

**Effective November 1, 2023, refer to CMS Reasonable and Necessary for services included in this policy.**



**BlueCross BlueShield  
of Alabama**

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**Name of Blue Advantage Policy:**

**Endovascular Stent Grafts for Abdominal Aortic Aneurysms**

Policy #: 645

Latest Review Date: May 2023

Category: Surgery

**ARCHIVED 11/1/2023**

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**BACKGROUND:**

*Blue Advantage medical policy does not conflict with Local Coverage Determinations (LCDs), Local Medical Review Policies (LMRPs) or National Coverage Determinations (NCDs) or with coverage provisions in Medicare manuals, instructions or operational policy letters. In order to be covered by Blue Advantage the service shall be reasonable and necessary under Title XVIII of the Social Security Act, Section 1862(a)(1)(A). The service is considered reasonable and necessary if it is determined that the service is:*

1. *Safe and effective;*
2. *Not experimental or investigational\*;*
3. *Appropriate, including duration and frequency that is considered appropriate for the service, in terms of whether it is:*
  - *Furnished in accordance with accepted standards of medical practice for the diagnosis or treatment of the patient's condition or to improve the function of a malformed body member;*
  - *Furnished in a setting appropriate to the patient's medical needs and condition;*
  - *Ordered and furnished by qualified personnel;*
  - *One that meets, but does not exceed, the patient's medical need; and*
  - *At least as beneficial as an existing and available medically appropriate alternative.*

*\*Routine costs of qualifying clinical trial services with dates of service on or after September 19, 2000 which meet the requirements of the Clinical Trials NCD are considered reasonable and necessary by Medicare. Providers should bill **Original Medicare** for covered services that are related to **clinical trials** that meet Medicare requirements (Refer to Medicare National Coverage Determinations Manual, Chapter 1, Section 310 and Medicare Claims Processing Manual Chapter 32, Sections 69.0-69.11).*

## **POLICY:**

**Blue Advantage** will treat **endovascular stent grafts** approved by the U.S. Food and Drug Administration (FDA) and used according to device indications, as a **covered benefit** for the treatment of abdominal aortic aneurysms (AAA).

*Blue Advantage does not approve or deny procedures, services, testing, or equipment for our members. Our decisions concern coverage only. The decision of whether or not to have a certain test, treatment or procedure is one made between the physician and his/her patient. Blue Advantage administers benefits based on the members' contract and medical policies. Physicians should always exercise their best medical judgment in providing the care they feel is most appropriate for their patients. Needed care should not be delayed or refused because of a coverage determination.*

## **DESCRIPTION OF PROCEDURE OR SERVICE:**

Endovascular stent grafts can be used as minimally invasive alternatives to open surgical repair for treatment of AAA. Open surgical repair of AAAs has high morbidity and mortality, and endovascular grafts have the potential to reduce the operative risk associated with AAA repair.

Management of a clinically significant AAA consists of surgical excision with placement of a sutured woven graft or endovascular grafting. Surgical excision is associated with a perioperative mortality rate between 1% and 5%. Perioperative morbidity and mortality are highest in older female patients with cardiac, pulmonary, or kidney disease; the most common cause of death is multisystem organ failure.

Due to the high mortality rate, endovascular prostheses were developed as a less risky and minimally invasive, catheter-based alternative to open surgical excision of AAAs. These devices are deployed across the aneurysm such that the aneurysm is effectively “excluded” from the circulation, with subsequent restoration of normal blood flow.

The main potential advantage of endovascular grafts for an AAA is that they offer a less invasive and less risky approach to the repair of abdominal aneurysms. While the use of an endovascular approach has the potential to reduce the relatively high perioperative morbidity and mortality associated with open AAA repair, use of endovascular grafts also has potential disadvantages. In particular, there are concerns about the durability of the anchoring system, aneurysm expansion, and other late complications related to the prosthetic graft. Aneurysm expansion may result from perivascular leaks, also known as endoleaks, which are a unique complication of endoprostheses. Perivascular leaks may result from an incompetent seal at one of the graft attachment sites, blood flow in aneurysm tributaries (these tributaries are ligated during open surgery), or perforation of graft fabric.

