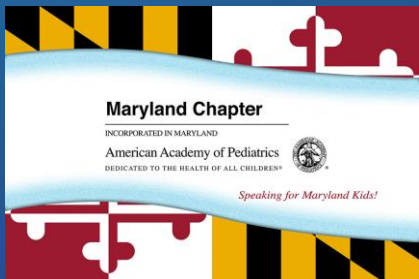


MDAAP/AAP Lead Testing ECHO

April 5, 2023

Session 7: Cases From The Field



American Academy of Pediatrics
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ACKNOWLEDGMENTS

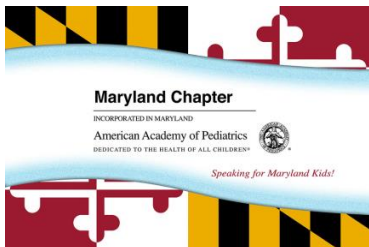
This material was supported by the American Academy of Pediatrics (AAP) and funded (in part) by the cooperative agreement award number 5 NU61TS000296-02-00 from the Agency for Toxic Substances and Disease Registry (ATSDR).

Acknowledgement: The U.S. Environmental Protection Agency (EPA) supports the PEHSU by providing partial funding to ATSDR under Inter-Agency Agreement number DW-75-9587770. The content in this material represents the views of the various contributors. It does not represent the views of the Centers for Disease Control and Prevention (CDC)/ATSDR nor EPA and does not represent endorsement by CDC/ATSDR nor EPA of the purchase of any commercial products or services that are mentioned.



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- Chat with Loretta I. Hoepfner in Chatbox if you need technical assistance



AGENDA

- Welcome – Loretta I. Hoepfner
- Case Presentations and Discussions
 - Mike Ichniowski, MD, FAAP
 - Paul Rogers, MD, FAAP
 - Guest Speaker: Clifford Mitchell, MS, MD, MPH (Maryland Department of Health)
- QI Data Review – Troy Jacobs, MD, FAAP
- Follow Up and Next Steps – Loretta I. Hoepfner



CASE PRESENTATIONS AND DISCUSSIONS

Michael Ichniowski, MD, FAAP

Paul T. Rogers, MD, MBA, FAAP

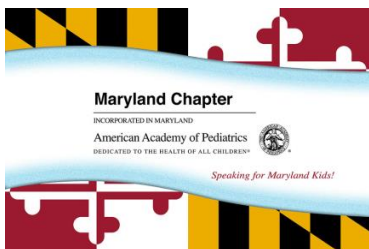
Clifford Mitchell, MS, MD, MPH

April 5, 2023



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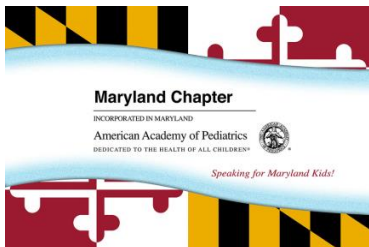
CASE PRESENTATION #1

(THANKS TO TAMARA KIM, CPNP-PC)

Michael Ichniowski, MD, FAAP

Clifford Mitchell, MS, MD, MPH

Paul T. Rogers, MD, MBA, FAAP



CASE PRESENTATION #1

CC: “A” is an eighteen-month male who had an elevated BLL of 4 ug/dL after his 18 month well child visit on 9/3/21. Lead risk screening negative at this visit. PEDS and MCHAT assessments normal. No behavioral concerns.

Property: Built in 1925

PMHx: Birth Hx: Pt. was born full term by vaginal delivery with no complications

Past Medical History: Eczema at two months; pneumonia at age 18 months

Medications: Loratadine 5 mg qd for allergic rhinitis; Albuterol inhaler 2 puffs prn wheezing

Development: Screening normal; Referred to Head Start Program 9/23/21

FHx: Two sisters; no further information available

SHx: Family moved into a newly built home 8/30/22



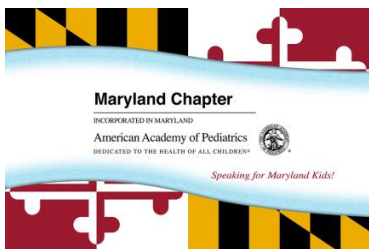
Previous residence



New residence built 2022

BLOOD LEAD LEVELS

Date	Result $\mu\text{g/dL}$	Age	Comments
9/13/21	4	18 mon.	Venous; Hgb=11.4
6/17/22	6.3	27 mon.	Venous; Hgb=12.3
9/19/22	4.6	30 mon.	Venous; Hgb=11.9
Average	4.9		



CASE PRESENTATION #1 - CHRONOLOGY

History:

4/9/21: 12 month well child visit: Lead risk assessment screening negative; PEDS & MCHAT assessments normal; Developmental screening normal; no behavior concerns. Venous blood lead and Hgb/Hct ordered.

9/3/21: 18 month well child visit: Child noted to be delayed for well visits and immunizations. Blood lead and Hgb/Hct had not been obtained. Lead risk screening negative; PEDS & MCHAT assessments normal; no behavior concerns. Labs reordered

9/13/21: Lab results: Venous Blood Lead Level=4 ug/dL; Hgb=11.4 g/dL; Hct=34.8%

9/23/21: Referral for Head Start enrollment initiated for elevated blood lead level

3/29/22: 2 year well child visit: Lead risk assessment positive for elevated lead level and family home built before 1978. Lead, Hgb/Hct ordered.

6/17/22: Lab results: VBLL=6.3ug/dL; Hgb=12.3g/dL; Hct=36.9%

7/19/22: Acute care visit for elevated blood lead: Family indicated they were in process of moving into newly constructed house. Family indicated that no obvious source of lead had been found in current home (unclear if health department had been involved in evaluation). Normal physical exam; no behavioral concerns; good appetite, not taking any vitamins. Follow-up Lead, Hgb/Hct ordered.

