

AMERICAN SOCIETY OF PLASTIC SURGEONS (ASPS)

Abdominoplasty and Panniculectomy
Performance Measurement Set

ASPS Approved : October, 2017

©2018 American Society of Plastic Surgeons. All Rights Reserved.

Disclaimer:

These Performance Measures and related data specifications were developed by the American Society of Plastic Surgeons (ASPS) through a multi-disciplinary physician workgroup and are based on a systematic review of published literature and/or relevant clinical practice guidelines to facilitate quality improvement activities by physicians. These Performance Measures are not clinical guidelines and do not establish a standard of medical care, and have not been tested for all potential applications. They are not intended to establish fixed protocols, but rather to serve as metrics by which a health care provider's or facility's performance may be compared with national benchmarks. Patient care and treatment should always be based on the clinician's independent medical judgment, given the individual patient's clinical circumstances. The Performance Measures, while copyrighted, can be reproduced and distributed, without modification, for noncommercial purposes, for example, use by health care providers in connection with their practices. Commercial use is defined as the sale, license, or distribution of the Measures for commercial gain, or incorporation of the Measures into a product or service that is sold, licensed or distributed for commercial gain. Commercial uses of the Performance Measures require a license agreement between the user and the ASPS. The ASPS nor its members shall be responsible for any use of the Performance Measures

CPT copyright 2016 American Medical Association. All rights reserved. CPT is a registered trademark of the American Medical Association.

ICD-10 is copyright 2016 World Health Organization. All Rights Reserved.

Table of Contents	Page	Measure can be used for:
Intended Audience, and Patient Population	4	
Importance of Topic	4	
Technical Specifications: Introduction	4	
Measure Exceptions	5	
Measure #1 (ASPSQ11): Seroma rate after primary abdominoplasty	7	Quality Improvement Only
Measure #2 (ASPSQ12): Wound disruption rate after primary abdominoplasty	8	Quality Improvement Only
Measure #3 (ASPS TBD): Wound complications after primary panniculectomy in patients with BMI \geq 30	9	Accountability or Quality Improvement
Measure #4 (ASPS12): Unplanned hospital admission after panniculectomy	12	Accountability or Quality Improvement
Measure #5 (ASPSQ13): VTE Screening for patients undergoing panniculectomy or abdominoplasty	13	Quality Improvement Only
Evidence Classification/Rating Schemes	15	
References	16	
Appendix A: Abdominoplasty and Panniculectomy Measurement Specifications	19	

Developer

Encompass Medical Partners (Emily Richardson, MD)
<https://encompassmedical.com/>

ASPS Measures Work Group Reviewers:

Michele Manahan, MD
Gary Culbertson, MD
Michael Freedman, MD
Richard Greco, MD
Karol Gutowski, MD
Michel Saint-Cyr, MD
Jon Ver Halen, MD
Amy Wandel, MD
Georgios Ziakas, MD

ASPS Staff

Caryn Davidson, MA
Christopher Simmons
Katelyn Stermer, MPH

Intended Audience, Care Setting and Patient Population

These measures are designed for use by physicians and other health care professionals who provide plastic surgery services to patients 18 and older.

These measures are meant to be used to calculate performance and/or reporting at the individual clinician level.

Importance of Topic

Incidence, Prevalence, & Cost

Abdominoplasty/Panniculectomy

Abdominoplasty was the sixth-most commonly performed cosmetic surgery in the US in 2016, an increase of 104% since 2000 (ASPS NCPSS 2016). Abdominoplasty is associated with a higher complication rate compared with other aesthetic procedures (Winocour et al 2015). Panniculectomy is a common reconstructive procedure performed to remove a pannus, or hanging flap of loose skin and fat, from the abdomen. Panniculectomy surgery is typically performed following massive weight loss. Unlike abdominoplasty, a panniculectomy does not involve abdominal muscle tightening. Review of the 2014-2016 TOPS data revealed that panniculectomy was associated with the highest rate of unplanned hospital admissions (ASPS TOPS ad hoc analysis 2017).

Technical Specifications: Introduction

The performance measures found in this document have been developed to enable the physician to track his or her performance in individual patient care across patient populations. **Please note that the provision of surgical procedures must be based on individual patient needs and professional judgment.** Performance measures are not to be used as a substitute for clinical guidelines and individual physician clinical judgment. There may be instances

where an individual patient falls outside the parameters for the performance measure(s); however, this does not necessarily mean that they should not have the procedure. Whether or not a patient should undergo a specific procedure is a decision that needs to be made between the patient and the physician while weighing the risks and benefits of the procedure, along with individual patient preference.

There are several data sources available for collecting performance measures; generally different data sources require different sets of measure specifications, due to the structure of the systems storing the data.

Quality measure technical specifications for administrative data sources are developed with administrative code sets –ICD-10-CM and CPT®, for example. A measure intended for administrative data source use or reporting may have significant differences in the specifications due to the nature of the various data sources. In administrative data sources, administrative or billing codes are typically used to identify eligible populations and reported immediately following the provision of care.

