



# QUANTIFYING THE IMPACT

Clinical Economics References from Leading Gynecology Surgeons



From a hospital perspective, clinical benefits may result in the potential cost reductions noted below; however, these clinical benefits and costs may vary per hospital and be higher or lower than mentioned during this presentation.

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*<sup>®</sup> System acquisition, yearly service costs and other intraoperative and post-operative hospital costs are not included/considered.

In order to provide benefit and risk information, Intuitive Surgical reviews the highest available level of evidence on representative *da Vinci* procedures. Intuitive Surgical strives to provide a complete, fair and balanced view of the clinical literature. However, a quoted article may not be reflective of the broader literature and our materials should not be seen as a substitute for a comprehensive literature review for inclusion of all potential outcomes. We encourage patients and physicians to review the original publications and all available literature in order to make an informed decision. Clinical studies are available at [pubmed.gov](https://pubmed.gov).

# Gynecologic Surgery



GYN



**John Crane, MD, FACOG**

Banner McKee Medical Center  
Loveland, CO

Featured Procedure:  
Benign Hysterectomy



**Devin Garza, MD, FACOG**

North Austin Medical Center  
Austin, TX

Featured Procedure:  
Benign Hysterectomy



**Thomas M. Shultz, MD, FACOG**

Cox Medical Centers-South  
Springfield, MO

Featured Procedure:  
Benign Hysterectomy

# Surgeon Profile



**John Crane, MD, FACOG, FPMRS**  
Banner McKee Medical Center  
Loveland, CO

## da Vinci® System Training:

2009

## Hospital:

Banner McKee Medical Center

## IDN System:

Banner Health

## Residency:

Texas Tech University Health Sciences Center

## Fellowship:

Spences Pelvic Surgery Watson Clinic

## Memberships:

American College of Obstetric Gynecologists (ACOG)  
American Association of Gynecologic Laparoscopists (AAGL)  
American Urogynecologic Society (AUGS)  
Society of Gynecologic Oncology (SGO)

## Estimated MIS Procedure Volume

55%

Before da Vinci® Training

98%

After da Vinci® Training



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# Clinical Outcomes and Potential Cost Savings

