

# Pediatric Clinical Support: Congenital Cytomegalovirus (CMV)

Cytomegalovirus (CMV), a member of the herpes virus family, is a common virus that usually affects most people by the time they are 40 years of age. Twenty percent of children in the United States will have contracted CMV by puberty. Most people don't realize they are carrying CMV, as it tends to stay dormant, and the virus rarely exhibits symptoms. CMV is problematic, however, in individuals who are immunocompromised and those who are pregnant. This paper will focus primarily on congenital CMV, which is currently the most common intrauterine infection in the US (Dahle, et al, 2000).

**Characterized by:** Most infants are asymptomatic at birth, although a small percentage (5 to 10%) show signs of CMV, such as microcephaly, jaundice, retinitis, and neurological deficits (see Figure 1). Sequelae that may develop later in infancy are usually more severe in symptomatic babies, the most common being sensorineural hearing loss.

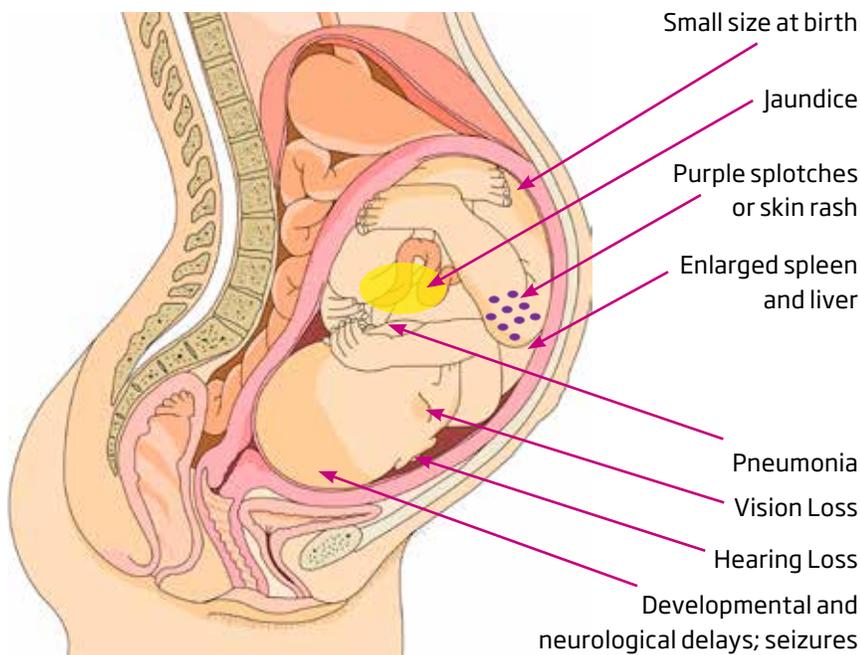
**Incidence rate:** Approximately 0.5 to 1.0% of newborns are infected at or before birth (see Figure 2).

CMV can be spread through secretions such as saliva, breast milk, blood, urine, and genital secretions. Sometimes it can be spread by blood transfusion or organ transplantation.

**Diagnosis:** Detected in saliva or urine within the first 2 weeks of life.

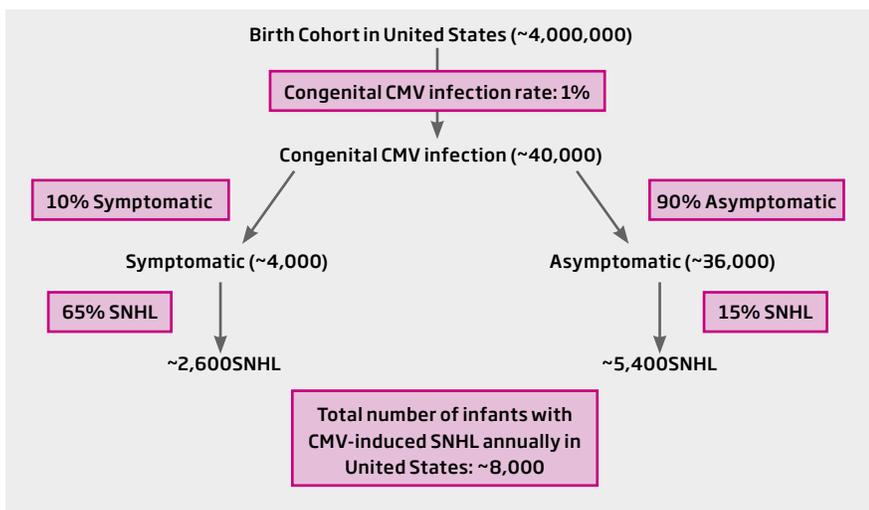
**Differential Diagnosis:** TORCH, Guillain-Barre syndrome, mononucleosis, Epstein-Barr syndrome, HIV, viral Hepatitis, toxoplasmosis.

