Congenital Cytomegalovirus: What Providers and Patients Need to Know

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The mission of the National CMV Foundation is to prevent pregnancy loss, childhood death, and disability due to congenital CMV.

Objectives

- Participant will list 3 ways pregnant persons can reduce their risk of contracting CMV.
- Participant will list 3 potential outcomes for children with a congenital CMV infection.
- Participant will list 3 interventions or support that may help children with a congenital CMV diagnosis.

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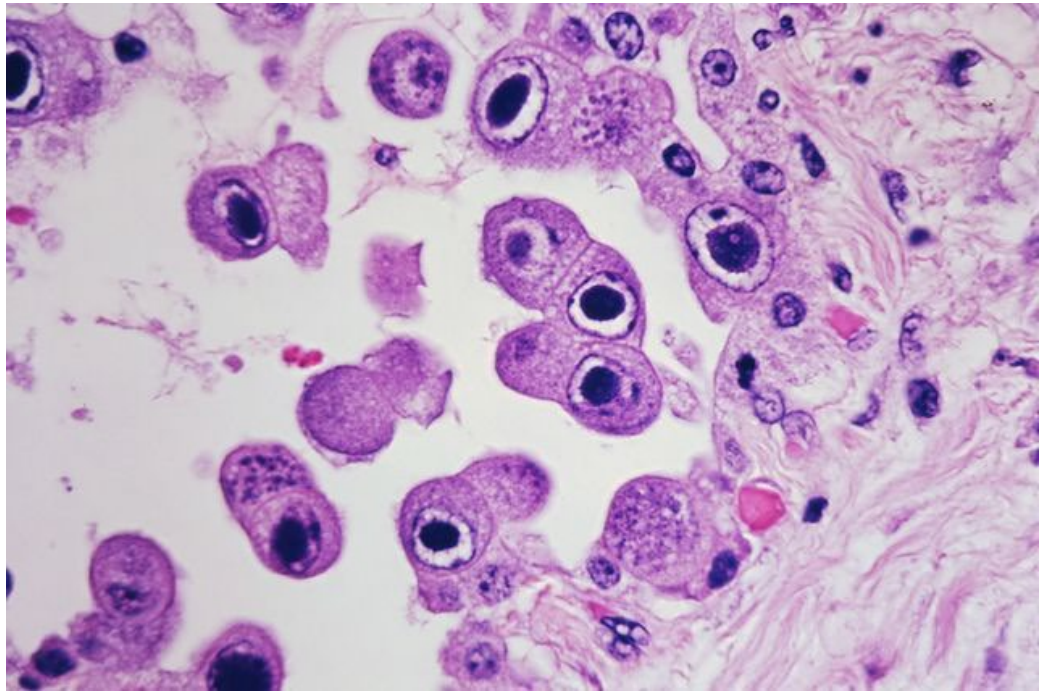
Cytomegalovirus (CMV)

- Double-stranded DNA virus
- Herpes family
- Most infections are “silent”
- Common
  - Most adults (50-80%) have been exposed by age 40
  - Up to 80% of healthy children are shedding the virus at any given time



Congenital Cytomegalovirus (cCMV)

- When an expectant mother catches CMV, the virus can cross the placenta and infect the developing baby
- When a baby is infected with CMV before birth it is called congenital CMV (cCMV)
- 1 in 200 infants is born with cCMV
- 1 in 5 of these infants will have a birth defect or permanent health condition
- CMV is the most common infectious cause of birth defects

Transmission

- Risk of transmission through casual contact is small
- Virus is mainly transmitted through urine and saliva (toddlers are “hot zones” for CMV)
- Virus can be transmitted from mother to baby during pregnancy. Most common cause is from child < 3 yrs
  - 1 out of 3 women who are infected during pregnancy will pass the virus to their developing baby

Ryder's Story

*Shared with permission

- Born July 2018
  - Passed hearing screen on 3rd try
  - Born with petechiae
  - Not tested for CMV
- At age 1
  - Hearing loss, white matter changes in brain
  - Neurologist requested blood spot be tested for CMV
- "We only got the CMV diagnosis because we pushed and pushed for a cause of the hearing loss"
- Missed out on possible antiviral treatment, follow-up hearing testing, and early intervention

