

Impact of Continuing Medical Education on Primary Care Providers' Knowledge and Confidence in Caring for Patients with Congenital Hypothyroidism

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California Department of Public Health**

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The PCH Project

Long Term Follow-Up of Patients with
Primary Congenital Hypothyroidism (PCH)
by Primary Care Providers (PCPs)

- **A three-year grant** funded by the Health Resources and Services Administration (HRSA) from August 1st, 2013 through July 31st, 2016
- **Participating states:** California and Hawaii
- **Target populations:** PCPs and their patients with PCH

PCH Project: Overall Objectives

- 1) **Assess** the willingness and capability of PCPs to provide long-term care for patients with PCH and their needs for PCH-related continuing medical education
- 2) **Evaluate** the current case management patterns and clinical outcomes
- 3) **Determine** PCPs' willingness to obtain informed consent and provide data to the PCH long-term follow-up (LTFU) database
- 4) **Investigate** the practicality of providing real time LTFU data by PCPs and identify barriers incurred
- 5) **Improve** PCPs' knowledge about PCH and increase their capability of providing care for patients with PCH

Why develop a CME course for PCPs?

Clinical Knowledge Gaps

Our 2014 cross-sectional survey (N=226) revealed gaps in PCPs' knowledge on treating patients with PCH:

- Only 49% knew the recommended frequency of blood tests to monitor PCH over a patient's lifespan
- Only 23% knew when to try a patient off levothyroxine treatment to determine if PCH is transient

Interest

- 84% of surveyed PCPs reported that they are **likely** or **very likely** to participate in CME on PCH if available

High incidence rate:

PCH is the most common disorder identified in blood spot screening and affects 1 in 1,706 live births in CA

Relatively simple to treat:

Patients with PCH can potentially be managed well by PCPs with support from endocrinologists

Geographic distribution of cases:

Need to increase number of PCPs who can provide PCH case-management in rural areas of CA with very few pediatric endocrinologists

To improve access to quality care:

CME for PCPs may reduce barriers to quality follow-up care for families for whom specialty care is difficult to obtain

More good reasons for a PCH course....

Congenital Hypothyroidism

What Every Pediatrician Needs to Know

Swati Banerjee, M.D.

Division of Pediatric Endocrinology
Valley Children's Specialty Medical Group

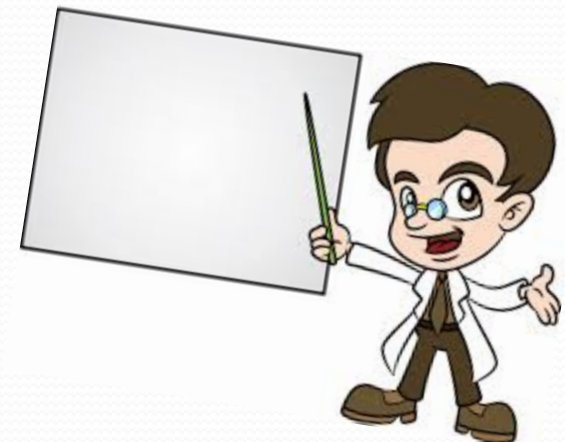
Goals

By the end of this session, you will be able to:

- ▶ **Initiate retesting and treatment**
if newborn thyroid function screening is abnormal
- ▶ **Monitor treatment**
of primary congenital hypothyroidism (CH) for
infants, children, and adolescents
- ▶ **Educate families**
about the importance of adherence to treatment

Course was developed with the PCH Project's Advisory Committee of CA pediatric endocrinologists

Continuing Medical Education (CME) can be a key element in a PCP-centered follow-up model



Course Format and Content Summary

- **50 minute lecture**, followed by a 10 minute Q & A
- **Begin** by presenting 5 Case Studies in question format
- **Review** of California's PCH newborn screening methodology
- **Review** of thyroid pathophysiology and clinical presentation of PCH symptoms
- **Focus** on the functional priorities of PCH diagnosis, treatment and follow-up in the pediatric primary care context
- **Recommend** consultation with endocrinologist when needed
- **Conclude** with the same 5 Case Studies, with opportunity for audience self-assessment and discussion

Learning Objectives

At the end of this course, participants will be able to:

