Clinical Guideline Name	Cytomegalovirus (CMV) Screening Protocol
Effective Date	January 2017
Approved By	Department of Pediatric Newborn Medicine Clinical Practice Council **12/8/16** CWN PPG **12/14/16** BWH SPP Steering **12/21/16** Nurse Executive Board/CNO **1/25/17**

I. Purpose

To provide a standard protocol for cytomegalovirus (CMV) screening of the full term infant.

II. Background

- Congenital CMV infection is the most common intrauterine infection in the U.S. (1-2% of births)
- Primary maternal infections transmits CMV 30% of time
- Asymptomatic: 85%-90% of infants do not have clinical findings at birth
- Symptomatic: 10-15% of infants have clinical findings. These include:

• Hearing loss	• Jaundice
• Developmental delay	• IUGR
• Cerebral Palsy	• Microcephaly
• vision loss	• Thrombocytopenia

- Congenital CMV is the most common nonhereditary cause of sensorineural hearing loss in children
- It is important to test for CMV with urine, saliva or blood within the 1st 2-3 weeks of life to be able to differentiate prenatally from postnatally acquired CMV
- Early treatment improves sensorineural hearing loss outcomes

III. Criteria for Implementation of CMV Screening

- Any healthy newborn who does not pass hearing screen in one or both ears
- Any baby with the signs of CMV infection per clinician's judgment: including SGA, mother with CM, IUGR, microcephaly, petechiae, hepatomegaly, neurologic abnormalities.

IV. Procedure for CMV screening

- Urine and saliva from infected infants contain high CMV viral loads and are both excellent testing specimens. ***Either*** ***(not both)*** urine or saliva may be ordered and collected to test for CMV.
- The collection of the saliva specimen should be with a MacroPur swab P. This swab should be collected between cheek and lower gum, prefeed, it should be saturated with saliva. The swab should then be placed in the Remel MicroTest M4RT Transport viral medium tube. The swabs and culture tubes are stocked together by material management. (see appendix A)
- If urine is collected it should be placed in a urine cup and sent to the lab.

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In the event that a baby fails the final hearing screen:

- The audiology technician will notify the nurse who will then notify the attending pediatrician or Neonatologist.
- The attending will discuss failure with parents and will then place order for saliva or urine to be sent for shell vial and culture. These results will be forwarded to primary pediatrician or neonatologist and the BWH attending.
- The BWH Hearing Screening Program will arrange outpatient audiology appointment for parents and will fax results to outpatient audiologist.

In the event that BWH attending identifies a sign or symptom from the list above in section II:

If in the Well Baby Nursery:

- Notify nurse, parents and send saliva for CMV screening shell vial and culture
- The results will be followed up by the attending pediatrician or by the well baby nursery pediatrician in which case the well baby nursery administrative assistant will fax results to the baby's PCP.
- The results will be followed by the BWH Faculty Newborn Administrative Assistant who will forward to primary pediatrician and attending.

If CMV sent from the NICU:

- The neonatologist will insure that the results will be followed, and will notify the PMD
- If CMV+, regardless of hearing screen results, baby will require full audiology evaluation and audiology technician can assist with this.

V. In case of a positive CMV culture or shell vial

- If the baby is still hospitalized at BWH- Patient is to be referred to Infectious disease, and a consult is to be obtained.
- Baby and Mother should be placed on standard contact precautions as per BWH hospital policy see appendix B
- Consider obtaining head u/s, CBC and LFTs in consultation with ID -Dr Sandra Burchett- Children's Hospital 617-355-6832
- If patient is out patient other ID: Mass General Hospital: Contact Chadi (Chadi) M. El Saleeby, MD 617-724-8990

References

Adler, S. P. (2011). Screening for cytomegalovirus during pregnancy. *Infectious Diseases in Obstetrics and Gynecology, 2011*, 1-9. doi:10.1155/2011/942937 [doi]

Barkai, G., Ari-Even Roth, D., Barzilai, A., Tepperberg-Oikawa, M., Mendelson, E., Hildesheimer,M.,

& Kuint, J. (2014). Universal neonatal cytomegalovirus screening using saliva - report of clinical experience. *Journal of Clinical Virology : The Official Publication of the Pan American Society for Clinical Virology, 60*(4), 361-366. doi:10.1016/j.jcv.2014.04.024 [doi]

de Vries, J. J., Vossen, A. C., & Kroes, A. C. (2010). Screening newborns for congenital cytomegalovirus infection. *Jama, 304*(4), 407; author reply 408. doi:10.1001/jama.2010.1023 [doi]

de Vries, J. J., Vossen, A. C., Kroes, A. C., & van der Zeijst, B. A. (2011). Implementing neonatal screening for congenital cytomegalovirus: Addressing the deafness of policy makers. *Reviews in Medical Virology, 21*(1), 54-61. doi:10.1002/rmv.679 [doi]

Din, E. S., Brown, C. J., Grosse, S. D., Wang, C., Bialek, S. R., Ross, D. S., & Cannon, M. J. (2011). Attitudes toward newborn screening for cytomegalovirus infection. *Pediatrics, 128*(6), e1434-42. doi:10.1542/peds.2011-1444 [doi]

Dollard, S. C., Schleiss, M. R., & Grosse, S. D. (2010). Public health and laboratory considerations regarding newborn screening for congenital cytomegalovirus. *Journal of Inherited Metabolic Disease, 33*(Suppl 2), S249-54. doi:10.1007/s10545-010-9125-3 [doi]

