



## **Disparities in Utilization of Minimally Invasive Breast Biopsy – Illinois, 2008-2010**

### **Background:**

Every year in the United States, more than one million women undergo breast biopsy. A breast biopsy is performed to evaluate a suspicious lesion. Between 70% and 80% of these biopsies lead to a non-cancerous diagnosis.

Open surgical biopsies sample tissue from suspicious lesions through a surgical incision. Open surgical biopsies are typically performed in an operating room and often require general anesthesia. Surgical biopsies present the risk of infection, scarring and disfigurement, and adverse reactions to anesthesia.

Core needle, or minimally invasive, breast biopsies sample tissue through insertion of a hollow needle into the breast and removal of three to five rice-grain sized samples. Patients generally receive local anesthesia, and the procedure is often performed in an outpatient setting.

The most common kind of minimally invasive breast biopsy (MIBB) is an image guided biopsy, in which a provider uses stereotactic equipment or an ultrasound machine to guide the insertion of the needle and sampling of the tissue. In stereotactic guided biopsy, the surgeon takes a series of x-rays while taking the sample. This requires a special stereotactic machine, but allows the surgeon to biopsy lesions that are not palpable. Ultrasound guided biopsy uses ultrasound rather than x-ray. If the lesion is palpable, surgeons can sample without image guidance.

There are several advantages associated with MIBB. Because an incision is never made, patients who receive a minimally invasive breast biopsy have less scarring and infection than patients who have a surgical biopsy. There is less risk that the shape and appearance of the breast will be affected. Patients who receive an MIBB have a much shorter recovery time as well, allowing them to return to work or family obligations often within one day of receiving the procedure.

Studies have found that MIBB has a diagnostic accuracy equivalent to or better than surgical biopsies. The Agency for Healthcare Research and Quality recently released a report demonstrating a sensitivity of 96-99% with MIBB.

In 2003, 2005, and 2009, the International Breast Cancer Consensus Conference came together to advocate for expanded use of MIBB rather than surgical biopsy. In 2009, they issued a statement in which they identify MIBB as the gold standard of biopsy, and advocate for the replacement of open surgical biopsy with minimally invasive breast biopsies. They recommend that healthcare systems and providers endeavor to reach a surgical biopsy rate of 5-10%.

This analysis explores the rate of MIBB in Illinois and identifies disparities in utilization of MIBB. With thousands of breast biopsies occurring in Illinois every year, most of which do not result in a diagnosis of cancer, the cost, risk, and complications from breast biopsy should be minimized.

**Methods:**

The Illinois Hospital Discharge database collects procedure codes, demographic data, and charge data for all discharges from Illinois hospitals and ambulatory surgery centers. The discharge database was queried for all women undergoing breast biopsy for the years 2008-2010. Current Procedural Terminology (CPT) codes 19100, 19102, and 19103 were identified for MIBB, and codes 19101 and 19125 for surgical biopsy. We analyzed demographic information, procedure data, hospital type, and residency information. Using Behavioral Risk Factor Surveillance System strata, patient addresses were categorized as Cook County, collar counties, urban counties or rural counties outside of Cook County.

We used chi square tests to test the relationship between patient demographic factors and the rate of MIBB. We used logistic regression to test the increase in MIBB over time, and to test the increase in charge over time for both MIBB and surgical biopsies. All analysis was completed using SAS 9.1.