- 1 Perform confirmatory testing and initiate treatment if newborn thyroid function screening is abnormal
- 2 Assess treatment needs and monitor clinical outcomes for infants, children, and adolescents with congenital hypothyroidism
- 3 Describe the diagnostic process for determining whether a patient has transient or permanent hypothyroidism
- 4 Educate families about the importance of adherence to treatment for congenital hypothyroidism

5 Handouts

Parents' Guide To Primary Congenital Hypothyroidism (CH)

Treating Congenital Hypothyroidism (CH)

After Receiving Positive Newborn Screening (NBS) Results

- Within 24 hours of receiving a positive NBS result for CH (TSH ≥ 29 $\mu\text{IU/mL}$), test serum TSH and free T4 (or total T4) for confirmatory diagnosis
- If newborn screening TSH result is:
 - > 40 $\mu\text{IU/mL}$: **Initiate treatment** as soon as a serum sample is collected and refer to a pediatric endocrinologist
 - 29 – 40 $\mu\text{IU/mL}$: **May wait** for the results of confirmatory serum test to initiate treatment
- If confirmatory serum TSH result is:
 - > 40 $\mu\text{IU/mL}$: **Initiate levo-thyroxine treatment immediately**
 - 10 – 40 $\mu\text{IU/mL}$: Repeat the free T4 (or total T4) and TSH tests but do not start levo-thyroxine treatment yet

You are strongly encouraged to work closely with a pediatric endocrinologist to perform diagnostic evaluation, initiate treatment, and coordinate for ongoing care. Treatment must begin within 2 weeks of age for confirmed cases.

Weight (grams)	Daily Dose
2000 – 2499	25 μg
2500 – 3999	37.5 μg
4000 or more	50 μg

Levo-thyroxine Treatment Dosing

- Start at 10 – 15 $\mu\text{g/kg}$ (Use 15 $\mu\text{g/kg}$ if free T4 < 0.5 ng/dL or total T4 < 5 $\mu\text{g/dL}$)
- Either brand name or generic, but stay with the same formulation, if possible. **USE TABLETS, DO NOT USE LIQUID FORM**
- Maintain TSH concentration in the age-specific reference range
- Maintain free T4 (or total T4) concentration in the upper half of the age-specific reference range

Age	Frequency
< 6 months	Every 1-2 months

Follow-up Frequency

- 2 weeks after treatment initiation: The first clinical follow-up examination and lab tests should take place

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Congenital Hypothyroidism Course Evaluation

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1. Please indicate how confident you are with the following tasks related to the management of patients with confirmed congenital hypothyroidism (CH) with 1="Not confident at all", 2="Somewhat confident", 3="Confident", 4="Very confident".

Tasks	Circle the Score (1-4)
1a. Confirm diagnosis for patients with positive newborn screening results for CH	1.....2.....3.....4
1b. Initiate treatment for patients with confirmed CH	1.....2.....3.....4
2. Conduct follow-up for patients with confirmed CH	1.....2.....3.....4

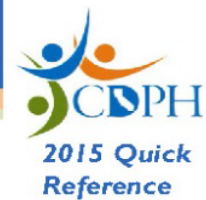
Check TRUE or FALSE for each of the following statements

Statements	True or False
hormone (TSH) surges by 30 minutes after 10 $\mu\text{IU/mL}$ within 3 days	<input type="checkbox"/> True <input type="checkbox"/> False
CH cases are permanent and need monitoring	<input type="checkbox"/> True <input type="checkbox"/> False
treatment should be initiated as soon as a sample is collected for confirmatory testing	<input type="checkbox"/> True <input type="checkbox"/> False
recommended initial treatment dose of levothyroxine for confirmed CH is 15-20 $\mu\text{g/kg}$	<input type="checkbox"/> True <input type="checkbox"/> False

3b. The majority of confirmed CH cases are lifelong treatment and monitoring

3c. For severe CH, treatment should be initiated as soon as a serum sample is collected for confirmatory testing

Treating Congenital Hypothyroidism (CH)



After Receiving Positive Newborn Screening (NBS) Results

- **Within 24 hours** of receiving a positive NBS result for CH (TSH ≥ 29 $\mu\text{IU/mL}$), test serum TSH and free T4 (or total T4) for confirmatory diagnosis
- **If newborn screening TSH result is:**

