

# RE-EVALUATION OF THE PREVALENCE OF PERMANENT CONGENITAL HYPOTHYROIDISM IN NIIGATA, JAPAN: A RETROSPECTIVE STUDY

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## INTRODUCTION

Although newborn screening (NBS) for congenital hypothyroidism (CH) in Japan started more than 40 years ago, the true prevalence of CH remains unclear. Prevalence estimations among the NBS-positive CH individuals include those with transient hypothyroidism and transient hyperthyrotropinemia, and re-evaluation with increasing age is necessary to clarify the actual incidence. Thus, we re-evaluated the incidence of permanent CH multiple times.

## AIM

To determine the true prevalence of permanent CH in Niigata Prefecture, Japan.

The secondary outcome was the prevalence of transient CH among patients with CH who received LT4 replacement.

## METHOD

**Subjects:** Of the 106,114 patients who underwent NBS in the Niigata Prefecture, Japan, between April 2002 and March 2006, 116 were examined further due to high TSH levels ( $\geq 8$  mIU/L) and were included in the study.

**Methods:** We retrospectively evaluated their levothyroxine sodium (LT4) replacement therapy status from the first visit to 15 years of age (specifically, re-evaluation at age 2-4 years, etiological diagnosis determination for CH after 5 years of age, and re-evaluation at final height).

## RESULTS

The background of the subjects are listed in Table 1. Fifteen percent of the NBS-positive infants had a low birthweight. Of the 116 NBS-positive subjects with high TSH levels, 105 (91%) were evaluated at our hospital (Figure 1). Therefore, this study is based on a population base of  $106,114 \times 91\%$  (i.e., 96,000 newborns). The LT4 replacement status for each age group is shown in Figure 2. Of these, 73 patients (69%) were initiated on LT4 at their first visit, while 32 (31%) were left initially untreated; 10 of the latter had persistent mildly elevated TSH levels and were initiated on LT4 by the age of 1 year. Thus, 73 out of 87 patients (84%) were treated with LT4 for 2 years, excluding those who were transferred or those for whom the follow-up had ended. Subsequently, 27 patients continued LT4 replacement until 15 years of age after multiple re-evaluations. In addition to the 27 patients receiving LT4 replacement at 15 years of age, 10 patients were transferred or died while on LT4 replacement therapy.

Sex (n)	Male (54), female (62)
NBS-positive timing (n)	First examination (28), second examination (88)
TSH level in filter paper at NBS	10.5 (9.8–31.3) mIU/L
Median (interquartile range)	
>30 mIU/L; n (%)	29 (25%)
10–30 mIU/L; n (%)	55 (47.4%)
8–<10 mIU/L; n (%)	32 (27.5%)
Birth weight (BW); mean $\pm$ SD (range)	2,830 $\pm$ 664 g (424–3,916)
BW <2,500 g; n (%)	18 (15.5%)
BW <1,500 g; n (%)	8 (6.9%)
Thyroid morphology (n)	Ectopic (7), hypoplasia (10), enlarged (7), eutopic (81)