Measure Exceptions

Measure Exclusions

ASPS follows the PCPI® process of distinguishing between measure exceptions and measure exclusions (PCPI® 2013). Exclusions arise when the intervention required by the numerator is not appropriate for a group of patients who are otherwise included in the initial patient or eligible population of a measure (ie, the denominator). Exclusions are absolute and are to be removed from the denominator of a measure and therefore clinical judgment does not enter the decision.

Measure Exceptions

Exceptions are used to remove a patient from the denominator of a performance measure when the patient does not receive a therapy or service AND that therapy or service would not be appropriate due to patient-specific reasons. The patient would otherwise meet the denominator criteria. Exceptions are not absolute, and are based on clinical judgment, individual patient characteristics, or patient preferences.

For process, structural, and outcome measures, the PCPI® provides two categories of exception reasons for which a patient may be removed from the denominator of an individual measure.

Medical reason(s)

- Contraindicated in patient (potential allergy due to previous reported allergic history, potential adverse drug interaction, other)
- Already received/performed
- Intolerant (therapy was tried and the patient was intolerant)
- Other medical reason(s)

Patient or Non-medical reason(s)

- Patient refused/declined
- Access issues or insurance coverage/payer-related limitations (patient not covered for treatment)
- Patient functional limitations
- Patient preference: Social reason(s) (eg, family or support system not supportive of intervention/treatment); Religious

These measure exception categories are not available uniformly across all measures; for each measure, there must be a clear rationale to permit an exception for a medical, patient, or system reason. For some measures, examples

have been provided in the measure exception language of instances that would constitute an exception. Examples are intended to guide clinicians and are not all-inclusive lists of all possible reasons why a patient could be excepted from a measure. There are different approaches for reporting measure exceptions, depending on whether the measure is being reported from an electronic clinical data source or an administrative data source.

Administrative Data Sources

Exceptions reported from administrative data sources can be reported using a Quality Data Code (QDC), which may be a CPT® Category II code or a G-code.

Although this methodology does not require the external reporting of more detailed exception data, the PCPI® recommends that physicians document the *specific* reasons for exception in patients' medical records for purposes of optimal patient management and audit-readiness. The PCPI® also advocates the systematic review and analysis of each physician's exceptions data to identify practice patterns and opportunities for quality improvement. For example, it is possible for implementers to calculate the percentage of patients that physicians have identified as meeting the criteria for exception.

Please refer to documentation for each individual measure for information on the acceptable exception categories and the codes and modifiers to be used for reporting.

This measure may be used for accountability purposes

Measure #1: Seroma rate after primary abdominoplasty (QI only)

Measure Description

Percentage of patients aged 18 years and older who undergo primary abdominoplasty who develop clinically significant seroma requiring operative placement of a drain within 30 days of initial procedure

Measure Components

Numerator Statement	Patients who develop clinically significant seroma requiring operative placement of a drain within 30 days of initial procedure
Denominator Statement	All patients aged 18 years and older who undergo primary abdominoplasty
Exclusions	Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)
Denominator Exceptions	None

Measure Importance

Rationale/ Opportunity for Improvement	<p>Abdominoplasty is one of the most frequently performed cosmetic procedures (ASPS NCPSS 2016), and seroma is the most common complication of abdominoplasty (Ardehali & Fiorentino 2017; Seretis et al 2017).</p> <p>Abdominoplasty was the sixth-most commonly performed cosmetic surgery in the US in 2016, an increase of 104% since 2000 (ASPS NCPSS 2016). Abdominoplasty is associated with a higher complication rate compared with other aesthetic procedures, and seroma is most common complication in abdominoplasty (Bercial et al 2012; Hurvitz et al 2014).</p> <p><u>GAP IN CARE</u></p> <p>In a 2017 meta-analysis of seroma rate, seroma rate was found to be 7.5% in a prevention group that utilized interventions to prevent seroma, such as preservation of Scarpa's fascia, tissue adhesives and, and progressive tension sutures) and 19.5% in a control group where no interventions were used (Seretis et al 2017).</p>
---	--

Measure Designation

Measure Purpose	• Quality Improvement
Type of Measure	• Outcome
Care Setting	• Inpatient or Surgical Center
Data Source	• Medical record

This measure may be used for accountability purposes

Measure #2: Wound disruption rate after primary abdominoplasty (QI only)

Measure Description

Percentage of patients aged 18 years and older who undergo primary abdominoplasty who develop moderate or severe wound disruption within 30 days of initial procedure

Numerator Statement	Patients who develop moderate or severe wound disruption within 30 days of initial procedure Definitions: Moderate wound disruption- healed in 2 to 6 weeks Severe wound disruption- healed in more than 6 weeks
Denominator Statement	All patients aged 18 years and older who undergo primary abdominoplasty
Exclusions	Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)
Denominator Exceptions	None

