Population Health Implications of Medical Tourism

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Background: Fifteen million U.S. patients each year seek medical care abroad; however, there are no data on outcomes and follow-up of these procedures. This study aims to identify, evaluate, and survey patients presenting with complications from aesthetic procedures abroad and estimate their cost to the U.S. health care system.
Methods: A single-center retrospective review was conducted. A cohort of patients presenting with complications from aesthetic procedures performed abroad was generated. Demographic, complication, and cost data were compiled. Patients were surveyed to assess their overall experience.
Results: Over a 36-month period, 42 patients met inclusion criteria (one man and 41 women), with an average age of 35 ± 11.4 years (range, 20 to 60 years). Comorbidities included four active smokers, two patients with hypertension, and one patient with diabetes. Average body mass index was 29 ± 4.4 kg/m^2 (range, 22 to 38 kg/m^2). Procedures performed abroad included abdominoplasty ($n = 28$), liposuction ($n = 20$), buttock augmentation ($n = 10$), and breast augmentation ($n = 7$), with several patients undergoing combined procedures. Eleven patients presented with abscesses and eight presented with wound dehiscence. Eight of the 18 patients who were surveyed were not pleased with their results and 11 would not go abroad again for subsequent procedures. Average cost of treating the complications was $18,211, with an estimated cost to the U.S. health care system of $1.33 billion. The main payer group was Medicaid.
Conclusions: Complications from patients seeking aesthetic procedures abroad will continues to increase. Patients should be encouraged to undergo cosmetic surgery in the United States to improve patient outcomes and satisfaction and because it is economically advantageous. (*Plast. Reconstr. Surg.* 140: 66, 2017.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

Medical tourism is a growing phenomenon, with an estimated 15 million patients in the United States seeking medical care abroad every year. This represents a $370 million opportunity cost for U.S. clinicians.[1] Increasing demand for affordable aesthetic procedures and promises of reduced costs are luring many patients abroad to countries such as the Dominican Republic and Mexico. A survey of 400 U.S. plastic surgeons showed that the majority of them had experience treating patients and the sequelae that ensued for those that had traveled abroad for plastic surgery procedures. Almost all surgeons who participated in the survey felt that medical tourism was a trend that had increased or stayed the same over the past 5 years.[2,3]

It is our responsibility to critically evaluate the risk-to-benefit ratio of medical tourism and its effect on both our practice of medicine and our patients. For patients interested in aesthetic surgery, medical tourism allows for potentially lower overall costs, increased privacy, and a vacation-based recuperation.[4] For plastic surgeons, the benefits of engaging in medical tourism include collaboration with

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A "Hot Topic Video" by Editor-in-Chief Rod J. Rohrich, M.D., accompanies this article. Go to PRSJournal.com and click on "Plastic Surgery Hot Topics" in the "Digital Media" tab to watch. On the iPad, tap on the Hot Topics icon.

international providers and in theory retention of top plastic surgeons that have moved abroad. However, embedded in this type of medical care is significant risk. The most common risks associated with medical tourism are the lack of follow-up care and the burden of treating complications in the home country. Other alarming risk factors include the lack of legal recourse,[5] risks of travel after surgery,[6] exposure and transport of foreign pathogens,[7,8] increased inequity of health care between wealthy and poor in the destination country,[9] and the burden of treating complications in the home country.[10]

The cost burden of treating complications from medical tourism is significant not only for patients and plastic surgeons, but also for public health programs, insurance companies, and hospitals that are ultimately the end payers for these complications. The vast majority of medical tourists seek intervention from their local health service rather than the primary surgeon in case of a complication.[11] These complications often require special treatment and management that incur significant expense because of differences in medical care, surgical techniques, and bacterial populations.[12] Complications arising from medical tourism and the burden they place on the domestic health care system, in this respect, represent an ineffective health care expenditure requiring strategies to minimize complication and injury population-wide, strategies that fall under the rubric of "population health."[13]

