

# A Study of Thyroid Disease in Family Practice

J. Christopher Shank, MD  
Hershey, Pennsylvania

Thyroid disease is relatively common in family practice, yet is often undiagnosed or poorly managed. This study examines several aspects of thyroid disease in a large, semirural family practice setting and exemplifies the type of practical clinical research that can be done in family medicine.

An overall prevalence of approximately one percent was determined for thyroid disease in this practice. In a series of 85 patients, the ratio of hypothyroidism:hyperthyroidism:euthyroid goiter was 9:2:1 respectively. Initial signs and symptoms recorded for these patients conformed closely to the findings in other large series. Eighty percent of the patients with idiopathic hypothyroidism never had enlarged glands, whereas 100 percent of the patients with hypothyroidism associated with Hashimoto's thyroiditis had enlarged glands.

Laboratory aids such as serum thyroid stimulating hormone (TSH), anti-thyroid antibodies, and radioactive iodine uptake (RAIU) and scans were inadequately utilized. Medical and/or surgical consultation was obtained in 17.5 percent of patients with hypothyroidism, 80 percent of patients with hyperthyroidism, and 63 percent of those with euthyroid goiter. Currently 95 percent of the hypothyroid patients and 100 percent of the hyperthyroid patients are euthyroid.

Diseases of the thyroid are relatively common in family practice and yet are frequently undiagnosed or poorly investigated. This paper examines several facets of thyroid disease occurring in a family practice setting. The purpose is twofold: to illustrate the patterns of thyroid disease being seen by one group of family physicians, and to exemplify the type of clinical research that can be performed in primary care medicine. Geyman and others have emphasized that the potential is great for important research contributions from the field of family practice.<sup>1,2</sup> With a system of disease indexing and records which facilitate orderly review, family physicians can identify significant patterns of prevalence, natural history, and treatment practice for many common

medical problems.

Reviewing and categorizing problems of the thyroid, for example, can have many positive benefits for the practitioner. Educationally, it stimulates review of basic physiology, disease prevalence, and presenting signs and symptoms. Such inquiry allows for the application of newer and more available diagnostic tests to aid in understanding a given patient's pathophysiology. And finally, better patient management can be facilitated by identifying needs for adjustment in therapy consonant with the most current recommendations in the literature.

## Materials and Methods

The Department of Family and Community Medicine at The Milton S. Hershey Medical Center uses a disease indexing system related to the well-known Metcalfe modification of the Royal College of General Practitioners' code. After a patient has filled out a Patient Data Abstract containing basic demographic information, this is pro-

grammed into a computer, along with coded problems on the problem list. Then, at any time, the computer can furnish a printout of all patients with a given problem.

In December 1974, a printout was obtained of all patients with "hyperthyroidism," "hypothyroidism," or "other thyroid disease" as one of their problems. Of this list of 105 patients, 98 charts were located and reviewed, and 80 instances of documented thyroid disease were noted.

The 80 charts, plus five additional patients first noted after December 1974, were included in the study for a total of 85 cases of thyroid disease. The 85 charts were individually reviewed by the author, and information in the following categories was tabulated: (a) patient's disease [ie, hyperthyroidism, hypothyroidism, or euthyroid goiter] (b) present age, (c) date of first diagnosis, (d) initial signs and/or symptoms, (e) description of gland, past and/or present, (f) work-up beyond a T<sub>4</sub> and T<sub>3</sub> resin uptake, (g) present status, (h) treatment regimen, (i) frequency of follow-up visits, and (j) consultants used, if any. Analysis of the data obtained, plus a commentary form the body of this report.

## Prevalence of Thyroid Disease in Family Practice

There are few reports in the literature of the overall prevalence or incidence of thyroid disease in population groups. Both Pitt-Rivers' and Werner's textbooks on thyroid diseases state that the true incidence or prevalence of hypothyroidism is unknown, largely due to the lack of accurate morbidity statistics from large communities.<sup>3,4</sup> The situation is essentially the same for hyperthyroidism, because most series only include hospital admissions or patients at large referral centers.<sup>5,6</sup> Logan and Cushion did report on data from representative general practices in Britain, showing that patients attending with hyperthyroidism during the course of one year amounted to 1.1 per thousand of the population at risk.<sup>7</sup>

The Department of Family Medicine at the Hershey Medical Center provides primary care for approximately 12,000 patients in the semirural area of Hershey and surrounding communities in East Central Pennsylvania. By December 1974, 7,944 of these patients had been seen and

From the Department of Family and Community Medicine, The Milton S. Hershey Medical Center, The Pennsylvania State University, Hershey, Pennsylvania. Requests for reprints should be addressed to Dr. J. Christopher Shank, Resident III, Department of Family and Community Medicine, The Milton S. Hershey Medical Center, The Pennsylvania State University, Hershey, PA 17033.