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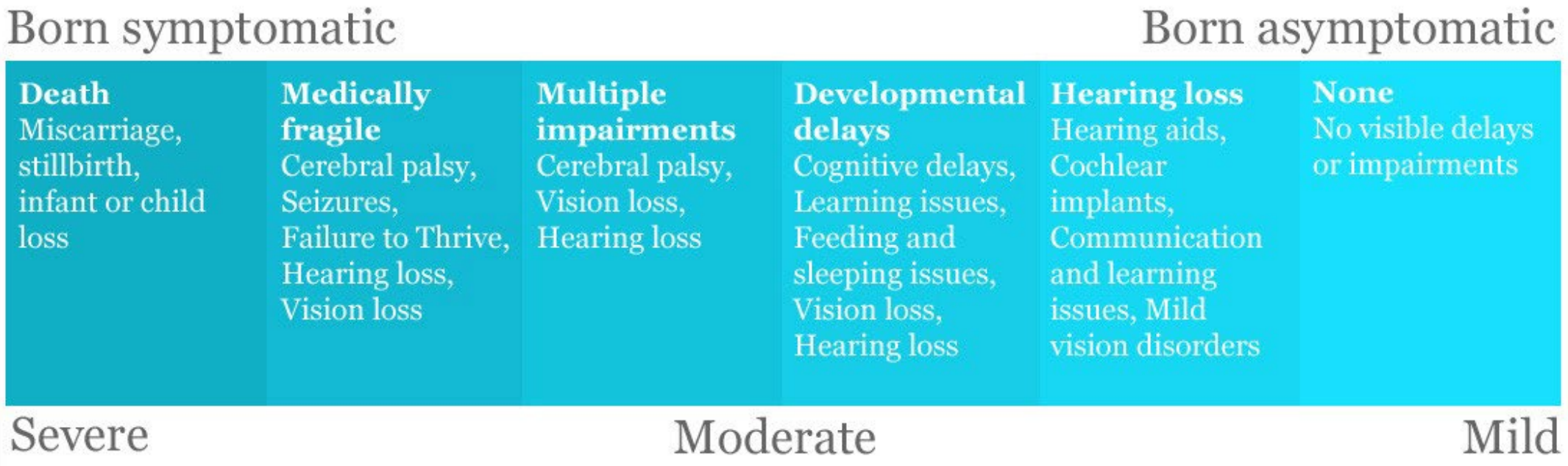
Impact

- 1 in 200 babies is born with cCMV- 20,000+ babies/year
- 90% are asymptomatic at birth
  - >90% of infants with symptomatic cCMV are not identified
- 1 out of every 5 babies born with the virus will have a permanent health condition (may show up months or years later)
  - 4,000+ birth defects or permanent health conditions per year
- Recent research indicates nearly half of children with asymptomatic cCMV have vestibular, gaze, or balance disorders
- Black and multi-racial infants are at increased risk for cCMV
- Hearing loss is the most common consequence of cCMV, with up to 25% of children with cCMV developing sensorineural hearing loss.

www.nationalcmv.org
Sorichetti, B. et al.
https://www.cdc.gov/cmv/index.html
Swetha, P. et al.
Fowler, KB, Ross, SA, et al.
Lanzieri, TM, et al.

