical Practice Guidelines on Arterial Conduits for Coronary Artery Bypass Grafting. *The Annals of Thoracic Surgery*, *101*(2), 801–809. https://doi.org/10.1016/j.athoracsur.2015.09.100
5. Blitz, A., Osterday, R. M., & Brodman, R. F. (2013). Harvesting the Radial Artery. *Annals of Cardiothoracic Surgery*, *2*(4), 533–542. https://doi.org/10.3978/j.issn.2225-319X.2013.07.10
6. Cancelli G, Audisio K, Chadow D, Soletti GJ, Gaudino M. The evidence for radial artery grafting: When and when not?. *JTCVS Tech*. 2021;10:114-119. Published 2021 Sep 24. doi:10.1016/j.xjtc.2021.09.039
7. Gaudino, M., Bakaeen, F. G., Benedetto, U., di Franco, A., Fremes, S., Glineur, D., Girardi, L. N., Grau, J., Puskas, J. D., Ruel, M., Tam, D. Y., Taggart, D. P., Antoniades, C., Patrono, C., Schwann, T. A., Tatoulis, J., & Tranbaugh, R. F. (2019). Arterial Grafts for Coronary Bypass. *Circulation*, *140*(15), 1273–1284. https://doi.org/10.1161/circulationaha.119.041096
8. Bellusse, Gislaine Cristhina, Julio Cesar Ribeiro, Isabel Cristina Martins de Freitas, and Cristina Maria Galvão. 2019. "Effect of Perioperative Hyperglycemia on Surgical Site Infection in Abdominal Surgery: A Prospective Cohort Study." *American Journal of Infection Control*, December. https://doi.org/10.1016/j.ajic.2019.11.009.
9. Frisch, Anna, Prakash Chandra, Dawn Smiley, Limin Peng, Monica Rizzo, Chelsea Gatcliffe, Megan Hudson, et al. 2010. "Prevalence and Clinical Outcome of Hyperglycemia in the Perioperative Period in Noncardiac Surgery." *Diabetes Care* 33 (8): 1783–88.
10. Gandhi, Gunjan Y., Gregory A. Nuttall, Martin D. Abel, Charles J. Mullany, Hartzell V. Schaff, Brent A. Williams, Lisa M. Schrader, Robert A. Rizza, and M. Molly McMahon. 2005. "Intraoperative Hyperglycemia and Perioperative Outcomes in Cardiac Surgery Patients." *Mayo Clinic Proceedings. Mayo Clinic* 80 (7): 862–66.
11. Kotagal, Meera, Rebecca G. Symons, Irl B. Hirsch, Guillermo E. Umpierrez, E. Patchen Dellinger, Ellen T. Farrokhi, David R. Flum, and SCOAP-CERTAIN Collaborative. 2015. "Perioperative Hyperglycemia and Risk of Adverse Events among Patients with and without Diabetes." *Annals of Surgery* 261 (1): 97–103.
12. Kwon, Steve, Rachel Thompson, Patchen Dellinger, David Yanez, Ellen Farrohki, and David Flum. 2013. "Importance of Perioperative Glycemic Control in General Surgery: A Report from the Surgical Care and Outcomes Assessment Program." *Annals of Surgery* 257 (1): 8–14.
13. Mendez, Carlos E., Paul J. Der Mesropian, Roy O. Mathew, and Barbara Slawski. 2016. "Hyperglycemia and Acute Kidney Injury During the Perioperative Period." *Current Diabetes Reports* 16 (1): 10.
14. Ramos, Margarita, Zain Khalpey, Stuart Lipsitz, Jill Steinberg, Maria Theresa Panizales, Michael Zinner, and Selwyn O. Rogers. 2008. "Relationship of Perioperative Hyperglycemia and Postoperative Infections in Patients Who Undergo General and Vascular Surgery." *Annals of Surgery* 248 (4): 585–91.