Measure Importance

Rationale/ Opportunity for Improvement	<p>Wound Disruption can be Superficial (defined as disruption of dermal and subcutaneous layers) OR Deep/Fascia (defined as disruption of deep fascial layers w/without superficial layers). Postoperative wound dehiscence impacts morbidity, length of stay, healthcare costs and readmission rates. In spite of the progress in abdominoplasty techniques, a significant complication rate is still associated with abdominoplasty procedures including flap necrosis, seroma, hematoma, infections, wound dehiscence, and delayed healing of wound (Ghnnam et al 2016). Tracking wound disruption rates may help identify patient factors or other practice trends which may be influenced or modified.</p> <p><u>GAP IN CARE</u> Analysis of the 2014-2016 TOPS data revealed superficial wound disruption was the most frequently reported adverse event. Rate of superficial and deep wound disruption after abdominoplasty was found to be around 1%. Although this is low, we are implementing this measure for quality improvement to try to get a realistic wound disruption rate.</p>
---	---

Measure Designation

Measure Purpose	• Quality Improvement
Type of Measure	• Outcome
Care Setting	• Inpatient or Surgical Center
Data Source	• Administrative data • Medical record

[Jump to Measure Specifications](#)

This measure may be used for accountability purposes

Measure #3: Wound complications after primary panniculectomy in patients with BMI \geq 30

Measure Description

Percentage of patients aged 18 years and older with a BMI \geq 30 who undergo primary panniculectomy who develop moderate or severe wound disruption OR clinically significant seroma requiring operative placement of a drain within 30 days of initial procedure.

This measure has 3 performance rates:

Performance Rate 1: Moderate or Severe Wound Disruption

Performance Rate 2: Clinically Significant Seroma Requiring Operative Placement of a Drain

Performance Rate 3: Overall wound complications (wound disruption and seroma combined) (this is the rate that will be used for benchmarking)

Numerator Statement	<p>Patients who develop moderate or severe wound disruption within 30 days of initial procedure</p> <p>Definitions:</p> <p>Moderate wound disruption- healed in 2 to 6 weeks</p> <p>Severe wound disruption- healed in more than 6 weeks</p> <p>Seroma is considered clinically significant when there is a fluid collection requiring operative drainage.</p> <p>This measure has 3 performance rates:</p> <p>Performance Rate 1: Moderate or Severe Wound Disruption</p> <p>Performance Rate 2: Clinically Significant Seroma Requiring Operative Placement of a Drain</p> <p>Performance Rate 3: Overall wound complications (wound disruption and seroma combined) (this is the rate that will be used for benchmarking)</p>
Denominator Statement	All patients aged 18 years and older with a BMI \geq 30 who undergo primary panniculectomy
Exclusions	Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy).
Denominator Exceptions	None

[Jump to Measure Specifications](#)

Measure Importance

Rationale/ Opportunity for Improvement	<p>Postoperative wound dehiscence impacts morbidity, length of stay, healthcare costs and readmission rates. Studies show rates of overall wound complications ranging from 22% to 34%. In patients with wound complications specifically, there was a significantly higher body mass index versus those with no wound complications (43.7% vs. 30.7%, $P < 0.0001$).</p> <p>The (post-weight loss) body mass index at the time of body contouring surgery is a predictor for postoperative complications. The overwhelming conclusion from multiple studies is that increasing BMI is associated with an increased number of complications and poorer outcomes. Major complications of post-bariatric panniculectomy included wound breakdown and re-exploration. The only factor that independently predicted postoperative complications after a panniculectomy was pre-panniculectomy BMI. Studies showed that complications increased at BMI > 25, 28, 30, or 35 (Vastine et al 1999; Van der Beek et al 2011; Derickson et al 2018; Chetta et al 2016; Arthurs et al 2007; Momeni et al 2009; Au et al 2008; Shanmugan et al 2015). The majority of studies used BMI > 30 as the cut point at which complication rates were seriously impacted (Van der Beek et al 2011; Momeni et al 2009; Au et al 2008), but they also lumped abdominoplasty and panniculectomy in most cases. The majority of patients undergoing panniculectomy start with a BMI greater than 30.</p> <p>Seroma has been defined as serous fluid collection under the skin flaps or in the axillary dead space following skin dissection. Seromas are particularly common after abdominal surgeries. The larger the surgical intervention, the more likely it is that seromas appear. Larger seromas take longer to resolve than small seromas, and are more likely to undergo secondary infection.</p> <p>This measure looks at wound complications for patients with a BMI ≥ 30. We expect that the rate of wound complications will be much higher for patients with higher BMIs. However, panniculectomy is still an important, and often necessary part of the process for patients undergoing bariatric surgery. The hope is that by benchmarking patients against similar populations, physicians will still continue to perform this procedure even on those patients with higher BMIs.</p> <p><u>GAP IN CARE</u></p> <p>Wound dehiscence rates for panniculectomy procedures after massive weight loss (MWL) by diet or bariatric surgery ranged from 11% to 27% (Barbour et al., 2015; Greco et al 2008; Grieco et al 2015). Bariatric surgery patients had higher rates of wound complications. The probability for impairment of wound healing was greater than 60% for those patients with a BMI of 35 kg/m² and more at time of surgery. (Parvizi et al., 2015).</p> <p>The literature reports seroma rates of around 10% for panniculectomy patients (Zemlyak et al 2012; Zannis et al 2012).</p>
---	--