**Table 1. Types of Thyroid Disorders**

	Number	Percent
<b>Hypothyroidism (75% of all)</b>		
Idiopathic or unknown etiology	54	86
Secondary to Hashimoto's thyroiditis	5	8
Associated with cold nodule	1	1
Associated with prior neck surgery	3	5
<b>Total</b>	<b>63</b>	<b>100</b>
<b>Hyperthyroidism (16% of all)</b>		
Idiopathic (Graves' disease)	11	79
Secondary to subacute thyroiditis	1	7
Secondary to toxic, hot nodule	1	7
Secondary to medication	1	7
<b>Total</b>	<b>14</b>	<b>100</b>
<b>Euthyroid Goiter (9% of all)</b>		
Diffuse goiter	6	75
Associated with cold nodule	2	25
<b>Total</b>	<b>8</b>	<b>100</b>

**Table 2. Disease Spectrum in Male and Female Patients**

	Number Males	Number Females
<b>Hypothyroidism</b>		
Idiopathic or unknown etiology	4	50
Secondary to Hashimoto's thyroiditis	-	5
Associated with cold nodule	1	-
Associated with prior neck surgery	1	2
<b>Total</b>	<b>6</b>	<b>57</b>
<b>Hyperthyroidism</b>		
Idiopathic (Graves' disease)	2	9
Secondary to subacute thyroiditis	1	-
Secondary to toxic, hot nodule	-	1
Secondary to medication	-	1
<b>Total</b>	<b>3</b>	<b>11</b>
<b>Euthyroid Goiter</b>		
Diffuse goiter	-	6
Associated with cold nodule	1	1
<b>Total</b>	<b>1</b>	<b>7</b>

registered in the computer index. It is estimated that this was 75 to 80 percent of the total patient population cared for by the Department of Family Medicine at that time. Exactly 80 cases of thyroid disease were noted out of this patient population of 7,944, for a prevalence rate of approximately one percent in the patient population registered. Breaking this down, the approximate prevalence for hypothyroidism was 0.75 percent, for hyperthyroidism 0.16 percent, and for euthyroid goiter 0.08 percent. It is possible that the prevalence is somewhat less in the 20 to 25 percent of our total population which was not registered before December 1974. Thus, the overall prevalence rate of

thyroid disease in our total practice may be slightly less than one percent.

**Types of Thyroid Disorders**

Table 1 illustrates the type-specific analysis of the 85 patients with thyroid disease. Seventy-five percent of our thyroid patients were hypothyroid, compared with 16 percent hyperthyroid and 9 percent with euthyroid goiter, a ratio of 9:2:1 respectively. Figures comparable to these are difficult to find in the literature. Certainly, the breakdown of thyroid patients reported from large referral centers cannot be considered to reflect the general population.

Of the 63 patients with hypothyroidism, 54 (86 percent) were of

the idiopathic or unknown etiology type, 5 (8 percent) were documented as being secondary to Hashimoto's thyroiditis, 3 (5 percent) were associated with prior neck surgery, and 1 (1 percent) was associated with a cold nodule in the thyroid gland. In a review of 400 patients with hypothyroidism seen in a university thyroid clinic, Watanakunakorn et al report 43.25 percent idiopathic, 7.75 percent secondary to thyroiditis, 22.25 percent secondary to previous I<sup>131</sup> therapy, 8.75 percent secondary to previous thyroidectomy, 8.5 percent secondary to previous treatment of thyroid carcinoma, and 4.25 percent secondary to Sheehan's Syndrome or hypopituitarism.<sup>8</sup> Thus, our family practice is seeing approximately two times the percent of the idiopathic type, and about the same percent of Hashimoto's thyroiditis seen at the university referral center studied in the Watanakunakorn report.

Of the 14 patients with hyperthyroidism, 11 (79 percent) were idiopathic or had Graves' Disease. One each (7 percent) of cases secondary to subacute thyroiditis, toxic hot nodule, and over-medication were noted. Of eight instances of euthyroid goiter, 6 (75 percent) were diffuse and 2 (25 percent) were associated with a cold nodule. It is of note that we had one patient with thyroid cancer in our series of 85 patients. This patient was one of the two with euthyroid goiter and a cold nodule.

**Sex Ratios**

Of the 85 patients with thyroid disease, 75 (88 percent) were female and 10 (12 percent) were male. Of the ten males, six were hypothyroid, three were hyperthyroid, and one had euthyroid goiter (thyroid carcinoma) (Table 2).