## Benign Hysterectomy



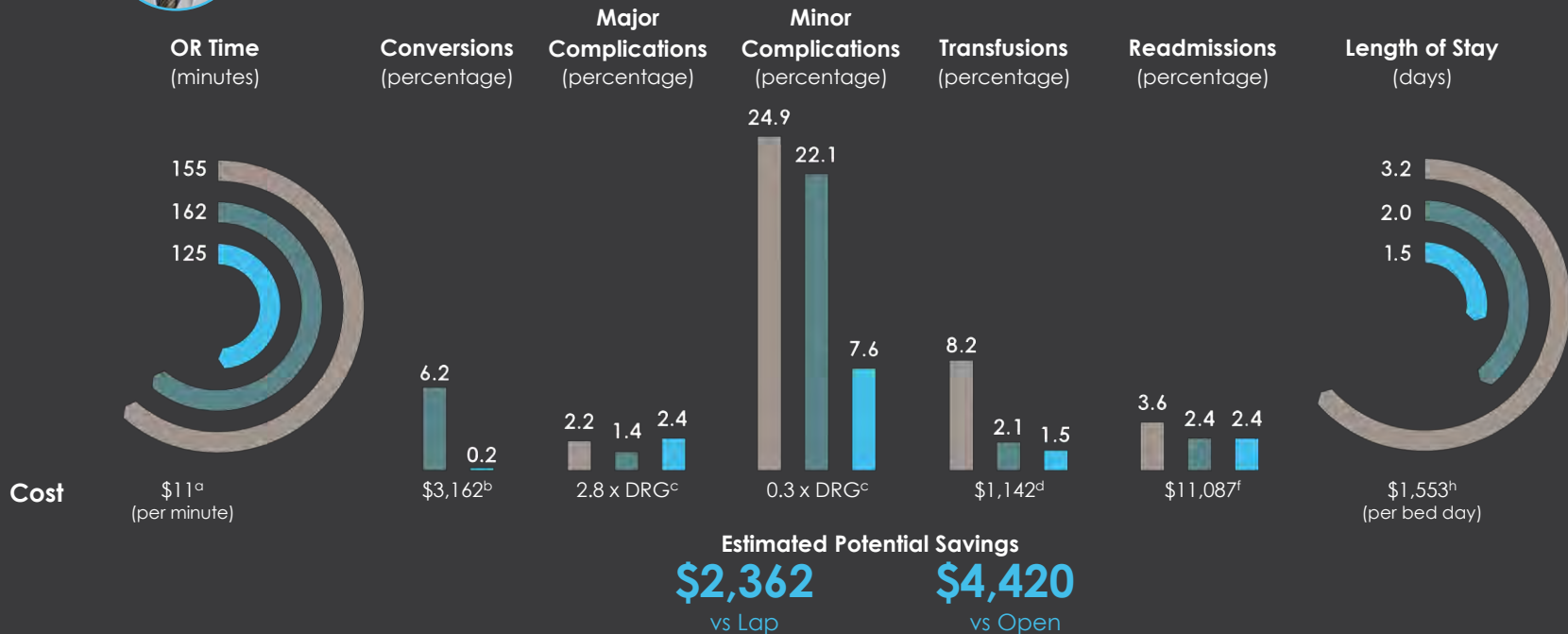
**John Crane, MD, FACOG, FPMRS**

Banner McKee Medical Center  
Loveland, CO

DA VINCI (n=410; John Crane) ●

LAP (n=100,787; ISI estimates based on Premier data\*) ●

OPEN (n=81,573; ISI estimates based on Premier data\*) ●



Data presented for robotic-assisted surgery reflect a single surgeon experience (data is not collected under formalized study, DATA IS NOT PEER REVIEWED AND NOT PUBLISHED) that may or may not be reproducible and is not generalizable. This data comparison is not case-matched for patient complexity and/or disease status and may not be comparable across these surgical modalities. As such, this data presentation should be considered as informational only and is not conclusive. Cost estimates have been independently generated by Intuitive Surgical, Inc. using cost modeling methodology based on national averages and have not been published or peer-reviewed. Costs related to *da Vinci* System acquisition, yearly service costs and other intraoperative and post-operative hospital costs are not included/considered.

Outcomes comparisons were made among unmatched patient populations.

\* ISI internal estimates based on 2010 – 2013 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical.



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# Supply Cost Comparison

## Benign Hysterectomy



**John Crane, MD, FACOG, FPMRS**

Banner McKee Medical Center

Loveland, CO

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.

	<i>da Vinci</i> <sup>®</sup>		Lap
Total	\$1,542		\$1,308
Instrument			
Long Tip Forceps	\$245	Bipolar or advanced energy – LigaSure™	\$490
Fenestrated Bipolar Forceps	\$257	Suction irrigator (Stryker Strike Flow II™)	\$50
Mega SutureCut Needle Drive	\$240	Endostitch™ (w/Reload) – TLH	\$398
Monopolar Curved Scissors	\$320	Endostitch™ Reloads (x2)	\$160
Prograsp Forceps	\$220	Disposable trocars	\$210
Disposable Accessory Kit, 4-Arm*	\$260		



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# Surgeon Profile



**Devin Garza, MD, FACOG**  
North Austin Medical Center  
Austin, TX

## da Vinci® System Training:

2006

## Hospital:

North Austin Medical Center

## IDN System:

HCA

## Residency:

Johns Hopkins Hospital  
Franklin Square Hospital

## Memberships:

American College of Obstetrics and Gynecology (ACOG)  
American Association of Gynecologic Laparoscopists (AAGL)

## Estimated MIS Procedure Volume

80%

Before da Vinci® Training

99%

After da Vinci® Training



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# Clinical Outcomes and Potential Cost Savings

