CLINICAL VALUE OF *DA VINCI*® SURGERY

and Impact on Total Cost of Care for Benign Hysterectomy

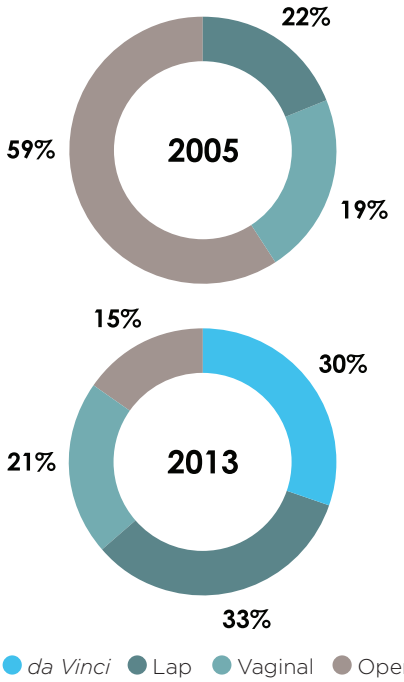
Cost estimates seen here have been independently generated by Intuitive Surgical, Inc. using cost modeling methodology based on national averages and have not been published or peer-reviewed. Cost calculations include intraoperative instrument and accessory costs. Costs related to *da Vinci*® System acquisition, yearly service costs and other intraoperative and post-operative hospital costs are not included/considered.

SUMMARY

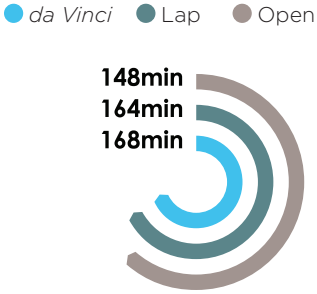
Historically, conventional minimally invasive surgery (MIS) for benign hysterectomy has not been extended to the majority of patients. However, the *da Vinci*® Surgical System, introduced for this procedure in 2005, provided another minimally invasive approach that allowed complex cases to be performed robotically.[1] By 2014, patients that benefited from *da Vinci* Surgery represented ~30% of all benign hysterectomies. Over the same period, the use of open techniques declined from ~59% to ~15% as the use of laparoscopy rose, as well. Now, more patients are receiving the benefits of MIS than ever before.

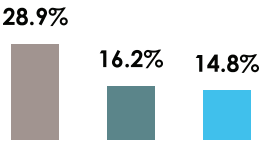
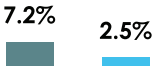
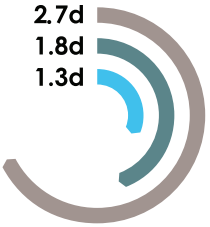
MARKET SHARE[2]

da Vinci Surgery is Enabling MIS



OUTCOMES AND POTENTIAL COST OFFSETS



	Estimated Savings vs Open	Estimated Savings vs Lap
Operative Time[1#] Cost per Minute: $11[a]	-$220	-$44
 **Complication Rate[1]** Cost: 3,632[b]	$512	$51
 **Conversion to Open Surgery[1]** Cost: $3,162[c]	—	$149
 **Readmissions[3]** Cost: $11,087[d]	$277	$177
 **Length of Stay[4]** Cost per Day: $1,553[e]	$2,174	$777
Estimated Instrument and Accessories Cost Differential[5]	-$920 to -$473	-$488 to $213
Estimated Potential Cost Savings per Case	**$1,823 to $2,270 vs Open**	**$622 to $1,323 vs Lap**

Surgery time decreased with progressive experience, falling below three hours after 100 cases (2.8 hours for the last 25 cases).