[Jump to Measure Specifications](#)

Measure Designation

Measure Purpose	<ul style="list-style-type: none">• Quality Improvement• Accountability
Type of Measure	<ul style="list-style-type: none">• Outcome
Care Setting	<ul style="list-style-type: none">• Inpatient or Surgical Center
Data Source	<ul style="list-style-type: none">• Administrative data• Medical record

This measure may be used for accountability purposes
Measure #4: Unplanned hospital admission after panniculectomy

Measure Description

Percentage of patients aged 18 years and older who undergo primary panniculectomy who have an unplanned hospital admission within 30 days of initial procedure

Numerator Statement	Patients who have an unplanned hospital admission within 30 days of initial procedure.
Denominator Statement	All patients aged 18 years and older who undergo primary panniculectomy
Exclusions	Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)
Denominator Exceptions	None

Measure Importance

Rationale/ Opportunity for Improvement	Unplanned hospital admissions are costly to both healthcare delivery systems and to patients. Review of the 2014-2016 TOPS data revealed that panniculectomy was associated with the highest rate of unplanned hospital admissions (ASPS TOPS ad hoc analysis 2017). Outcomes research using national databases can help us understand an intervention’s effectiveness rather than just its efficacy (Alderman et al 2009). Tracking unplanned admissions may help identify patient factors or other trends which may be influenced or modified.
---	--

Measure Designation

Measure Purpose	<ul style="list-style-type: none"> • Quality Improvement • Accountability
Type of Measure	<ul style="list-style-type: none"> • Outcome
Care Setting	<ul style="list-style-type: none"> • Surgical Center; outpatient hospital; inpatient
Data Source	<ul style="list-style-type: none"> • Administrative data • Medical record

[Jump to Measure Specifications](#)

**Measure #5: VTE Screening for panniculectomy and abdominoplasty patients
(QI only)**

Measure Description

Percentage of patients aged 18 years and older who undergo primary panniculectomy or abdominoplasty who received screening for VTE with a validated instrument prior to their procedure

Numerator Statement	<p>Patients who receive screening for VTE with a validated instrument prior to their procedure</p> <p>Definition: validated instrument includes 2005 Caprini Risk Assessment Model or other similarly validated model.</p>
Denominator Statement	<p>All patients aged 18 years and older who undergo primary panniculectomy or abdominoplasty</p>
Exclusions	<p>None</p>
Denominator Exceptions	<p>None</p>
Supporting Evidence	<p>The following statements are taken verbatim from existing guidance statements:</p> <p>We recommend that all plastic and reconstructive surgery patients should be risk-stratified for perioperative venous thromboembolism risk using a 2005 Caprini score (Figs. 8 and 9) (grade 1C). We recommend that surgeons consider chemoprophylaxis on a case-by-case basis in patients with Caprini score greater than 8 (Pannucci et al 2016).</p> <p>Inpatient adult aesthetic and reconstructive plastic surgery patients who undergo general anesthesia:</p> <p style="padding-left: 40px;"><i>should</i> complete a 2005 Caprini risk factor assessment tool to stratify patients into a VTE risk category based on their individual risk factors. <i>Grade B</i></p> <p>OR</p> <p style="padding-left: 40px;"><i>should</i> complete a VTE risk-assessment tool comparable to the 2005 Caprini RAM to stratify patients into a VTE risk category based on their individual risk factors. <i>Grade D</i></p> <p>Outpatient adult aesthetic and reconstructive plastic surgery patients who undergo general anesthesia:</p> <p style="padding-left: 40px;"><i>Should consider</i> completing a 2005 Caprini risk factor assessment tool to stratify patients into a VTE risk category based on their individual risk factors. <i>Grade B</i></p> <p>OR</p> <p style="padding-left: 40px;"><i>Should consider</i> completing a VTE risk-assessment tool comparable to the 2005 Caprini RAM to stratify patients into a VTE risk category based on their individual risk factors. <i>Grade D</i></p> <p>(Murphy, Alderman, Gutowski 2012)</p>

