

Inappropriate Radiologic Staging Examinations in Early-Stage Breast Cancer: Assessment of the Costs to the Québec Government

T. Hijal, MD; H. Habibullah, MD; S. Rahman, BSc; H. Almarzouki, MD; B. Gallix, MD and C. Freeman, MBBS

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INTRODUCTION

Cancer staging is essential before the initiation of therapy. A sizeable portion of patients with early-stage breast cancer undergoes unnecessary staging tests, which are costly. Several national and international groups define which staging tests are considered necessary for staging.

OBJECTIVES

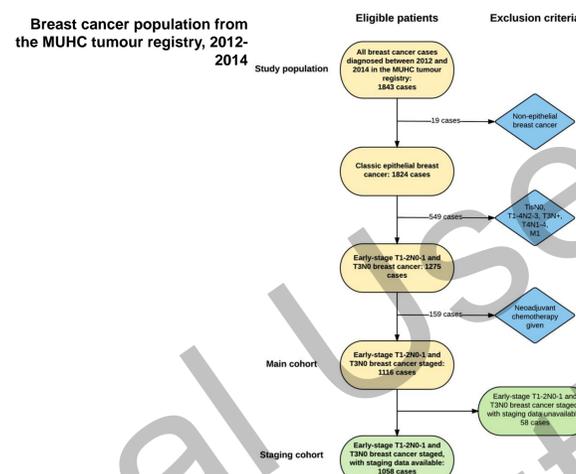
This study seeks to quantify the cost of such unnecessary tests in patients with early-stage breast cancer in the province of Québec, Canada.

METHODS / INTERVENTIONS

All patients diagnosed with breast cancer between 2012 and 2014 and listed in the tumour registry of the McGill University Health Centre, were included in this retrospective study. For each patient with early-stage breast cancer, the type and number of unnecessary staging tests, as per national guideline definitions, was extracted from the medical chart. The cost of each test, from a single payer point of view, was obtained from the Quebec government manuals of payment. The total cost of unnecessary staging tests was derived. Finally, an extrapolation was done to estimate the total cost for the whole province of Québec per year.

RESULTS

1845 patients were listed in the tumour registry of the MUHC, 1116 of which were diagnosed with early-stage breast cancer. 82.5% of patients underwent at least one inappropriate staging test. Less than 1% of these tests detected metastatic disease. The average cost of inappropriate staging tests per patient was \$235.84, \$251.83 and \$217.34 for 2012, 2013, and 2014 respectively, with an average 10-year cost of \$8,306,596.18.



	Eligible population	Abdominal U/S	Chest x-ray	CT chest	Bone scan	CT pelvis	Detection rates of the positive staging tests
Number of tests ordered	2490	404	744	253	653	230	
Number of positive tests	14	4	2	1	6	1	
Detection rate	0.56%	0.99%	0.27%	0.40%	0.92%	0.43%	

Costs of inappropriate staging tests in the staging cohort	2012-2014	2012	2013	2014
Inappropriate tests	2490	925	954	611
Staging cohort - number of patients	1058	388	379	291
Number of inappropriate tests per patient	2.35	2.38	2.51	2.10
Total cost of unnecessary staging	\$250,194.21	\$91,504.31	\$95,444.66	\$63,245.24
Cost of unnecessary staging tests per patient	\$236.48	\$235.84	\$251.83	\$217.34

	Proportion of patients that have early-stage breast cancer and that did not receive neoadjuvant treatment			Sensitivity analyses for the total costs
Number of tests per patient	-5.00%	Baseline	5.00%	Panel A represents the theoretical cost while panel B represents the true budgetary cost, over 10 years
2.11	\$7,034,839.18	\$7,458,262.96	\$7,887,003.64	
2.35	\$7,835,010.47	\$8,306,596.18	\$8,784,103.58	
3.7	\$12,335,973.92	\$13,078,470.59	\$13,830,290.74	

	Proportion of patients that have early-stage breast cancer and that did not receive neoadjuvant treatment		
Number of tests per patient	-5.00%	Baseline	5.00%
2.11	\$10,965,049.09	\$11,625,033.50	\$12,293,305.57
2.35	\$12,212,258.47	\$12,947,312.19	\$13,691,596.25
3.7	\$19,227,811.21	\$20,385,129.84	\$21,556,981.32

PATIENT IMPACT

Unnecessary testing has a major patient impact: It exposes patients to radiation and risk of secondary malignancy. Furthermore, false positive results lead to further tests, some of which are invasive. These generate unnecessary anxiety, and possible complications to patients.

CONCLUSION

The majority of patients with early-stage breast cancer undergo unnecessary staging tests. In a social system with limited resources, these tests are costly to the single payer Québec government. Physician education is paramount in reducing the use of unnecessary staging tests performed in early-stage breast cancer.

TRANSLATION ACROSS THE RCN

This study applies primarily to the MUHC, but includes a sizeable minority of patients from RCN partner institutions. The data confirms that patients undergo unnecessary staging at all RCN institutions. Changes in practice must be implemented across the RCN.