Regarding the 63 patients with hypothyroidism, 57 (90 percent) were female, with a female to male ratio of 9.5:1. Werner and Ingbar relate that most series show about 80 percent of all hypothyroidism in females.<sup>4</sup> Watanakunakorn et al, in a series of 400 patients with hypothyroidism, had 82 percent females.<sup>8</sup> Of the 14 patients with hyperthyroidism, 11 (80 percent) were female, with a female to male ratio of 3.7:1. Werner and Ingbar state that the average quoted ratio is 4.5:1.<sup>6</sup>

Thus for females, the ratio of hypo-

Table 3. Age at First Diagnosis

	Unknown	0 - 12	13 - 17	18 - 25	26 - 40	41 - 64	65 plus	Total
<b>Hypothyroidism</b>								
Idiopathic or unknown etiology	15	2	2	6	9	16	4	54
Secondary to Hashimoto's thyroiditis	1	-	2	-	1	1	-	5
Associated with cold nodule	-	-	-	-	-	1	-	1
Associated with prior neck surgery	1	-	-	-	-	2	-	3
<b>Hyperthyroidism</b>								
Idiopathic (Graves' disease)	1	-	-	3	4	3	-	11
Secondary to subacute thyroiditis	-	-	-	-	1	-	-	1
Secondary to toxic, hot nodule	-	-	-	1	-	-	-	1
Secondary to medication	-	-	-	-	-	1	-	1
<b>Euthyroid Goiter</b>								
Diffuse goiter	1	1	-	2	1	1	-	6
Associated with cold nodule	-	-	-	-	1	1	-	2
<b>Totals</b>	<b>19</b>	<b>3</b>	<b>4</b>	<b>12</b>	<b>17</b>	<b>26</b>	<b>4</b>	<b>85</b>

Table 4. Present Age Distribution

	Unknown	0 - 12	13 - 17	18 - 25	26 - 40	41 - 64	65 plus	Total
<b>Hypothyroidism</b>								
Idiopathic or unknown etiology	-	-	-	5	11	22	16	54
Secondary to Hashimoto's thyroiditis	-	-	2	-	-	3	-	5
Associated with cold nodule	-	-	-	-	-	1	-	1
Associated with prior neck surgery	-	-	-	-	-	3	-	3
<b>Hyperthyroidism</b>								
Idiopathic (Graves' disease)	-	-	-	2	3	6	-	11
Secondary to subacute thyroiditis	-	-	-	-	1	-	-	1
Secondary to toxic, hot nodule	-	-	-	-	1	-	-	1
Secondary to medication	-	-	-	-	-	1	-	1
<b>Euthyroid Goiter</b>								
Diffuse goiter	-	-	-	1	2	3	-	6
Associated with cold nodule	-	-	-	-	-	2	-	2
<b>Total</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>8</b>	<b>17</b>	<b>41</b>	<b>16</b>	<b>85</b>

to hyperthyroidism was 57/22 or about 5:1, whereas for males this ratio was 6/3 or 2:1. For females, this data generally conforms with the literature, but for males, some authors report more hyper- than hypothyroidism. For instance, Rowntree, in a review of the endocrine disease found in World War II recruits, noted hyperthyroidism four to five times as often as hypothyroidism.<sup>9</sup>

#### Age Distribution

Table 3 shows the age at first diagnosis according to age groups and Table 4 shows the present age distributions of the patients with thyroid disorders. Twenty-five of the 39 (65 percent) patients with idiopathic hypothyroidism for whom an age of first diagnosis was available were initially noted in the middle years from 26 to 64. Patients with hyperthyroidism and euthyroid goiter were first diagnosed fairly evenly through-

out the 18 to 25, 26 to 40, and 41 to 64 age groups.

In the present population of patients, 38 out of 54 (70 percent) patients with idiopathic hypothyroidism and 45 out of 63 (71 percent) patients with hypothyroidism are 41 or older. Watanakunakorn's series of 400 patients with hypothyroidism showed 78 percent of patients between 30 and 70, with the peak incidence in the sixth decade.<sup>8</sup>

#### Presenting Signs and Symptoms

Table 5 shows the presenting signs and symptoms of the patients in the practice. Many patients had more than one key symptom or sign, but in the charts of others no such symptoms or signs were recorded.

For hypothyroidism, the most frequently recorded findings were fatigue/malaise (24), weight gain/obesity (11), complaint of a lump in the front of the neck (11), dry skin or

hair changes (8), voice change (3), cold intolerance (3), and swelling of the face or ankles (3). In Watanakunakorn's series of 400 patients with hypothyroidism, his seven most frequent symptoms and signs were nearly identical to ours.<sup>8</sup> They were, in order of frequency: (1) dry skin or hair, (2) fatigue, (3) edema, puffy hands or face, (4) pallor, (5) cold intolerance, (6) mental and/or physical slowness, (7) hoarseness, and (8) obesity, [ie, weight gain greater than 15 lbs]. Oddie and coworkers also investigated the incidence of signs and symptoms in thyroid disease in a large series of their own specialty clinic patients, and reviewed several other series.<sup>10</sup> They defined a figure of merit (ie, the incidence of a sign or symptom in the diseased group compared to the incidence in the euthyroid group) to select the most useful symptoms and signs for diagnosing disease. For hypothyroidism, the highest figures of merit were for dry skin or edema,

cold intolerance, lethargic movements, coarse hair, and slow speech.