9/19/22: Lab results: VBLL=4.6 ug/dL; Hgb=11.9 g/dL; Hct=36.4%

9/29/22: 30 month well child visit: Family reported moving into new home 8/30/22. Ht-87cm (7%ile); Wt-11.9kg (9.6%ile). Lead level to be repeated at 3 year well child visit

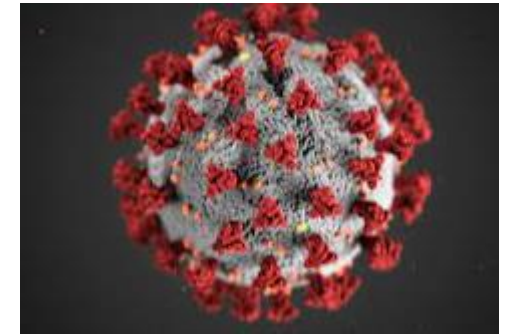
QUESTIONS FOR DISCUSSION

1. What were some barriers to optimal lead testing in this case?
2. What counseling can you, as primary care providers, provide to your patients in a similar situation?
3. What would be the recommended timing for follow-up lead testing?
4. What information or support from other agencies would be helpful to you for ongoing follow-up of this patient?



BARRIERS TO TESTING

- Parental compliance with blood testing
- Availability/affordability of in-office testing
- COVID lockdown and disruption of regular care



LEAD HAZARD REDUCTION COUNSELING



1. Reduce continued lead exposure in the home: inspection to identify sources of lead
2. Nutritional interventions to minimize further absorption of lead: Iron/Vitamin C; Calcium/Vitamin D
3. Minimize exposure to lead in house dust: wet mopping, damp dusting, HEPA filtered vacuum; wash toys, pacifiers, etc.
4. Minimize exposure to lead in soil: take off shoes at door, wash hands after outdoor play
5. Eliminate any other sources of lead exposure: work, hobbies, imported spices, glazed cookware



BLOOD LEAD LEVEL (BLL) MONITORING

Venous blood lead	Early F/U testing	Later F/U testing**
3.5-9 ug/dL	3 months*	6-9 months
10-19 ug/dL	1-3 months*	3-6 months
20-44 ug/dL	2-4 weeks	1-3 months
≥45 ug/dL	repeat ASAP (consider admission for chelation)	

***initial F/U test can be done within one month to check for rising BLL**

****after 2-4 tests show steady decline**

<https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm>



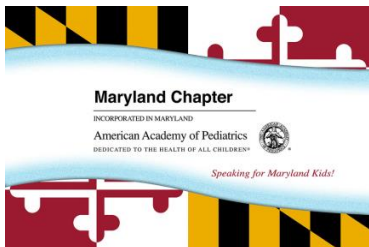
CASE PRESENTATION #2

(THANKS TO CHEL MENCHAVEZ, MD, FAAP)

Paul T. Rogers, MD, MBA, FAAP

Michael Ichniowski, MD, FAAP

Clifford Mitchell, MS, MD, MPH



CASE PRESENTATION #2

CC: “W”, a three-and-a-half-year-old male and his siblings have been followed in this practice since December 28, 2021, for elevated BLL. He is back in the office for a follow-up for his lead poisoning.

Property: This house was built in 1853 and previously served as a doctor’s office and a hospital during the Civil War. Pt.’s mother reported paint was in good condition until they started to do home renovations. An Environmental Investigation by the MDE on April 7, 2021, found, on visual inspection, chipping, flaking and peeling paint in ten interior locations. All nine dust wipes were positive for lead-contaminated house dust. Two outdoor soil samples exceeded the threshold. An XRF Analyzer detected eight positive samples from interior surfaces, five in child play areas. Water samples were below the threshold. No other lead hazards were detected at this property.

Visiting property: “W” and his siblings were exposed to lead based paint hazards at the maternal grandmother’s home, which was built in 1910.



CASE PRESENTATION #2 - CONTINUED

PMHx: Birth Hx: Pt. was born full term by vaginal delivery with no complications. He was
Developmental Hx: Current developmental screening passed. Followed by Infants & Toddlers
Hospitalizations: 2019 for croup.
Medications: None
ROS: dental caries

FHx: Two sisters and one of two brothers have had elevated blood lead levels.

SHx: Due to size of house the family has not been able to fix or sell. Other agencies involved: MWPH Lead Clinic, Local Health Dept. & MDE



LABORATORY RESULTS

Date	Result µg/dL	Age	Comments
7/20/2020	24	14 mon.	Capillary; Hgb=11.3
7/21/2020	19	14 mon.	Venous
8/21/2020	16	15 mon.	Venous
10/12/2010	14	17 mon.	Venous
11/16/2020	14	18 mon.	Venous
12/15/2020	17	19 mon.	Venous
2/26/2021	16	21 mon.	Venous; Hgb=11.7
3/26/2021	12	22 mon.	Venous
10/5/2021	12	29 mon.	Venous; Hgb=12.3
12/28/2021	9	31 mon.	Venous
4/8/2022	9	35 mon.	Venous
5/18/2022	8.2	36 mon.	Venous
1/10/2023	7.5	44 mon.	Venous
Average	13.6		



DISCUSSION

Dr. Michael Ichniowski: Primary care aspects: counseling, follow-up testing, referral for services

Dr. Clifford Mitchell: Home visiting and lead abatement services for families available in Maryland

Dr. Paul Rogers: Lead poisoning effects on neurodevelopment



BLOOD LEAD LEVEL (BLL) MONITORING

Venous blood lead	Early F/U testing	Later F/U testing**
3.5-9 ug/dL	3 months*	6-9 months
10-19 ug/dL	1-3 months*	3-6 months
20-44 ug/dL	2-4 weeks	1-3 months
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<https://www.cdc.gov/nceh/lead/advisory/acclpp/actions-blls.htm>



CASE PRESENTATION #3

Paul T. Rogers, MD, MBA, FAAP

Clifford Mitchell, MS, MD, MPH

Michael Ichniowski, MD, FAAP



CASE PRESENTATION #3

CC: “Lily” is a seven-year-old female with previous history of an elevated BLL who returns to your office because of poor academic achievement

Property: This house was built in 1905 where Lily lived from her birth till July 15, 2016, when she was 21 months old. Pt.’s mother reported deteriorated paint and lead-contaminated house dust throughout the house when they moved in. Lily had significant pica and was noted to chew on paint chips. An Environmental Investigation by the MDE detected the presence of lead-based paint by XRF testing and dust wipes. Tap water tested below the threshold for lead but two soil samples were above the lead threshold. No other lead hazards were detected. Lily’s older sister did not have an elevated BLL.