> 40 $\mu\text{IU/mL}$	$29 - 40$ $\mu\text{IU/mL}$
Initiate treatment as soon as a serum sample is collected and refer to a pediatric endocrinologist	May wait for the results of confirmatory serum test to initiate treatment

If confirmatory serum TSH result is:

- **> 40 $\mu\text{IU/mL}$**
Initiate levo-thyroxine treatment immediately
- **$10 - 40$ $\mu\text{IU/mL}$**
Repeat the free T4 (or total T4) and TSH tests but do not start levo-thyroxine treatment yet
- **< 10 $\mu\text{IU/mL}$**
Considered normal, no treatment needed

You are strongly encouraged to work closely with a pediatric endocrinologist to perform diagnostic evaluation, initiate treatment, and coordinate for ongoing care.

Treatment must begin within 2 weeks of age for confirmed cases.

Levo-thyroxine Treatment Dosing

- **Start at 10 – 15 $\mu\text{g/kg}$**
(Use 15 $\mu\text{g/kg}$ if free T4 < 0.5 ng/dL or total T4 < 5 $\mu\text{g/dL}$)
- **Either brand name or generic**, but stay with the same formulation, if possible. **USE TABLETS, DO NOT USE LIQUID FORM**
- Maintain TSH concentration in the age-specific reference range
- Maintain free T4 (or total T4) concentration in the upper half of the age-specific reference range

Approximate daily dose by weight:

Weight (grams)	Daily Dose
2000 – 2499	25 μg
2500 – 3999	37.5 μg
4000 or more	50 μg

Follow-up Frequency

- **2 weeks after treatment initiation:**
The first clinical follow-up examination and lab tests should take place

Recommended follow-up schedule by age:

Age	Frequency
< 6 months	Every 1–2 months

PCPs and PCH?? CME Evaluation Questions

- Medical Specialty of participant?

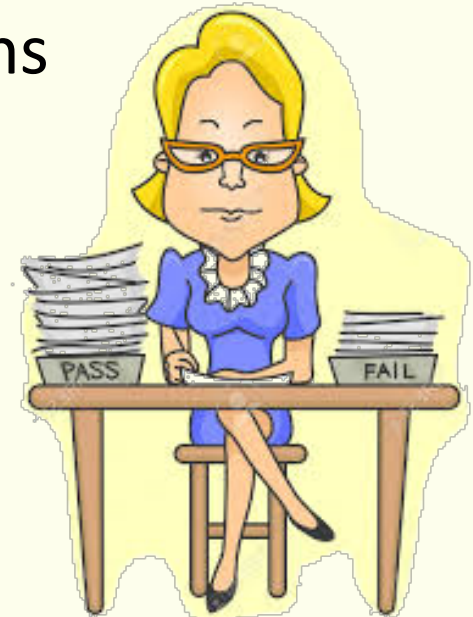


Paired Pre- and Post- Course Questions:

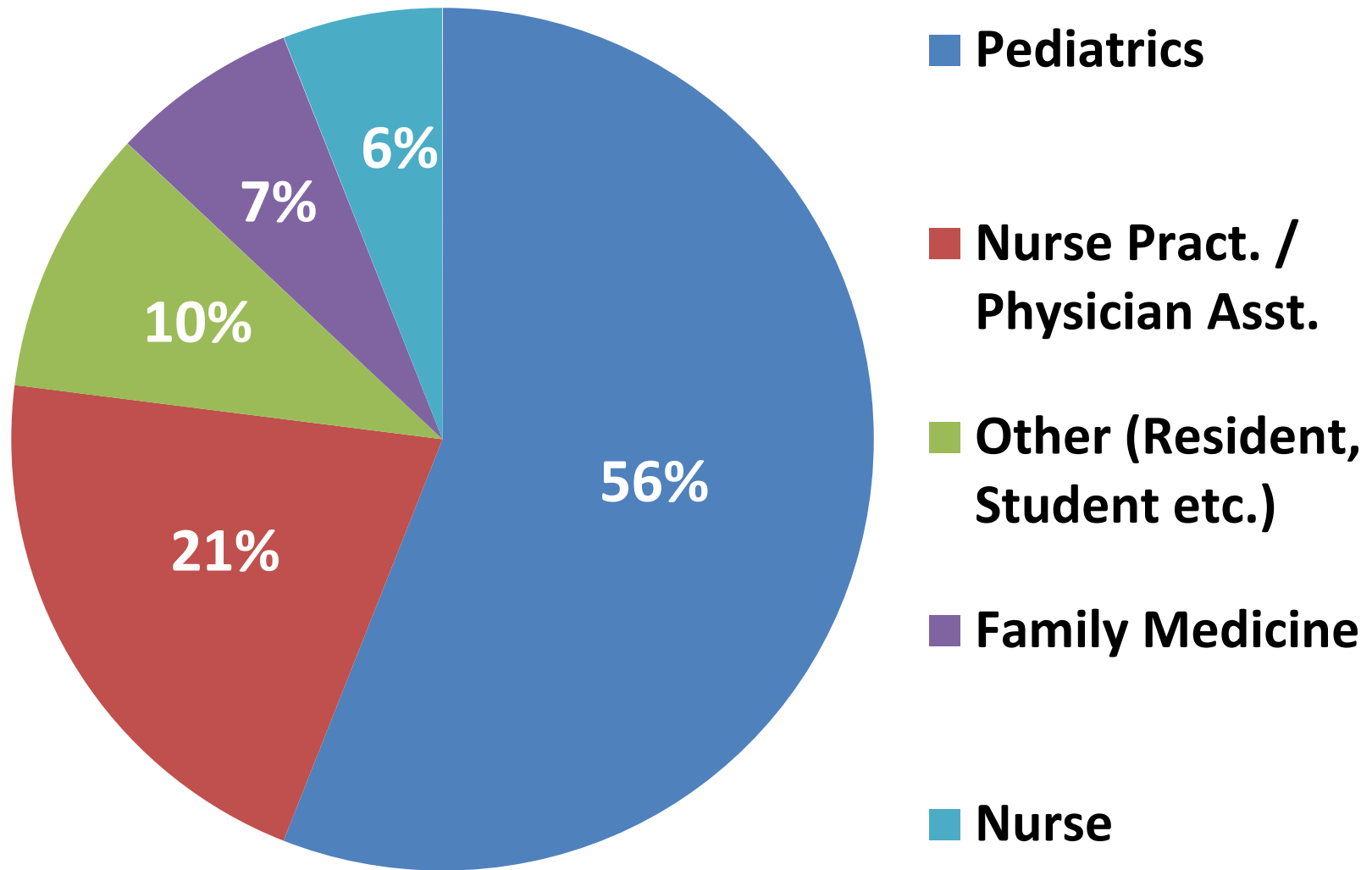
- CONFIDENCE?**
3 questions assessing PCP's confidence with PCH Diagnosis, Treatment and Follow-up

- KNOWLEDGE?**
8 True/False PCH clinical knowledge questions

- Intending to make changes to practice?
- Course Ratings?
- Comments and suggestions?



Medical Specialties of Course Participants (N=171)