Despite evidence demonstrating the growth of medical tourism in aesthetic surgery, there are very few data on the outcomes, follow-up, and complication rates of plastic surgery procedures performed abroad. Furthermore, the magnitude of costs from medical management of complications resulting from medical tourism has yet to be examined systematically. The purpose of this study was to identify patients who presented to a single academic medical center with complications from aesthetic surgery abroad and to better delineate the types of complications and management of these complications. Using a population health approach and cost analysis, our goal was to not only highlight the scope of the issue but also to start and address strategies hospitals can take in the management of these patients in an attempt to prevent some of the complications and sequelae.

PATIENTS AND METHODS

Study Population

A retrospective chart review was performed at a major academic medical center. All patients who presented to a single medical center from October of 2013 through July of 2016 with complications caused by aesthetic surgery procedures performed abroad were included in the study.

Data Collection

Looking Glass Clinical Analytics (Streamline Health, Atlanta, Georgia) a software application that mines electronic medical records for demographic and clinical data sets, was used to generate the patient cohort. Variables collected included patient demographics, smoking history, and presence of medical comorbidities. Charts were reviewed for the primary surgical procedure and whether there were any simultaneous procedures performed. Complications were reviewed, and included the time of presentation from the date of the original operation. We also collected data on the management of complications (medical management versus surgical treatment, and hospital admission versus outpatient care). Patients who had a positive microbial culture were noted and the type of microbe was identified. Additional parameters included hospitalization, surgical care, antibiotic treatment, length of hospital stay, and the mean follow-up time.

Financial Analysis

Patient financial reports and payments to the hospital were collected. Cost analysis was performed using Clinegrity 360 (Nuance Communications, Burlington, Mass.) and was based on the patient *International Classification of Diseases, Ninth* and *Tenth Revision* codes. In addition, the major health care groups responsible for paying for the patient complications were reviewed.

To determine the cost of complications to the U.S. health care system, the average cost of the complication from our study was multiplied by the estimated number of individuals going abroad for medical tourism each year and then multiplied by the estimated complication rate for that procedure. The estimated number of patients going abroad each year was based on survey studies conducted by the Deloitte Center for Health Solutions on health care consumers.[1] The complication rate abroad for analogous procedures was assumed to be the same as in the United States. The rate was based on a literature review of recent publications on complication rates of abdominoplasty and breast augmentation published in *Plastic and Reconstructive Surgery*.[14–18]

Patient Interviews

Patients were surveyed over the phone to assess their experience going abroad. Patient interviews were conducted by the same research team member (K.A) to maintain consistency throughout the data

Table 1. Medical Tourism Questionnaire Administered to Patients Who Suffered Complications from Undergoing Cosmetic Surgery Abroad

What was the total cost of the procedure?
What was your length of stay?
How did you find the surgeon?
Did you consider a surgeon in the United States?
What did you envision the cost difference to be?
Are you pleased with your results?
How responsive has your surgeon been?
Did the surgeon know about the complications?
Would you go abroad again for another procedure?
Did you go alone?
What criteria did you use to pick a surgeon?
What was most appealing about going abroad?
Did you have friends that also went abroad for medical tourism? Please estimate the number.

collection process. The interviews were semistructured, and standard interview questions were used (Table 1). Patients were asked about how much they spent and what they envisioned the cost difference to be between going abroad and undergoing their surgery in the United States. They were asked whether cost was the number one reason for going abroad, how they found their surgeon initially, whether they considered choosing a surgeon in the United States, and their length of stay. Moreover, they were asked about the complication, whether the surgeon was informed about the complication, and how responsive the surgeon has been in the patient's care. Furthermore, the patients were asked whether they knew other people who had also gone abroad for surgery and the estimated number.