Visiting property: No visits to daycare or relative’s homes.



CASE PRESENTATION #3 - CONTINUED

PMHx: Birth Hx: Pt. was born full term by vaginal delivery with no complications.

Developmental Hx: Mother was concerned that Lily had speech delay noted at two years of age. Currently she is very active, often defiant and has temper tantrums when she does not get her way.

Hospitalized : At age of three for gastrointestinal symptoms diagnosed as chronic diarrhea and esophagitis.

Medications: None now; previously iron for iron deficient anemia and medications for her GI problems.

ROS: Severe dental caries requiring repair under general anesthesia at seven years old: fillings in two teeth; extractions of two teeth; stainless steel crowns for five teeth.

FHx: No FHx of ADHD, LD, or ID. Mother has history of GAD and her father works in a plastics factory. Lily's older sister did not have an elevated BLL.

SHx: Recently, CPS involvement with family due to marital problems between Lily's father and mother.



LILY'S LEAD TESTING HISTORY

EBL (µg/dL)	EBL (ppb)	Age	Date	Address	Comment
8	80	12 mon.	7/23/15	Home	Venous
20	200	15 mon.	10/28/15	Home	Venous
11	110	17 mon.	12/7/15	Home	Venous
9	90	20 mon.	3/2/16	Home	Venous; Ferritin 10
8	80	22 mon.	5/3/16	Red Roof Inn	Venous
7	70	23 mon.	6/9/16	Home	Venous
6	60	25 mon.	9/6/16	Home	Venous
6	60	30 mon.	12/7/16	Home	Venous
4	40	33 mon.	4/17/17	Home	Venous
2	29	44 months	3/29/2018	Home	Venous; Fe=17 (25-101; ZPP 95µg/dL (<100))
8.7	AVG.				



LILY'S SCHOOL HISTORY

“Lily”, now eight years old, was retained in first grade at a private school with the following concerns of the teachers:

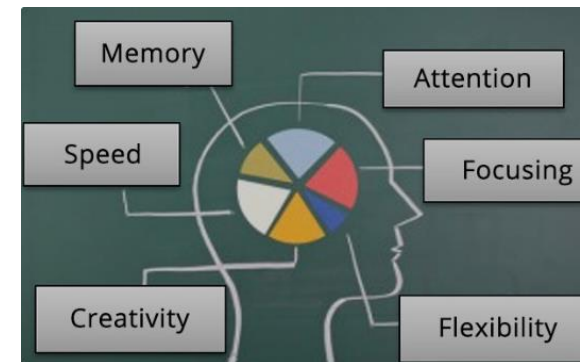
- Short attention span
- Easily distracted
- Doing well in math
- Behind in reading fluency
- Defiant in difficult situations
- Anxious
- Difficult to understand her speech
- Immature pencil grip, poor penmanship



PEDIATRICIAN'S PLAN FOR LILY

Problem	Action Planned
1. Assess current house for lead exposure	Lead questionnaire negative
2. Inattention, distractibility	Parent & teacher rating scale; ND Pediatrician
3. Anxiety	Rating scale; neuropsychological testing
4. Handwriting, pencil grip	OT found visual motor delays and Sensory Processing Disorder
5. Speech	S&L found speech fluency disorder
6. Behavior problems	Individual counseling with Art Therapy, Individual, Supportive, Family Therapy, and CBT
6. Academic underachievement	Vision, Hearing screen; neuropsychological testing; IEP, 504
7. Parent marital discord	Marital counseling
8. Possible future pediatric medical problems	Anemia; Delayed Puberty; Hypertension; Slow Growth; Sleep Problems
9. Possible future adult medical problems	Reproductive Problems, Cancer, Coronary Artery Disease, and osteoporosis. She also is at risk for further cognitive decline and psychopathology

Neuropsychological Test	Results
1. WISC-V	FSIQ 96; VSI 75
2. Visual Motor Integration Test	SS 85
3. Executive Function with the BRIEF-P	Significant problems
4. Social Emotional functioning with BASC-3	Significant behavior problems with attention and self-regulation of Lily's adaptive function characteristic of a much younger child
5. Adaptive behavior	Delayed with SS 75



DISCUSSION

Dr. Clifford Mitchell: Ending the historic, persistent impacts of lead poisoning

Dr. Paul Rogers: Lead poisoning effects on neurodevelopment

Dr. Michael Ichniowski: Primary Care aspects: long-term educational and behavioral follow-up



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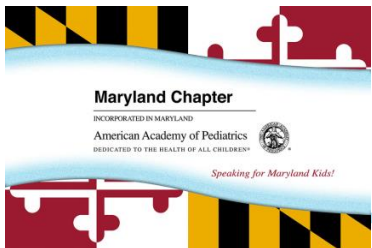
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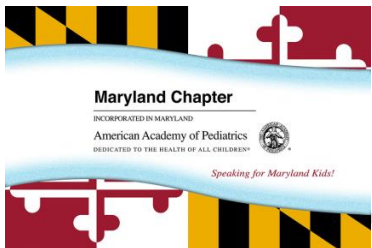


QUESTIONS?