Measure Importance

Rationale/ Opportunity for Improvement	<p>Deep venous thrombosis and pulmonary embolism, together called venous thromboembolism, remain a serious national health problem. Estimates suggest that over 900,000 cases occur in the United States per year, with 300,000 deaths per year (Wakefield et al 2009). Recent literature has addressed the misconception that plastic surgery patients are all at low risk for perioperative venous thromboembolism events. In fact, an 18-fold variation in venous thromboembolism risk exists among the overall plastic and reconstructive surgery population (Pannucci 2017).</p> <p>Massive weight loss patients undergoing body contouring surgery are at increased risk for VTE due to elevated BMI, presence of pulmonary comorbidities, extended operative time, multiple-site surgery, and decreased ability to ambulate postoperatively (Caprini et al 2001).</p> <p>The extensively validated 2005 Caprini score is known to identify a 5- to 20-fold variation in venous thromboembolism risk among patients undergoing plastic and reconstructive surgery (Pannucci et al 2016).</p> <p><u>GAP IN CARE</u></p> <p>Despite these risk factors, 40% of surgeons performing abdominoplasty with liposuction do not use VTE prophylaxis, based on 2007 survey results (Broughton G II et al 2007). Survey results asking plastic surgeons to report incidence of VTE in past 24 months and whether their practice had a policy for VTE prophylaxis revealed that 73% had a policy for VTE prophylaxis; however, 39% were unaware of current recommendations for VTE prophylaxis relative to plastic and reconstructive surgery (Spring & Gutowski 2006). A survey of the ASPS membership in 2011 also found variable identification of common VTE risk factors. Clavijo-Alvarez et al. (2011) found that risk factors which would score high on validated risk assessment models had a low grade of concern from the surveyed plastic surgeons performing post-bariatric surgery, abdominoplasty, or panniculectomy. 48% of surgeons responding to the survey did not administer chemoprophylaxis for patients undergoing abdominoplasty or panniculectomy. This demonstrates a gap in knowledge of which patients are candidates for chemoprophylaxis.</p>
---	---

Measure Designation

Measure Purpose	<ul style="list-style-type: none"> • Quality Improvement
Type of Measure	<ul style="list-style-type: none"> • Outcome
Care Setting	<ul style="list-style-type: none"> • Ambulatory care • Inpatient
Data Source	<ul style="list-style-type: none"> • Administrative data • Medical record

[Jump to Measure Specifications](#)

Grading Scales for Recommendations
Pannucci et al 2016.

Grade	Description	Benefit vs. Risk and Burdens	Quality of Supporting Evidence	Implications
1A	Strong recommendation, high-quality evidence	Benefits clearly outweigh risks and burdens, or vice versa	RCTs without important limitations or overwhelming evidence from observational studies	Strong recommendation and can apply to most patients in most circumstances without reservation
1B	Strong recommendation, moderate-quality evidence	Benefits clearly outweigh risks and burdens, or vice versa	RCTs with important limitations or exceptionally strong evidence from observational studies	Strong recommendation and can apply to most patients in most circumstances without reservation
1C	Strong recommendation, low- or very low-quality evidence	Benefits clearly outweigh risks and burdens, or vice versa	Observational studies or case series	Strong recommendation but may change when higher quality evidence becomes available
2A	Weak recommendation, high-quality evidence	Benefits closely balanced with risks and burden	RCTs without important limitations or overwhelming evidence from observational studies	Weak recommendation, best action may differ depending on circumstances or patient's or societal values
2B	Strong recommendation, moderate-quality evidence	Benefits closely balanced with risks and burden	RCTs with important limitations or exceptionally strong evidence from observational studies	Weak recommendation, best action may differ depending on circumstances or patient's or societal values
2C	Weak recommendation, low- or very low-quality evidence	Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced	Observational studies or case series	Very weak recommendation; other alternatives may be equally reasonable

RCTs, randomized controlled trials.

Reproduced from Guyatt G, Gutterman D, Baumann MH, et al. Grading strength of recommendations and quality of evidence in clinical guidelines: Report from an American College of Chest Physicians task force. *Chest* 2006;129:174-181.

Murphy, Alderman, Gutowski 2012

Table 1. ASPS Evidence Rating Scale for Therapeutic Studies

Level of Evidence	Qualifying Studies
I	Highest-quality, multicenter or single-center, randomized controlled trial with adequate power; or systematic review of these studies
II	Lesser-quality, randomized controlled trial; prospective cohort or comparative study; or systematic review of these studies
III	Retrospective cohort or comparative study; case-control study; or systematic review of these studies
IV	Case series with pre/post test; or only post test
V	Expert opinion developed by means of consensus process; case report or clinical example; or evidence based on physiology, bench research, or "first principles"

Table 2. ASPS Evidence Rating Scale for Diagnostic Studies

Level of Evidence	Qualifying Studies
I	Highest-quality, multicenter or single-center, cohort study validating a diagnostic test (with criterion standard as reference) in a series of consecutive patients; or a systematic review of these studies
II	Exploratory cohort study developing diagnostic criteria (with criterion standard as reference) in a series of consecutive patient; or a systematic review of these studies
III	Diagnostic study in nonconsecutive patients (without consistently applied criterion standard as reference); or a systematic review of these studies
IV	Case-control study; or any of the above diagnostic studies in the absence of a universally accepted criterion standard
V	Expert opinion developed by means of consensus process; case report or clinical example; or evidence based on physiology, bench research, or "first principles"