**Results:**

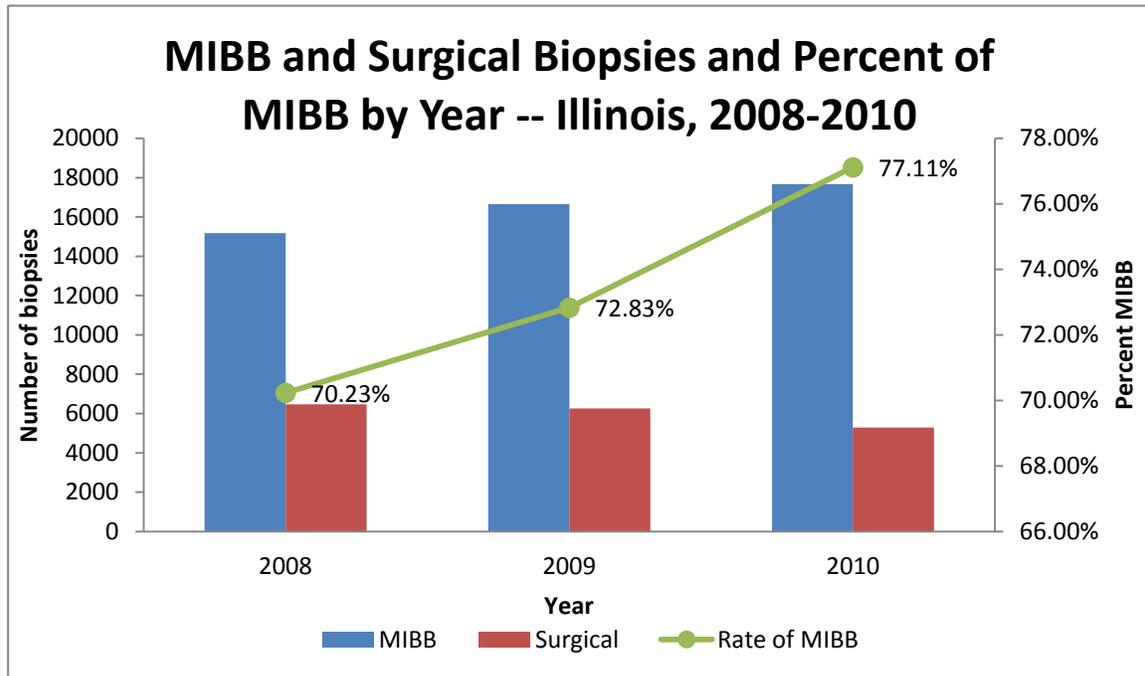
During the study period, approximately 22,500 biopsies were completed every year. In total, our sample therefore had 64,629 women. Table 1 shows the number of biopsies by biopsy type code during the study period.

Table 1: Number and percent of breast biopsy CPT codes by year – Illinois, 2008-2010

Year	Minimally invasive breast biopsies (CPT codes 19100, 19102 and 19103) n (%)	Surgical biopsies (CPT codes 19101 and 19125) n (%)	Total biopsies
2008	15546 (70.6%)	6478 (29.4%)	22024
2009	16995 (73.0%)	6271 (27.0%)	23266
2010	17971 (77.2%)	5296 (22.8%)	23267

Figure 1 shows the number and rate of MIBB over the study period. The rate of MIBB increased during the study period – from just over 70% in 2008, to approximately 77% in 2010. Although this was a statistically significant increase in MIBB, the rate of surgical biopsy was still three to six times higher than the Consensus Conference believes it should be. This amounts to 3750 to 4875 excessive surgical biopsies every year.

Figure 1: MIBB and Surgical Biopsies and Percent of MIBB by Year



**Demographic information:**

We studied the rate of MIBB by race, income level, payer type and age of the woman. The results are shown in Table 2.

Table 2: Rates of MIBB by patient characteristic – Illinois, 2008-2010

Patient characteristic	Group	Percent MIBB	p value
Age	<=40	76.0%	<.01
	41-50	73.4%	<.01
	51-60	73.1%	<.05
	>61	72.1%	Ref.
Race	White	72.9%	Ref
	Black	76.3%	<.01
	Latina	70.2%	<.01

Income	< \$50,000	73.6%	ns
	\$60,000- \$79,999	71.2%	<.01
	\$80,000 - \$119,999	74.6%	ns
	>= \$120,000	73.6%	Ref.
Payer	Private insurance	74.0%	Ref.
	Medicaid	72.5%	<.05
	Medicare	71.7%	<.01
	Uninsured	72.7%	ns

Latina women in Illinois had significantly higher rates of open biopsy than other racial groups. Younger women had higher rates of MIBB than women over the age of 61. Women with Medicaid and Medicare had lower rates of MIBB than women with private insurance.