CASE REPORTS

Case 1

A 19-year-old woman presented with a history of *Mycobacterium*-infected abdominoplasty after an elective procedure performed in the Dominican Republic and further complicated by unknown pregnancy at that time. Two weeks after her procedure, the patient noted bullae rupturing along the wound, with acute worsening in 3 months. She was treated multiple times with incision and drainage of granuloma and abscesses on the anterior abdominal wall. Wound cultures were positive for *Mycobacterium* and she was treated with intravenous antibiotics through a peripherally inserted central catheter line. After a successful vaginal delivery of a 40-week-old baby girl, the patient continued to have granulomas and underwent radical débridement of the anterior abdominal wall and local tissue rearrangement (Fig. 1).

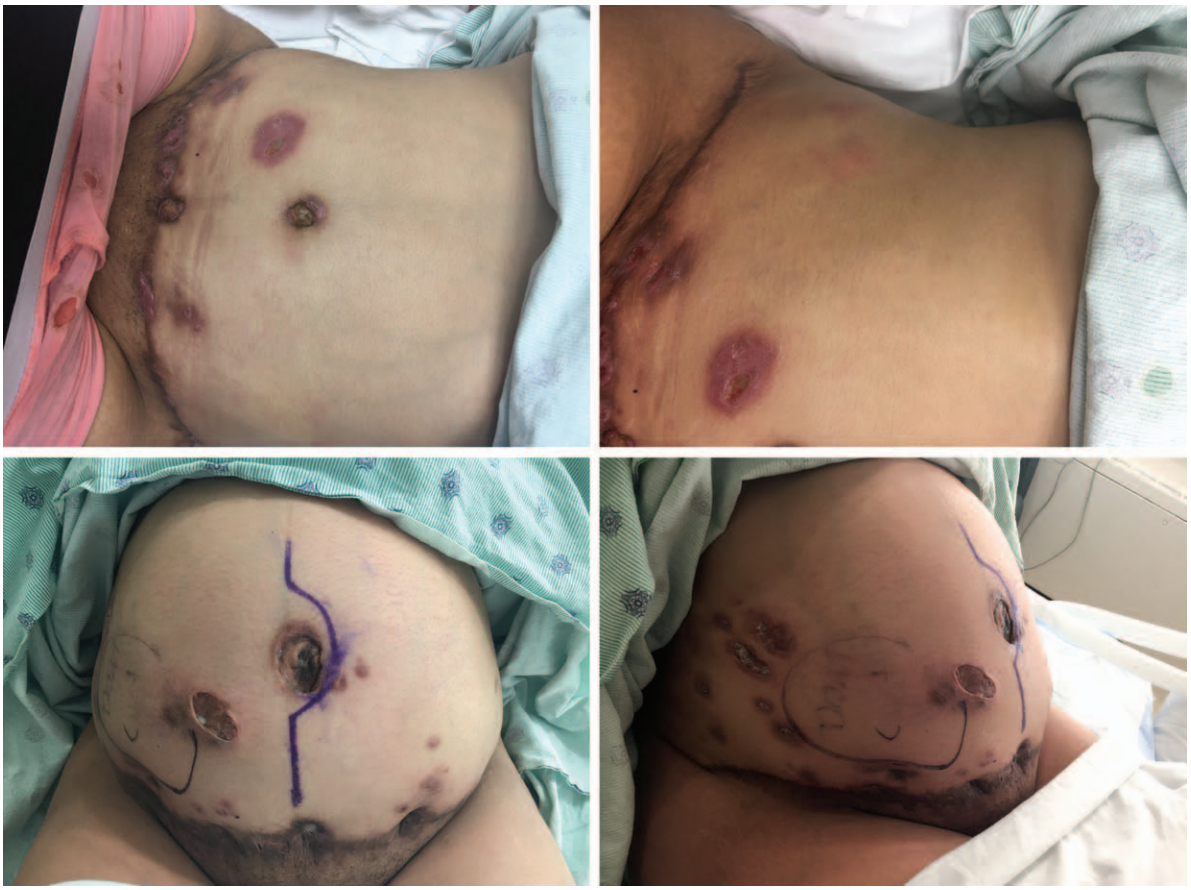

Fig. 1. Initial presentation of the patient in case 1 with bullae rupturing along her wound and multiple granulomas after delivery.