References

- Alderman AK, Collins ED, Streu R, Grotting JC, Sulkin AL, Neligan P, Haeck PC, Gutowski KA. Benchmarking outcomes in plastic surgery: national complication rates for abdominoplasty and breast augmentation. *Plast Reconstr Surg*. 2009 Dec;124(6):2127-33.
- American Society of Plastic Surgeons. National Clearinghouse of Plastic Surgery Statistics. Available at <https://d2wirczt3b6wjm.cloudfront.net/News/Statistics/2016/2016-plastic-surgery-statistics-report.pdf> Accessed May 18, 2017.
- American Society of Plastic Surgeons. TOPS: Tracking Operations and Outcomes for Plastic Surgeons ad hoc analysis. <https://www.plasticsurgery.org/for-medical-professionals/quality-and-registries/tracking-operations-and-outcomes-for-plastic-surgeons>. Accessed May 19, 2017.
- Ardehali B, Fiorentino F. A Meta-Analysis of the Effects of Abdominoplasty Modifications on the Incidence of Postoperative Seroma. *Aesthet Surg J*. 2017 May 6.
- Arthurs ZM, Cuadrado D, Sohn V, et al. Post-bariatric panniculectomy: Pre-panniculectomy body mass index impacts the complication profile. *Am J Surg*. 2007;193:567–70.
- Au K, Hazard SW 3rd, Dyer AM, Boustred AM, Mackay DR, Miraliakbari R. Correlation of complications of body contouring surgery with increasing body mass index. *Aesthet Surg J*. 2008 Jul-Aug;28(4):425-9.
- Barbour JR1, Iorio ML, Oh C, Tung TH, O'Neill PJ. Predictive Value of Nutritional Markers for Wound Healing Complications in Bariatric Patients Undergoing Panniculectomy. *Ann Plast Surg*. 2015 Oct;75(4):435-8. doi: 10.1097/SAP.000000000000188.
- Bercial ME, Sabino Neto M, Calil JA, Rossetto LA, Ferreira LM. Suction drains, quilting sutures, and fibrin sealant in the prevention of seroma formation in abdominoplasty: which is the best strategy? *Aesthetic Plast Surg*. 2012 Apr;36(2):370-3.
- Broughton G II, Rios JL, Rohrich RJ, et al. Deep venous thrombosis prophylaxis practice and treatment strategies among plastic surgeons: survey results. *Plast Reconstr Surg*. 2007; 119:157–174. [PubMed: 17255670]
- Broughton G 2nd1, Rios JL, Rohrich RJ, Brown SA, Chetta MD1, Aliu O1, Tran BA2, Abdulghani M3, Kidwell KM4, Momoh AO1. Complications in body contouring stratified according to weight loss method. *Plast Surg (Oakv)*. 2016 Summer;24(2):103-6
- Caprini JA, Arcelus JI, Reyna JJ. Effective risk stratification of surgical and nonsurgical patients for venous thromboembolic disease. *Semin Hematol*; 2001; 38(2 suppl 5):12–19.
- Chetta MD1, Aliu O1, Tran BA2, Abdulghani M3, Kidwell KM4, Momoh AO1. Complications in body contouring stratified according to weight loss method. *Plast Surg (Oakv)*. 2016 Summer;24(2):103-6. Epub 2016 May 27.
- Clavijo-Alvarez JA1, Pannucci CJ, Oppenheimer AJ, Wilkins EG, Rubin JP. Prevention of venous thromboembolism in body contouring surgery: a national survey of 596 ASPS surgeons. *Ann Plast Surg*. 2011 Mar;66(3):228-32. doi: 10.1097/SAP.0b013e3181e35c64.
- Derickson M1, Phillips C2, Barron M2, Kuckelman J2, Martin M2, DeBarros M2. Panniculectomy after bariatric surgical weight loss: Analysis of complications and modifiable risk factors. *Am J Surg*. 2018 May;215(5):887-890. doi:

10.1016/j.amjsurg.2018.02.008. Epub 2018 Feb 7.

Ghnnam W, Elrahawy A, Moghazy ME. The Effect of Body Mass Index on Outcome of Abdominoplasty Operations. *World J Plast Surg*. 2016 Sep;5(3):244-251.

Greco JA 3rd¹, Castaldo ET, Nanney LB, Wendel JJ, Summitt JB, Kelly KJ, Braun SA, Hagan KF, Shack RB. The effect of weight loss surgery and body mass index on wound complications after abdominal contouring operations. *Ann Plast Surg*. 2008 Sep;61(3):235-42. doi: 10.1097/SAP.0b013e318166d351.

Grieco M1, Grignaffini E1, Simonacci F1, Raposio E1. Analysis of Complications in Postbariatric Abdominoplasty: Our Experience. *Plast Surg Int*. 2015;2015:209173. doi: 10.1155/2015/209173. Epub 2015 Jul 12.

Hurvitz KA, Olaya WA, Nguyen A, Wells JH. Evidence-based medicine: Abdominoplasty. *Plast Reconstr Surg*. 2014 May;133(5):1214-21.

Momeni A, Heier M, Bannasch H, Stark GB. Complications in abdominoplasty: a risk factor analysis. *J Plast Reconstr Aesthet Surg*. 2009 Oct;62(10):1250-4.

Murphy RX Jr¹, Alderman A, Gutowski K, Kerrigan C, Rosolowski K, Schechter L, Schmitz D, Wilkins E. Evidence-based practices for thromboembolism prevention: summary of the ASPS Venous Thromboembolism Task Force Report. *Plast Reconstr Surg*. 2012 Jul;130(1):168e-175e. doi: 10.1097/PRS.0b013e318254b4ee.