## Benign Hysterectomy

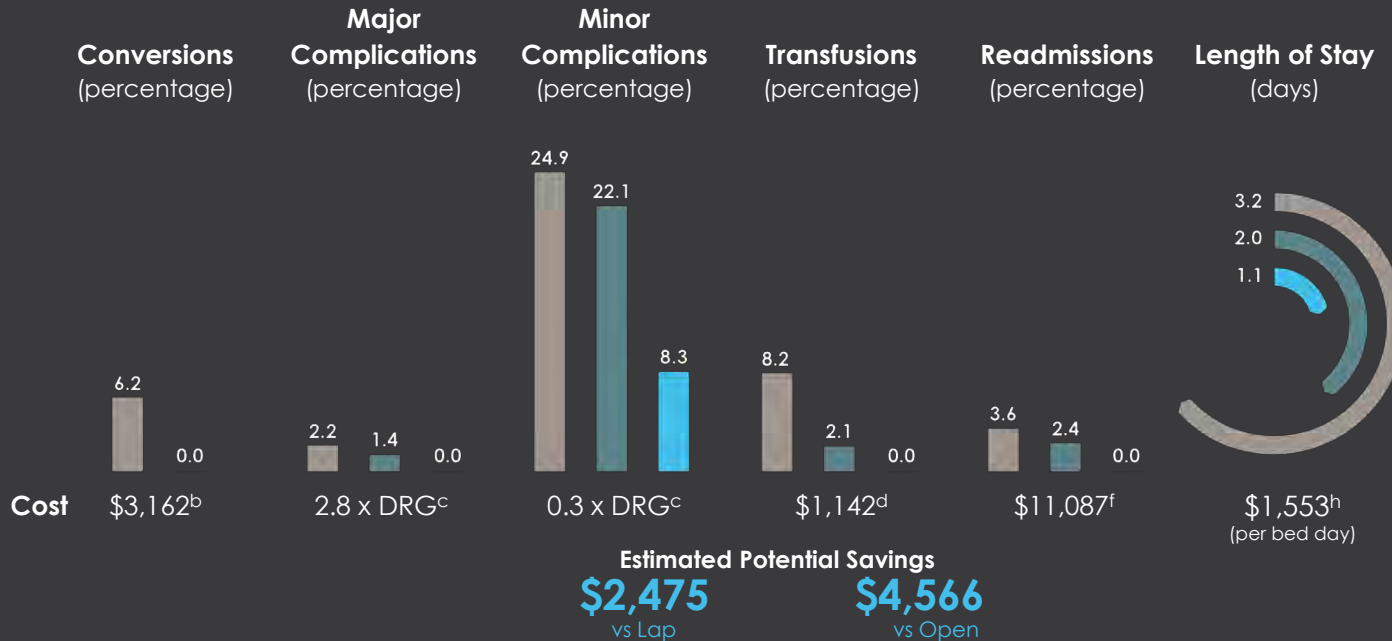


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**Devin Garza, MD, FACOG**  
 North Austin Medical Center  
 Austin, TX

DA VINCI (n=236; Devin Garza) ●  
 LAP (n=100,787; ISI estimates based on Premier data\*) ●  
 OPEN (n=81,573; ISI estimates based on Premier data\*) ●



Data presented for robotic-assisted surgery reflect a single surgeon experience (data is not collected under formalized study, DATA IS NOT PEER REVIEWED AND NOT PUBLISHED) that may or may not be reproducible and is not generalizable. This data comparison is not case-matched for patient complexity and/or disease status and may not be comparable across these surgical modalities. As such, this data presentation should be considered as informational only and is not conclusive. Cost estimates have been independently generated by Intuitive Surgical, Inc. using cost modeling methodology based on national averages and have not been published or peer-reviewed. Costs related to *da Vinci* System acquisition, yearly service costs and other intraoperative and post-operative hospital costs are not included/considered.

Outcomes comparisons were made among unmatched patient populations.

\* ISI internal estimates based on 2010 – 2013 national Premier database. Analysis and data, including ICD-9 codes, are on file at Intuitive Surgical.



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# Supply Cost Comparison

## Benign Hysterectomy



**Devin Garza, MD, FACOG**  
North Austin Medical Center  
Austin, TX

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.

