

# Congenital Hypothyroidism in Newborn Infants with Borderline TSH Screening Cut-off Points



**Conchita G. Abarquez, MD**  
**Newborn Screening Center Mindanao**  
**Southern Philippines Medical Center**  
**Davao City, Philippines**



**St Louis Union Hotel, Missouri, USA**  
**March 3, 2016**

# CONGENITAL HYPOTYROIDISM (CH)

- **Congenital Hypothyroidism (CH) is one of the most preventable causes of intellectual disability**
- **Philippine data (as of Dec 2014) <sup>1</sup>**
  - ❖ **Incidence is 1 in 2,673**
- **Screening for CH started in 1996 <sup>1</sup>**
- **Biomarker – elevated TSH on DBS sample collected (heel-prick method)**

1. Newborn Screening Reference Center, National Institutes of Health, University of the Philippines, Manila, December 2014.

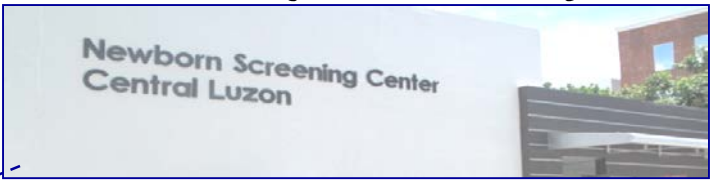


# 5 Newborn Screening Centers (NSCs) in the Philippines

**TSH Cut-off Value  $\geq 15$  mIU/L**

**TSH Cut-off Value  $\geq 15$  mIU/L**

**TSH Cut-off Value  $\geq 12.5$  mIU/L**



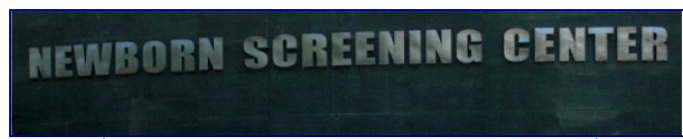
NSC - Central Luzon (Angeles University Foundation) Regions 1,2,3 & CAR



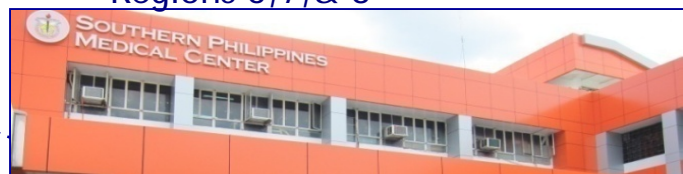
NSC - NIH (Ayala Technohub) NCR, Region 5



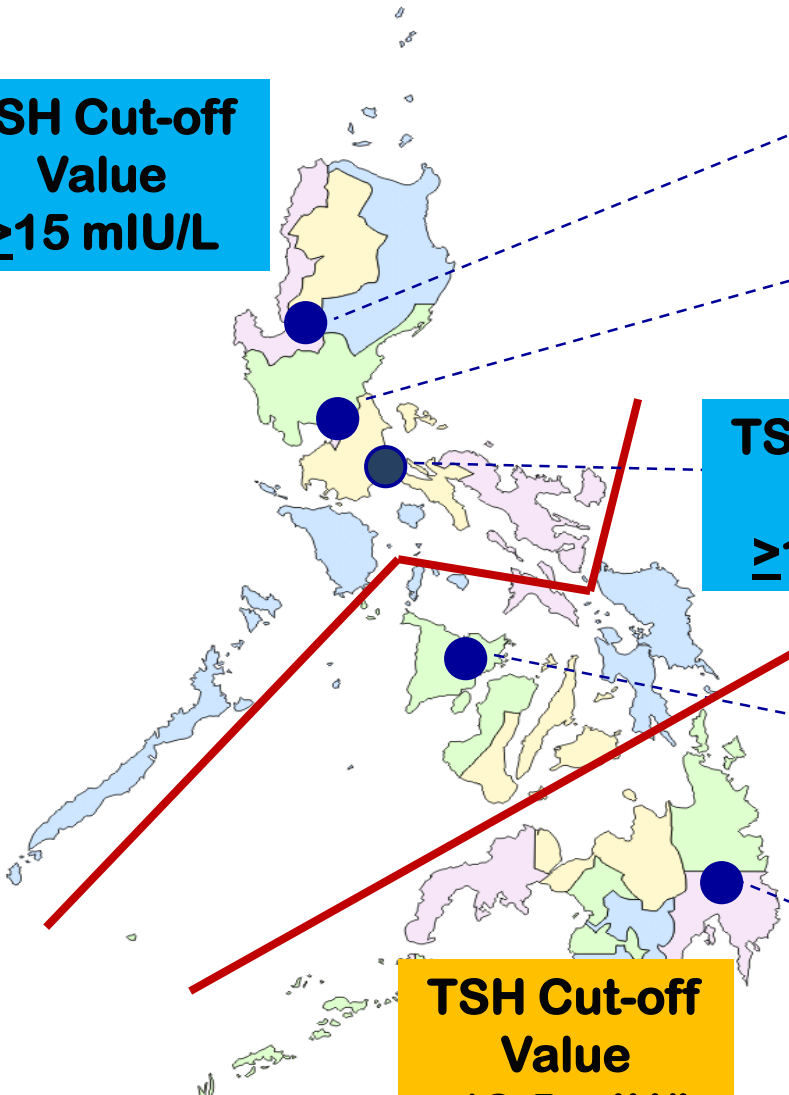
NSC - Southern Daniel Mercado Medical Center) Region 4