Several types of grafts are currently in use: straight grafts, in which both ends are anchored to the infrarenal aorta, and bifurcated grafts, in which the proximal end is anchored to the infrarenal aorta, and the distal ends are anchored to the iliac arteries. Fenestrated grafts have also been

investigated. These grafts are designed with openings in the wall that can be placed across the renal or celiac arteries while still protecting vessel patency through these critical arteries. In addition, extensions can be placed from inside the main endograft body into the visceral arteries to create a hemostatic seal.

## **KEY POINTS:**

The most recent literature update covers the period through March 16, 2023.

### **Summary of Evidence**

For individuals who have AAAs eligible for open repair who receive endovascular stent grafts, the evidence includes randomized controlled trials (RCTs), systematic reviews of RCTs, and cohort studies. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. Evidence from a patient-level meta-analysis of 4 RCTs comparing endovascular aneurysm repair (EVAR) with open repair for elective treatment of AAAs has indicated that neither approach is clearly superior to the other. While EVAR is associated with an early reduction in mortality, outcomes at 5 years or longer have shown a greater reintervention rates and endovascular mortality and comparable overall survival rates for EVAR and open repair. Thus, the early advantage of EVAR is offset by a higher rate of late complications over the long term. Based on these data, EVAR may be considered as an alternative to open surgery in patients who are candidates for both procedures. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have ruptured AAAs who receive endovascular stent grafts, the evidence includes RCTs, systematic reviews of RCTs and nonrandomized comparative studies. Relevant outcomes are overall survival, morbid events, and treatment-related mortality and morbidity. For patients with ruptured AAAs, evidence from 3 RCTs and 2 meta-analyses have indicated that short- and intermediate-term survival (up to 1 year) following EVAR is comparable with open repair, while perioperative complications are reduced with EVAR. Evidence from a large nonrandomized matched comparison demonstrated that EVAR is associated with a perioperative mortality benefit up to 4 years post surgery, at the cost of the increased likelihood of the need for reintervention. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

### **Practice Guidelines and Position Statements**

#### **American College of Cardiology Foundation and American Heart Association**

In 2022, the American College of Cardiology and the American Heart Association (ACC/AHA) published a guideline for the management of aortic disease, including AAA. Recommendations from the guideline regarding AAA repair are listed below.

## Guideline on Management of Patients with Aortic Disease: Abdominal Aortic Aneurysm Repair

Recommendation	COR	LOE
In patients with nonruptured AAA with low to moderate operative risk and suitable anatomy, a shared decision-making process weighing the risks and benefits of endovascular versus open repair is recommended.	I	A
In patients with nonruptured AAA with high operative risk, endovascular repair is reasonable to reduce risk of 30-day morbidity, mortality, or both.	IIa	B-NR
In patients with nonruptured AAA with moderate to high operative risk and suitable anatomy for an FDA-approved fenestrated endovascular device, endovascular repair is reasonable over open repair to reduce risk of perioperative complications.	IIa	B-NR
In patients with ruptured AAA with suitable anatomy, endovascular repair is recommended over open repair to reduce risk of morbidity and mortality.	I	B-R

AAA: abdominal aortic aneurysm; COR: class of recommendation; FDA: Food and Drug Administration; LOE: level of evidence; NR: nonrandomized; R: randomized.

In 2011, the ACC/AHA released an update to their 2005 guidelines on the management of AAAs that focused on the management of patients with peripheral artery disease. These guidelines made the following recommendations:

## Guidelines on Management of Patients with Peripheral Artery Disease

Recommendation	COR	LOE
Open or endovascular repair of infrarenal AAAs and/or common iliac aneurysms is indicated in patients who are good surgical candidates	I	A
Periodic long-term surveillance imaging should be performed to monitor for endoleak, confirm graft position, document shrinkage or stability of the excluded aneurysm sac, and determine the need for further intervention in patients who have undergone endovascular repair of infrarenal aortic and/or iliac aneurysms	I	A
Open aneurysm repair is reasonable to perform in patients who are good surgical candidates but who cannot comply with the periodic long-term surveillance required after endovascular repair	IIa	C

Endovascular repair of infrarenal aortic aneurysms in patients who are at high surgical or anesthetic risk as determined by the presence of coexisting severe cardiac, pulmonary, and/or renal disease is of uncertain effectiveness	IIb	C
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AAA: abdominal aortic aneurysm; COR: class of recommendation; LOE: level of evidence.