	<b>da Vinci®</b>		<b>Lap</b>
<b>Total</b>	<b>\$1,095</b>		<b>\$1,308</b>
Instrument			
Monopolar Hook	\$143	Disposable trocars	\$210
Fenestrated Bipolar Grasper	\$257	LigaSure™	\$490
Wristed Needle Driver	\$230	Suction Irrigator	\$50
Single-Site® Port	\$143	Endostitch™	\$398
Suction Irrigator	\$50	Endostitch™ Reloads (x2)	\$160
3-arm Drape	\$200		
Cannula Seals	\$57		
10 mm Assist (green) Seal	\$15		



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# Surgeon Profile



**Thomas M. Shultz, MD, FACOG**

Cox Medical Centers-South  
Springfield, MO

## da Vinci® System Training:

2008

## Hospital:

Cox Medical Centers-South

## IDN System:

CoxHealth

## Residency:

University of Missouri at Columbia

## Memberships:

American College of Obstetric Gynecologists (ACOG)  
American Association of Gynecologic Laparoscopists (AAGL)  
Society of Gynecologic Surgeons (SGS)

## Estimated MIS Procedure Volume

52%

Before da Vinci® Training

99%

After da Vinci® Training



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# Clinical Outcomes and Potential Cost Savings

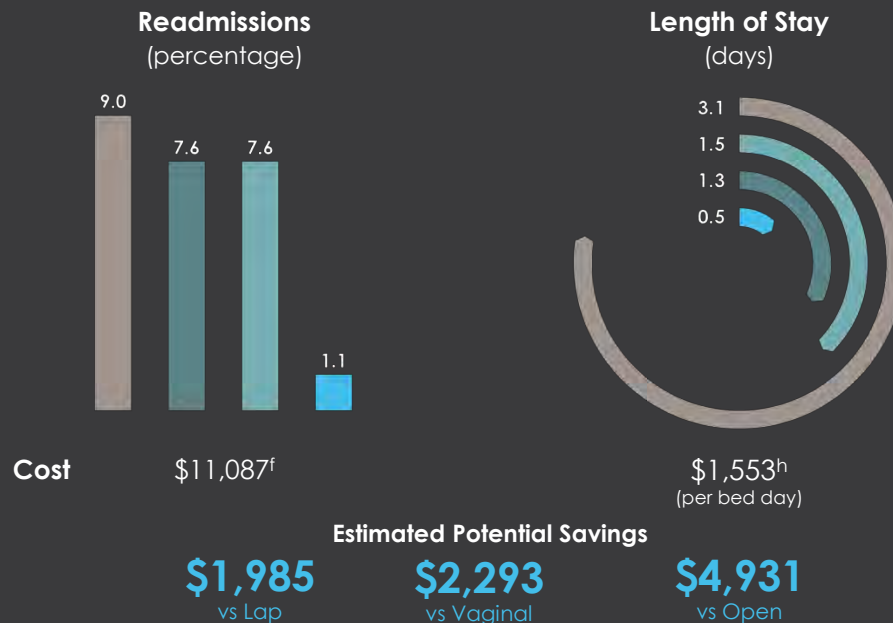
## Benign Hysterectomy



**Thomas M. Shultz, MD, FACOG**

Cox Medical Centers-South  
Springfield, MO

- DA VINCI (n=283, Thomas Shultz) ●
- VAGINAL (n=224, GYN peers at CoxHealth) ●
- LAP (n=223, GYN peers at CoxHealth) ●
- OPEN (n=334, GYN peers at CoxHealth) ●



Data presented reflect a single center experience (data is not collected under formalized study, DATA IS NOT PEER REVIEWED AND NOT PUBLISHED) that may or may not be reproducible and is not generalizable. This data comparison is not case-matched for patient complexity and/or disease status and may not be comparable across these surgical modalities. As such, this data presentation should be considered as informational only and is not conclusive. Cost estimates have been independently generated by Intuitive Surgical, Inc. using cost modeling methodology based on national averages and have not been published or peer-reviewed. Costs related to *da Vinci* System acquisition, yearly service costs and other intraoperative and post-operative hospital costs are not included/considered.

Outcomes comparisons were made among unmatched patient populations.

\* Data provided by Cox Medical Centers-South, Springfield, MO.



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# Supply Cost Comparison

## Benign Hysterectomy



**Thomas M. Shultz, MD, FACOG**

Cox Medical Centers-South  
Springfield, MO

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.