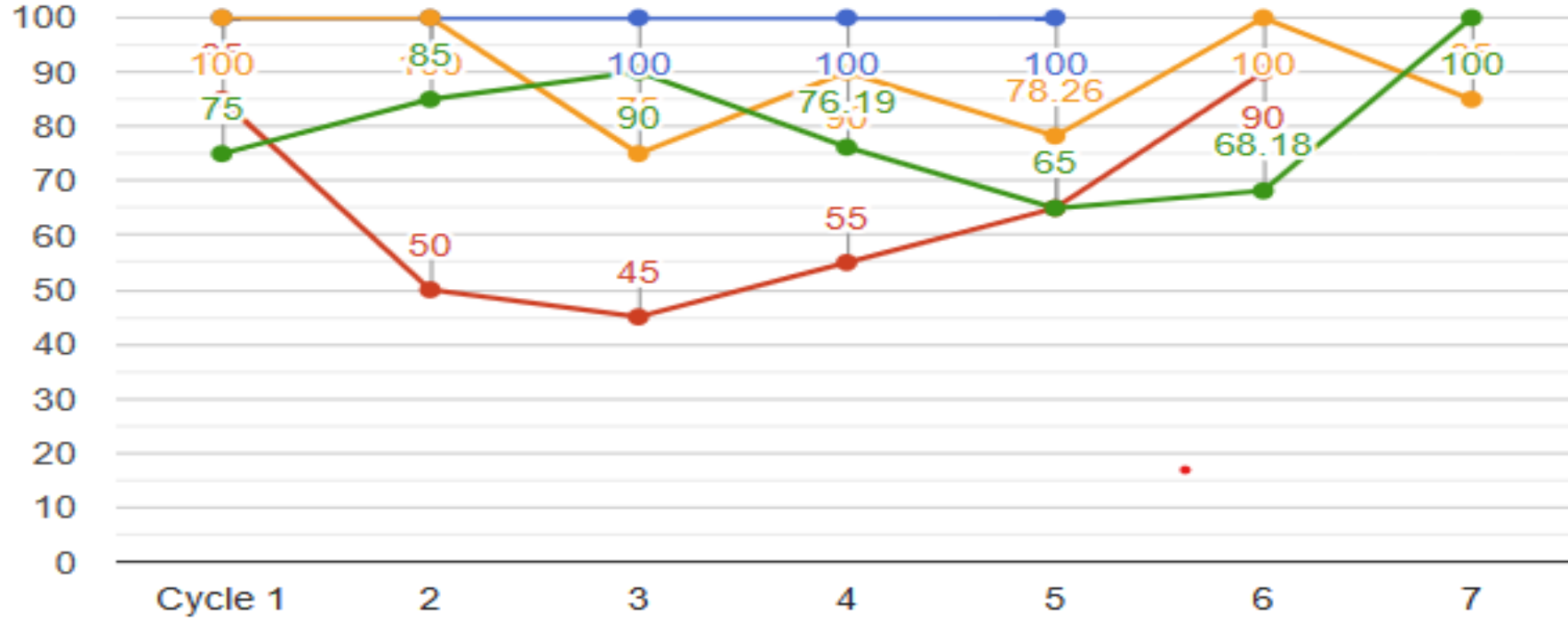


QI DATA REVIEW

Troy A. Jacobs, MD, MPH, FAAP



Risk Assessment



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 Cycle: 3 (N = 20)
 Cycle: 4 (N = 20)
 Cycle: 5 (N = 20)
 Cycle: 6 (N = 0)
 Cycle: 7 (N = 0)

University of Maryland Shore Medical Group-Pediatrics

Cycle 1 (N = 20)
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Greenspring Pediatric Associates

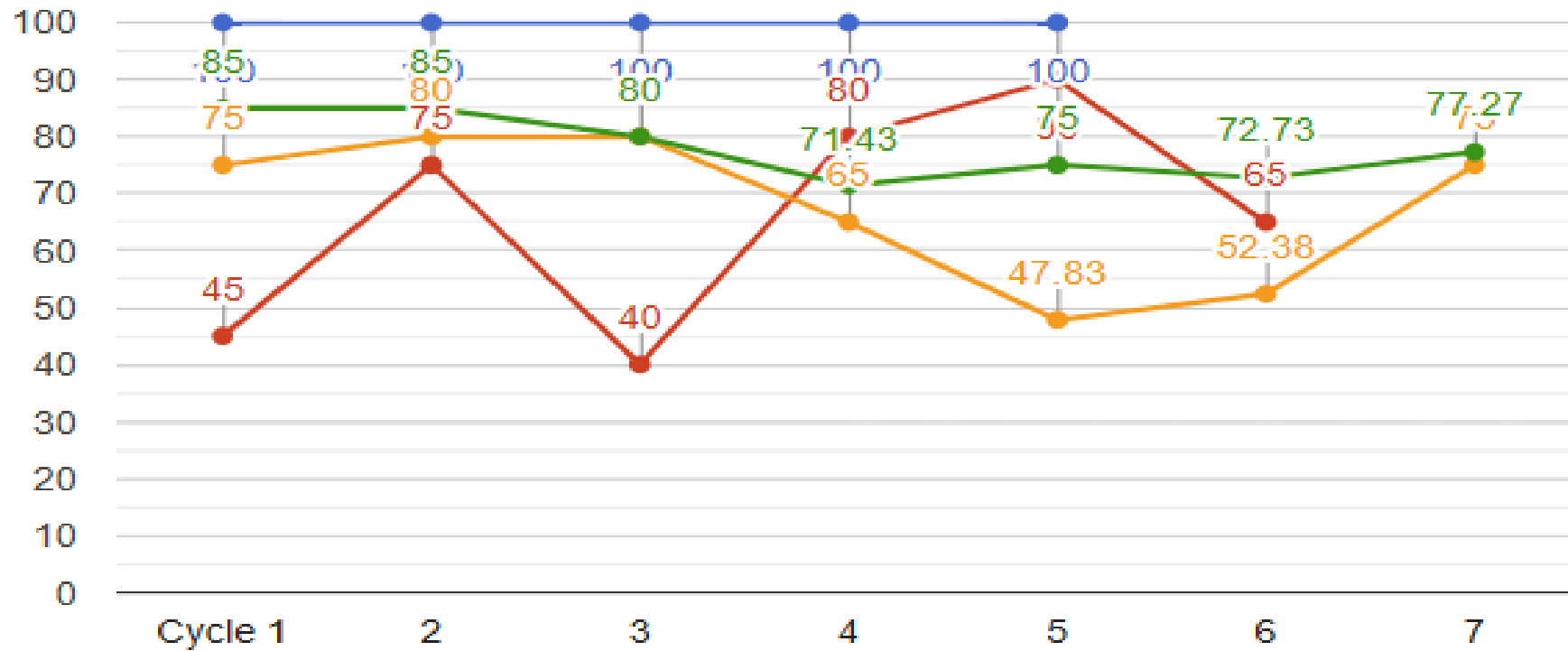
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MENCHAVEZ Pediatrics