6 Events / Total attendance: ~ 300 / Evaluations Returned: 195

Confidence with CONFIRMING a PCH Diagnosis



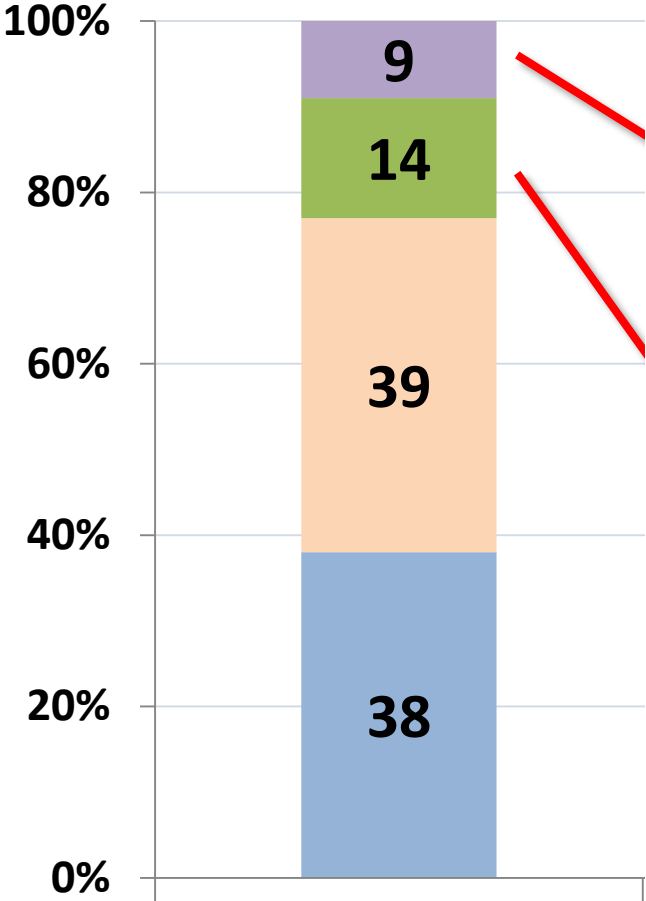
Pre-Course

N=144

**70 % improved
their confidence**

- Very Confident
- Confident
- Somewhat confident
- Not confident at all

Confidence with INITIATING TREATMENT for PCH



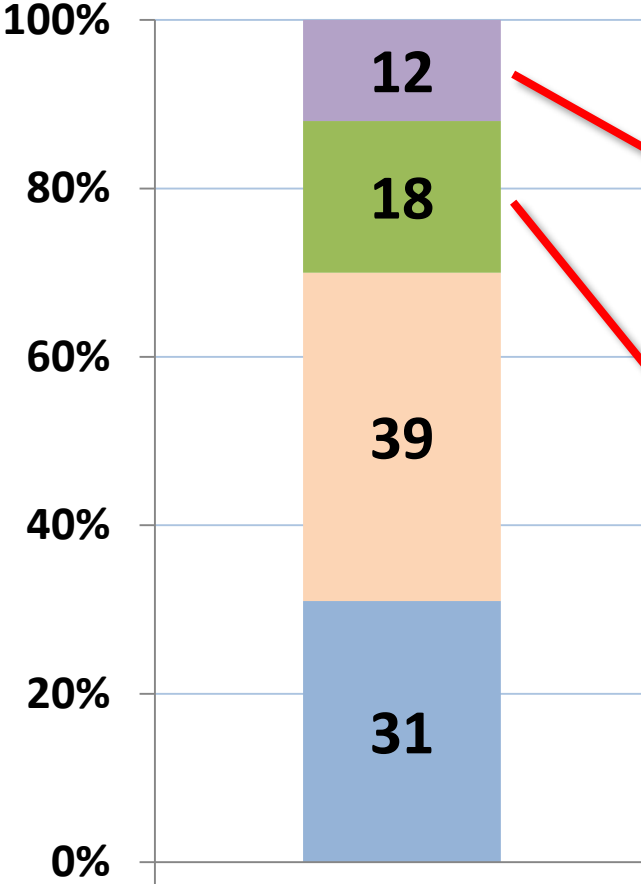
80 % improved their confidence

- Very Confident
- Confident
- Somewhat confident
- Not confident at all

Pre-Course

N=140

Confidence with PROVIDING FOLLOW-UP for PCH



Pre-Course

N=143

69 % improved their confidence

- Very Confident