References

1. Luciano AA, Luciano DE, Gabbert J, Seshadri-Kreaden U. The impact of robotics on the mode of benign hysterectomy and clinical outcomes. Int J Med Robot. 2015 Mar 4. doi: 10.1002/rcs.1648. [Epub ahead of print]
2. ISI internal estimates based on 2013 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical.
3. Martino MA, Berger EA, McFetridge JT, Shubella J, Gosciniak G, Wejkszner T, Kainz GF, Patriarco J, Thomas MB, Boulay R. A comparison of quality outcome measures in patients having a hysterectomy for benign disease: robotic vs. non-robotic approaches. J Minim Invasive Gynecol. 2014 May-Jun;21(3):389-93.
4. Landeen LB, Bell MC, Hubert HB, Bennis LY, Knutsen-Larson SS, Seshadri-Kreaden U. Clinical and cost comparisons for hysterectomy via abdominal, standard laparoscopic, vaginal and robot-assisted approaches. S D Med. 2011 Jun;64(6):197-9, 201, 203 passim.
5. Instrument and accessories data provided by Devin Garza, MD, Thomas M. Shultz, M.D, John Crane, MD. Instrument and accessories cost estimates based on internal ISI data.

Cost Modeling Methodology

Reference	Clinical Metric	Resources	Calculation Method	Published Value	Value Adjustment
a	Operative Time	Chatterjee A, Payette MJ, Demas CP, et al. Opportunity cost: a systematic application to surgery. Surgery 2009;146:18-22.	Opportunity Cost	$9/min	2009-2014 Medical Services Consumer Price Index
NOTE: Published value is based on laparoscopic ventral hernia repair.					
b	Complications				
	DRG multiplier	Vonlanthen R, Slankamenac K, Breitenstein S, et al. The impact of complications on costs of major surgical procedures: a cost analysis of 1200 patients. Ann Surg. 2011;254(6):907-913.	Cost of complication − Cost of surgery w/o complications / Cost of surgery w/o complications	n/a	n/a
	DRG value	FY 2015 Final Rule Tables. Centers for Medicare and Medicaid Services.	n/a	$5,368	n/a
		FY 2016 Final Rule Tables. Centers for Medicare and Medicaid Services.	n/a	$7,263	n/a
NOTE: Surgical complications classified as Clavien-Dindo Grade II utilized for the purposes of this analysis. The DRG multiplier featured (0.5) is an average of the calculated values from column 4 for each of these classifications.					
c	Conversions	Intuitive Surgical, Inc. analysis of 2013 Premier Database for robotic and laparoscopic conversion costs.	Weighted Average	n/a	2013-2014 Medical Services Consumer Price Index
NOTE: Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical.					
d	Readmissions	Agency for Healthcare Research and Quality. HCUPnet: A tool for identifying, tracking, and analyzing national hospital statistics. All patient readmissions within 30 days. National statistics, 2012. Index stay - 124 Hysterectomy, abdominal and vaginal.		$14,718	2012-2014 Medical Services Consumer Price Index
e	Length of Stay	Halpern NA, Pastores SM. Critical care medicine in the United States 2000-2005: an analysis of bed numbers, occupancy rates, payer mix, and costs. Crit Care Med 2010;38(1):65-71.		$1,153/day (general ward) $3,518/day (intensive care)	2005-2014 Medical Services Consumer Price Index

Important Safety Information

Surgical risks of benign hysterectomy (benign) include urinary tract injury, vaginal cuff problem (separation, adhesions, granulation tissue, infection, cellulitis, hematoma), bladder injury, bowel injury, vaginal tear or laceration, vaginal shortening, voiding dysfunction, fistula formation: vesicovaginal, rectovaginal. Uterine tissue may contain unsuspected cancer. The cutting or morcellation of uterine tissue during surgery may spread cancer, and decrease the long-term survival of patients.

Serious complications may occur in any surgery, including da Vinci® Surgery, up to and including death. Examples of serious or life-threatening complications, which may require prolonged and/or unexpected hospitalization and/or reoperation, include but are not limited to, one or more of the following: injury to tissues/organs, bleeding, infection and internal scarring that can cause long-lasting dysfunction/pain. Individual surgical results may vary. For Important Safety Information, indications for use, risks, full cautions and warnings, please also refer to www.davincisurgery.com/safety and www.intuitivesurgical.com/safety.

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