

# **Quality Improvement of Follow Up Strategies Using Region 4 Post Analytical Tools to Evaluate VLCADD and CACT/CPTII Newborn Screening Results**

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# What's the problem?

**Time period for this project: 1/1/12 – 3/6/14**

**2 years and 2 months**

- **122 positive screens for VLCADD**
- **125 positive screens for CACT/CPTII**

**Outcomes of those positive screens:**

- **VLCADD: 9 (PPV 7.3%)**
- **VLCADD carriers: 14**
- **CACT/CPTII: 0**

- **Large numbers of false positive results and the associated follow up cause the following for NBS staff, parents and other healthcare providers:**



# Time analysis

## VLCADD

- Average amount of time follow up spends on the initial report of the abnormal results per case:

**38.5 minutes**

- Min: 9
- Max: 120

## CACT/CPT2

- Average amount of time follow up spends on the initial report of the abnormal results per case:

**71.9 minutes**

- Min: 26
- Max: 180

These figures are based on a subset of the abnormal results and not the entire data set.

# Time Analysis

Disorder	Average time per case	number of positive screens	Average total time spent
VLCADD	38.5 minutes	122	78.3 hours
CACT/CPTII	71.9 minutes	125	149.8 hours

- **1.1 working days per month**
- **Does not include:**
  - repeat contacts to pediatrician
  - time spent discussing case with geneticists
  - coordinating referral to metabolic clinic
  - the time spent by primary care and neonatology to find, assess, and test their kids

# What are we doing currently?

## VLCADD

- **Single analyte algorithm: C14:1**
- **Follow up team uses R4S single condition post analytical tool**
- **Categorize results:**
  - **Low risk – repeat NBS**
  - **Medium risk – biochemical testing**
  - **High risk – biochemical and molecular testing, possible immediate referral to metabolic clinic**

## CACT/CPTII

- **Co-primary algorithm: C16 and C18:1**

### Score Interpretation Guidelines

This tool has been validated only for neonatal (<10 days) blood spots. Use of this tool is not advised to calculate scores for older patients.

**Score is  $\geq 110$**   
Condition is very likely VLCAD.

**Score is  $\geq 50$  and  $< 110$**   
Condition is likely VLCAD.

**Score is  $\geq 15$  and  $< 50$**   
Condition is possibly VLCAD.

**Score is  $< 15$**   
Profile is not informative for VLCAD.

# Follow Up Recommendations

## VLCADD

- 43 diagnostic testing
- 77 repeat NBS

## CACT/CPT2

- 45 diagnostic testing
- 80 repeat NBS

Reminder of the outcomes:

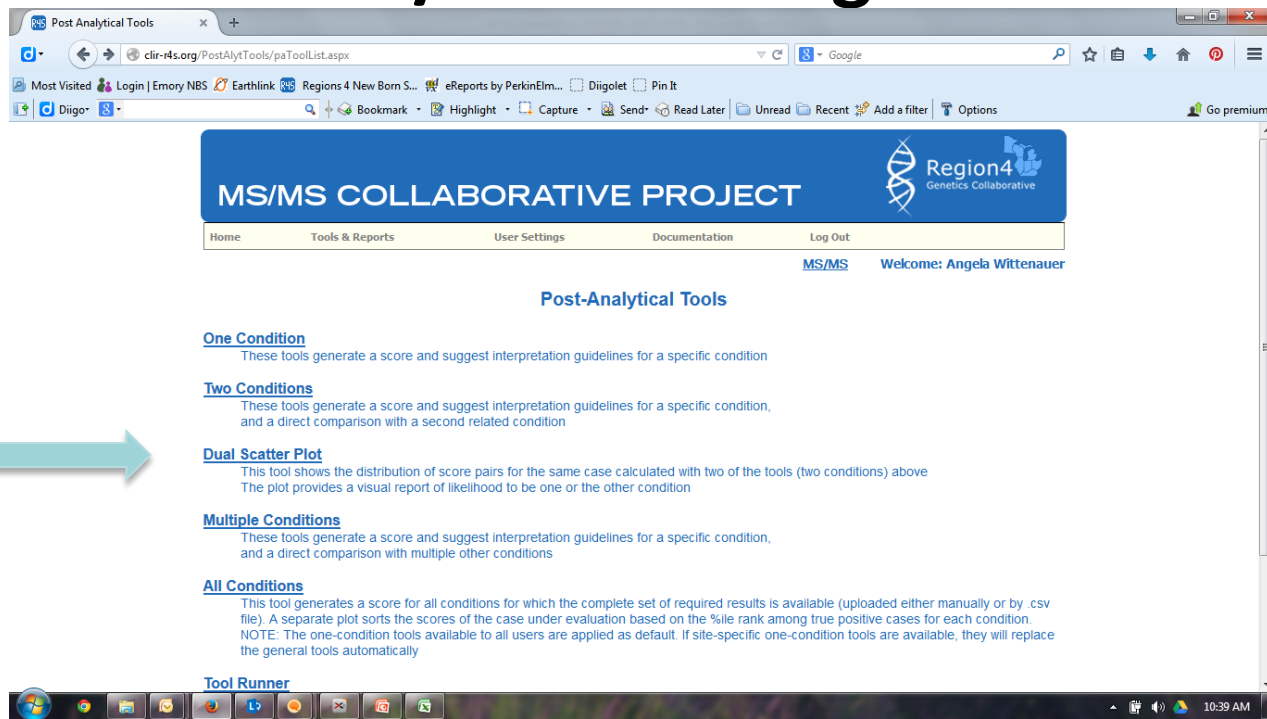
VLCADD: 9

CACT/CPT2: 0

# How can we make it better?

- R4S has additional tools: dual scatter plot
- For this analysis we used two of these tools:

**VLCADD vs. VLCADD heterozygote**  
**CACT/CPTII vs. high C16**



Post Analytical Tools

clir-rs.org/PostAlytTools/paToolList.aspx

MS/MS COLLABORATIVE PROJECT

Region4 Genetics Collaborative

Home Tools & Reports User Settings Documentation Log Out

MS/MS Welcome: Angela Wittenauer

**Post-Analytical Tools**

**One Condition**  
These tools generate a score and suggest interpretation guidelines for a specific condition

**Two Conditions**  
These tools generate a score and suggest interpretation guidelines for a specific condition, and a direct comparison with a second related condition

**Dual Scatter Plot**  
This tool shows the distribution of score pairs for the same case calculated with two of the tools (two conditions) above  
The plot provides a visual report of likelihood to be one or the other condition

**Multiple Conditions**  
These tools generate a score and suggest interpretation guidelines for a specific condition, and a direct comparison with multiple other conditions

**All Conditions**  
This tool generates a score for all conditions for which the complete set of required results is available (uploaded either manually or by .csv file). A separate plot sorts the scores of the case under evaluation based on the %ile rank among true positive cases for each condition.  
NOTE: The one-condition tools available to all users are applied as default. If site-specific one-condition tools are available, they will replace the general tools automatically