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Documented Initial Blood Lead Test



Sanchez Pediatrics

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University of Maryland Shore Medical Group-Pediatrics

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Greenspring Pediatric Associates

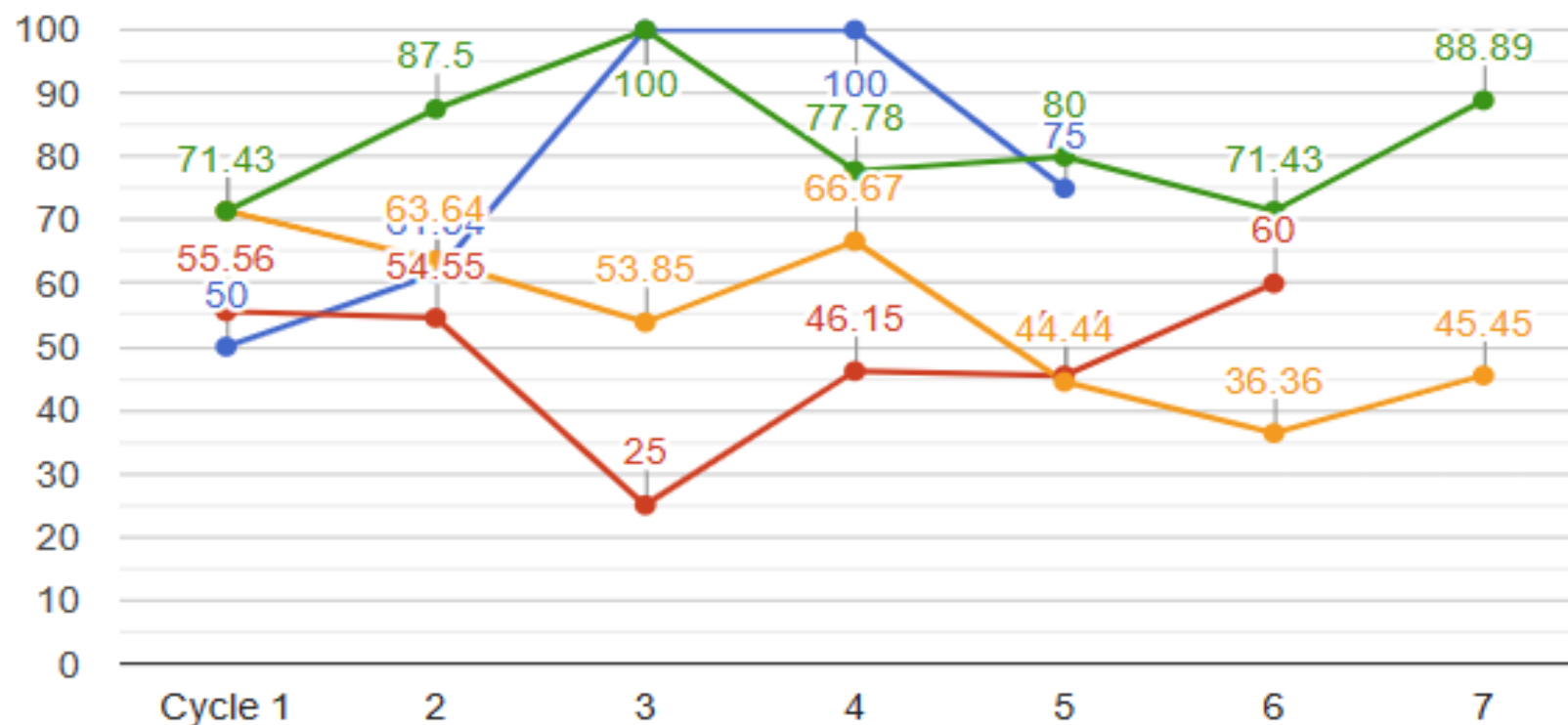
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MENCHAVEZ Pediatrics

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Blood Lead Testing



Sanchez Pediatrics

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University of Maryland Shore Medical Group-Pediatrics

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Greenspring Pediatric Associates