In hyperthyroidism, we found tremor, weight loss, eye signs, weakness, diarrhea, tachycardia, and heat intolerance to be most frequently noted. Oddie's large review noted tachycardia, heat intolerance, weight loss, tremor, warm moist skin, eye signs, and a bruit over the thyroid

gland.<sup>10</sup> Again the lists are similar and serve to illustrate the most useful findings in the hyper- as well as hypothyroid states.

As would be expected for euthyroid goiter, the most common observations in our series were a large gland on examination of the neck or complaints of a lump in the neck anteriorly. Two of the eight patients also initially complained of dysphagia.

### Relation of Gland Enlargement to Disease

Table 6 illustrates the types of gland enlargement for each disease state. Naturally, in some instances the gland has changed, but the purpose here is to tabulate those disease entities characterized by gland enlargement at any point in their natural history.

Of the patients with idiopathic hypothyroidism, 43 out of 54 (80 percent) never had enlarged glands. Oddie's review showed 145 of 185 (79 percent) without goiter.<sup>10</sup> Of all instances of hypothyroidism, we had 46 of 63 (73 percent) without goiter and Watanakunakorn had 257 of 400 (64.5 percent).<sup>8</sup> Of the five documented patients with Hashimoto's thyroiditis, all glands were enlarged, 4 of 5 (80 percent) diffusely so. Again Oddie's data are comparable, with 131 of 174 (76 percent) cases of Hashimoto's disease with diffuse or multinodular enlargement.<sup>10</sup> Rallison and coworkers in 62 childhood cases, reported 85 percent with enlarged glands.<sup>11</sup> In general, the patients with

hyperthyroidism were fairly evenly divided as to the presence of gland enlargement; however, it was unclear in at least three records if the glands were enlarged prior to thyroidectomy.

Concerning tender glands, we had 1 in 63 patients (1.6 percent) with hypothyroidism, 1 in 14 patients (7 percent) with hyperthyroidism, and 1 in 8 patients (12 percent) who had euthyroid goiters. Oddie's large review showed tender glands in 4 of 202 patients (2 percent) with hypothyroidism, 7 of 125 patients (4 percent) with hyperthyroidism, and 35 of 744 patients (4.7 percent) with euthyroid goiter, all excluding thyroiditis. They found tender glands in all of 26 patients (100 percent) with acute suppurative thyroiditis, 51 of 57 patients (90 percent) with subacute non-suppurative thyroiditis, 21 of 171 patients (12 percent) with Hashimoto's thyroiditis, and 16 of 144 patients (11 percent) with thyroid cancer.<sup>10</sup>

### Diagnostic Work-Up of Thyroid Disease

Table 7 illustrates the diagnostic work-up performed on our series of 85 patients and demonstrates when consultants were used. In the idiopathic hypothyroid group, 5 of 54 patients (9 percent) did not have a thyroid panel (serum T<sub>4</sub> by displacement and a T<sub>3</sub> resin uptake) recorded on the chart, ie, they were diagnosed on purely clinical grounds. Further, only 1 of 54 had a serum TSH ordered by our department. It would seem appropriate that all patients with suspected hypothyroidism have a thyroid panel, and furthermore, as noted recently by Gilliland,<sup>12</sup> McMurry,<sup>13</sup> and Ramey and Burrow,<sup>14</sup> the serum TSH is a very sensitive test now readily available for all physicians. The TSH may rise before the serum T<sub>4</sub> falls below the normal range in primary hypothyroidism, and a low TSH in the face of a low T<sub>4</sub> can uncover the unusual pituitary or hypothalamic causes of hypothyroidism.