**Tool Runner**

10:39 AM



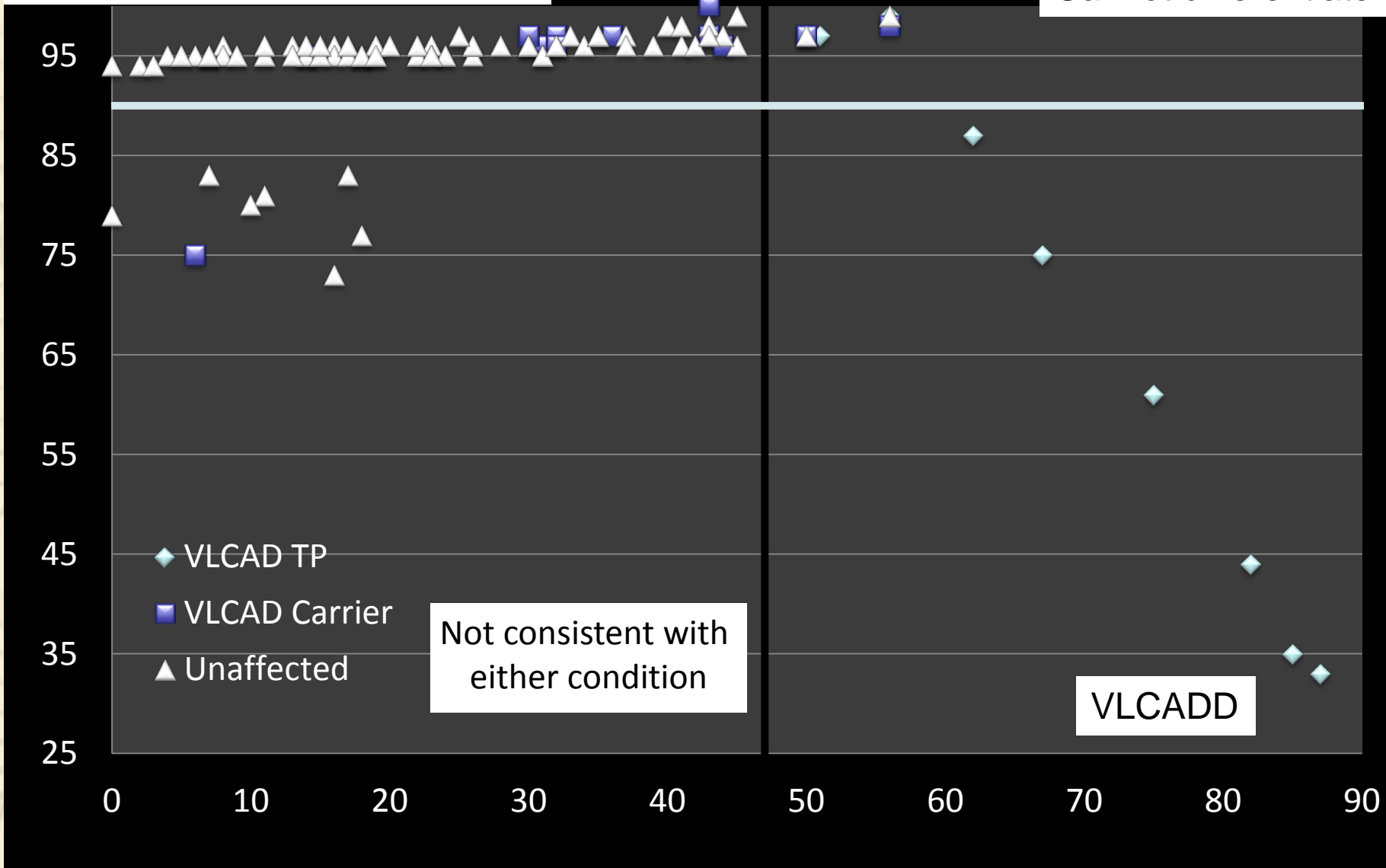
# How can we make it better?

- **Could using these tools help us determine which kids are more likely to be false positives and which kids are more likely to be affected?**
- **Could we use this information to reduce time spent in follow up?**
- **Could we reduce our false positive rate from the state lab?**