Spectrum of Symptoms

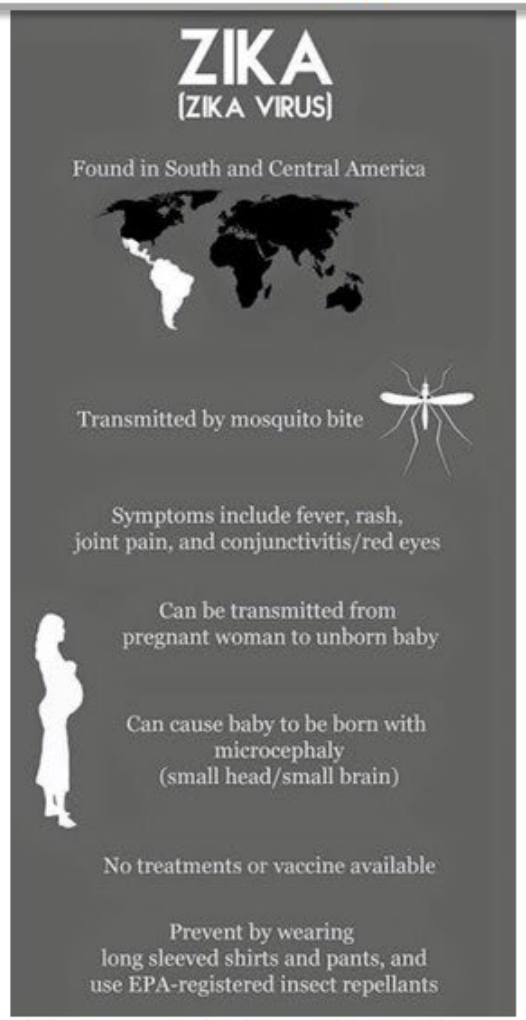


Economic Impact

- Estimated cost in 1990s (US): 1.9 billion annually
- Estimated average cost per affected child (US): $300,000 annually
- Privately insured children with recognized symptomatic cCMV had 4-year expenditures >20 times as great as other privately insured US children
- Costs can include medication, hospitalization, therapy, doctor visits, adaptive equipment, hearing aids, cochlear implants, surgery, special education, etc.

www.nationalcmv.org
Arvin, A. et al.
Grosse, S.

Viral causes of congenital health conditions



Liveborn infants with birth defects due to Zika = 203 (US & Territories) **TOTAL**
(MMWR (2018); 858-867)

Liveborn infants with birth defects due to CRS = 0.75/yr
(MMWR (2013) 62; 226-229)

Liveborn infants with birth defects due to cCMV = 8,000-10,000 (US) **EVERY YEAR**
(CDC)

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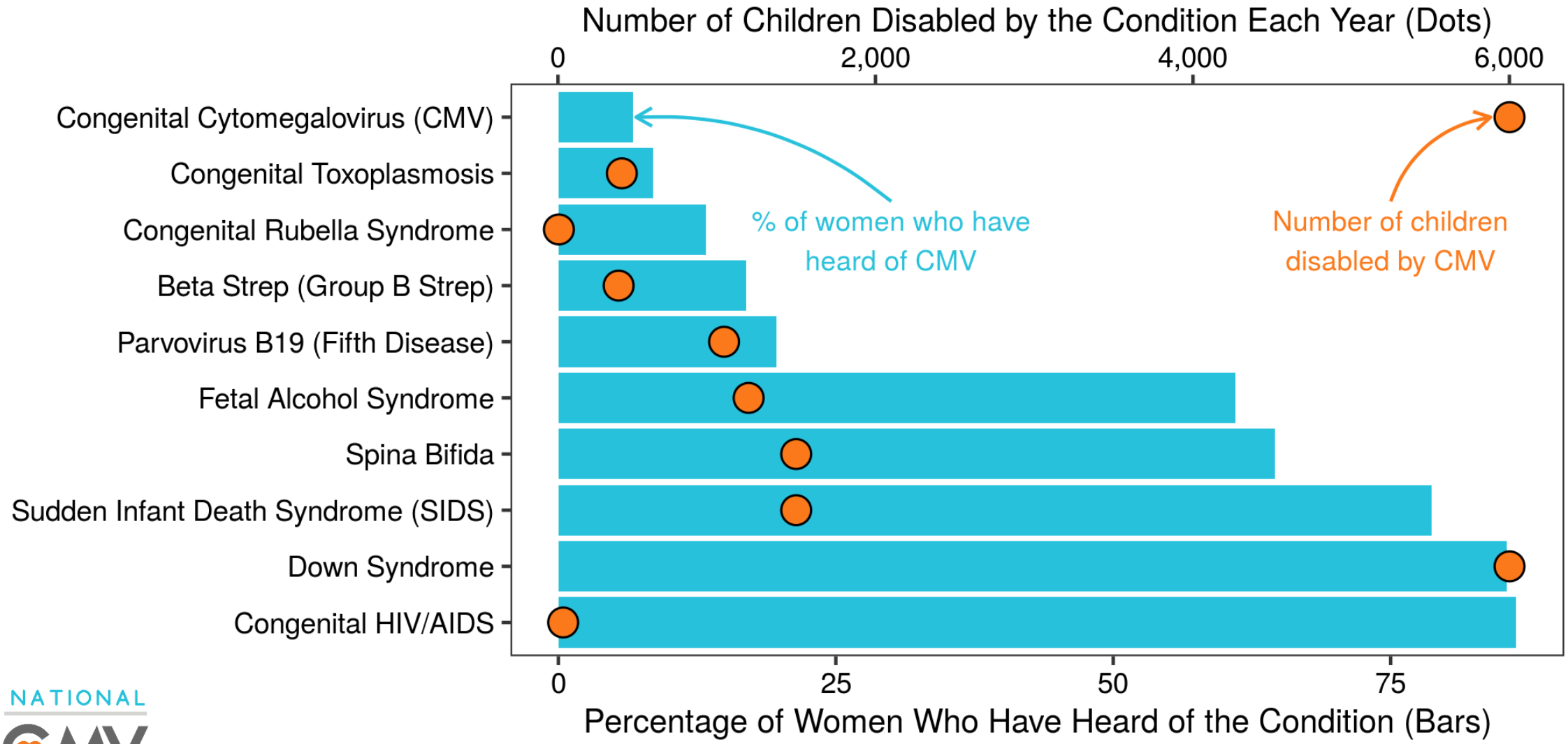
Awareness vs Incidence of Congenital Conditions