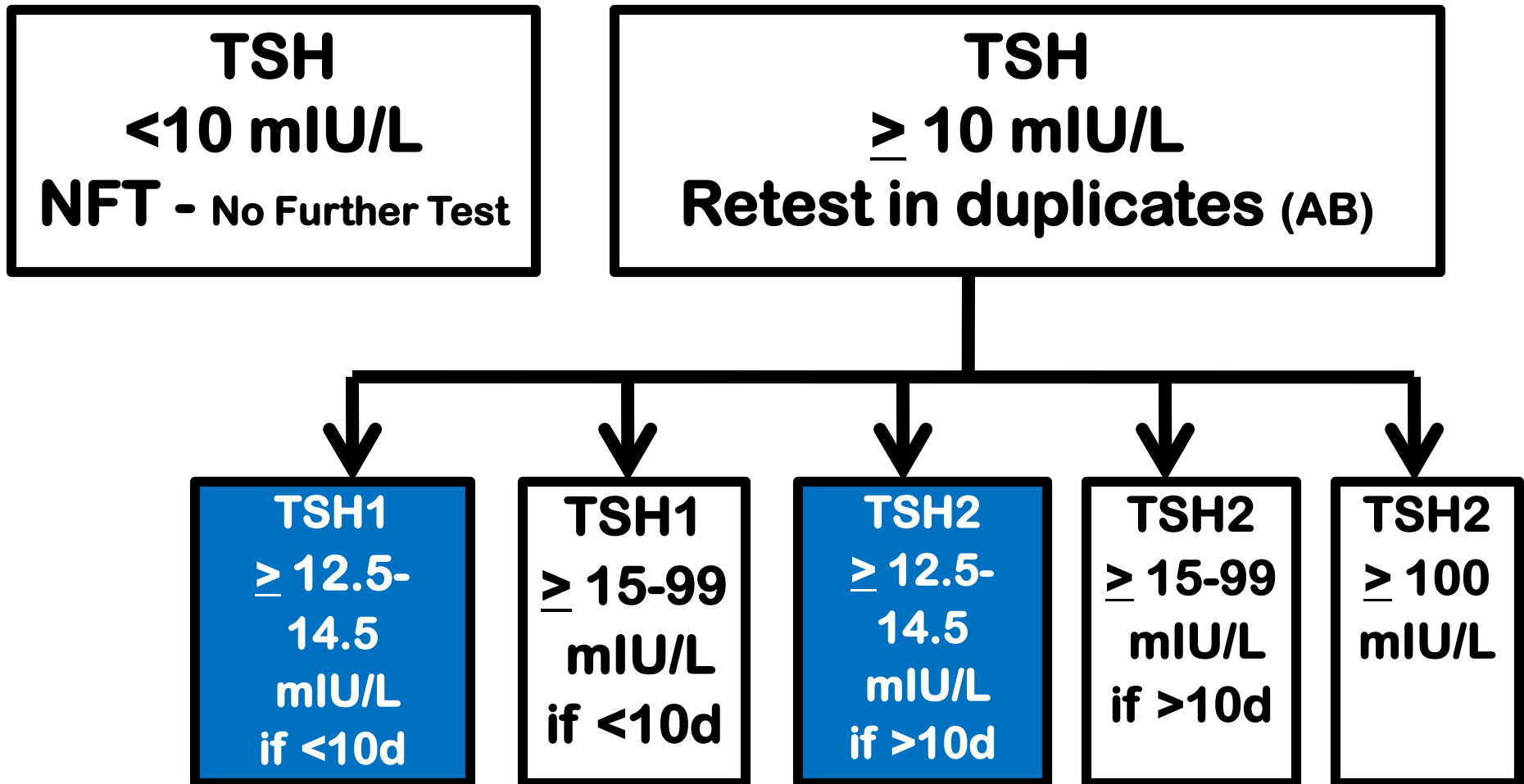
NSC - Visayas (West Visayas State University) Regions 6, 7, & 8