In 2006, the ACC/AHA suggested in their professional guidelines, based on both randomized and nonrandomized trials, that endovascular repair of infrarenal aortic and/or common iliac aneurysms is reasonable in patients at high risk of complication from open surgeries.

### **Society of Interventional Radiology et al**

Guidelines on the use of EVAR were developed jointly by the Society of Interventional Radiology, the Cardiovascular and Interventional Radiological Society of Europe, and the Canadian Interventional Radiology Association in 2010. These guidelines indicated that:

“Indications for EVAR are currently the same as open repair....”

“Patient preference for EVAR versus open repair should be considered when appropriate....”

“Endovascular abdominal aortic aneurysm repair should be considered as having an intermediate to high cardiac risk that ranges from 3% to 7%.”

There has been increasing use of EVAR for ruptured aneurysms. “Achieving optimal EVAR results for ruptured AAA requires establishment of a treatment protocol involving the emergency department, the endovascular team, anesthesiology, and the operating room personnel.”

“Lifelong imaging surveillance of patients after EVAR is critical for:

1. The detection and, if possible, the characterization of endoleaks;
2. Evidence of expansion or shrinkage of the residual AAA sac through measurement of aneurysm size, volume calculation, and identification of substantial changes in aneurysm dimensions;
3. Detection of mechanical changes in the stent-graft, such as migration, kinking, or fracture;
4. Evaluation of the long-term performance of the endoprosthesis.”

### **Society for Vascular Surgery**

The Society for Vascular Surgery published guidelines for the treatment of AAAs in 2018. As in previous publications, these guidelines indicated that open surgery and EVAR are options for patients with aneurysms that meet the current treatment threshold. These guidelines also contained the following statements and recommendations.

## Guidelines on Management of Patients with Aneurysms

Recommendation	QOE	LOR
EVAR is progressively replacing open surgery as the treatment of choice, and accounts for more than half of all elective AAA repairs in the United States		
Emergent EVAR should be considered for treatment of a ruptured AAA, if anatomically feasible	Moderate	Strong
EVAR may be considered for high-risk patients unfit for surgical repair	Low	Weak
For patients with ruptured aneurysm, immediate repair is recommended.	High	Strong

AAA: abdominal aortic aneurysm; EVAR: endovascular aneurysm repair; LOR: level of recommendation; QOE: quality of evidence.

### National Institute for Health and Care Excellence

Recommendations for the diagnosis and management of AAAs were published by the National Institute for Health and Care Excellence (NICE) in March 2020.

Recommendations for repairing unruptured aneurysms include:

- "1.5.1: Consider aneurysm repair for people with an unruptured AAA, if it is:
  - symptomatic
  - asymptomatic, larger than 4.0 cm, and has grown by more than 1 cm in 1 year (measured inner-to-inner maximum anterior-posterior aortic diameter on ultrasound)
  - asymptomatic and 5.5 cm or larger (measured inner-to-inner maximum anterior-posterior aortic diameter on ultrasound)."
- "1.5.4: Consider endovascular aneurysm repair (EVAR) for people with unruptured AAAs who meet the criteria in recommendation 1.5.1 and who have abdominal copathology, such as a hostile abdomen, horseshoe kidney or a stoma, or other considerations, specific to and discussed with the person, that may make EVAR the preferred option"
- "1.5.5: Consider EVAR or conservative management for people with unruptured AAAs meeting the criteria in recommendation 1.5.1 who have anaesthetic risks and/or medical comorbidities that would contraindicate open surgical repair."

Recommendations for repairing ruptured aneurysms include:

- "1.6.1: Consider endovascular aneurysm repair (EVAR) or open surgical repair for people with a ruptured infrarenal abdominal aortic aneurysm (AAA). Be aware that:
  - EVAR provides more benefit than open surgical repair for most people, especially men over 70 and women of any age

- Open surgical repair is likely to provide a better balance of benefits and harms in men under 70."
- "1.6.2: Consider open surgical repair for people with a ruptured AAA if standard EVAR is unsuitable."