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Based on US data from Doutré SM *et al.* (2016) Losing Ground: Awareness of Congenital Cytomegalovirus in the United States. *Journal of Early Hearing Detection and Intervention* 1:39-48. Chart by Artful Analytics, LLC (@_sethdobson). For more information, visit nationalcmv.org.

“Silent Global Burden”

- Why is attention to CMV low?
  - Maternal and newborn infections are usually asymptomatic
  - Sequelae are usually delayed, and once visible testing for cCMV is not possible
  - False belief that congenitally infected children who are born to women with preexisting antibodies have normal outcomes
    - 2/3 of infants with congenital CMV are born to mothers who were seropositive before conception

Manicklal, S, Emery, V., et al

Prevention

- Per the CDC, pregnant women may be able to lessen their risk of acquiring CMV during pregnancy
- Prevention has been hindered by the sense that CMV is “unavoidable,” or will add to a pregnant person’s stress level
- There have been several studies indicating that hygienic measures can reduce seroconversion during pregnancy, with no adverse affects noted
- A few states have laws mandating pregnant women be provided CMV prevention materials
- 2015 ACOG Practice Bulletin called prevention measures “impractical or burdensome”
- Prenatal education is recommended by RANZCOG (March 2019) and SOGC, SOGC gave prevention evidence a “high” rating

https://www.cdc.gov/cmv/index.html
Adler, S. et al.
ACOG Practice Bulletin Number 151, June 2015
https://www.cdc.gov/cmv/index.html

5 Simple Tips to Help Prevent CMV

Avoid contact with saliva when kissing a child

Do not put a pacifier in your mouth

Do not share food, utensils, drinks or straws

Do not share a toothbrush

Wash your hands after changing a diaper

Should You Exclude/Avoid a Child with cCMV?

- 95% of children born with CMV are not diagnosed. Additionally, 1 in 3 children will be infected by age 5.
- "Since not all children undergo CMV testing and most with CMV show no signs of this infection, workers and staff must follow these precautions for **all** children. These precautions should also apply to daycare workers or staff who work in schools and who are in contact with young children."
- "Adults are at a much higher risk of acquiring CMV from children living in the same household than from an occupational exposure."

  -AAO-HNS Position Statement
- The CDC and AAP do not recommend treating children with cCMV any differently than other children. Asymptomatic shedding is common in people of all ages. Standard precautions should be used.