Of the patients with Hashimoto's thyroiditis, two were diagnosed by high thyroid antibody titers, and two by excisional biopsy. Most physicians now have the thyroid antibody test available. It seems appropriate to use this noninvasive means to make this diagnosis, and as noted by Peake and others, probably many more instances of "idiopathic" hypothyroidism are

Table 5. Presenting Signs and Symptoms

Hypothyroidism (63 cases)	
fatigue — malaise	24
weight gain — obesity	11
complaint of neck lump	11
dry skin, hair changes	8
voice change	3
cold intolerance	3
swelling of the face, ankles	3
constipation	2
depression	1
hypoactive DTR's	1
secondary amenorrhea	1
no primary signs and symptoms recorded	23
Hyperthyroidism (14 cases)	
tremor	4
weight loss	4
eye signs and/or complaints	4
weakness	3
diarrhea	3
tachycardia, palpitations	3
heat intolerance	2
"nervousness"	2
complaint of neck lump	1
no primary signs and symptoms recorded	5
Euthyroid Goiter (8 cases)	
large gland on physical examination	5
complaint of neck lump	3
dysphagia	2

Table 6. Types of Goiter

	Never Recorded Enlarged	Diffuse Enlargement	Obviously Assymetric Enlargement
Hypothyroidism			
Idiopathic (54)	43	9 (1 painful)	2
Secondary to Hashimoto's thyroiditis (5)		4	1
Associated with cold nodule (1)			1
Associated with prior neck surgery (3)	3		1
Hyperthyroidism			
Idiopathic (11)	5*	6	
Secondary to subacute thyroiditis (1)	1		
Secondary to toxic, hot nodule (1)			1 (painful)
Secondary to medication (1)	1		
Euthyroid Goiter			
Diffuse goiter (6)		4	2 (2 painful)
Associated with cold nodule (2)			2

\*In 3 of these 5, it was unclear from the record if there was gland enlargement before surgical therapy.

Table 7. Diagnostic Work-Up

	Thyroid Panel <sup>a</sup>	Thyroid Antibodies	TSH	<sup>131</sup> I uptake and scan	Medical Consult	Med-Surg Consult	Surg Consult
<b>Hypothyroidism</b>							
Idiopathic (54)	49	1	3b	3	7	-	-
Secondary to Hashimoto's thyroiditis (5)	4	2	1	-	1	-	2c
Associated with cold nodule (1)	1	-	-	1	-	-	1
Associated with prior neck surgery (3)	3	-	-	-	-	-	-
<b>Hyperthyroidism</b>							
Idiopathic (11)	11	-	-	4	4	2	3
Secondary to subacute thyroiditis (1)	1	1	-	1	1	-	-
Associated with hot nodule (1)	1	-	-	1	-	1	-
Secondary to medication (1)	1	-	-	-	-	-	-
<b>Euthyroid Goiter</b>							
Diffuse goiter (6)	6	1d	-	4d	1	2	-
Associated with cold nodule (2)	2	-	-	2	-	-	2
<b>Total</b>	<b>79</b>	<b>5</b>	<b>4</b>	<b>16</b>	<b>14</b>	<b>5</b>	<b>8</b>
<b>Percentage</b>	<b>93</b>	<b>6</b>	<b>5</b>	<b>19</b>	<b>16</b>	<b>6</b>	<b>9</b>

a Serum T<sub>4</sub> and T<sub>3</sub> resin uptake

b Two of these ordered by consultant

c For biopsy and/or subtotal removal

d Studies on one patient ordered by consultant

really old Hashimoto's disease, undiagnosed.<sup>15</sup>

Of the 11 patients with idiopathic hyperthyroidism, all had thyroid panels and four had Radioactive Iodine Uptake (RAIU) and scans performed, but no T<sub>3</sub> suppression tests were ordered. Most authors agree (McMurry, Ramey and Burrow) on the clinical utility of the RAIU in hyperthyroidism.<sup>13,14</sup> The T<sub>3</sub> suppression test, using 100 mcg/day of T<sub>3</sub>, then repeating the RAIU, can be easily performed by the physician to separate out autonomous instances of hyperthyroidism before instituting treatment.

Of the eight instances of euthyroid goiter, all had thyroid panels and six underwent RAI scanning. It seems appropriate to use the scan in this situation to look for cold nodules. Perhaps, too, the TSH and thyroid antibody assay should be used more often in these goiters to uncover early hypothyroidism secondary to Hashimoto's thyroiditis.

Overall in the 85 instances of thyroid disease, medical consultation only was obtained in 14 patients (16 percent), medical plus surgical in 5 (6 percent) and surgical only in 8 (9 percent). Thus 27 of 85 (32 percent) of our patients had specialist consultation.

Comparing pathophysiological states, 11 of 63 patients (17.5 percent) with hypothyroidism had consultative help, 11 of 14 patients (80 percent) with hyperthyroidism, and 5 of 8 instances (63 percent) of euthyroid goiter. The records do not distinguish between consultations for diagnostic or for therapeutic assistance. For hypothyroidism, even a figure of 17.5 percent referrals seems high. It would seem that an appropriately trained family physician should diagnose and treat up to 95 percent of his patients with hypothyroidism, and should need internist-endocrinologist assistance only for the more severe myxedema coma patients.