### Geographic disparities:

Approximately 22% of the state population of Illinois, or nearly three million people, lives in the city of Chicago. Cook County and the five surrounding “collar counties” comprise more than 65% of the state’s population. We categorized patient’s home county using strata from the BRFSS as Cook County, including Chicago, the urban and suburban “collar counties,” urban counties outside of Cook County, and rural counties. We examined the rate of open biopsy by home residence zip code of the patient. Women living in rural counties had a MIBB rate of 60.9%, significantly lower than the rate for women in urban counties outside of Cook County (74.7%), the collar counties (70.1%), and Cook County (77.8%). The results are displayed in Table 3.

Table 3: Rates of MIBB by patient home county strata – Illinois, 2008-2010

County strata	MIBB rate	P value
Cook County	77.76%	Ref.
Collar counties	71.95%	p<.01
Urban counties	72.34%	p<.01
Rural counties	69.60%	p<.01

The city of Chicago is home to one of the largest medical districts in the country, including a public safety-net hospital open to uninsured patients and several tier-one

research institutions. Of the 18 teaching hospitals in the state, 15 are located in Cook County.

Critical Access Hospitals receive cost-based Medicare reimbursement designed to improve their financial performance and prevent hospital closures in underserved rural communities . Critical Access Hospitals must be at least 35 miles from another hospital. All of the state’s critical access hospitals are located outside of Cook County, and more than 90% are located in rural counties.

Utilization of MIBB varies dramatically by facility type. The state’s teaching hospitals have achieved a MIBB rate almost at the goal benchmark of 90-95%. The non-teaching hospitals have a rate slightly below the state average. Almost half of all biopsies performed at the critical access hospitals that serve the state’s rural population were surgical biopsies.

Table 4: Rates of MIBB by facility type – Illinois, 2008-2010

Facility type	MIBB rate	P value
Teaching hospital	83.85%	Ref
Non-teaching hospital	71.26%	p<.01
Critical Access hospital	46.61%	p<.01

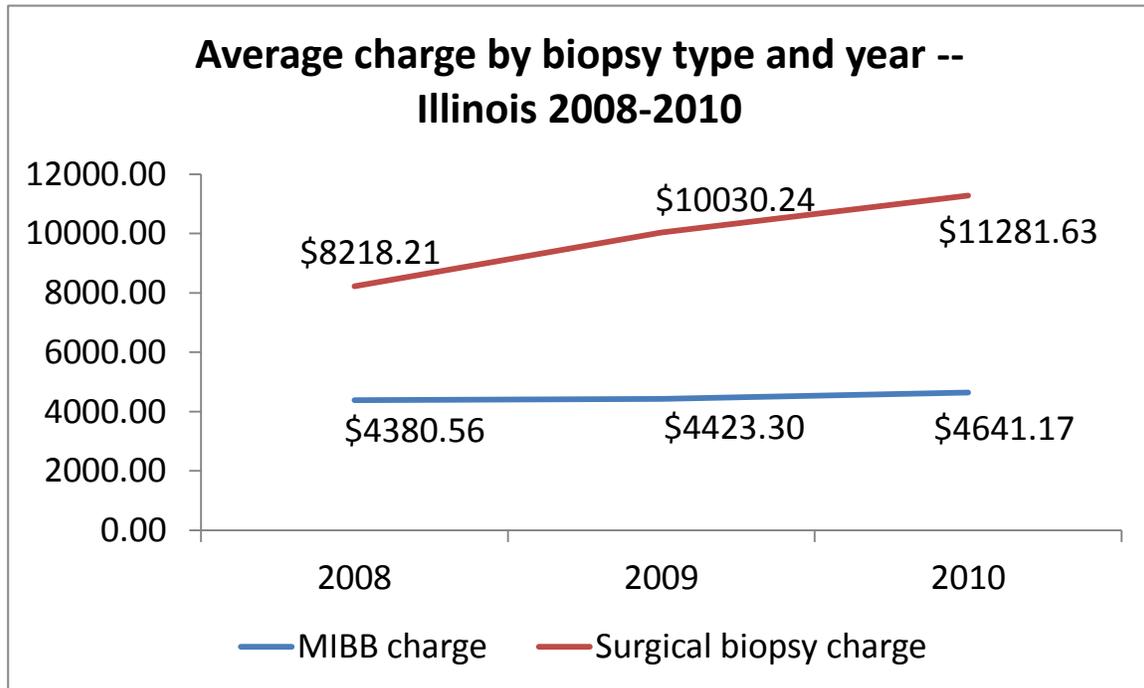
Most minimally invasive breast biopsies are performed with stereotactic equipment. Stereotactic equipment is very expensive, and requires special training to operate. Access to, and operation of, stereotactic equipment is one major barrier to greater utilization of minimally invasive breast biopsies. In Illinois, fifty-nine of the 80 hospitals in rural counties, approximately 74%, do not have any stereotactic equipment. Seven hospitals in rural counties reported having stereotactic equipment, but performed fewer than ten stereotactic biopsies a year, indicating a possible lack of trained personnel. Even ultrasound-guided biopsies were difficult to access in rural counties, with 55% of hospitals not performing any ultrasound guided biopsies either.