Case 2

A 27-year-old woman with a history of massive weight loss underwent an abdominoplasty, back liposuction, and autologous fat grafting to the buttocks in the Dominican Republic. After surgery, she reports that she was put on antibiotics by the primary surgeon for skin sloughing and burning pain. She was reassured that the condition was not serious. At presentation, she had a full-thickness burn and eschar, which measured 22 cm in height and 16 in length (Fig. 2). She required several surgical débridement procedures and subsequent skin grafting.

RESULTS

Patient Demographics

Over a 36-month period, a total of 42 patients were identified (one man and 41 women), with an average age of 35 ± 11 years (range, 20 to 60 years) (Table 2). Comorbidities included four patients with a positive smoking history, two patients with hypertension, and one patient with diabetes. The average body mass index was 29 ± 4.4 kg/m^2 (range, 22 to 38 kg/m^2).

Surgical Procedures

The most common procedure performed abroad with complication was abdominoplasty ($n = 28$), followed by liposuction ($n = 20$), buttock augmentation ($n = 10$), and breast augmentation ($n = 7$). The majority of patients ($n = 26$) who presented with complications underwent combined

Fig. 2. Patient in case 2 with a full-thickness burn and eschar beginning with her initial presentation and the multiple stages of her débridement and skin grafting.

Table 2. Study Demographics for Complications from Procedures Performed Abroad from October of 2013 to July of 2016

Characteristic	Value
No.	42
Age, yr	
Mean ± SD	36 ± 11.4
Range	20–60
Sex	
Male	1 (2%)
Female	41 (98%)
BMI, kg/m^2	
Mean ± SD	29 ± 4.4
Range	22–38
Comorbidities, %	
Current smoker	10
Hypertension	5
Diabetes	2

BMI, body mass index.

Table 3. Types of Procedures Performed Abroad

Procedures	%
Abdominoplasty	67
Liposuction	48
Buttock augmentation	24
Breast augmentation	17
Combined procedures	**%**
Abdominoplasty and buttock augmentation	17
Abdominoplasty and liposuction	17
Liposuction and buttock augmentation	12
Abdominoplasty, breast augmentation, and liposuction	5

procedures, including abdominoplasty and buttock augmentation (n = 7); abdominoplasty and liposuction (n = 7); buttock augmentation and liposuction (n = 5); abdominoplasty and breast augmentation (n = 2); and abdominoplasty, breast augmentation, and liposuction (n = 2)[19] (Table 3).

Complications and Management

Patients presented with complications an average of 7.2 ± 9.5 weeks after their initial operation (range, 0.9 to 52 weeks). Complication categories were not mutually exclusive. Many patients presented with multiple complications. The majority presented with infection as at least one of their complications (n = 30). Eleven patients had an abscess and eight patients presented with wound dehiscence. Less common complications included cellulitis (n = 6), seromas (n = 3), deep venous thrombosis/fat embolism (n = 3), sepsis (n = 3), and pyelonephritis (n = 2) (Fig. 3). Microbial cultures identified included *Candida albicans*, *Escherichia coli*, nontuberculous *Mycobacterium*, and *Bacteroides fragilis*.

Twenty patients required hospitalization, including 13 that underwent a surgical procedure as treatment for their complication. The most common surgical procedure for management of complications was incision and drainage (n = 14), whereas the most common conservative treatment was drain placement by interventional radiology. The average inpatient hospital stay for complications was 7 ± 5.7 days (range, 1 to 20 days). The mean follow-up time, from the time of treatment to the last clinical encounter, was 13 ± 18 weeks (range, 1 to 52 weeks).