# VLCADD vs VLCADD Het.

Condition is VLCADD Heterozygote

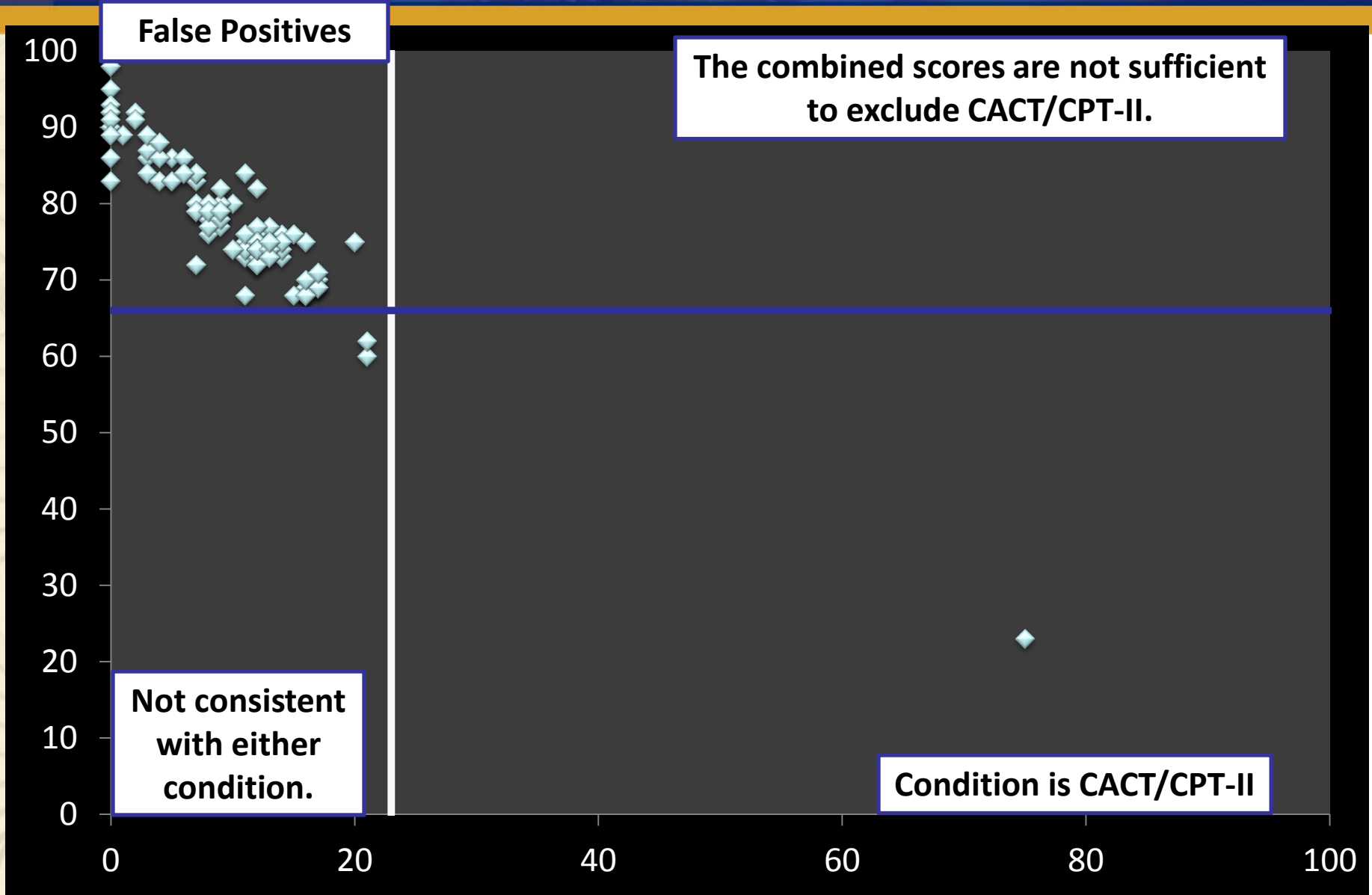
Cannot differentiate



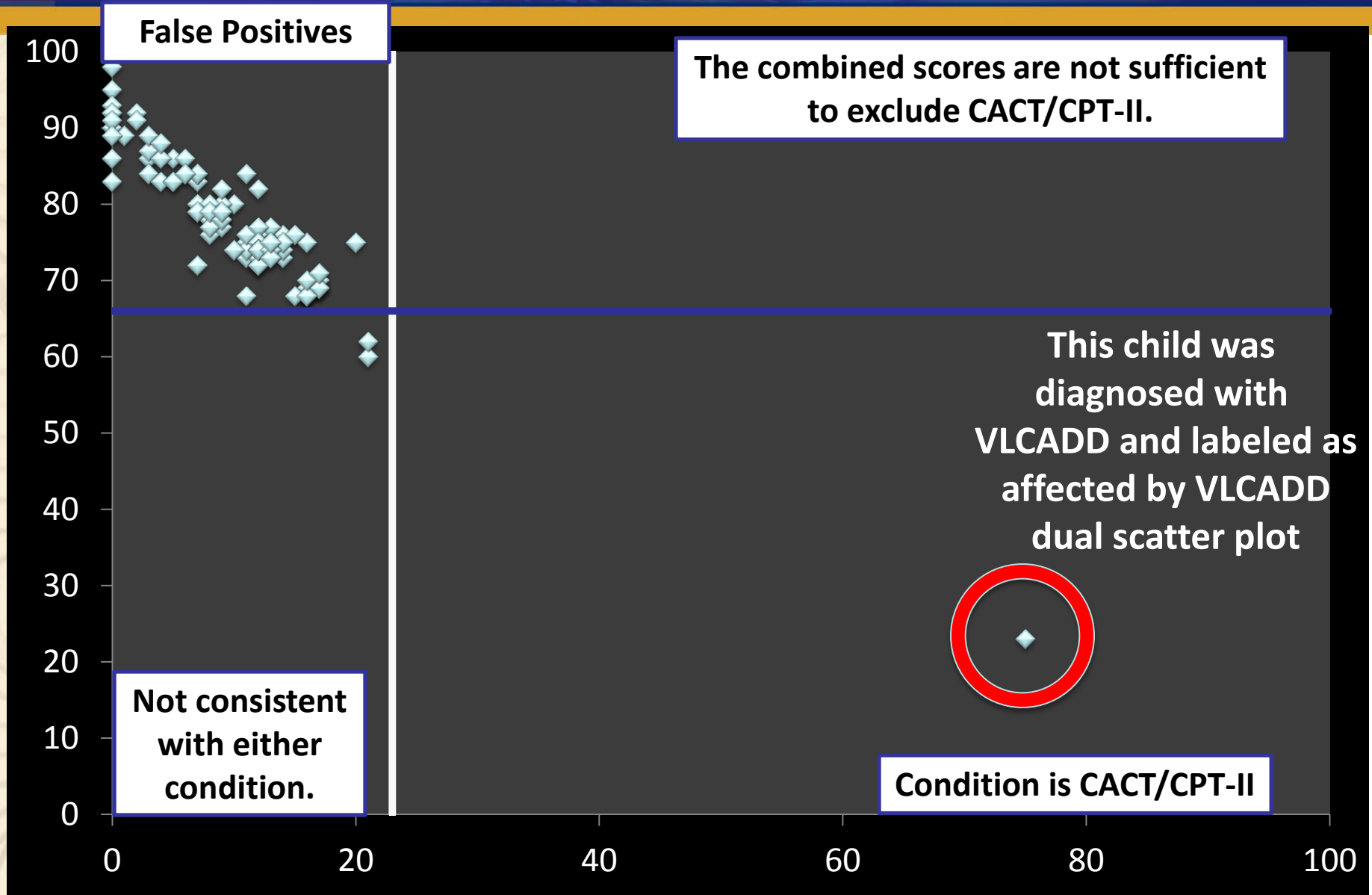
# VLCADD vs VLCADD het.

- **It is reasonable to rule out all children who fall in the “VLCADD heterozygote” or the “not either condition” quadrants.**
- **Abnormal NBS reports and diagnostic testing are still appropriate for children who fall in the indeterminate or affected quadrants.**

# CACT/CPTII vs high C16



# CACT/CPTII vs high C16



# CACT/CPTII vs high C16

- **Confidence in making big changes?**
  - No diagnosed cases in this group of children.
- **Can we stop calling these positive screens?**
- **Should we take a less cold turkey approach and advise assessment then close if normal?**

# Why is this important?

- **False Positive screens are a problem**
  - Testing algorithms are stretched
  - Follow up algorithms are stretched
  - Providers are stretched
  - New conditions are coming: SCID, Pompe pilot, CCHD
- **Resources are limited, demands increasing = need process improvement!**

**Dual Scatter plot tools may be our opportunity to reduce workload and be highly effective**

# Plans and Ideas

- **We will continue to evaluate these tools**
- **Partner with the state lab in utilizing tools**
- **Consider partnering with other states to evaluate tools**



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- **Georgia Public Health Laboratory**
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**Thank you!**