### **U.S. Preventive Services Task Force Recommendations**

Recommendations from the U.S. Preventive Services Task Force (USPSTF) on AAA screening were updated on December 10, 2019. The USPSTF notes the following in their section on "Current Practice" as it relates to this topic:

"The standard of care for elective repair is that patients with an AAA of 5.5 cm or larger in diameter should be referred for surgical intervention with either open repair or EVAR. This recommendation is based on RCTs conducted in men. The AAA size needed for surgical intervention in women may differ. As a result, guidelines from the Society for Vascular Surgery recommend repairing AAAs between 5.0 and 5.4 cm in diameter in women. However, concerns about poorer surgical outcomes in women, who have more complex anatomy and smaller blood vessels, have led some to caution against lowering the threshold for surgical intervention in women."

### **KEY WORDS:**

EVAR, AAA, abdominal aortic aneurysm, endovascular repair, AneuRx® Prosthesis System, Gore® Excluder®, Zenith® AAA Endovascular Graft, Endologix Powerlink®, Talent® Abdominal Stent Graft System, Endurant® II, Ovation™, Aorfix™, abdominal aneurysm, TREO

### **APPROVED BY GOVERNING BODIES:**

A large number of endovascular grafts have been approved by the U.S. Food and Drug Administration (FDA) through the premarket approval (PMA) process for treatment of AAAs (see Table 3). The original PMA dates are shown. Most stents have undergone device modification, name changes, and have approved supplements to the original PMA.

**Table 3: Abdominal Aortic Stent Grafts Approved by FDA**

Stent Name	PMA Applicant	Approval Date	PMA No.
AneuRx® Prosthesis System (AneuRx AAAdvantage Stent Graft)	Medtronic Vascular	1999	P990020
Ancure® Aortoiliac System	Guidant Endovascular Technologies	2002	P990017
Gore® Excluder®	W.L. Gore & Associates	2002	P020004

Zenith® AAA Endovascular Graft	Cook	2003	P020018
Talent® Abdominal Stent Graft System	Medtronic	2008	P070027
Endologix Powerlink® (Afx Endovascular AAA system)	Endologix	2004	P040002
Endurant® II AAA Stent Graft System	Medtronic	2010	P100021
Ovation™ Abdominal Stent Graft System	TriVascular	2012	P120006
Aorfix™ AAA Flexible Stent Graft System	Lombard Medical	2013	P110032
Incraft® AAA Stent Graft System	Cordis	2018	P150002
TREO®	Bolten Medical	2020	P190015

PMA: premarket approval.

### **BENEFIT APPLICATION:**

Coverage is subject to member's specific benefits. Group-specific policy will supersede this policy when applicable.

### **CURRENT CODING:**

#### **CPT Codes:**

The overall procedure involves 4 steps: establishing vascular access, introducing catheters and guide wires into the arterial system, deploying the endoprosthesis, and radiologic supervision. Below are the codes for the procedure.

34701	Endovascular repair of infrarenal aorta by deployment of an aorto-aortic tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the aortic bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the aortic bifurcation; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer)
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34702	Endovascular repair of infrarenal aorta by deployment of an aorto-aortic tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the aortic bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the aortic bifurcation; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer, traumatic disruption)
34703	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-uni-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer)
34704	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-uni-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer, traumatic disruption)
34705	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-bi-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer)
34706	Endovascular repair of infrarenal aorta and/or iliac artery(ies) by deployment of an aorto-bi-iliac endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, all endograft extension(s) placed in the aorta from the level of the renal arteries to the iliac bifurcation, and all angioplasty/stenting performed from the level of the renal arteries to the iliac bifurcation; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, penetrating ulcer, traumatic disruption)