In hyperthyroidism, there should also be little need for diagnostic assistance. The family physician should be able to make the diagnosis and determine the indication for either drug therapy, RAI, or surgery. RAI or surgery should be left to consultants, but many patients can be treated medically by the family doctor.

Among the patients with euthyroid goiter, more than 50 percent were referred to consultants, and this seems inordinately high. Except for instances associated with cold nodules, there should be little diagnostic or therapeutic advantage to referring the euthyroid goiter patient.

### Types of Treatment

Table 8 illustrates drugs and doses used to treat hypothyroidism and euthyroid goiter in our practice. Twenty-three patients were on desiccated thyroid, average 108 mg per day, 16 were on Synthroid (L-thyroxine), average 0.18 mg per day, 11 were on Proloid (thyroglobulin T<sub>4</sub>/T<sub>3</sub> = 2.5/1) average 159 mg per day, five were on Euthroid (liotrix T<sub>4</sub>/T<sub>3</sub> = 4/1), average 130 mg per day, four were on Cytomel (T<sub>3</sub>) average 81 µg per day, and one was on Thyrolar (liotrix T<sub>4</sub>/T<sub>3</sub> = 4/1), 65 mg per day. Three patients were following no current drug regimen.

Our average daily doses of desiccated thyroid, Synthroid, and Euthroid conform to the recent recommendations of Stock and coworkers. This group suggests that, as opposed to older teaching, the average daily replacement dose of thyroxine should be between 100 and 200 µg per day.<sup>16</sup> Assuming that 65 mg of desiccated thyroid hormone is equivalent to 0.1 mg L-thyroxine, we are in excess of their recommendations with our use of the preparation Proloid.

Of the eight patients with euthyroid goiter, four were not on drug treatment and four were on suppressive therapy to shrink the gland, with

**Table 8. Treatment of Hypothyroidism and Euthyroid Goiter**

	Hypothyroidism		Euthyroid Goiter	
	Number of Patients	Average Daily Dose (mg)	Number of Patients	Average Daily Dose (mg)
Dessicated thyroid	23	108	-	-
Proloid	11	159	-	-
Euthroid	5	130	-	-
Synthroid	16	0.18	3	0.12
Cytomel	4	0.081	1	0.050
Thyrolar	1	65	-	-
No current drug treatment	3	-	4	-
<b>Total</b>	<b>63</b>		<b>8</b>	

**Table 9. Treatment of Hyperthyroidism**

	Drugs Alone	Drugs and RAI	RAI	Drugs and Surgery	Surgery Alone	Discontinue Medication
Idiopathic	3	2	1	2	3	-
Secondary to thyroiditis	1	-	-	-	-	-
Secondary to toxic nodule	-	-	-	-	1	-
Secondary to medication	-	-	-	-	-	1

three on Synthroid, average 0.12 mg per day, and one on 50 µg per day of Cytomel. Shimaoka and Sohal have recently demonstrated that T<sub>3</sub> (Cytomel) in doses of 50 to 100 µg per day is more effective than T<sub>4</sub> in doses of 200 to 400 µg per day in shrinking large euthyroid goiters.<sup>17</sup>

Table 9 illustrates our treatment of the patients with hyperthyroidism. As noted in basic texts on the thyroid gland and in recent reviews, the treatment of hyperthyroidism has long been controversial.<sup>6,18,19</sup>

Concerning our patients in the idiopathic group, there is a fairly even distribution of therapeutic choices except that only one patient was treated solely with RAI. Recall that seven of ten of the patients in the idiopathic group were first diagnosed in the age range 18 to 40. Based on current literature, RAI appears to be the agent of first choice for most typical instances of diffuse, toxic goiter (Graves' disease) which have their onset in the young and middle adult years.<sup>19-24</sup> RAI is generally not recommended for individuals less than 18 to 20 or for pregnant women, with drug therapy being the first choice in such patients. Surgical therapy is generally suggested for those toxic multinodular goiters which have associated obstructive or dysphagic features. Our data showing drugs used preliminary to RAI or surgery is generally consistent with the literature.

### Thyroid Cancer

One patient with thyroid carcinoma was detected in our series of 85 patients. This was a presently 51-year-old white male who had noted a lump in the anterior neck and dysphagia in 1963 at the age of 39. His gland then had an assymmetrically enlarged, firm, non-tender right lobe and he was euthyroid. After RAIU showed a cold nodule, he underwent right thyroid lobectomy in 1963 with a tissue diagnosis of follicular carcinoma. He was asymptomatic until 1973 when metastases were noted on a routine chest x-ray. RAIU revealed no uptake, so he has been managed with bleomycin and adriamycin. He maintains a euthyroid status.