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https://www.health.state.mn.us/diseases/cytomegalovirus/providerfs.pdf
https://www.entnet.org/resource/care-of-children-infected-with-cytomegalovirus/
https://www.vumc.org/health-wellness/news-resource-articles/cmv-exposure-pregnancy
2024 AAP Red Book

Vaccine Development

- Vaccines have been in development for over 30 years
- Institute of Medicine gave development of a vaccine “highest priority” rating
- Most cost-effective vaccine in development (pre-COVID)
- Moderna’s Phase 3 trial has completed recruitment

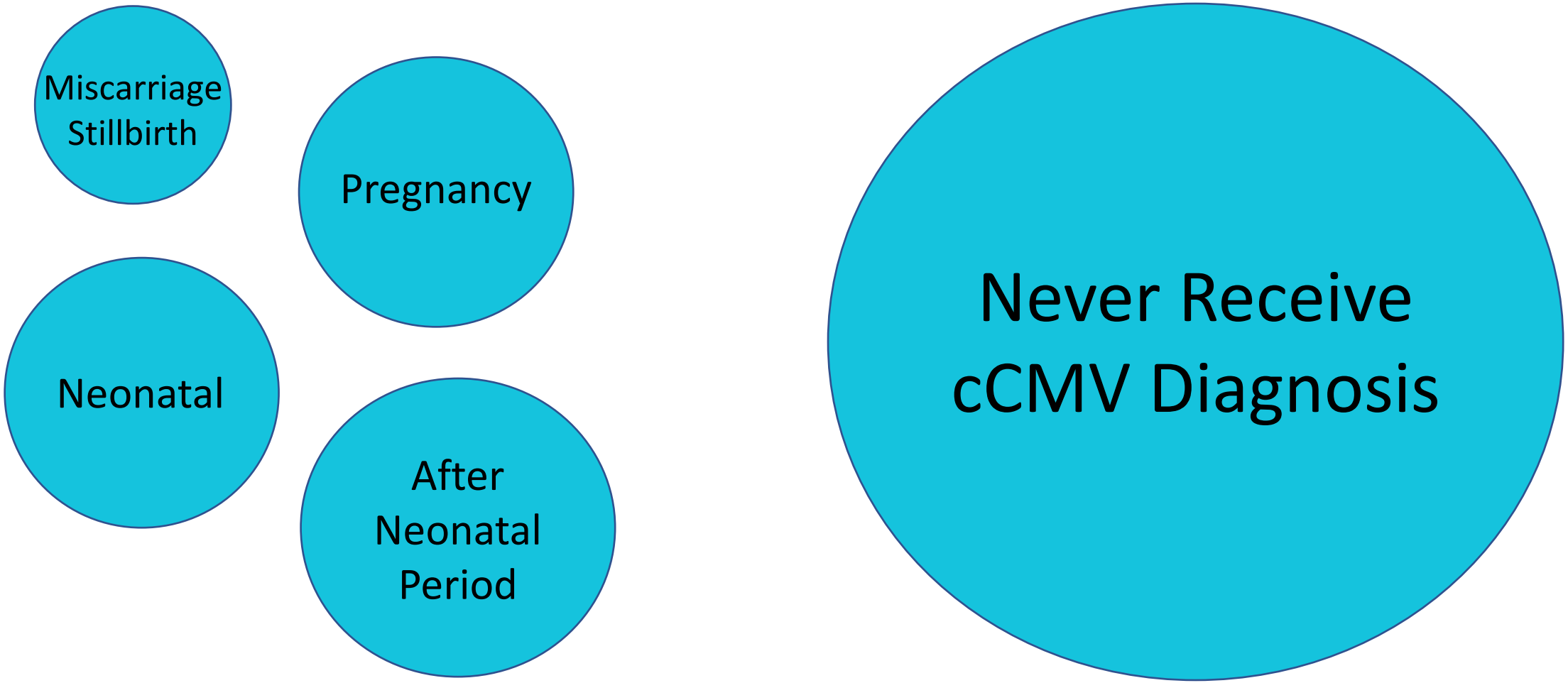
www.nationalcmv.org
Arvin, A. et al.
https://trials.modernatx.com/study/?id=mRNA-1647-P301