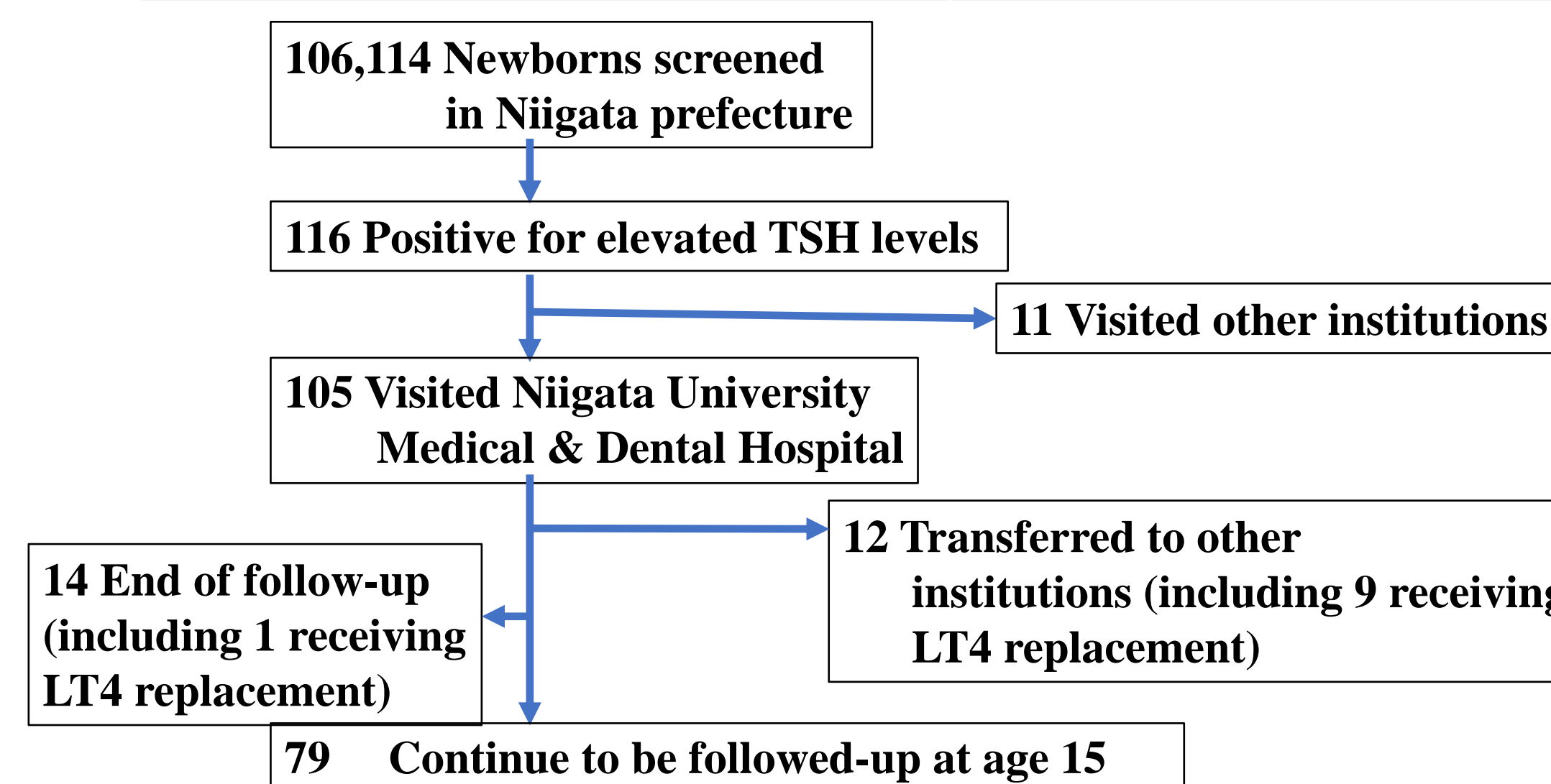
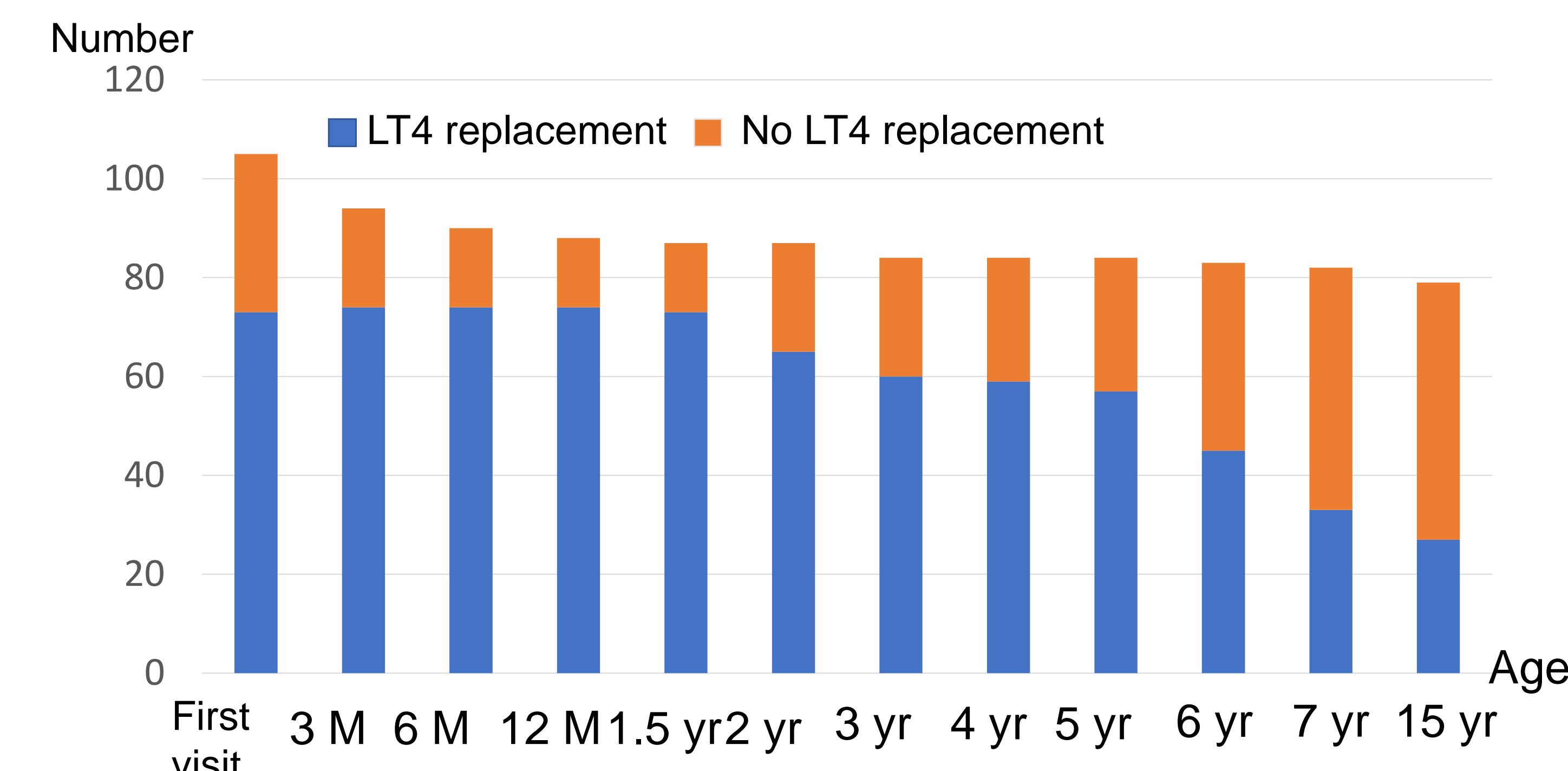


Figure 1. Enrollment of the study subjects



Transfer	7 (5)	2 (1)	1 (1)		1 (1)		1 (1)	
End of follow-up	4	2	1 (1)	1	1	1	1	3

Figure 2. The LT4 replacement status of each age group. (n), the number in both parenthesis indicates the number of patients receiving Lt4 replacement

### ● Permanent CH Prevalence

The number of patients with permanent CH from April 2002 to March 2006 ranged from 27 to 37, and the permanent CH prevalence was 1 in 2500–3500 children.

### ● Transient CH Prevalence

The number of patients with transient CH or transient hyperthyrotropinemia ranged from 46 to 56, and the transient CH or transient hyperthyrotropinemia prevalence was 1 in 1700–2100 children.

## CONCLUSIONS

In our study, 62.5% of the LT4 replacement patients discontinued treatment by 15 years of age. From these results, the prevalence of permanent CH in the Niigata Prefecture during this period was 1 in 2,500–3,500 children.

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