NSC - Mindanao (Southern Philippines Medical Center) Regions 9, 10, 11, 12, 13 & ARMM



# CH SCREENING ALGORITHM



**TSH 1 – repeat NBS test**

**TSH 2 – confirmatory testing, pediatric endocrinologist referral**



# OBJECTIVE

➤ To evaluate the clinical outcome of newborn infants who initially had borderline TSH screening result and were subsequently confirmed to have CH when further examination was carried out

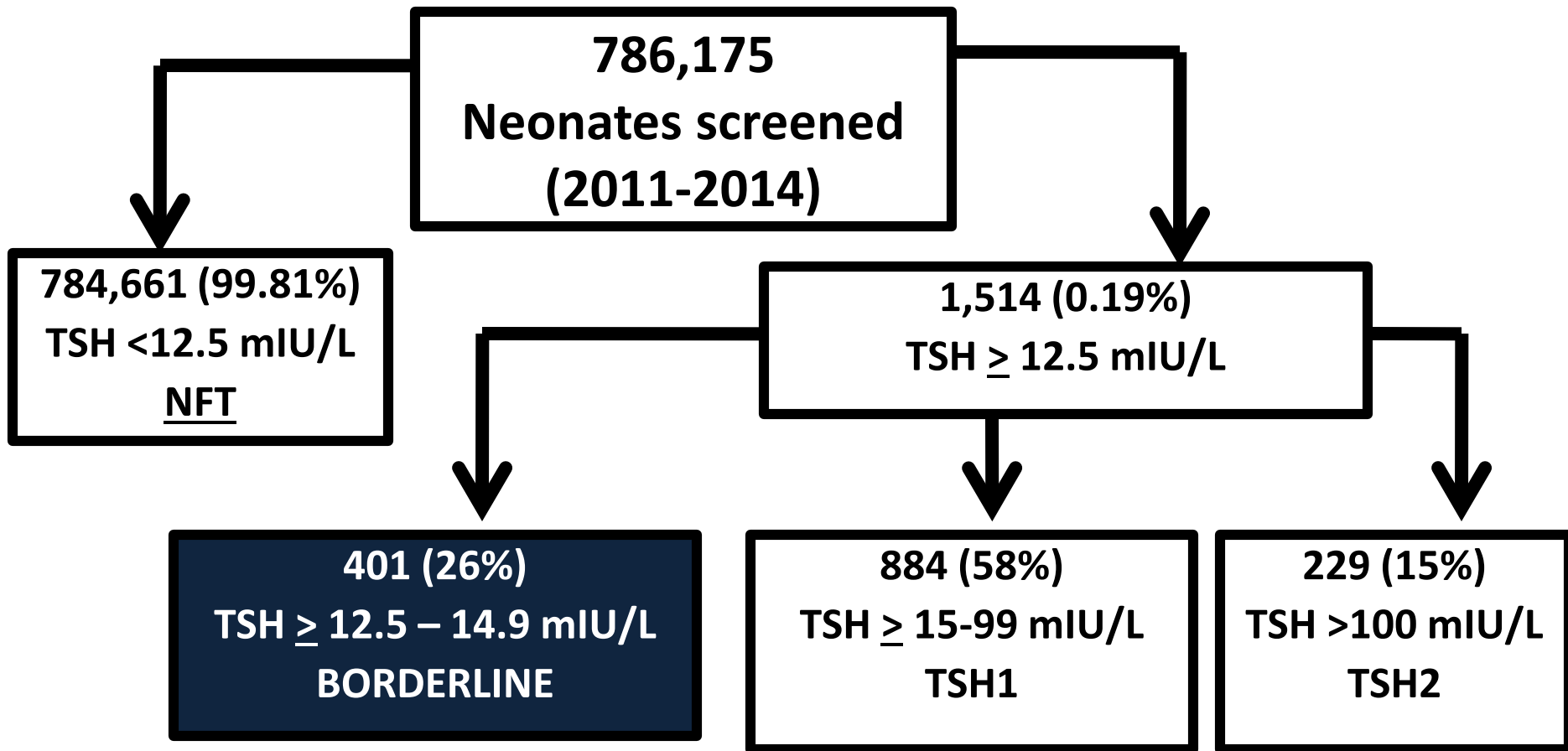


# MATERIALS & METHOD

- **Retrospective study**
- **Data review of newborn infants screened between January 2011 to December 2014 and who had borderline TSH screening values ( $\geq 12.5$ -14.5 mIU/L) and subsequently confirmed to have CH**
- **Data include:**
  - ❖ **Demographics (including screening & treatment age)**
  - ❖ **Laboratory number, TSH values (initial & repeat)**
  - ❖ **Relevant investigations done (serum TSH, FT4 & imaging studies)**