Treatment

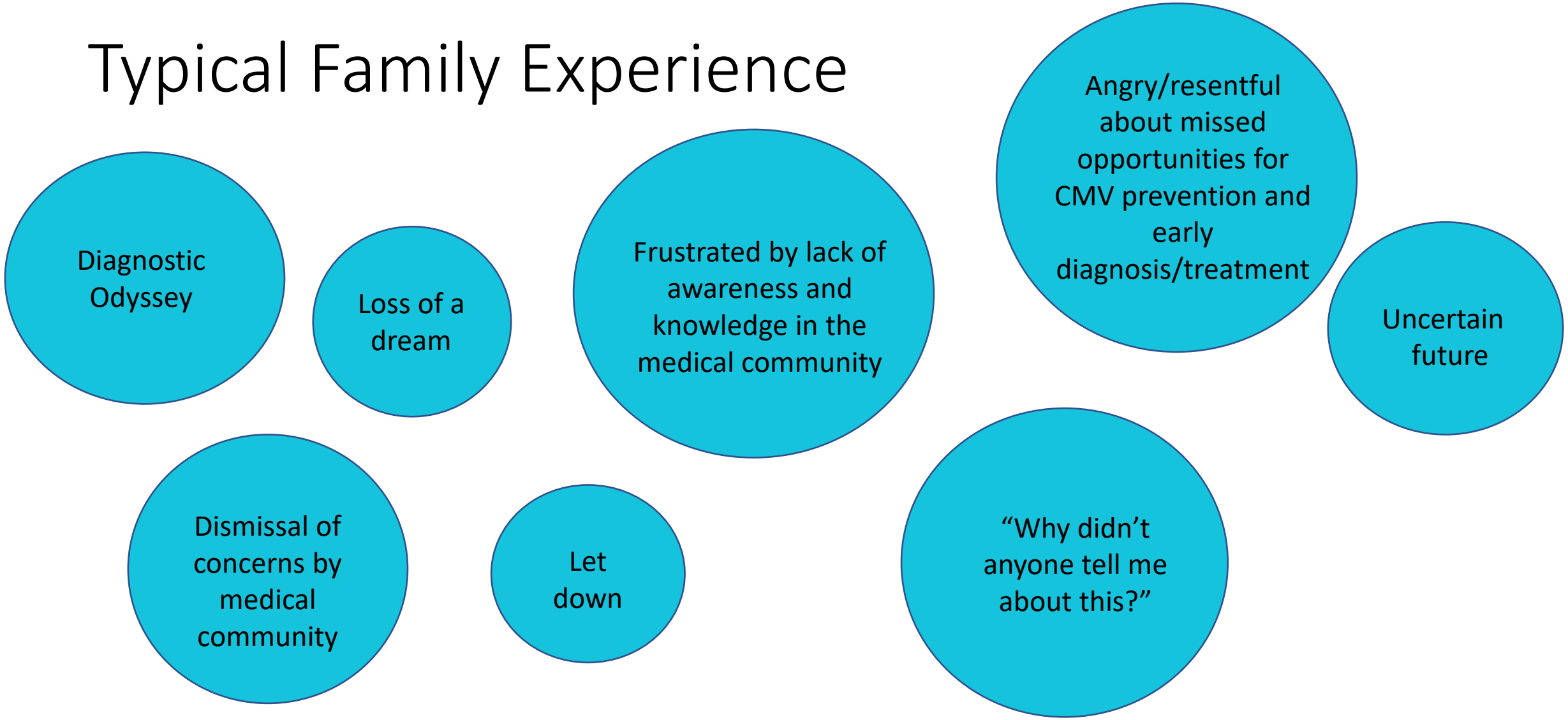
- Pregnancy- no standard treatment
  - Cytogam- IV immunoglobulin
  - Oral Valaciclovir
- After birth (note: babies will not receive treatment if they are not diagnosed)
  - Infants need regular follow up: hearing, vision, development, etc.
    - Automatic qualifier for Early Intervention in many states
  - Symptomatic infants who receive antiviral therapy had improved outcomes
    - 6-month oral therapy regimen
    - Need to be monitored by infectious disease specialist
    - Need frequent blood work