34707	Endovascular repair of iliac artery by deployment of an ilio-iliac tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally to the iliac bifurcation, and treatment zone angioplasty/stenting, when performed, unilateral; for other than rupture (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation)
34708	Endovascular repair of iliac artery by deployment of an ilio-iliac tube endograft including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and all endograft extension(s) proximally to the aortic bifurcation and distally to the iliac bifurcation, and treatment zone angioplasty/stenting, when performed, unilateral; for rupture including temporary aortic and/or iliac balloon occlusion, when performed (eg, for aneurysm, pseudoaneurysm, dissection, arteriovenous malformation, traumatic disruption)
34709	Placement of extension prosthesis(es) distal to the common iliac artery(ies) or proximal to the renal artery(ies) for endovascular repair of infrarenal abdominal aortic or iliac aneurysm, false aneurysm, dissection, penetrating ulcer, including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and treatment zone angioplasty/stenting, when performed, per vessel treated (List separately in addition to code for primary procedure)
34710	Delayed placement of distal or proximal extension prosthesis for endovascular repair of infrarenal abdominal aortic or iliac aneurysm, false aneurysm, dissection, endoleak, or endograft migration, including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and treatment zone angioplasty/stenting, when performed; initial vessel treated
34711	Delayed placement of distal or proximal extension prosthesis for endovascular repair of infrarenal abdominal aortic or iliac aneurysm, false aneurysm, dissection, endoleak, or endograft migration, including pre-procedure sizing and device selection, all nonselective catheterization(s), all associated radiological supervision and interpretation, and treatment zone angioplasty/stenting, when performed; each additional vessel treated (List separately in addition to code for primary procedure)
34712	Transcatheter delivery of enhanced fixation device(s) to the endograft (eg, anchor, screw, tack) and all associated radiological supervision and interpretation
34713	Percutaneous access and closure of femoral artery for delivery of endograft through a large sheath (12 French or larger), including ultrasound guidance, when performed, unilateral (List separately in addition to code for primary procedure)

34714	Open femoral artery exposure with creation of conduit for delivery of endovascular prosthesis or for establishment of cardiopulmonary bypass, by groin incision, unilateral (List separately in addition to code for primary procedure)
34715	Open axillary/subclavian artery exposure for delivery of endovascular prosthesis by infraclavicular or supraclavicular incision, unilateral (List separately in addition to code for primary procedure)
34716	Open axillary/subclavian artery exposure with creation of conduit for delivery of endovascular prosthesis or for establishment of cardiopulmonary bypass, by infraclavicular or supraclavicular incision, unilateral (List separately in addition to code for primary procedure)
34812	Open femoral artery exposure for delivery of endovascular prosthesis, by groin incision, unilateral (List separately in addition to code for primary procedure)
34820	Open iliac artery exposure for delivery of endovascular prosthesis or iliac occlusion during endovascular therapy, by abdominal or retroperitoneal incision, unilateral (List separately in addition to code for primary procedure)
34839	Physician planning of a patient-specific fenestrated visceral aortic endograft requiring a minimum of 90 minutes of physician time.
34841	Endovascular repair of visceral aorta (e.g., aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) by deployment of a fenestrated visceral aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including one visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34842	;including two visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34843	;including three visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34844	;including three visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])

34845	Endovascular repair of visceral aorta and infrarenal abdominal aorta (e.g., aneurysm, pseudoaneurysm, dissection, penetrating ulcer, intramural hematoma, or traumatic disruption) with a fenestrated visceral aortic endograft and concomitant unibody or modular infrarenal aortic endograft and all associated radiological supervision and interpretation, including target zone angioplasty, when performed; including one visceral artery endoprosthesis (superior mesenteric, celiac or renal artery)
34846	;including two visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34847	;including two visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
34848	;including two visceral artery endoprostheses (superior mesenteric, celiac and/or renal artery[s])
36200	Induction of catheter, aorta