# RESULTS

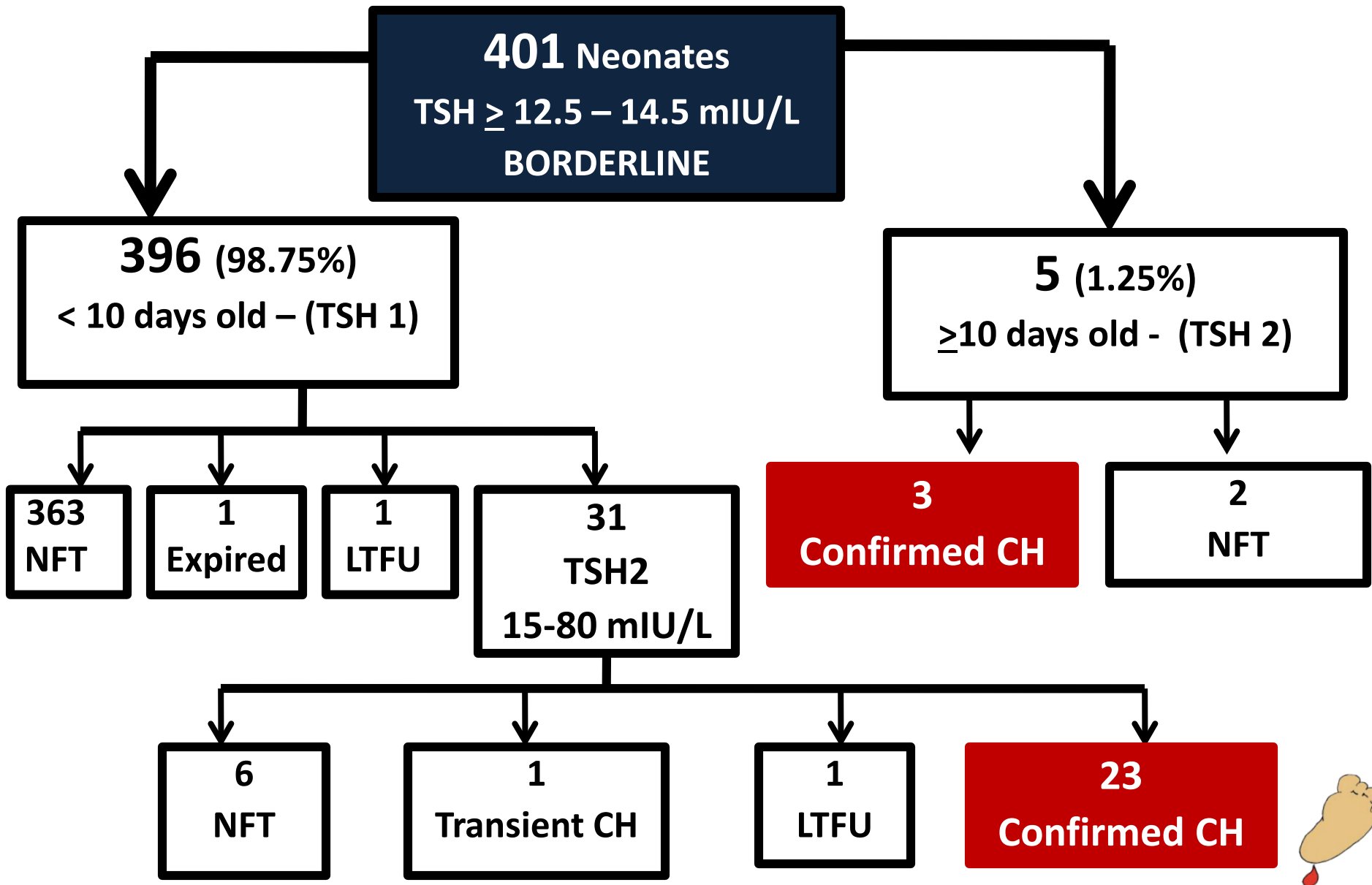


**TSH 1 – repeat NBS test**

**TSH 2 – confirmatory testing, pediatric  
endocrinologist referral**



# RESULTS





# RESULTS

**26 Confirmed CH:**

**15 males (57.7%)**

**11 females (42.3%)**

**All were full term babies (38-40 weeks)**

**Median screening age 2 days**

**Median age of treatment - 28.5 days**

**8 babies were clinically symptomatic –  
umbilical hernia, prolonged jaundice**



# RESULTS

## 26 Confirmed CH:

serum TSH values ranged from

↑ 8.35 - 85 (NV 0.25-5 uIU/ml)

serum FT4 values ranged from

↓ 1.60 – 8.34 (NV 9-20 pmol/L)

8 cases had low normal serum FT4 values

11 – 14 (NV 9-20 pmol/L)

Antibodies & iodine status were not determined

(not readily available in the local setting)

Only 4 underwent imaging studies

(because of financial limitations)



# RESULTS

## 26 Confirmed CH:

- **with normal growth & development**
- **are still on treatment (at present date)**
- **still following up at the NBS continuity clinic**



# NBS Continuity Clinics

**14** Continuity  
Clinics in operation

**RECALL RATE**

**77%**

(Each of continuity  
clinics has a full  
time nurse & a part  
time pediatrician)



- ★ Ilocos Training and Regional Medical Center, Region 1
- ★ Cagayan Valley Medical Center, Region 2
- ★ Jose B. Lingad Memorial Regional Hospital, Region 3
- ★ Baguio General Hospital and Medical Center, CAR
- ★ Philippine General Hospital, NCR
- ★ Gen. Emilio Aguinaldo Memorial Hospital, CALABARZON
- ★ Bicol Regional Training and Teaching Hospital, Region 5
- ★ West Visayas State University Medical Center, Region 6
- ★ Vicente Sotto Memorial Medical Center, Region 7
- ★ Eastern Visayas Regional Medical Center, Region 8
- ★ Zamboanga City Medical Center, Region 9
- ★ Northern Mindanao Medical Center, Region 10
- ★ Southern Philippines Medical Center, Region 11
- ★ Cotabato Regional Medical Center, Region 12

# DISCUSSION

- **CH screening highly successful**
- **Screening protocols for CH differ in many NBS programs e.g. analyte cut-off points**