Shahar-Nissan, K, Pardo, J, et al.
Kimberlin, D, et al
www.nationalcmv.org

Typical Family Experience-Diagnosis



Typical Family Experience



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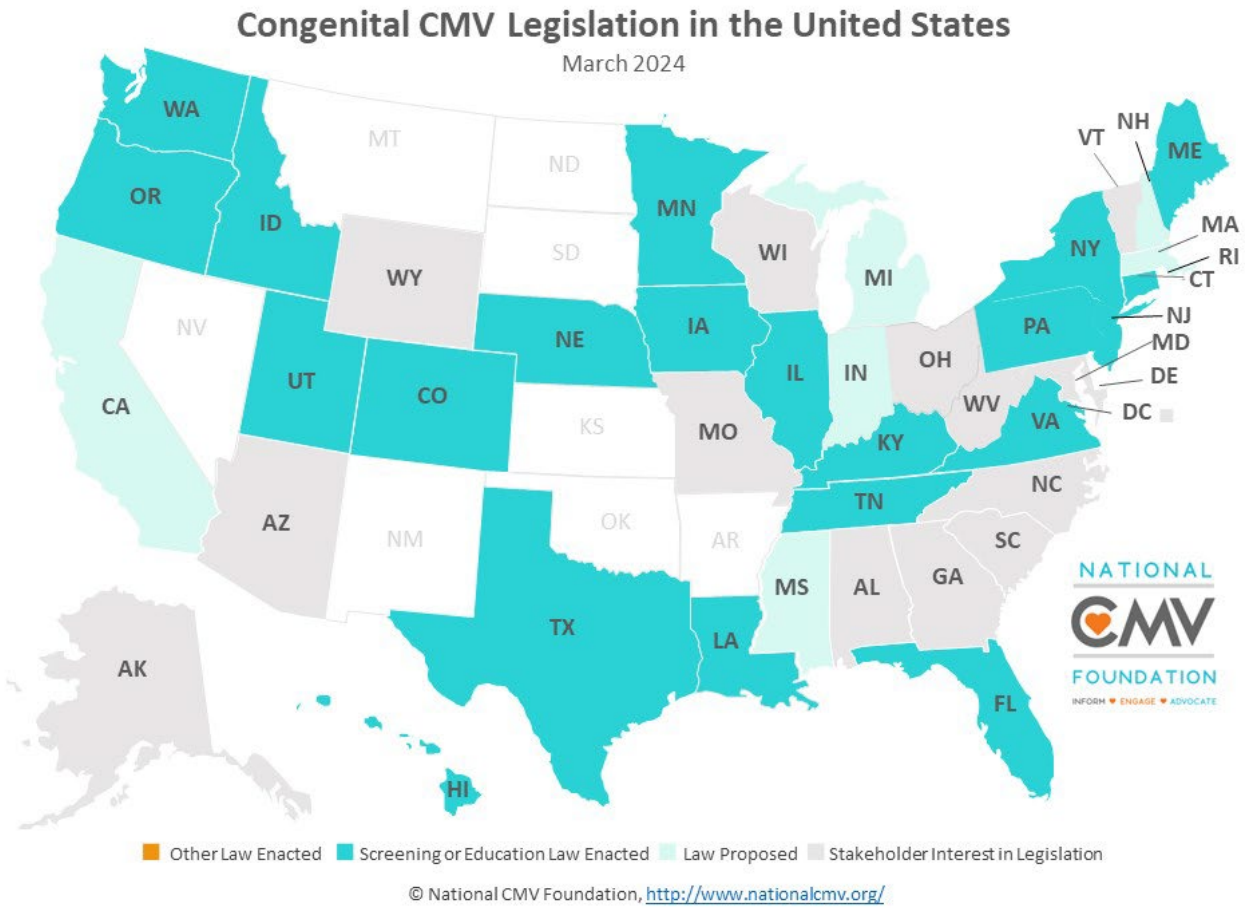
Vandrevala et. al
Zappas, MP. et al