Access to stereotactic equipment outside of rural counties is consistently higher. In Cook County, 23% of hospitals had no stereotactic equipment. One third of hospitals in the suburban collar counties, and 38% of hospitals in the urban counties outside of the Chicago-land area did not have stereotactic equipment.

**Charge data:**

Surgical biopsies are significantly more expensive than minimally invasive breast biopsies. In 2008, the average charge for a minimally invasive breast biopsy was \$4380.56. By 2010, after adjusting for inflation, the charge had risen slightly, to an average of \$4641.17. This was not a significant increase. The average charge for a surgical biopsy was \$9245.49. This was a significantly higher charge than the charge for a MIBB in 2008 (p<.01). By 2010, the average charge had risen to \$11281.63. By

regression analysis, this was a significant increase in charge from 2008 to 2010 ( $p < .01$ ). Figure 2 demonstrates the charge associated with each biopsy type over the study period.



### **Conclusion:**

Minimally invasive breast biopsy is safer than surgical biopsy. There is a lower risk of infection, lower risk of surgically-associated complications including complications associated with use of general anesthesia, and a short recovery time following the procedure. Minimally invasive breast biopsy costs significantly less than surgical biopsy, and, if current trends continue, this difference in cost will only increase over time. Minimally invasive breast biopsy has a diagnostic sensitivity that meets or exceeds that of surgical biopsy. Fortunately, the rate of MIBB in Illinois is increasing, from just over 70% in 2008, to 77% in 2010. Despite these increases, the rate remains far below the recommended rate of 90-95%.

Some groups in Illinois have particularly low rates of MIBB. In this analysis, we identified Latina women and women who live outside of Cook County, especially in rural counties, as having significantly lower rates of MIBB.

Although additional investigation is warranted, one reason for the low rates of MIBB in rural counties may be access to stereotactic equipment, and to providers able to perform image-guided minimally invasive breast biopsies.

Efforts to increase use of MIBB should be targeted at rural counties. Especially in facilities where stereotactic equipment is available but not being utilized, hospitals should provide training opportunities to surgeons on the use of stereotactic equipment for breast

biopsy. Patient groups in rural areas should educate women receiving biopsies on the benefits of MIBB, and work with facilities to increase access to MIBB for eligible candidates.

Breast biopsy is a very common procedure in Illinois. In 2010, more than 23,000 women received a breast biopsy. Based on trends, we expect this number to continue to increase significantly in the future. Increasing access to MIBB, therefore, has the potential to improve breast care for thousands of women every year. In addition, breast biopsy represents a significant healthcare cost. In 2010, almost \$142 million was spent on breast biopsies. As the charge for surgical biopsies continues to increase, the potential cost savings by increasing utilization of MIBB grows.