- Confident
- Somewhat confident
- Not confident at all

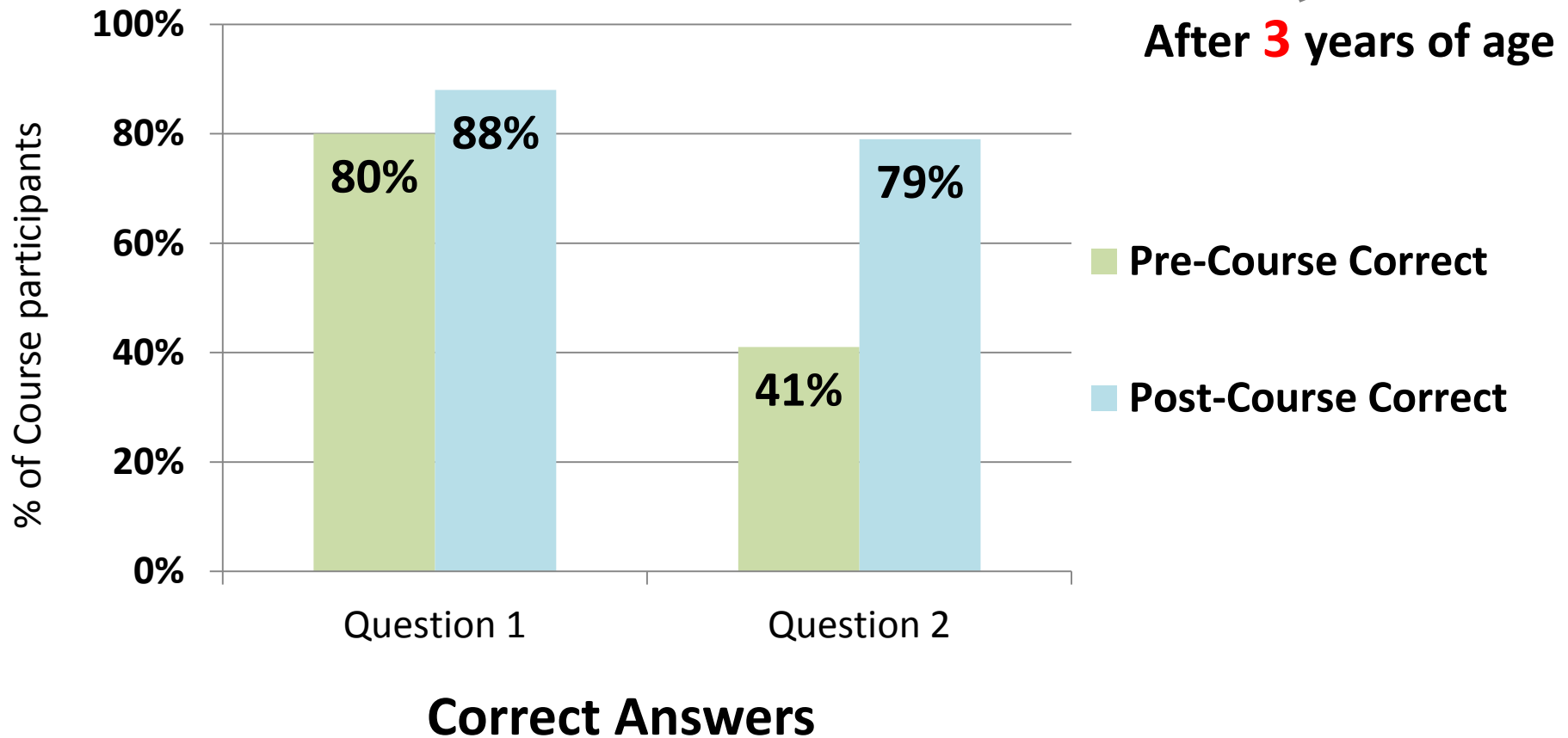
Improvements in Knowledge: True/False Questions

Question 1: The recommended frequency of blood tests to monitor PCH patients in first 6 months of life is every 1-2 months (N=167)

True!

Question 2: When transient PCH is suspected, it is safe to do a trial off levothyroxine for 4–6 weeks after 1 year of age (N=164)

False!



Question 3: The American Academy of Pediatrics (AAP) recommended initial treatment dose of LT4 for babies with confirmed PCH is 15–20 $\mu\text{g}/\text{kg}$ (N=162)