Pannucci CJ. Evidence-Based Recipes for Venous Thromboembolism Prophylaxis: A Practical Safety Guide. *Plast Reconstr Surg*; . 2017 Feb; 139(2):520e-532e.

Pannucci CJ, MacDonald JK, Ariyan S, Gutowski KA, Kerrigan CL, Kim JY, Chung KC Benefits and Risks of Prophylaxis for Deep Venous Thrombosis and Pulmonary Embolus in Plastic Surgery: A Systematic Review and Meta-Analysis of Controlled Trials and Consensus Conference. *Plast Reconstr Surg*. 2016 Feb; 137(2):709-30.

Parvizi D, Friedl H, Wurzer P, Kamolz L, Lebo P, Tuca A, Rappl T, Wiedner M, Kuess K, Grohmann M, Koch H. (2015, August). A multiple regression analysis of postoperative complications after body-contouring surgery: a retrospective analysis of 205 patients: Regression analysis of complications. *Obes Surg*. 25(8): 1482-90.

Seretis K, Goulis D, Demiri EC, Lykoudis EG Prevention of Seroma Formation Following Abdominoplasty: A Systematic Review and Meta-Analysis. *Aesthet Surg J*. 2017 Mar 1;37(3):316-323.

Shanmugam V, Fernandez S, Evans K, McNish S, Banerjee A, Couch K, Mete M, and Shara N, Postoperative wound dehiscence: predictors and associations. *Wound Repair Regen*. 2015 ; 23(2): 184–190.

Spring MA¹, Gutowski KA. Venous thromboembolism in plastic surgery patients: survey results of plastic surgeons. *Aesthet Surg J*. 2006 Sep-Oct;26(5):522-9. doi: 10.1016/j.asj.2006.07.003.

Van der Beek ES¹, van der Molen AM, van Ramshorst B. Complications after body contouring surgery in post-bariatric patients: the importance of a stable weight close to normal. *Obes Facts*. 2011;4(1):61-6.

Vastine VL, Morgan RF, Williams GS, et al. Wound complications of abdominoplasty in obese patients. *Ann Plast Surg*. 1999;42:34–9.

Wakefield TW¹, McLafferty RB, Lohr JM, Caprini JA, Gillespie DL, Passman MA. Call to action to prevent venous thromboembolism. *J Vasc Surg*: 2009 Jun;49(6):1620-3.

Winocour J, Gupta V, Ramirez JR, Shack RB, Grotting JC, Higdon KK. Abdominoplasty: Risk Factors, Complication Rates, and Safety of Combined Procedures. *Plast Reconstr Surg*. 2015 Nov;136(5):597e-606e.

Zannis J, Wood BC, Griffin LP, Knipper E, Marks MW, David LR. Outcome study of the surgical management of panniculitis. *Ann Plast Surg*. 2012 Feb;68(2):194-7. doi: 10.1097/SAP.0b013e318212f39a.

Zemlyak AY, Colavita PD, El Djouzi S, Walters AL, Hammond L, Hammond B, Tsirlina VB, Getz S, Heniford BT. Comparative study of wound complications: isolated panniculectomy versus panniculectomy combined with ventral hernia repair. *J Surg Res*. 2012 Oct;177(2):387-91. doi: 10.1016/j.jss.2012.06.029. Epub 2012 Jul 6. PMID: 22795269

APPENDIX A
Abdominoplasty and Panniculectomy
Measurement Specifications

Coding Added September, 2017

Measure #1: Seroma rate after primary abdominoplasty (QI only)

Denominator (Eligible Population)	<p>All patients aged 18 years who undergo primary abdominoplasty</p> <p>Age ≥ 18 years</p> <p>AND</p> <p>CPT® and HCPCS Code for Encounter:</p> <p>15847</p> <table border="1" style="margin-left: 20px;"> <tr> <td style="width: 50px; text-align: center;">15847</td> <td>Abdominoplasty</td> </tr> </table>	15847	Abdominoplasty
15847	Abdominoplasty		
Denominator Exclusions	<p>Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)</p> <p>CPT codes to be excluded if billed in combination with 15847:</p> <p>Hernia Repair: All CPT Codes from 49491 through 49900</p> <p>Cesarean Section: 59510</p> <p>Hysterectomy: 58150- 58958</p>		
Numerator	<p>Patients who develop clinically significant seroma requiring operative placement of a drain within 30 days of initial procedure</p> <p>Captured by workflow within the ASPS QCDR</p>		
Denominator Exceptions	<ul style="list-style-type: none"> • None 		

Measure #2: Wound disruption rate after primary abdominoplasty (QI only)