### Frequency of Follow-Up

Table 10 illustrates the variable frequency of follow-up afforded thyroid patients in our family practice. Hyperthyroid and euthyroid goiter patients are seen more frequently than hypothyroid patients. Naturally, this depends on many factors, including the disease activity, physician habits, and patient compliance. The data are presented with the hope that they might be the basis for comparison with other family physicians and practices.

### Present Status of Our Patients

Table 11 shows the present physiologic status of our patients. Unfortu-

nately one hyperthyroid and five hypothyroid patients were lost to follow-up. Reasons for this include patients moving away or transferring to another physician. Fifty-five of the remaining 58 (95 percent) hypothyroid patients are euthyroid, and all of the 13 (100 percent) hyperthyroid patients are euthyroid. It is noted that 28 of 55 hypothyroid patients considered clinically euthyroid had not had a serum T<sub>4</sub> within two years. Certainly one's clinical impression is most important, but it could be argued that a serum T<sub>4</sub> every two years is indicated in a disease with such subtle clinical signs and symptoms.

### Distribution of Disease in the Practice Subdivisions

The Department of Family Medicine has two active offices, felt to be staffed equally by staff and resident physicians. The total patient population is fairly evenly divided between the two offices. Sixty-three percent of our patients with hypothyroidism are cared for in the East Unit while 37 percent are cared for in the Central Unit. The patients are evenly distributed for hyperthyroidism with 7 (50 percent) in each office. Six of eight patients (75 percent) with euthyroid goiter are seen in the East Unit while 2 (25 percent) are seen in the Central Unit. This type of data is potentially useful in determining to which types of illness residents are exposed. Conceivably, residents' schedules or patients' appointments could be adjusted to provide the optimum exposure to various types of thyroid disease.

### Discussion

This study has examined several aspects of thyroid disease in a large semirural family practice setting. Using the technique of systematic chart review, much data was collected and critically examined.

An overall prevalence figure of about one percent was determined for thyroid disease in our registered patients. It would be very interesting to compare this figure with that of family practices in other rural, suburban, and urban settings. Our data on the ratio of hypo:hyper:euthyroid goiter of 9:2:1 would also be interesting to compare to other settings.

Comparing our breakdown of hypothyroidism to Watanakunakorn's large series, it is noted that we are seeing

twice the percentage of patients with hypothyroidism of the idiopathic variety. We should wonder if we are failing to be more specific with our investigation and diagnoses.

The data on sex ratios show preponderance of females and this tends to parallel the literature. Regarding age distribution, the data illustrates that hypothyroidism is a disease most common in the 40 to 60 age group, whereas hyperthyroidism generally occurs in the young adult range. According to Werner and Ingbar, the peak incidence of hyperthyroidism is in the third to fourth decades, and our patients followed this pattern.<sup>5</sup>

The information collected on presenting signs and symptoms correlated closely with the large series quoted. Thus it is reinforced that fatigue, weight gain, dry skin, changes in hair texture, voice changes, cold intolerance, and peripheral edema or facial puffiness are the early findings with hypothyroidism. On the other hand, tremor, weight loss, eye signs, tachycardia, heat intolerance, and weakness form the presenting picture in hyperthyroidism.

The information on gland enlargement emphasizes that for idiopathic hypothyroidism, 80 percent of patients may never have a goiter, whereas for hypothyroidism associated with Hashimoto's thyroiditis, 75 to 80 percent will have enlarged glands. We found very few instances of tender glands in all our patients with thyroid disorders. It is evident that except for acute suppurative and subacute thyroiditis, thyroid disorders in general are not associated with tender thyroid glands.

The description of our diagnostic work-up of thyroid disease is intended to be critical in a positive sense. For patients suspected to be hypothyroid, family physicians must learn to use the TSH and antithyroid antibody tests in addition to a serum T<sub>4</sub> and T<sub>3</sub> resin uptake. For hyperthyroidism, the RAIU and T<sub>3</sub> suppression tests are also useful for the family doctor. Specialist consultation should rarely be necessary for diagnosis of thyroid disease.

Review of the data on types of treatment of thyroid disease is beneficial to both our staff and our patients. It is educational for us to compare our work with recognized

	1-2 months	3-4 months	6-12 months	Greater than 12 months or lost to follow-up
Hypothyroidism (63)	6	16	31	10
Hyperthyroidism (14)	-	7	6	1
Euthyroid Goiter (8)	-	3	4	1

	Hypothyroid, clinically and/or low T <sub>4</sub>	Hyperthyroid clinically and/or high T <sub>4</sub>	Euthyroid clinically <sup>a</sup>	Euthyroid normal T <sub>4</sub> <sup>b</sup>
Hypothyroidism (63)	8c	-	28	27
Hyperthyroid (14)	-	1d	1	12
Euthyroid Goiter (8)	-	-	-	8

a - no T<sub>4</sub> recorded on chart within last two years  
 b - normal T<sub>4</sub> recorded within last two years  
 c - five of eight lost to follow-up, other three still being treated  
 d - lost to follow-up

authorities, and our patients will also gain from the adjustments suggested.

