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# Thyroid cancer is more likely to be detected incidentally on imaging in private hospital patients

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## ABSTRACT

**Background:** The incidence of well-differentiated thyroid cancer (WDTC) is increasing. Patients with higher socioeconomic status have higher rates of WDTC, possibly due to increased imaging and overdiagnosis. We compared methods of WDTC diagnosis in patients treated at a public and an adjacent private university hospital.

**Materials and methods:** Patients with WDTC at the two hospitals between 2004 and 2010 were included. Patients were categorized into having their WDTC discovered on physical examination or on unrelated imaging. Demographic and pathologic data were collected. T-test was used for quantitative variables, and chi-squared test was used for categorical values. Binomial logistic regression was used to assess for confounding.

**Results:** Among 473 patients, 402 (85%) were from the university hospital, and 71 (15%) were from the public hospital. Patients from the university hospital were older (mean age: 49 versus 44,  $P = 0.02$ ) and had a different racial composition compared to those from the public hospital. The patients at the public hospital had larger tumors (23 versus 18 mm,  $P = 0.04$ ). Patients from the university hospital were more likely to have WDTC detected by imaging than patients in the public hospital (46% versus 28%,  $P < 0.01$ ) on univariate analysis.

**Conclusions:** This study demonstrates that patients with WDTC treated at a university hospital are more likely to have their tumor detected on unrelated imaging than those treated at a public hospital. These data may support the hypothesis that patients with improved insurance are more likely to have WDTC detected by imaging.

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## Introduction

Since 1975, the incidence of thyroid cancer has nearly tripled in the United States. This is either due to an increased incidence or increased screening and overdiagnosis. It may also be due to a combination of the two.<sup>1-10</sup> Overdiagnosis is defined as increased medical scrutiny leading to increased detection of subclinical cancers that would otherwise not go on to cause symptoms or death. Concomitant to the rise of

thyroid cancer rates, thyroid cancer detection has improved due to increased screening technology and prevalence. Notably, despite the increase in thyroid cancer rates, thyroid cancer mortality has stayed the same.

It is known that higher socioeconomic status (SES) and insurance status correlate with thyroid cancer incidence but not thyroid cancer mortality.<sup>2,3,11-13</sup> The reason for this relationship is unclear. It may be secondary to an unidentified risk factor in the environment or due to better access to care

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leading to increased imaging and diagnosis. We wanted to examine this relationship by comparing diagnostic patterns in patients from two different hospitals who mostly come from different SES backgrounds.

Our aim was to explore the relationship between thyroid cancer rates and insurance status. We examined thyroid cancer detection methods at two hospitals staffed by the same group of surgeons and residents. One is a private tertiary medical center with mostly privately insured and Medicare patients and the other is a public hospital with mostly uninsured and Medicaid patients. We hypothesized that patients at the private hospital would have a higher proportion of thyroid cancer detection on unrelated imaging rather than by palpation compared to the public hospital.

## Materials and Methods

The medical records of 402 patients who underwent thyroid surgery with a postoperative diagnosis of well-differentiated thyroid cancer (WDTC) at NYU Langone Medical Center and 130 patients from the adjacent Bellevue Hospital by members of NYU Endocrine Surgery Associates between 2004 and 2010 were reviewed. NYU Langone Medical Center is a private university hospital with mostly privately insured and Medicare patients. Bellevue hospital is a municipal hospital with mostly uninsured and Medicaid patients. Seventy-six percent of NYU Langone medical center patients are insured privately, 1% receive Medicaid, and 22% receive Medicare. At Bellevue hospital, 8% are privately insured, 63% have Medicaid, 18% have Medicare, and 10% have some other form of coverage (e.g., no fault, workers comp). Both hospitals are staffed by the same group of attending and resident physicians.

Patients were classified based on the method of initial cancer detection into either a “palpation” or “imaging” group. The palpation group included those patients in whom further

diagnostic studies were initiated because a physician had noted an abnormality on physical examination or because the patient or another nonprofessional had noted a mass in the neck. The imaging group included patients for whom further diagnostic workup was indicated because of a nodule that was initially detected on an imaging study. The indications for these imaging studies were unrelated to the thyroid tumor and are described in a previous study from our group.<sup>14</sup> Patients whose WDTCs were found incidentally on final pathology when the indications for surgery were unrelated to the WDTC were excluded. The indication for surgery in both groups was a suspicious or malignant cytological finding on fine needle aspiration biopsy. Demographic and pathologic data were also collected. Tumors were also classified into size groups. These groups were less than 1 cm, 1 cm to less than 2 cm, 2 cm to less than 4 cm, and 4 cm or greater.

Statistical analysis was performed using SPSS, version 23, for Windows (SPSS, Chicago, IL). Contingency tables were analyzed by chi-squared test and Fisher’s exact test, and comparison of means was performed with independent samples t-test. Binomial logistic regression was performed. Two tailed P values  $\leq 0.05$  were considered significant.

This study was approved by the NYU Cancer Institute Protocol Review and Monitoring Committee and by the NYU Institutional Review Board.

## Results

The patient demographics are listed in Table 1. Among 473 patients, 402 (85%) were from the university hospital and 71 (15%) were from the public hospital. Fifty-nine patients were excluded from the public hospital data set because the initial mode of detection could not be identified. Patients from the university hospital were older, with a mean age of 49 versus 44 (P value 0.02). The racial composition varied between the

**Table 1 – Patient demographics.**

	Total		Private		Public		P value
	n	%	n	%	n	%	
Hospital							
Private	402	85					
Public	71	15					
Female	352	75	296	74	56	79	0.38
Race							
White	241	74	238	90	3	5	
Black	11	3	5	2	6	10	
Hispanic	23	7	4	2	19	30	
Asian	52	16	17	6	35	56	<0.001
	Mean	SD	Mean	SD	Mean	SD	
Age	48	15	49	15	44	13	0.02
n = 473							
SD = standard deviation.							

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