## REFERENCES:

1. AlOthman O, Bobat S. Comparison of the Short and Long-Term Outcomes of Endovascular Repair and Open Surgical Repair in the Treatment of Unruptured Abdominal Aortic Aneurysms: Meta-Analysis and Systematic Review. *Cureus*. Aug 12 2020; 12(8):e9683.
2. Antoniou GA, Juszczak MT, Antoniou SA, et al. Editor's Choice - Fenestrated or Branched Endovascular versus Open Repair for Complex Aortic Aneurysms: Meta-Analysis of Time to Event Propensity Score Matched Data. *Eur J Vasc Endovasc Surg*. Feb 2021; 61(2): 228-237.
3. Antonopoulos CN, Moulakakis KG, Rorris FP, et al. Individual Patient Data Meta-Analysis of 10-Year Follow-Up after Endovascular and Open Repair for Ruptured Abdominal Aortic Aneurysms. *Ann Vasc Surg*. Jan 21 2023.
4. Atkins AD, Atkins MD. Branched and Fenestrated Aortic Endovascular Grafts. *Methodist DeBakey Cardiovasc J*. 2023; 19(2): 15-23.
5. Badger S, Bedenis R, Blair PH, et al. Endovascular treatment for ruptured abdominal aortic aneurysm. *Cochrane Database Syst Rev*. 2014; 7:CD005261.
6. Badger S, Forster R, Blair PH, et al. Endovascular treatment for ruptured abdominal aortic aneurysm. *Cochrane Database Syst Rev*. May 26 2017; 5:CD005261.
7. Becquemin JP, Pillet JC, Lescalie F, et al. A randomized controlled trial of endovascular aneurysm repair versus open surgery for abdominal aortic aneurysms in low- to moderate-risk patients. *J Vasc Surg*. May 2011; 53(5):1167-1173 e1161.
8. Biancari F, Catania A, D'Andrea V. Elective endovascular vs. open repair for abdominal aortic aneurysm in patients aged 80 years and older: systematic review and meta-analysis. *Eur J Vasc Endovasc Surg*. Nov 2011; 42(5):571-576.

9. Blue Cross and Blue Shield Association. Endovascular Stent-Grafts for Abdominal Aortic Aneurysm Repair. TEC Assessment Program. 2001; 16(2).
10. Blum U, Voshage G, Lammer J, et al. Endoluminal stent-grafts for infrarenal abdominal aortic aneurysms. N Engl J Med. Jan 2 1997; 336(1):13-20.
11. Braithwaite B, Cheshire NJ, Greenhalgh RM, et al. Endovascular strategy or open repair for ruptured abdominal aortic aneurysm: one-year outcomes from the IMPROVE randomized trial. Eur Heart J. Aug 14 2015; 36(31): 2061-2069.
12. Brown LC, Thompson SG, Greenhalgh RM, et al. Incidence of cardiovascular events and death after open or endovascular repair of abdominal aortic aneurysm in the randomized EVAR trial 1. Br J Surg. Jul 2011; 98(7):935-942.
13. Bulder RMA, Bastiaannet E, Hamming JF, et al. Meta-analysis of long-term survival after elective endovascular or open repair of abdominal aortic aneurysm. Br J Surg. Apr 2019; 106(5): 523-533.
14. Cao P, De Rango P, Verzini F, et al. Comparison of surveillance versus aortic endografting for small aneurysm repair (CAESAR): results from a randomised trial. Eur J Vasc Endovasc Surg. Jan 2011; 41(1):13-25.
15. Chen ZG, Tan SP, Diao YP, et al. The long-term outcomes of open and endovascular repair for abdominal aortic aneurysm: A meta-analysis. Asian J Surg. Oct 2019; 42(10): 899-906.
16. De Bruin JL, Baas AF, Buth J, et al. Long-term outcome of open or endovascular repair of abdominal aortic aneurysm. N Engl J Med. May 20 2010; 362(20):1881-1889.
17. De Rango P, Verzini F, Parlani G, et al. Quality of life in patients with small abdominal aortic aneurysm: the effect of early endovascular repair versus surveillance in the CAESAR trial. Eur J Vasc Endovasc Surg. Mar 2011; 41(3):324-331.
18. Desgranges P, Kobeiter H, Katsahian S, et al. ECAR (Endovasculaire ou Chirurgie dans les Anevrysmes aorto-iliaques Rompus): A French randomized controlled trial of endovascular versus open surgical repair of ruptured aorto-iliac aneurysms. Eur J Vasc Endovasc Surg. Sep 2015; 50(3):303-310.
19. Edwards ST, Schermerhorn ML, O'Malley AJ, et al. Comparative effectiveness of endovascular versus open repair of ruptured abdominal aortic aneurysm in the Medicare population. J Vasc Surg. Mar 2014; 59(3):575-582.
20. Filardo G, Powell JT, Martinez MA, et al. Surgery for small asymptomatic abdominal aortic aneurysms. Cochrane Database Syst Rev. 2012; 3:CD001835.
21. Greenhalgh RM, Brown LC, Powell JT, et al. Endovascular repair of aortic aneurysm in patients physically ineligible for open repair. N Engl J Med. May 20 2010; 362(20):1872-1880.
22. Greenhalgh RM, Brown LC, Powell JT, et al. Endovascular versus open repair of abdominal aortic aneurysm. N Engl J Med. May 20 2010; 362(20):1863-1871.
23. Improve Trial Investigators, Powell JT, Sweeting MJ, et al. Endovascular or open repair strategy for ruptured abdominal aortic aneurysm: 30 day outcomes from IMPROVE randomised trial. BMJ. 2014; 348:f7661.