- **Some programs adopt lower cut-off points to avoid missed cases**
- **Using borderline TSH cut-off points has increased detection rate of CH including subclinical CH**
- **The 26 true & subclinical CH would have been missed cases had NSC Mindanao used the  $>15$  uIU/L TSH cut-off points.**



# DISCUSSION

- **Impact of treating subclinical CH remains to be seen**
- **Some studies show that children with subclinical CH are at risk for overt hypothyroidism later in life % will therefore benefit from levothyroxine treatment <sup>1</sup>**
- **Grosse et al study – children with subclinical CH documented a decreased intellectual potential & increased behavioral abnormalities <sup>2</sup>**
- **Need to monitor subclinical cases**

1. Calaciura F, Motta RM, Miscio G, Fichera G, Leonardi D, Carta A, Trischitta V, Tassi V, Sava L and Vigneri R. Subclinical Hypothyroidism in Early Childhood: A frequent outcome of transient neonatal hyperthyrotropinemia. *J Clin Endocrinol Metab.* July 2002,87(7):3209-3214.

2. Grosse SD, Van Vliet G: Abstract. Prevention of intellectual disability through screening for congenital hypothyroidism: how much and at what level? *Arch Dis Child* 2011; 96: 374– 379.



# DISCUSSION

- **Lowering cut-off points will lead to increased recall rate**
- **Using the recommended screening cut-off points, recall rate of 0.14%**
- **With lower cut-off, recall rate was 0.19%**



# CONCLUSION & RECOMMENDATIONS

**The use of borderline TSH cut-off points has increased the detection rate of both true and subclinical CH.**

**TSH screening cut-off point may be lowered to  $\geq 12.5$  mIU/L for appropriate screening outcome and to avoid missing any case of CH.**





# Congenital Hypothyroidism in Newborn Infants with Borderline TSH Screening Cut-off Points



**Conchita G. Abarquez, MD**  
**Newborn Screening Center Mindanao**  
**Southern Philippines Medical Center**  
**Davao City, Philippines**



**St Louis Union Hotel, Missouri, USA**  
**March 3, 2016**