The concluding sections illustrate how frequently we follow these patients and their present status. Ninety-five to 100 percent of patients in our study are considered euthyroid. Here the important question is raised as to how often a patient being treated for hypo- or hyperthyroidism needs a serum T<sub>4</sub> checked.

As noted in the introduction, there were two goals for this work. As well as illustrating the multiple facets of thyroid disease in family practice, it is hoped on a broader scale to exemplify the type of basic research which can be performed in family medicine. Both the family practice resident and the experienced practitioner must contribute to this type of research or the luster and sophistication of our new specialty will fade.

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#### References

- Geyman JP: Toward a research base in family practice. *J Fam Pract* 2:3, 1975
- Eimerl TS, Laidlaw AJ: A handbook for research in general practice. Edinburgh and London, E & S Livingstone, 1969
- MacGregor AG: Hypothyroidism. In Pitt-Rivers R, Trotter WR (eds): *The Thyroid Gland*. London, Butterworth, 1964, p 117
- Werner SC: Hypothyroidism. In Werner SC, Ingbar SH (eds): *The Thyroid*. New York, Harper and Row, 1971, p 716
- Morgans ME: Hyperthyroidism. In Pitt-Rivers R, Trotter WR (eds): *The Thyroid Gland*. London, Butterworth, 1964, p 152
- Werner SC: Hyperthyroidism. In Werner SC, Ingbar SH (eds): *The Thyroid*. New York, Harper and Row, 1971, p 493
- Logan WPD, Cushion AA: Studies

on medical and population subjects. No. 14. In Office of Population Censuses and Surveys: *Morbidity Statistics from General Practice*, Volume I, London, H. M. Stationery Office, 1958

8. Watanakunakorn C, Hodges RE, Evans TC: Myxedema, a study of 400 cases. *Arch Intern Med* 116:183-190, 1965

9. Rowntree LG: Endocrine disease as revealed by 13,000,000 examinations of registrants. *J Clin Endocrinol Metab* 4:545-548, 1944

10. Oddie TH, Boyd CM, Fisher DA, et al: Incidence of signs and symptoms in thyroid disease. *Med J Aust* 2:981-986, 1972

11. Rallison ML, Dobyns BM, Keating FR, et al: Occurrence and natural history of chronic lymphocytic thyroiditis in childhood. *J Pediatr* 86:675-682, 1972

12. Gilliland PF: Myxedema - recognition and treatment. *Postgrad Med* 57:61-65, 1975

13. McMurry JF: Thyroid function testing. *Postgrad Med* 57:52-56, 1975

14. Ramey JN, Burrow GN: Clinical uses of thyrotropin-releasing hormone. *Am Fam Physician* 12:93-100, 1975

15. Peake RL: Thyroiditis. *Postgrad Med* 57:95-98, 1975

16. Stock JM, Surks MI, Oppenheimer JH: Replacement dosage of L-thyroxine in hypothyroidism, a re-evaluation. *N Engl J Med* 290:529-533, 1974

17. Shimaoka K, Sokal JE: Suppressive therapy of nontoxic goiter. *Am J Med* 57:576-582, 1974

18. Hamberger JI: Diagnosis and management of common thyroid problems. Springfield, Illinois, Charles C Thomas, 1969

19. Ibarra JD, Gilliland PF, Petty FC, et al: Treatment of hyperthyroidism, panel discussion. *Postgrad Med* 57:84-90, 1975

20. Vaidya VA, Bongiovanni AM, Parks JS, et al: Twenty-two years' experience in the medical management of juvenile thyrotoxicosis. *Pediatrics* 54:565-569, 1974

21. Cevallos JL, Hagen GA, Maloof F, et al: Low-dosage I<sup>131</sup> therapy of thyrotoxicosis. *N Engl J Med* 290:141-143, 1974

22. Safa AM, Schumacher OP, Rodriguez-Antunez A: Long-term follow-up results in children and adolescents treated with I<sup>131</sup> for hyperthyroidism. *N Engl J Med* 292:167-171, 1975

23. Sedgwick CE, Wool MS: Bilateral subtotal thyroidectomy for multinodular goiter. *Hosp Practice* 10(2):70-78, 1975

24. Sanfelippo PM, Beahrs DH, McConeahy WM, et al: Indications for thyroidectomy. *Mayo Clin Proc* 48:269-275, 1973