24. Improve Trial Investigators. Endovascular strategy or open repair for ruptured abdominal aortic aneurysm: one-year outcomes from the IMPROVE randomized trial. *Eur Heart J*. Aug 14 2015; 36(31):2061-2069.
25. IOM (Institute of Medicine). 2011. *Clinical Practice Guidelines We Can Trust*. Washington, DC: The National Academies Press.
26. Isselbacher EM, Preventza O, Hamilton Black Iii J, et al. 2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease: A Report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. *J Am Coll Cardiol*. Dec 13 2022; 80(24): e223-e393.
27. Krenzien F, Matia I, Wiltberger G, et al. Outcome after open surgery repair in endovascular-suitable patients with ruptured abdominal aortic aneurysms. *Vasa*. Nov 2013; 42(6):442-448.
28. Khoury MK, Heid CA, Rectenwald JE, et al. Understanding who benefits from endovascular aortic repair in those deemed unfit for open repair. *J Vasc Surg*. Feb 25 2022.
29. Lederle FA, Freischlag JA, Kyriakides TC, et al. Long-term comparison of endovascular and open repair of abdominal aortic aneurysm. *N Engl J Med*. Nov 22 2012; 367(21):1988-1997.
30. Lederle FA, Kyriakides TC, Stroupe KT, et al. Open versus Endovascular Repair of Abdominal Aortic Aneurysm. *N Engl J Med*. May 30 2019; 380(22): 2126-2135.
31. Li B, Khan S, Salata K, et al. A systematic review and meta-analysis of the long-term outcomes of endovascular versus open repair of abdominal aortic aneurysm. *J Vasc Surg*. Sep 2019; 70(3): 954-969.e30.
32. Liang NL, Reitz KM, Makaroun MS, et al. Comparable perioperative mortality outcomes in younger patients undergoing elective open and endovascular abdominal aortic aneurysm repair. *J Vasc Surg*. May 2018;67(5):1404-1409 e1402.
33. Lim S, Halandras PM, Park T, et al. Outcomes of endovascular abdominal aortic aneurysm repair in high-risk patients. *J Vasc Surg*. Apr 2015; 61(4):862-868.
34. Ouriel K, Clair DG, Kent KC, et al. Endovascular repair compared with surveillance for patients with small abdominal aortic aneurysms. *J Vasc Surg*. May 2010; 51(5):1081-1087.
35. Owens DK, Davidson KW, Krist AH, et al. Screening for Abdominal Aortic Aneurysm: US Preventive Services Task Force Recommendation Statement. *JAMA*. Dec 10 2019; 322(22): 2211-2218.
36. Paravastu SC, Jayarajasingam R, Cottam R, et al. Endovascular repair of abdominal aortic aneurysm. *Cochrane Database Syst Rev*. 2014; 1:CD004178.
37. Powell JT, Sweeting MJ, Thompson MM, et al. Endovascular or open repair strategy for ruptured abdominal aortic aneurysm: 30 day outcomes from IMPROVE randomised trial. *BMJ*. Jan 13 2014; 348: f7661.
38. Powell JT, Sweeting MJ, Ulug P, et al. Meta-analysis of individual-patient data from EVAR-1, DREAM, OVER and ACE trials comparing outcomes of endovascular or open repair for abdominal aortic aneurysm over 5 years. *Br J Surg*. Feb 2017; 104(3):166-178.
39. Reimerink JJ, Hoornweg LL, Vahl AC, et al. Endovascular repair versus open repair of ruptured abdominal aortic aneurysms: a multicenter randomized controlled trial. *Ann Surg*. Aug 2013; 258(2):248-256.