Cost Analysis

Hospital billing for treatment of complications was determined for patients presenting in 2013 and 2014 (n = 11). The average cost of treating the complications was $18,211. The most costly complications were an abscess ($39,602) and a deep venous thrombosis ($38,398). Data from 2015 hospital billing were not yet available at the time when our analysis was completed. Table 4 outlines the original procedure, complication, and associated cost.

Medicaid paid for most of the complications (n = 6), whereas three patients had commercial insurance and one had Medicare. One patient was

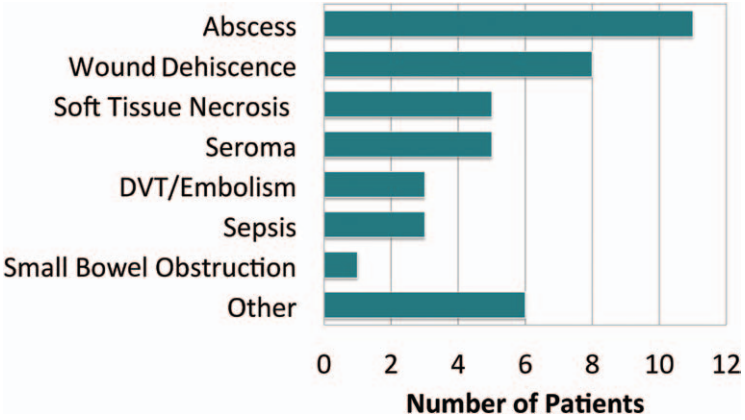

Fig. 3. Categorizing presenting complications. *DVT*, deep venous thrombosis.

Table 4. Hospital Billing for Major Complications Based on *International Classification of Diseases, Ninth Revision* Codes

Procedure	Complication	Total Estimated Payments
Abdominoplasty and buttock augmentation	Abscess	$21,288
Buttock augmentation	Abscess	$12,083
Liposuction and buttock augmentation	Abscess	$21,562
Abdominoplasty, liposuction, and breast augmentation	DVT	$38,398
Brachioplasty	Wound dehiscence	$11,379
Abdominoplasty, mastopexy, and liposuction	DVT	$7000
Breast augmentation and abdominoplasty	Wound dehiscence	$7574
Liposuction and breast augmentation	Pyelonephritis	$5427
Liposuction and buttock augmentation	Abscess	$39,602
Liposuction and buttock augmentation	Cellulitis	$11,571
Abdominoplasty	Abscess	$24,436
Average		$18,211

DVT, deep venous thrombosis.

reported as self-pay in the hospital billing records, indicating that they did not have insurance and likely the hospital incurred this cost.

The percentage of contribution made by each payor group was multiplied by the total estimated complication cost to estimate how much of the cost nationally was paid by each payor. Medicaid paid an estimated $730 million toward complications from medical tourism, whereas commercial insurance paid $359 million and Medicare paid $119 million.

Patient Surveys

Eighteen patients were successfully contacted to assess their experience going abroad for an aesthetic procedure (response rate, 43 percent). Twelve patients had notified the primary surgeon of the complication. Eight of the patients found their surgeons independently on realself.com. All of the patients knew of at least one other family member or friend (average, 5 ± 3; range, 3 to 10) who had gone abroad for a procedure. Eight were not pleased with their results, and the majority (n = 11) would not go abroad again for subsequent procedures (Fig. 4). One patient described her procedure as the "worst experience of her life," whereas another said that she was happy overall with her results but "would not go abroad [for a subsequent procedure] because the surgeon did not spend as much time with her preoperatively to discuss her procedure and the result she would have liked." Their average length of stay was 20 days.