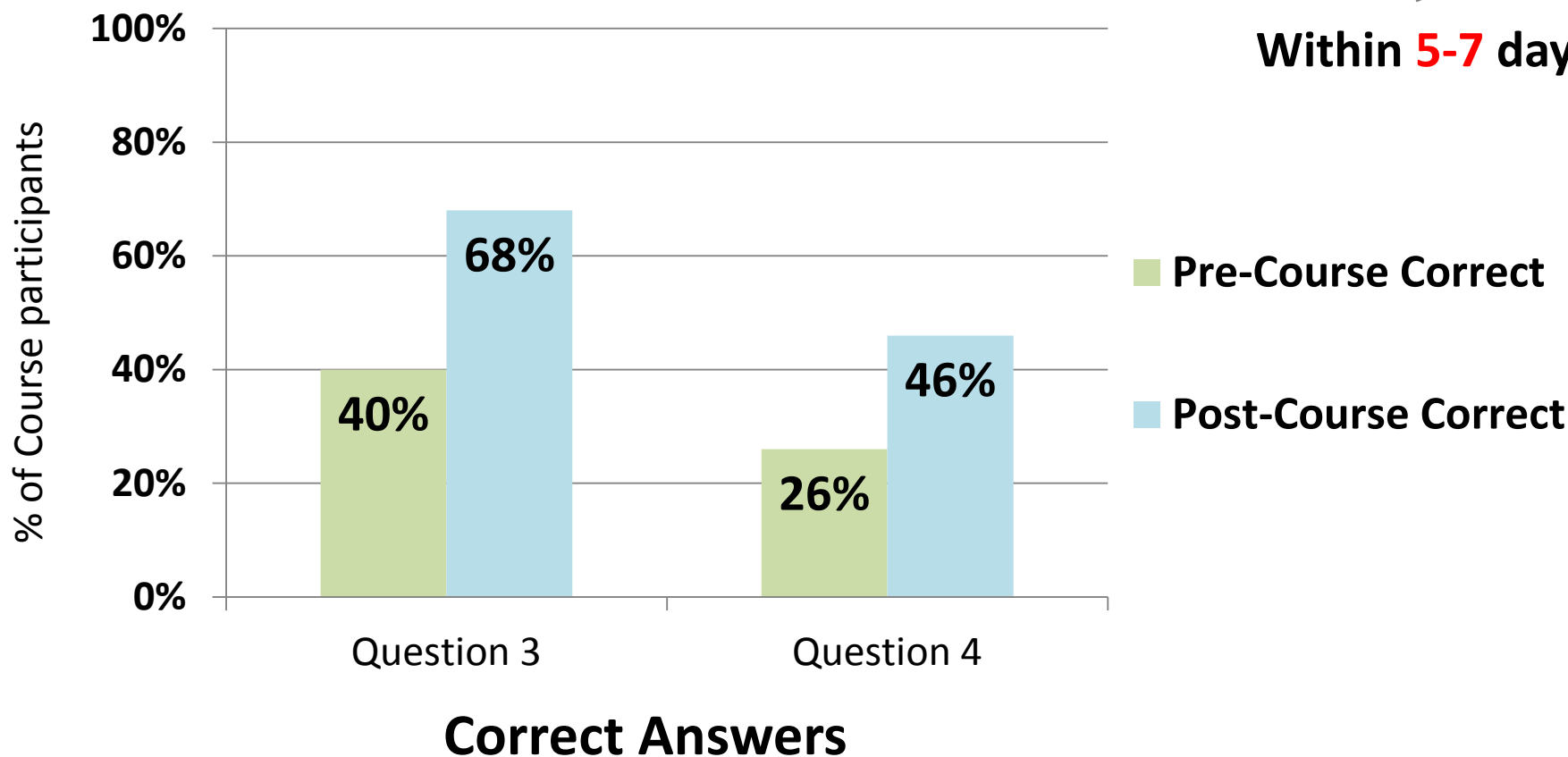
10-15 $\mu\text{g}/\text{kg}$

False!

Question 4: Thyroid stimulating hormone (TSH) surges by 30 minutes after birth and returns to $<10 \mu\text{IU}/\text{mL}$ within 3 days (N=159)

False!