40. Rooke TW, Hirsch AT, Misra S, et al. 2011 ACCF/AHA focused update of the guideline for the management of patients with peripheral artery disease (updating the 2005 guideline): a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol. Nov 1 2011; 58(19):2020-2045.
41. Schermerhorn ML, Buck DB, O'Malley AJ, et al. Long-term outcomes of abdominal aortic aneurysm in the Medicare population. N Engl J Med. Jul 23 2015; 373(4):328-338.
42. Shahin Y, Dixon S, Kerr K, et al. Endovascular aneurysm repair offers a survival advantage and is cost-effective compared with conservative management in patients physiologically unfit for open repair. J Vasc Surg. Feb 2023; 77(2): 386-395.e3.
43. Sweeting MJ, Balm R, Desgranges P, et al. Individual-patient meta-analysis of three randomized trials comparing endovascular versus open repair for ruptured abdominal aortic aneurysm. Br J Surg. Sep 2015; 102(10):1229-1239.
44. Sweeting MJ, Patel R, Powell JT, et al. Endovascular repair of abdominal aortic aneurysm in patients physically ineligible for open repair: very long-term follow-up in the EVAR-2 randomized controlled trial. Ann Surg. Nov 2017;266(5):713-719.
45. Ulug P, Powell JT, Martinez MA, et al. Surgery for small asymptomatic abdominal aortic aneurysms. Cochrane Database SystRev. Jul 01 2020; 7: CD001835.
46. Ulug P, Sweeting MJ, von Allmen RS, et al. Morphological suitability for endovascular repair, non-intervention rates, and operative mortality in women and men assessed for intact abdominal aortic aneurysm repair: systematic reviews with meta-analysis. Lancet. Jun 24 2017;389(10088):2482-2491.
47. van Beek SC, Reimerink JJ, Vahl AC, et al. Outcomes after open repair for ruptured abdominal aortic aneurysms in patients with friendly versus hostile aortoiliac anatomy. Eur J Vasc Endovasc Surg. Apr 2014; 47(4):380-387.
48. Walker TG, Kalva SP, Yeddula K, et al. Clinical practice guidelines for endovascular abdominal aortic aneurysm repair: written by the Standards of Practice Committee for the Society of Interventional Radiology and endorsed by the Cardiovascular and Interventional Radiological Society of Europe and the Canadian Interventional Radiology Association. J Vasc Interv Radiol. Nov 2010; 21(11):1632-1655.
49. Yokoyama Y, Kuno T, Takagi H. Meta-analysis of phase-specific survival after elective endovascular versus surgical repair of abdominal aortic aneurysm from randomized controlled trials and propensity score-matched studies. J Vasc Surg. Oct 2020;72(4): 1464-1472.e6.

## **POLICY HISTORY:**

Adopted for Blue Advantage, June 2017

Available for comment June 31 through August 13, 2017

Medical Policy Group, December 2017

Medical Policy Group, June 2018

Medical Policy Group, June 2019

Medical Policy Group, June 2020

Medical Policy Group, June 2021

Medical Policy Group, May 2022  
Medical Policy Group, May 2023  
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*This medical policy is not an authorization, certification, explanation of benefits, or a contract. Eligibility and benefits are determined on a case-by-case basis according to the terms of the member's plan in effect as of the date services are rendered. All medical policies are based on (i) research of current medical literature and (ii) review of common medical practices in the treatment and diagnosis of disease as of the date hereof. Physicians and other providers are solely responsible for all aspects of medical care and treatment, including the type, quality, and levels of care and treatment.*

*This policy is intended to be used for adjudication of claims (including preadmission certification, predeterminations, and pre-procedure review) in Blue Cross and Blue Shield's administration of plan contracts.*