	<i>da Vinci</i> <sup>®</sup>	Lap	Vaginal	Open
<b>Total</b>	<b>\$1,415</b>	<b>\$ 927</b>	<b>\$ 552</b>	<b>\$ 622</b>
Instrument				
Vessel Sealer / Ligasure™	\$595	\$475	\$250	\$250
Large Needle Driver & Suture	\$220	\$27	\$27	\$27
Cautery Tool	\$200			\$15
Trocar(s)	\$125	\$150		
Suction Irrigator	\$35	\$35	\$35	\$35
Wound Stapler				\$55
Other (wound protector, drapes, seals...)	\$240	\$240	\$240	\$240



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# Cost Modeling Methodology



Ref.	Clinical Metric	Resource(s)	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	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.					
c	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.	$\frac{\text{Cost of complication}}{\text{Cost of surgery w/o complications}} \div \frac{\text{Cost of surgery w/o complications}}{\text{Cost of surgery w/o complications}}$	n/a	n/a
	DRG value	FY2016 Final Rule Tables. Center for Medicare and Medicaid Services.	Weighted Average*	Hyst-Benign DRG-742 (32%*) - \$8,527.10 / DRG-743 (9%*) - \$5,521.30 APC-5362 (59%*) - \$6,861.00  Lobectomy DRG-163 (18%*) - \$27,177.90 / DRG-164 (56%*) - \$14,031.26 DRG-165 (26%*) - \$9,861.00  Colon Resection DRG-329 (25%*) - \$27,177.90 / DRG-330 (47%*) - \$13,942.36 DRG-331 (41%*) - \$9,005.93  Rectal Cancer DRG-332 (12%*) - \$24,848.85 / DRG-333 (47%*) - \$13,256.36 DRG-334 (41%*) - \$9,018.50  Ventral Hernia Repair DRG-353 (3%*) - \$15,953.33 / DRG-354 (11%*) - \$9,109.79 DRG-355 (13%*) - \$6,765.38 / APC-0132 (73%*) - \$4,001.00  Inguinal Hernia Repair DRG-350 (3%*) - \$13,655.39 / DRG-351 (1%*) - \$7,707.73 DRG-352 (4%*) - \$5,346.93 / APC-0131 (92%*) - \$4,038.82	n/a

**NOTE:**

- Surgical complications classified as Clavien-Dindo Grade I constitute "Minor Complications" for the purposes of this analysis. The DRG multiplier featured (0.3) is an average of the calculated values from column 4 for each of these classifications.
- Surgical complications classified as Clavien-Dindo Grade IIIb, IVa and IVb constitute "Major Complications" for the purposes of this analysis. The DRG multiplier featured (2.8) is an average of the calculated values from column 4 for each of these classifications.

\*Based on 2014 Premier Database inpatient/outpatient procedure mix and DRG mix.



# Cost Modeling Methodology (cont'd.)

Ref.	Clinical Metric	Resource(s)	Calculation Method	Published Value	Value Adjustment
d	Transfusions	Shander A, Hofmann A, Ozawa S, et al. Activity-based costs of blood transfusions in surgical patients at four hospitals. <i>Transfusion</i> 2010;50(4):753-765.	$\$1,183.32 + \frac{\$726.05}{2} = \$955$	\$1,183.32 / \$726.05	2008-2014 Medical Services Consumer Price Index
NOTE: Per-unit blood cost is based on the average of the two hospitals of the four studied that are based in the US, specifically, EHMC and RIH (the other two are in Europe).					
e	Surgical Site Infections	Zimlichman E, Henderson D, Tamir O. Health care-associated infections: a meta-analysis of costs and financial impact on the US health care system. <i>JAMA Intern Med.</i> 2013 Dec 9-23;173(22):2039-46.	n/a	\$20,785	n/a
f	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.	n/a	\$14,718	2012-2014 Medical Services Consumer Price Index
g	Recurrences	Poulose BK, Shelton J, Phillips S, et al. Epidemiology and cost of ventral hernia repair: making the case for hernia research. <i>Hernia.</i> 2012 Apr;16(2):179-83.	n/a	\$15,899	n/a
h	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. <i>Crit Care Med</i> 2010;38(1):65-71.	n/a	\$1,153/day (general ward) \$3,518/day (intensive care)	2005-2014 Medical Services Consumer Price Index



# Important Safety Information

Risks associated with benign hysterectomy (removal of the uterus and possibly nearby organs): injury to the ureters (the ureters drain urine from the kidney into the bladder), vaginal cuff problems (scar tissue in vaginal incision, infection, bacterial skin infection, pooling/clotting of blood, incision opens or separates), injury to bladder (organ that holds urine), bowel injury, vaginal shortening, problems urinating (cannot empty bladder, urgent or frequent need to urinate, leaking urine, slow or weak stream), abnormal hole from the vagina into the urinary tract or rectum, vaginal tear or deep cut. 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.