**Prevention:** Good oral hygiene (especially in pregnant women); hand washing with soap and water following contact with diapers, oral secretions, or young children in day care.



**Figure 1.** Congenital CMV symptoms that may be apparent at birth.

**Figure 2.** Percentage of infants who will acquire SNHL secondary to CMV-infection annually in the US. (From: Schleiss & Choo, 2006)



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**SNHL in CMV:** CMV is the leading cause of SNHL in children, accounting for 1/3 of SNHL in young children. Approximately half of the cases of hearing loss due to congenital CMV infection are late-onset and/or progressive and, therefore, will not be detected at birth through newborn hearing screening (Fowler *et al.*, 1999). The mechanism by which CMV causes hearing loss in some children and not others is not fully understood. Although most children with congenital CMV do not develop hearing loss, of those who do, the severity, configuration, and fluctuation of the loss is not defined.

Ten to 15% of all CMV-infected children will be diagnosed with hearing loss, in which 50% will have progressive or fluctuating loss. Thirty to 50% of symptomatic children are likely to develop sensorineural hearing loss whereas only eight to 12% of asymptomatic children would (Fowler & Boppana, 2006).

**Treatment:** Hearing evaluations to determine severity, and if the loss is unilateral or bilateral. Testing should occur every six months, or more often if fluctuations or progressive loss is noted. Hearing aids with a large range of gain are beneficial in the event of fluctuating or progressive hearing loss. Cochlear implants are an option if the hearing loss becomes profound. FM systems or other hearing assistive technology should be considered when in complex listening environments, such as a classroom.

**Professional Considerations:** Parents, most likely, have not heard of CMV. Provide basic information, but encourage parents to ask questions. The possibility of hearing loss or progression of hearing loss in the child should be discussed and hearing testing should occur as often as needed to ensure appropriate amplification. A close relationship with the child's pediatrician and/or ENT will enable parents to be up to date on the latest CMV research. Speech-language pathologists and audiologists may interact with the child and assist in different aspects of habilitation, including speech/language therapy, use of hearing aid/cochlear implant and FM use.

**Educational Considerations:** The presence of hearing loss as well as any other symptoms of CMV (eg., vision loss or developmental delay) should be indicated and addressed in the child's IEP. This includes allowing access to information, and effective strategies and approaches that will aid the child in his/her school activities. Use of FM, alone or in conjunction with hearing aids, will allow an improvement of SNR in complex listening environments. Preferential seating in the classroom is also recommended.

## Support and Other Online Sources:

<http://www.mdjunction.com/cytomegalovirus>

<http://www.bcm.edu/pediatrics/cmvregistry/p2p.cfm>

<http://www.congenitalcmv.org/parentinfo.htm>

<http://congenitalcmv.blogspot.com/2008/04/help-protect-babies-from-cmv.html>

<http://www.stopcmv.org/>

<http://www.mayoclinic.com/health/cmv/DS00938/DSECTION=symptoms>

<http://www.cdc.gov/cmv/index.html>

[http://kidshealth.org/parent/infections/bacterial\\_viral/cytomegalovirus.html](http://kidshealth.org/parent/infections/bacterial_viral/cytomegalovirus.html)

## References:

Cannon, M.J. (2009). Congenital cytomegalovirus (CMV) epidemiology and awareness. *Journal of Clinical Virology*, 46(Suppl 4): S6-S10.

Dahle, A.J., Fowley, K.B., Wright, J.R., Boppana, S.B., Britt, W.J., Pass, R.F. (2000). Longitudinal investigation of hearing disorders in children with congenital cytomegalovirus. *Journal of the American Academy of Audiology*, 11: 283-290.

Fowler, K.B., & Boppana, C.B. (2006). Congenital cytomegalovirus (CMV) infection and hearing deficit. *Journal of Clinical Virology*, 35(2): 226-231.

Fowler, K. B., Dahle, A. J., Boppana, S. B., & Pass, R. F. (1999). Newborn hearing screening: will children with hearing loss due to congenital cytomegalovirus infection be missed? *Journal of Pediatrics*, 135, 60-4.

Taylor, G.H. (2003). Cytomegalovirus. *American Family Physician*, 67(3): 519-524.

Ross, D.S. & Fowler, K.B. (2008). Cytomegalovirus: A Major Cause of Hearing Loss in Children. *The ASHA Leader*. <http://www.asha.org/Publications/leader/2008/080506/f080506b/>

Schleiss, M.R., & Choo, D.I. (2006). Mechanisms of congenital cytomegalovirus-induced deafness. *Drug Discovery Today: Disease Mechanisms*, 3(1): 105-113.