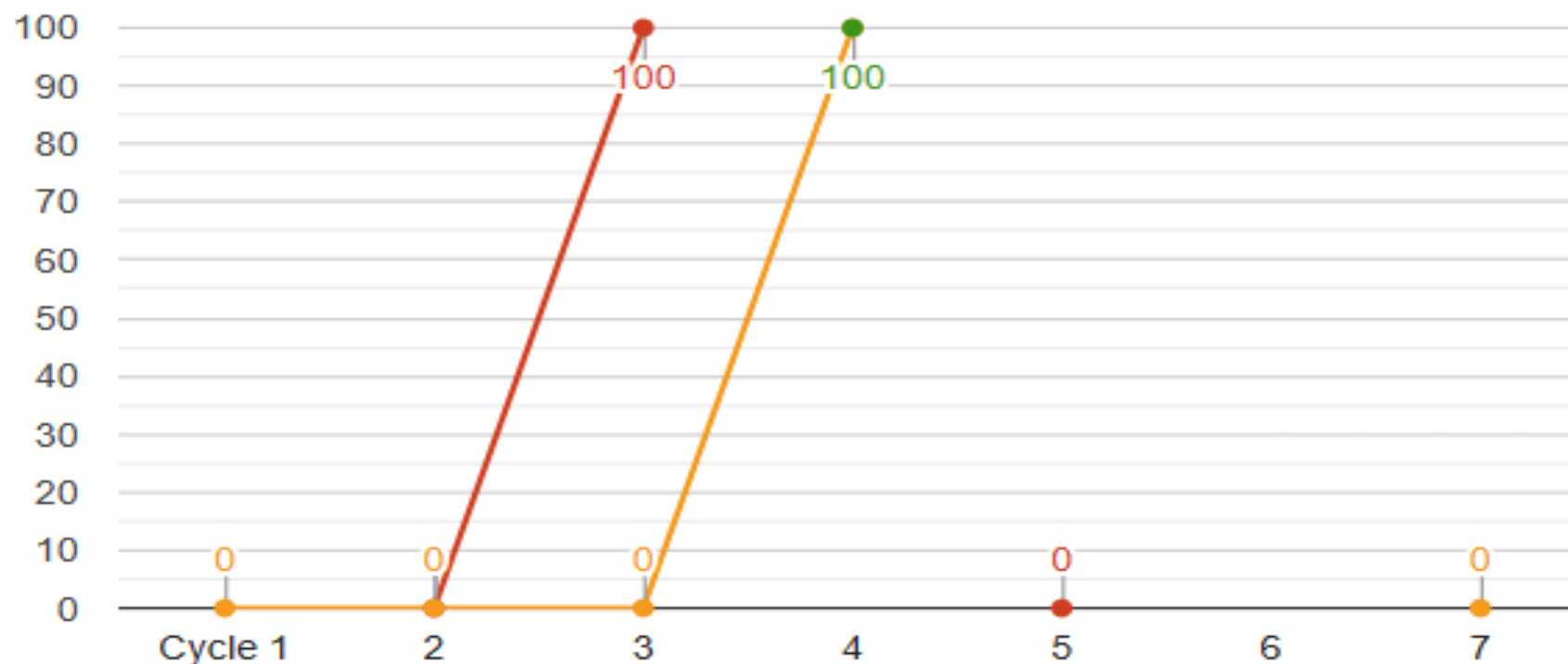
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MENCHAVEZ Pediatrics

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Blood Lead Results Interpretation (Follow Up Testing)



Sanchez Pediatrics

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University of Maryland Shore Medical Group-Pediatrics

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Greenspring Pediatric Associates

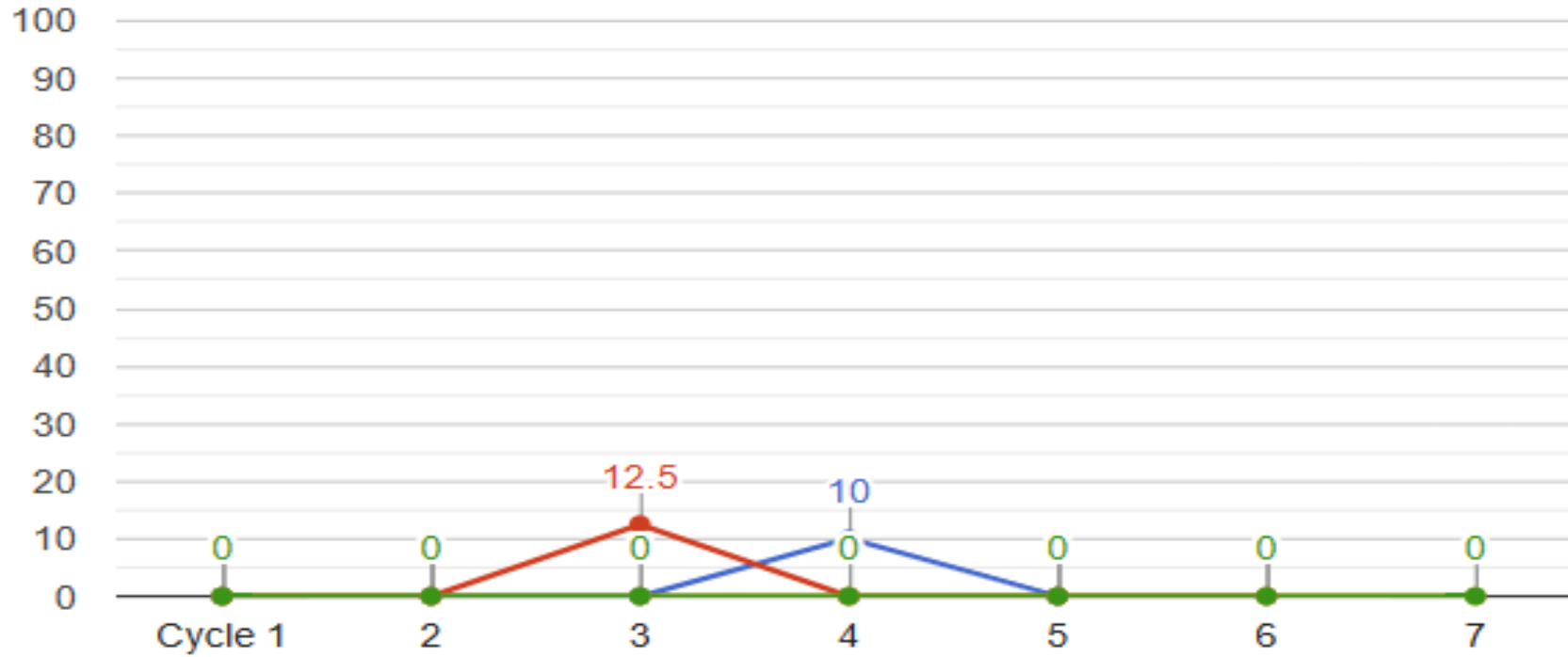
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MENCHAVEZ Pediatrics

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Care Management



Sanchez Pediatrics

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University of Maryland Shore Medical Group-Pediatrics