Within **5-7** days



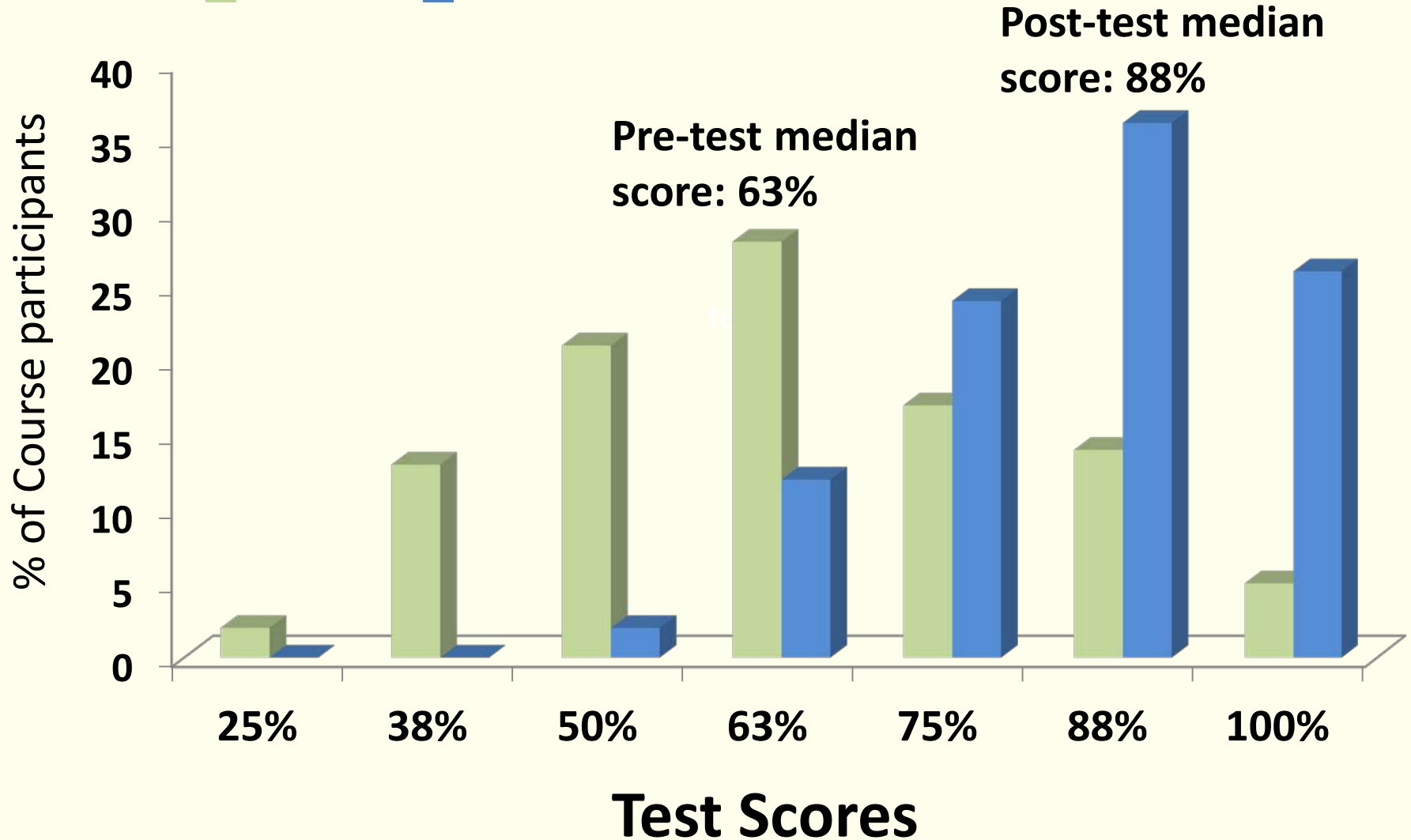
Overall Improvement in True/False Total Score

- **135** respondents answered all 8 pre-course and post-course true/false questions

Improvement on T/F Test Score (N=135)	Percentage
Improved their score	72%
Unchanged score	22%
Lower score	6%

Pre- and Post- Test Score Distributions For 8 True/False Knowledge Questions (N=135)

Pre-Test: ■ Post-Test: ■



Key Conclusions from True/False Results

Results suggest **largest knowledge gaps** among PCPs about the following issues:

- Timing of post-natal TSH surge and return to normal
- Initial treatment dosage
- When and how to assess patients for transient PCH



“Speaker covered practical, useful information. Very applicable to general providers.”



“I will be more conscious of following the monitoring of CH in newborns with guidelines discussed.”

“I like the simple explanation of the process.”

- **88%** rated the course as “Outstanding”
- **75%** said they plan to make changes to practice

Summary

- The course was shown to be effective in improving PCPs **knowledge** and **confidence** in providing follow-up care for patients with PCH
- PCPs were especially enthusiastic about the **simplicity** of the course format and the **practical instructions** provided
- Participants indicated **willingness and intention** to make changes to their clinical practice in treating PCH
- Newborn screening programs may consider offering CME courses to PCPs who care for patients with PCH

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Thank You!

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