Current Status of cCMV Screening

- Early identification allows for evaluation, treatment, and monitoring
- Most infants (>95%) with cCMV are not identified
- Several states have mandated “targeted screening” where infants are screened for CMV if they fail newborn hearing test
- Minnesota is the first state to screen all babies at birth. NY completed a 1 year screening pilot. CT will begin screening all babies in 2025.
- RUSP (Recommended Uniform Screening Panel) nomination
- More common than the 29 combined metabolic and endocrine disorders on the RUSP
- Research has indicated parents are supportive of CMV screening even if their children never develop symptoms



www.nationalcmv.org
Manicklal, S. et al.
Sorichetti, B. et al.
Grosse, S. et al.
Cannon, MJ. et al.

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Testing Modalities

	URINE	SALIVA	DRIED BLOOD SPOT
			
SENSITIVITY	99%	99%	75%
EASE OF COLLECTION	Difficult	Easy	Easy
TIMING	<21 days	<21 days	Anytime
OTHER	Send out lab	Breastmilk false positives	Not stored by all states

www.nationalcmv.org
Dollard, S. et. al.
Prepared by Megan Pesch, MD

What Can Providers Do?

- Ensure all pregnant women or women planning a pregnancy are give information about congenital CMV
- Consideration should be given to universal and “targeted” screening programs
- Provide resources for families diagnosed with cCMV:
  - Early Access
  - Audiology
  - Infectious Disease
  - Ophthalmology
  - Neurology
- Be familiar with state laws and hospital policies related to CMV newborn screening

CONGENITAL CMV:
SUPPORT AND NEXT STEPS

WHAT IS CYTOMEGALOVIRUS (CMV)?

Cytomegalovirus (CMV) is a common virus that infects people of all ages and is not harmful for most people. CMV spreads from person to person through body fluids, including saliva, urine, and blood. It is prevalent in the saliva of toddlers. Many people catch CMV as toddlers, and about 3 out of 4 adults have had CMV by age 40. Most of us will never even know we have had CMV.

WHAT IS CONGENITAL CMV (cCMV)?

Sometimes a pregnant woman will pass CMV to her baby. When a baby is born with CMV, it is called congenital CMV (cCMV).

- 1 out of every 200 babies are born with cCMV
- About 1 out of 4 babies born with cCMV will have hearing loss at birth or develop hearing loss during the first few years of life
- Some babies born with cCMV will have other challenges besides hearing loss, including vision loss or developmental delays

WHAT HAPPENS AFTER YOUR CHILD RECEIVES A DIAGNOSIS OF cCMV?

If your baby's CMV test is positive, your pediatrician will talk with you about whether your baby needs additional testing or medication. Your baby may need to see other specialists to get the best treatment for cCMV.

IF YOUR BABY IS DIAGNOSED WITH cCMV, WHERE CAN YOU FIND SUPPORT?

The National CMV Foundation may be able to help your family in several ways. The Foundation can help with:

- Learning more abut cCMV and the wide range of effects it may have on your child's development
- Connecting you with appropriate state specific CMV support
- Connecting you with other families experiencing a cCMV diagnosis
- Assisting you with finding providers in your state/region familiar with CMV

"A diagnosis changes a lot of things. But don't ever let that define your life, and most importantly, your child's. There is love and life within and after a diagnosis. Fourteen years later, and my daughter Avalee continues to show me this every single day."
Ashley, parent

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Rawlinson, W, Boppana, S, et al.
www.nationalcmv.org

Educational Material

- National CMV Foundation provides educational materials on our website
- Materials can be printed and distributed
- Work with groups on co-branding
- https://www.nationalcmv.org/resources/educational-downloads

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Questions?

- For more information please visit:
  - https://www.nationalcmv.org/
  - http://www.cdc.gov/cmv/index.html

- Email
  - amanda.devereaux@nationalcmv.org

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