Patients were also asked to comment on the perception of cost of surgery in the United States because many patients opted for surgery abroad because of perceived lower cost. We compared the average cost reported for abdominoplasty and breast augmentation by patients to the average cost of the procedures in the United States as reported in the American Society of Plastic Surgeons 2014 Plastic Surgery Statistics Report[19] (Fig. 5). On average, patients envisioned the cost to be $9060 more in the United States, reflecting a gross misconception on their part.

DISCUSSION

Complications from patients seeking aesthetic procedures abroad will increase as medical tourism

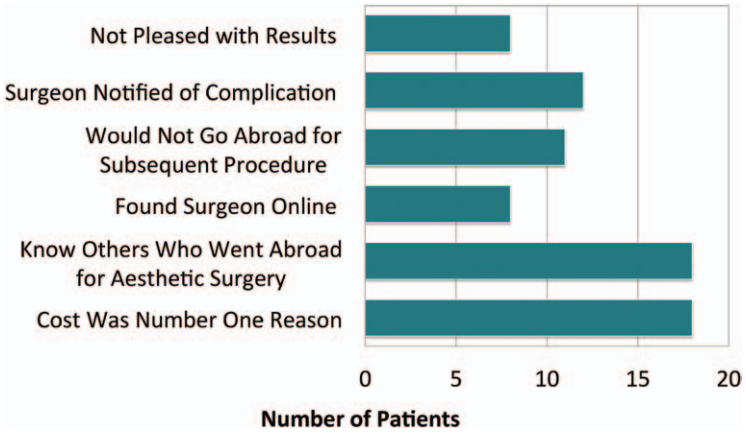

Fig. 4. Patient satisfaction.

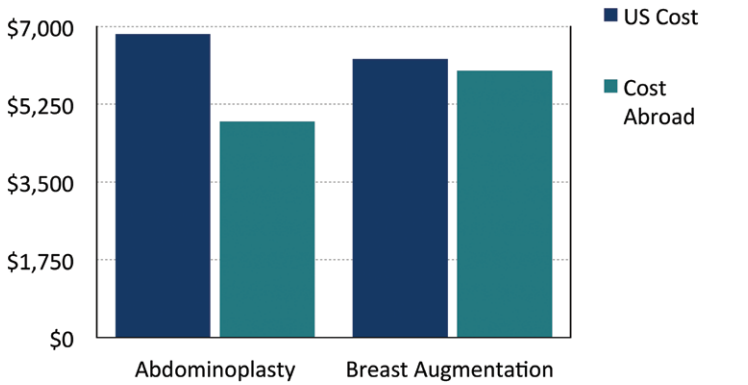

Fig. 5. Procedure cost abroad versus within the United States.

continues to grow. In reviewing our experience over 2 years, the majority of these patients were women with few medical comorbidities. Based on this study, it is unknown whether patients who elect to have cosmetic surgery abroad experience a higher complication rate than those patients who have the same procedure performed in the United States. For our analysis, we assumed the same incidence of complications for a given procedure performed here or abroad; however, as such, we may actually be underrepresenting the actual number of complications.

Patients may receive suboptimal care because of different standards in surgeon training and in surgical facility accreditation in the destination countries. In our study, these differences could have accounted for the number of patients with infection-related complications ($n = 30$), abscesses ($n = 11$), and wound dehiscence ($n = 8$). In addition, traveling immediately after an operation may expose patients to increased risk for certain complications such as deep vein thrombosis ($n = 3$).

Although a number of the complications in our case series could occur with any plastic surgery procedure, whether performed in the United States or abroad, other complications, such as the mycobacterial infections classically seen in these patients, are unique to this population, posing particular challenges for the surgical and clinical team treating them. Furthermore, disruptions to patients' continuity of care as they transition between provider and home countries can negatively impact the quality of care and health outcomes.[20] This suboptimal and discontinuous patient care can at least in part be responsible for the complications documented in our study and for the low patient satisfaction reported in our survey. Although our questionnaire consisted of open-ended questions, which limits the interpretation of data, future studies will assess patient satisfaction with multicenter structured interview surveys that can be more readily quantified.