<p>Denominator (Eligible Population)</p>	<p>All patients aged 18 years and older who undergo primary abdominoplasty</p> <p>Age ≥ 18 years</p> <p>AND</p> <p>CPT® and HCPCS Code for Encounter:</p> <p>15847</p> <table border="1" data-bbox="391 583 1105 642"> <tr> <td data-bbox="391 583 516 642">15847</td> <td data-bbox="516 583 1105 642">Abdominoplasty</td> </tr> </table>	15847	Abdominoplasty
15847	Abdominoplasty		
<p>Denominator Exclusions</p>	<p>Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)</p> <p>CPT codes to be excluded if billed in combination with 15847:</p> <p>Hernia Repair: All CPT Codes from 49491 through 49900</p> <p>Cesarean Section: 59510</p> <p>Hysterectomy: 58150- 58958</p>		
<p>Numerator</p>	<p>Patients who develop moderate or severe wound disruption within 30 days of initial procedure</p> <p>Definitions:</p> <p>Moderate wound disruption- healed in 2 to 6 weeks</p> <p>Severe wound disruption- healed in more than 6 weeks</p>		
<p>Denominator Exceptions</p>	<ul style="list-style-type: none"> • None 		

Measure #3: Wound disruption rate after primary panniculectomy in patients with BMI \geq 30 (accountability)

Denominator (Eligible Population)	<p>All patients aged 18 years and older with BMI \geq 30 who undergo primary panniculectomy</p> <p>Age \geq 18 years</p> <p>AND</p> <p>BMI \geq 30</p> <p>AND</p> <p>CPT® and HCPCS Code for Encounter:</p> <p>15830</p> <table border="1" data-bbox="386 674 1105 737"> <tr> <td>15830</td> <td>Panniculectomy</td> </tr> </table>	15830	Panniculectomy
15830	Panniculectomy		
Denominator Exclusions	<p>Combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)</p> <p>CPT codes to be excluded if billed in combination with 15830:</p> <p>Hernia Repair: All CPT Codes from 49491 through 49900</p> <p>Cesarean Section: 59510</p> <p>Hysterectomy: 58150- 58958</p>		
Numerator	<p>Patients who develop moderate or severe wound disruption OR clinically significant seroma requiring operative placement of a drain within 30 days of initial procedure</p> <p>Definitions:</p> <p>Moderate wound disruption- healed in 2 to 6 weeks</p> <p>Severe wound disruption- healed in more than 6 weeks</p> <p>Seroma is considered clinically significant when there is a fluid collection requiring operative drainage.</p> <p>This measure has 3 performance rates:</p> <p>Performance Rate 1: Moderate or Severe Wound Disruption</p> <p>Performance Rate 2: Clinically Significant Seroma Requiring Operative Placement of a Drain</p> <p>Performance Rate 3: Overall wound complications (wound disruption and seroma combined) (this is the rate that will be used for benchmarking)</p> <p>Captured by workflow within the ASPS QCDR</p>		
Denominator Exceptions	<ul style="list-style-type: none"> None 		

Measure #4: Unplanned hospital admission after panniculectomy
(accountability)

<p>Denominator (Eligible Population)</p>	<p>All patients aged 18 years who undergo outpatient panniculectomy</p> <p>Age ≥ 18 years</p> <p>AND</p> <p>CPT® and HCPCS Code for Encounter:</p> <p>15830</p> <table border="1" data-bbox="393 569 1105 632"> <tr> <td>15830</td> <td>Panniculectomy</td> </tr> </table>	15830	Panniculectomy
15830	Panniculectomy		
<p>Denominator Exclusions</p>	<p>Exclude combined procedures in abdominal area other than liposuction (including hernia repair, cesarean section, and hysterectomy)</p> <p>CPT codes to be excluded if billed in combination with 15830:</p> <p>Hernia Repair: All CPT Codes from 49491 through 49900</p> <p>Cesarean Section: 59510</p> <p>Hysterectomy: 58150- 58958</p>		
<p>Numerator</p>	<p>Patients who have an unplanned hospital admission within 30 day of initial procedure.</p> <p>Captured by workflow within the ASPS QCDR</p>		
<p>Denominator Exceptions</p>	<ul style="list-style-type: none"> • None 		

Measure #5: VTE Screening for panniculectomy and abdominoplasty patients (QI only)

Denominator (Eligible Population)	<p>All patients aged 18 years and older who undergo primary panniculectomy or abdominoplasty</p> <p>Age ≥ 18 years</p> <p>AND</p> <p>CPT® and HCPCS Code for Encounter:</p> <p>15830; 15847</p> <table border="1" data-bbox="375 520 1092 642"> <tr> <td data-bbox="375 520 500 579">15830</td> <td data-bbox="500 520 1092 579">Panniculectomy</td> </tr> <tr> <td data-bbox="375 579 500 642">15847</td> <td data-bbox="500 579 1092 642">Abdominoplasty</td> </tr> </table>	15830	Panniculectomy	15847	Abdominoplasty
15830	Panniculectomy				
15847	Abdominoplasty				
Denominator Exclusions	<p>None</p>				
Numerator	<p>Patients who receive screening for VTE with a validated instrument prior to their procedure</p> <p>Definition: validated instrument includes 2005 Caprini Risk Assessment Model or other similarly validated model.</p> <p>Captured by workflow within the ASPS QCDR</p>				
Denominator Exceptions	<p>None</p>				