Surgeons should counsel their patients that serious complications may occur with any surgery, including *da Vinci* Surgery, up to and including death. Examples of serious and 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 and/or organs
- Bleeding
- Infection
- Internal scarring that can cause long-lasting dysfunction or pain.

Surgeons should discuss these and all risks associated with surgery with their patients, including but not limited to the following:

- Potential for human error
- Potential for equipment failure
- Potential for anesthesia complications

Individual surgical results may vary.



# Important Safety Information

Risk specific to minimally invasive surgery, including *da Vinci*® Surgery, include but are not limited to:

- Temporary pain or nerve injury associated with positioning
- A longer operative time
- The need to convert the procedure to an open approach.

Converting the procedure could mean a longer operative time, a longer time under anesthesia, and/or the need for additional or larger incisions and/or increased complications.

Surgeons should counsel their patients that there are other surgical approaches available. You should discuss your surgical experience and review these and all risks with your patients. Patients and physicians should review all available information on non-surgical and surgical options in order to make an informed decision. Clinical studies are available through the National Library of Medicine at [www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed).

Be sure to read and understand all information in the applicable user manuals, including full cautions and warnings, before using *da Vinci* products. Failure to properly follow all instructions may lead to injury and result in improper functioning of the device. Training provided by Intuitive Surgical is limited to the use of its products and does not replace the necessary medical training and experience required to perform surgery. Procedure descriptions are developed with, reviewed and approved by independent surgeons. Other surgical techniques may be documented in publications available at the National Library of Medicine. For Important Safety Information, indications for use, risks, full cautions and warnings, please also refer to [www.davincisurgery.com/safety](http://www.davincisurgery.com/safety) and [www.intuitivesurgical.com/safety](http://www.intuitivesurgical.com/safety). Unless otherwise noted, products featured are available for commercial distribution in the U.S. For availability outside the U.S., please check with your local representative or distributor.

There are several models of the *da Vinci* System. Below are the cleared indications for use in the U.S. for the various models. Important Safety Information, Instructions for Use, Contraindications, Warnings, and Precautions are included in the product instructions provided with the system, instruments and accessories. Contraindications applicable to the use of conventional endoscopic instruments also apply to the use of all *da Vinci* instruments.

The Intuitive Surgical Endoscopic Instrument Control Systems (*da Vinci*, *da Vinci S* and *da Vinci Si* Surgical Systems Models IS1200, IS2000, IS3000) are intended to assist in the accurate control of Intuitive Surgical EndoWrist Instruments including rigid endoscopes, blunt and sharp endoscopic dissectors, scissors, scalpels, ultrasonic/harmonic shears, forceps/pick-ups, needle holders, endoscopic retractors, stabilizers, electrocautery and accessories for endoscopic manipulation of tissue, including grasping, cutting, blunt and sharp dissection, approximation, ligation, electrocautery, suturing, delivery and placement of





# Important Safety Information

microwave and cryogenic ablation probes and accessories, during urologic surgical procedures, general laparoscopic surgical procedures, gynecologic laparoscopic surgical procedures, transoral otolaryngology surgical procedures restricted to benign and malignant tumors classified as T1 and T2 and for benign base of tongue resection procedures, general thoracoscopic surgical procedures, and thoracoscopically assisted cardiomy procedures. The system can be employed with adjunctive mediastinotomy to perform coronary anastomosis during cardiac revascularization. The system is indicated for adult and pediatric use except for transoral otolaryngology surgical procedures. It is intended for use by trained physicians in an operating room environment in accordance with the representative, specific procedures set forth in the Professional Instructions for Use. The safety and effectiveness of this device for use in the treatment of obstructive sleep apnea have not been established.