An issue of significant relevance to medical tourism is patient access to safety profiles for hospitals offering plastic surgery. Although patients already have access to hospital safety reports for many hospitals in the United States and there is movement toward increasing the scope and efficacy of these reports,[21] this information is unavailable to patients going abroad currently, and we can expect that it will not be available in the near future. If safety profiles are provided by various hospitals offering plastic surgery, patients can make informed choices whether undergoing surgery within the United States or overseas. Many patients only consider the convenience of location and the price of surgery. However, when complications and safety data are provided to patients, patients are in a better position to decide whether to stay in the United States for treatment at reputable centers or to choose a hospital abroad that may provide ready access with much lower cost. As of now, however, the lack of hospital safety reporting profiles for hospitals abroad creates yet another barrier for patients trying to find a safe surgeon abroad.

Toward addressing the increased risks with medical tourism, both the American College of Surgeons and the American Medical Association have published guidelines for consideration by patients, employers, insurers, and other third-party groups responsible for coordinating such travel outside of the country.[22] Postprocedure monitoring and documentation of medical tourism as proposed by the authors of this article in a resolution to the American Medical Association would bring further improvement in patient care, health outcomes, data liquidity, and medical research.

Table 5. Proposed National Cost of Complications*

Year	No. of Patients	No. of Complications	Total Cost
2012	1,621,000	72,945	$1,328,401,395
2011	1,283,000	57,735	$1,051,412,085
2010	878,000	39,510	$719,516,610
2009	648,000	29,160	$531,032,760
2008	540,000	24,300	$442,527,300
2007	750,000	33,750	$614,621,250

*Average cost of complications from our study multiplied by the estimated number of patients going abroad and the complication rate for procedures.

To our knowledge, this study is the first to examine systematically the magnitude of costs from medical management of complications resulting from medical tourism. We propose a framework for assessing the potential cost of medical tourism to the U.S. health care system. Hospital billing from patients in our study was used to estimate the average complication cost. Assuming that the rate of complications abroad was no greater than in the United States, we conducted a literature review to determine the average complication rate for the procedures most commonly sought abroad. Data from a previously published survey study were used as estimates for the number of patients going abroad each year for medical tourism. We determined that the burden of complications from medical tourism in 2012 was a staggering $1.3 billion (Table 5). This cost will inevitably also increase, as the number of medical tourists is projected to rise to between 10.5 and 23.2 million by 2017.[1]

Medical tourism for aesthetic procedures may represent a cost to the health care system that was previously self-paid or treated at no cost by the primary surgeon. Of the 11 patients whose hospital billing was analyzed in our study, the majority (n = 6) were paid for by Medicaid, representing an estimated $730 million cost. The remainder of the complications were paid for by private insurance and the hospital. Therefore, the potential savings that some patients may benefit from with medical tourism could be thought of as a redistribution of cost away from the individual patients to social health programs, private insurance companies, and hospitals. As the demand for plastic surgery continues to grow, initiatives both at the policy-making and hospital administrative levels should create favorable incentives to attract patients to have aesthetic procedures performed domestically, minimizing the increasing cost of treating complications associated with medical tourism.

CONCLUSIONS

Although medical tourism may provide a more affordable option for some individual patients in the short term, complications arising from medical tourism are not only jeopardizing patient safety but also placing an increasing financial burden on our health care system. Complications from patients seeking aesthetic procedures abroad will increase as medical tourism continues to grow. Because of these complications and their experience abroad, the majority of patients surveyed said they would not go abroad for subsequent procedures. This represents a potential cost that could be invested in population-based interventions to attract patients to seek aesthetic procedures domestically, reducing the risk to patients and also minimizing the financial burden on our health care system. Patients need to be better educated on the risks and complications of aesthetic surgery both domestically and abroad so that they can make more informed decisions in the future.

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