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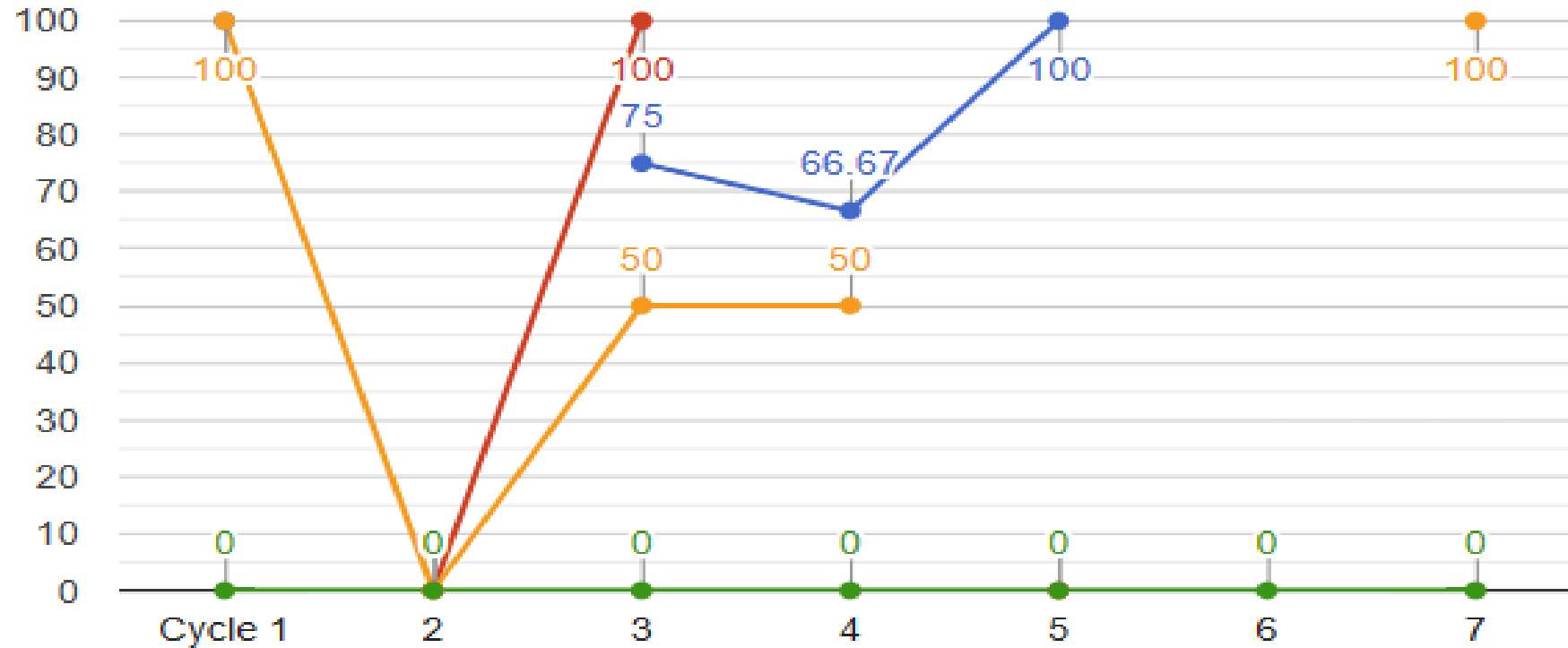
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 Cycle: 7 (N = 15)

MENCHAVEZ Pediatrics

Cycle 1 (N = 20)
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 Cycle: 4 (N = 15)
 Cycle: 5 (N = 15)
 Cycle: 6 (N = 16)
 Cycle: 7 (N = 17)



Counseling Parents



Sanchez Pediatrics

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University of Maryland Shore Medical Group-Pediatrics

Cycle 1 (N = 0)
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Greenspring Pediatric Associates

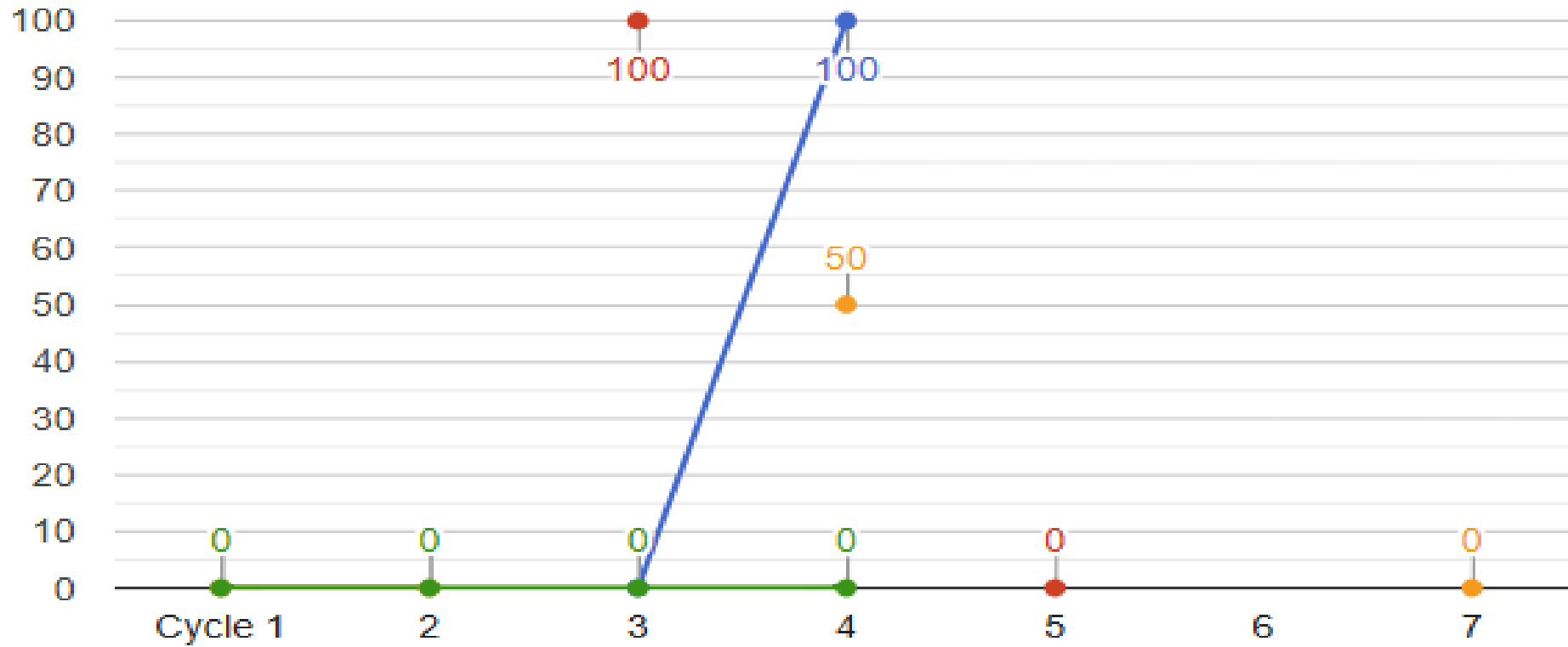
Cycle 1 (N = 1)
 Cycle: 2 (N = 1)
 Cycle: 3 (N = 2)
 Cycle: 4 (N = 2)
 Cycle: 5 (N = 0)
 Cycle: 6 (N = 0)
 Cycle: 7 (N = 1)