The Intuitive Surgical Endoscopic Instrument Control System (da Vinci Surgical Systems Model IS4000) is intended to assist in the accurate control of Intuitive Surgical Endoscopic Instruments including rigid endoscopes, blunt and sharp endoscopic dissectors, scissors, scalpels, forceps/pick-ups, needle holders, endoscopic retractors, electrocautery and accessories for endoscopic manipulation of tissue, including grasping, cutting, blunt and sharp dissection, approximation, ligation, electrocautery, suturing and delivery and placement of microwave and cryogenic ablation probes and accessories, during urologic surgical procedures, general laparoscopic surgical procedures, gynecologic laparoscopic surgical procedures, general thoracoscopic surgical procedures and thoracoscopically assisted cardiomy procedures. The system can be employed with adjunctive mediastinotomy to perform coronary anastomosis during cardiac revascularization. The system is indicated for adult and pediatric use. It is intended for use by trained physicians in an operating room environment in accordance with the representative specific procedures set forth in the Professional Instructions for Use.

Unless otherwise noted, products featured are available for commercial distribution in the U.S. Some products may not be available worldwide and may not be used for all applications. For availability outside the U.S., please check with your local representative or distributor.

Training provided by Intuitive Surgical is limited to the use of the da Vinci Surgical System and does not replace the necessary medical training and experience required to perform surgery. The da Vinci Surgical System should be used only by surgeons who have received specific training in its use.

Intuitive Surgical facilitates peer-to-peer clinical teaching. Intuitive Surgical does not teach surgery, nor does it provide or evaluate surgical credentialing. Procedure descriptions are developed with, reviewed and approved by independent surgeons.

Intuitive Surgical-sponsored presentations, instruction and promotional materials are intended for general information only and



# Important Safety Information

are not intended to substitute for formal medical training or certification. *da Vinci* Surgical System training programs are not replacements for hospital policy regarding surgical credentialing. Certification, OR access and hospital privileges are the responsibility of the surgeon and their institutions, not that of Intuitive Surgical.

Any demonstration during Intuitive Surgical-sponsored training or instructional material on how to use the system to perform a particular technique or procedure is not the recommendation or "certification" of Intuitive Surgical as to such technique or procedure, but rather is merely a sharing of information on how other surgeons may have used the system to perform a given technique or procedure. Clinical information and opinions expressed by training participants, including any inaccuracies or mistakes, belong to the individual. Information and opinions are not necessarily those of Intuitive Surgical, Inc.

Before performing any *da Vinci*<sup>®</sup> procedure, physicians are responsible for receiving sufficient training and proctoring to ensure that they have the skill and experience necessary to protect the health and safety of their patients.

Users of the *da Vinci* System must follow all instructions for use supplied with the system, instruments and accessories. Use of *da Vinci* instruments for tasks other than that for which they were designed may result in damage or breakage. Unless stated in the instructions, do not use *EndoWrist* instruments on cartilage, bone or hard objects. Failure to follow instructions may lead to serious injury or surgical complications for the patient, including death. Electrosurgical energy may cause burns, serious injury or complications to the patient, including death. It is important to fully understand the *da Vinci* System energy user interface, not exceed recommended energy levels and to use caution when working near critical anatomy.

For Important Safety Information, including indications for use and full cautions and warnings, please also refer to the product instructions for use. Read all instructions carefully. Failure to properly follow instructions, notes, cautions, warnings and danger messages associated with this equipment may lead to serious injury or complications for the patient, including death.

In the event that the *da Vinci* System, instruments, or accessories do not work as expected or if you are aware of a product deficiency or adverse event, please contact Intuitive Surgical Customer Service immediately. Please refer to the Customer Service contact information in the product Instructions for Use.

Intuitive Surgical promotes and facilitates the use of the *da Vinci* System for commercial use only in conjunction with on-label procedures set forth in the Instructions for Use. Intuitive Surgical recommends consulting your institutional policy regarding the use of cleared medical devices for off-label procedures prior to utilizing the *da Vinci* System.

It is the responsibility of the owner of the *da Vinci* Surgical System to properly train and supervise its personnel to ensure that the instruments and accessories are properly cleaned, disinfected and sterilized as required by the User's Manual. The *da Vinci*

# Important Safety Information

products should not be used in a clinical setting unless the institution has verified that these products are properly processed in accordance with the *da Vinci System User's Manual*.

When considering cost-effectiveness of an advanced technology like the *da Vinci System*, we recommend that hospitals perform a full cost-benefit analysis, considering not just the operating room costs but the costs associated with hospital stays, procedure-related complications and hospital re-admissions.

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