Kadambari, S., Williams, E. J., Luck, S., Griffiths, P. D., & Sharland, M. (2011). Evidence based management guidelines for the detection and treatment of congenital CMV. *Early Human Development, 87*(11), 723-728. doi:10.1016/j.earlhumdev.2011.08.021 [doi]

McMullan, B. J., Palasanthiran, P., Jones, C. A., Hall, B. M., Robertson, P. W., Howard, J., & Rawlinson, W. D. (2011). Congenital cytomegalovirus--time to diagnosis, management and clinical sequelae in australia: Opportunities for earlier identification. *The Medical Journal of Australia, 194*(12), 625-629. doi:mcm10834_fm [pii]

Plosa, E. J., Esbenshade, J. C., Fuller, M. P., & Weitkamp, J. H. (2012). Cytomegalovirus infection. *Pediatrics in Review, 33*(4), 156-63; quiz 163. doi:10.1542/pir.33-4-156 [doi]

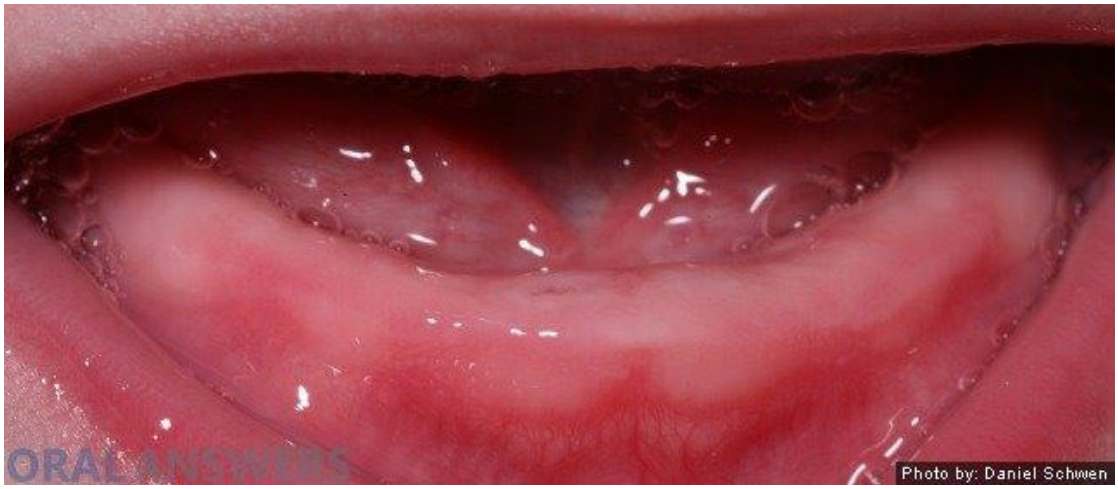
Soper, D. E. (2013). Congenital cytomegalovirus infection: An obstetrician's point of view. *Clinical Infectious Diseases : An Official Publication of the Infectious Diseases Society of America, 57 Suppl 4*, S171-3. doi:10.1093/cid/cit611 [doi]

Waters, A., Jennings, K., Fitzpatrick, E., Coughlan, S., Molloy, E. J., De Gascun, C. F., . . . Knowles, S. J. (2014). Incidence of congenital cytomegalovirus infection in ireland: Implications for screening and diagnosis. *Journal of Clinical Virology : The Official Publication of the Pan American Society for Clinical Virology, 59*(3), 156-160. doi:10.1016/j.jcv.2013.12.007 [doi]

Appendix A

Use this culture tube. This is posted in both nurseries.

To obtain a good sample, try to get the swab soaking wet from between cheek and lower gum. This is NOT a buccal swab!



Soak swab in saliva in the right side between gum and check in this picture—LOTS of saliva!

Sample should not be obtained immediately after feeding.

Appendix B

CYTOMEGALOVIRUS INFECTION
DISEASE ALIAS
CMV

Type of precautions	Standard Precautions = No special precautions required
Private room?	Not required
Hand hygiene	Disinfect with Purell. Hands must be disinfected **before** and **after** providing care that involves touching the patient, and after removing gloves, gowns, or respiratory protection devices, or touching contaminated items or surfaces.
Personal protective equipment	**Gloves** Clean, non-sterile gloves must be worn when touching blood, body fluids, secretions, excretions, and contaminated medical equipment. Remove gloves promptly after use, before touching clean items or surfaces or providing care for another patient. Disinfect hands immediately to avoid transmission of organisms to other patients. **Gowns** Clean, non-sterile gowns must be worn to protect skin and to prevent soiling of clothing during activities that may generate splashes or sprays of blood, body fluids, secretions, or excretions. Remove a soiled gown as promptly as possible and disinfect hands to avoid transfer of organisms to other patients. **Mask, Eye Protection, Face Shield** A mask in combination with eye protection (goggles), or a face shield is worn to protect mucous membranes of the eyes, nose, and mouth during activities that may generate splashes or sprays of blood, body fluids, secretions, or excretions.
Patient care equipment	Reusable patient care equipment must be disinfected with a hospital-approved disinfectant (e.g., Asepti-Wipes) before use on another patient.
Comments	Rarely transmitted in hospitals. Good hand hygiene is necessary before and after patient contact.