MENCHAVEZ Pediatrics

Cycle 1 (N = 2)
 Cycle: 2 (N = 2)
 Cycle: 3 (N = 1)
 Cycle: 4 (N = 4)
 Cycle: 5 (N = 2)
 Cycle: 6 (N = 2)
 Cycle: 7 (N = 1)



Referral to Academic programming



Sanchez Pediatrics

Cycle 1 (N = 0)
 Cycle: 2 (N = 0)
 Cycle: 3 (N = 1)
 Cycle: 4 (N = 3)
 Cycle: 5 (N = 0)
 Cycle: 6 (N = 0)
 Cycle: 7 (N = 0)

University of Maryland Shore Medical Group-Pediatrics

Cycle 1 (N = 0)
 Cycle: 2 (N = 0)
 Cycle: 3 (N = 1)
 Cycle: 4 (N = 0)
 Cycle: 5 (N = 1)
 Cycle: 6 (N = 0)
 Cycle: 7 (N = 0)

Greenspring Pediatric Associates

Cycle 1 (N = 1)
 Cycle: 2 (N = 1)
 Cycle: 3 (N = 0)
 Cycle: 4 (N = 2)
 Cycle: 5 (N = 0)
 Cycle: 6 (N = 0)
 Cycle: 7 (N = 1)

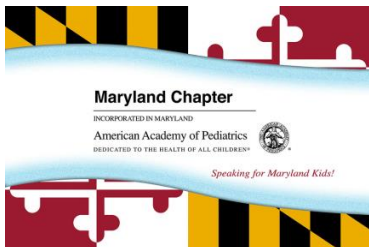
MENCHAVEZ Pediatrics

Cycle 1 (N = 2)
 Cycle: 2 (N = 2)
 Cycle: 3 (N = 1)
 Cycle: 4 (N = 4)
 Cycle: 5 (N = 0)
 Cycle: 6 (N = 0)
 Cycle: 7 (N = 0)

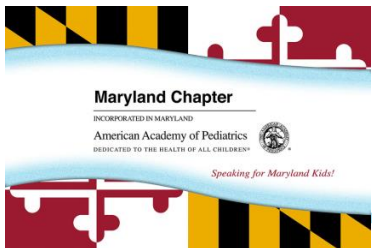


REFLECTIONS ON PDSAs

- Focus on practice changes/improvements
- Determine feasibility, acceptability, sustainability, “costs” etc of implementation
- PDSAs can be used: process, project, or study
- [Reed JE, Card AJ. The problem with Plan-Do-Study-Act Cycles. BMJ Qual Saf 2016; 25:147-152](#)

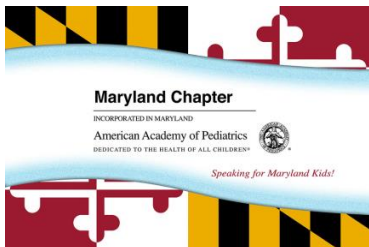


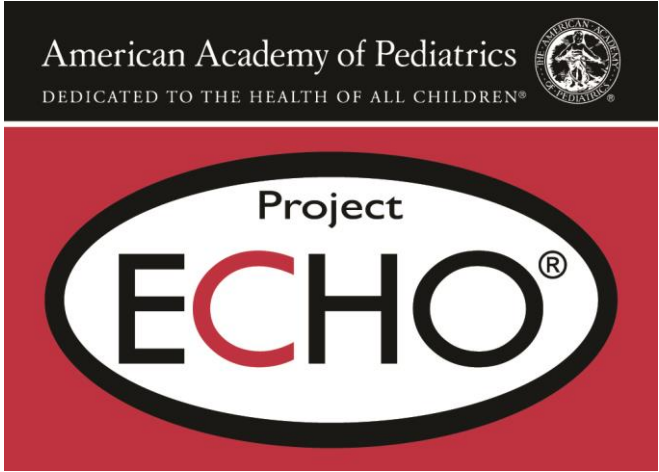
QUESTIONS?



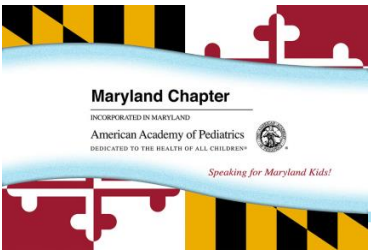
FOLLOW-UP AND NEXT STEPS

- You will receive a follow-up email from MDAAP with:
 - PPT slides from today and a recording of the session
 - Link to the post-session SurveyMonkey
- You will also be contacted by National AAP and MDAAP regarding:
 - Claiming CME and MOC credits
 - Retrospective survey on the Lead Testing ECHO program





**THANKS FOR BEING A PART
OF THIS ECHO!**



THANKS FOR TAKING CARE OF OUR MARYLAND KIDS!