15. Umpierrez, Guillermo E., Scott D. Isaacs, Niloofar Bazargan, Xiangdong You, Leonard M. Thaler, and Abbas E. Kitabchi. 2002. "Hyperglycemia: An Independent Marker of in-Hospital Mortality in Patients with Undiagnosed Diabetes." *The Journal of Clinical Endocrinology and Metabolism* 87 (3): 978–82.
16. Furnary, Anthony P., Guangqiang Gao, Gary L. Grunkemeier, Yingxing Wu, Kathryn J. Zerr, Stephen O. Bookin, H. Storm Floten, and Albert Starr. 2003. "Continuous Insulin Infusion Reduces Mortality in Patients with Diabetes Undergoing Coronary Artery Bypass Grafting." *The Journal of Thoracic and Cardiovascular Surgery* 125 (5): 1007–21.
17. Moghissi, Etie S., Mary T. Korytkowski, Monica DiNardo, Daniel Einhorn, Richard Hellman, Irl B. Hirsch, Silvio E. Inzucchi, et al. 2009. "American Association of Clinical Endocrinologists and American Diabetes Association Consensus Statement on Inpatient Glycemic Control." *Diabetes Care* 32 (6): 1119–31.
18. Lazar H., McDonnell M., Chipkin S., Furnary A., Engelman R., Sadhy A., Bridges C., Hann C., Svedjeolm R., Taegtmeyer H., SHemin R. 2009. The Society of Thoracic Surgeons Practice Guideline Series: Blood Glucose Management During Adult Cardiac Surgery. *The Annals of Thoracic Surgery*, 87: 663-9.
19. Alsharqawi, N.,Thampi, S., Kayani, W.T., Khan, R., London, M.J., & Siddiqui, O.(2020). "Frailty Assessment and Outcomes After Cardiac Surgery: A Systematic Review and Meta-Analysis." *The Journal of Heart and Lung Transplantation,* 39(7), S124.
20. Tse, H.F., Wai, A.K.C., Yu, S.C.H., & Jolissaint, L. (2021). "Frailty in Cardiac Surgery: A Comprehensive Narrative Review." *Journal of Cardiac Surgery*, 36(9), 3024-3037
21. Shih, T., Paone, G., Theurer, P. F., McDonald, D., Shahian, D. M., & Prager, R. L. (2015). The Society of Thoracic Surgeons Adult Cardiac Surgery Database Version 2.73: More Is Better. *The Annals of Thoracic Surgery*, *100*(2), 516–521. https://doi.org/10.1016/j.athoracsur.2015.02.085
22. Bergquist CS, Jackson EA, Thompson MP, Cabrera L, Paone G, DeLucia A 3rd, He C, Prager RL, Likosky DS; Michigan Society of Thoracic and Cardiovascular Surgeons Quality Collaborative. Understanding the association between frailty and cardiac surgical outcomes. Ann Thorac Surg. 2018;106:1326–1332. doi: 10.1016/j.athoracsur.2018.06.017
23. Shinall MC Jr, Arya S, Youk A, Varley P, Shah R, Massarweh NN, Shireman PK, Johanning JM, Brown AJ, Christie NA, et al. Association of preoperative patient frailty and operative stress with postoperative mortality. JAMA Surg. 2020;155:e194620. doi: 10.1001/jamasurg.2019.4620
24. Niv Ad, Holmes, S. D., Halpin, L., Shuman, D. J., Miller, C., & Lamont, D. (2016). The Effects of Frailty in Patients Undergoing Elective Cardiac Surgery. *Journal of Cardiac Surgery*, *31*(4), 187–194. https://doi.org/10.1111/jocs.12699
25. Sepehri, A., Beggs, T., Hassan, A., Rigatto, C., Shaw-Daigle, C., Navdeep Tangri, & Arora, R. C. (2014). The impact of frailty on outcomes after cardiac surgery: A systematic review. The Journal of Thoracic and Cardiovascular Surgery, 148(6), 3110–3117. https://doi.org/10.1016/j.jtcvs.2014.07.087
26. Rockwood, K. (2005). A global clinical measure of fitness and frailty in elderly people. Canadian Medical Association Journal, 173(5), 489–495. https://doi.org/10.1503/cmaj.050051