

STRONG CHILDREN'S RESEARCH CENTER

Summer 2013 Research Scholar

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ABSTRACT

Title: Respiratory Pathogens in Premature and Term Newborns Determined by TaqMan Low Density Array Cards (TAC)

Background: The Respiratory Pathogens Research Center (RPRC) study is a large ongoing NIH-sponsored prospective research study of 150 premature and 100 full-term infants from birth through 3 years of age. Immune development, gut and respiratory microbiome, and respiratory pathogens and symptoms are examined, with a long-term goal of investigating and analyzing immune development, microbiome, and breathing outcomes. We utilized newly designed and validated TAC cards as one portion of this larger study.

Objective: The objectives of this study were to:

1. Validate and test for specificity of the TAC cards, as well as test and confirm controls.
2. Test respiratory specimens from the RPRC study by TAC.

Methods: TAC technology utilizes simultaneous, singleplex, reverse transcription real-time PCR (RT-qPCR) in a 384-well microfluidic card format for testing clinical specimens. Initially, new TAC cards were designed, tested, and validated to confirm specificity and positivity using control samples. Standard PCR assays were used to confirm the controls and used as a back-up method of verifying positive results. Following initial validation testing, nose/throat specimens (flocked swabs) were processed, extracted, and tested on the cards. Additionally, I participated in enrollment and follow-up study visits, obtaining nose/throat swabs from the enrolled infants.

Results: Eighty-eight nose/throat samples from 29 enrolled subjects were tested by TAC for the presence of 23 respiratory pathogens. Eighty-six samples were obtained during routine visits and two were obtained at the time of respiratory symptoms. All samples were from infants ≤ 48 weeks post-menstrual age from March 2013 to July 2013. Of these samples, 52 were from premature infants and 36 were from full-term infants.

	# of Subjects	# of Samples	<i>U. urealyticum</i> / <i>U. parvum</i>	Pathogen* <i>Mycoplasma hominis</i>	Rhinovirus	<i>Haemophilus influenzae</i>
Premature cohort	10	52	13	14	3	0
Full-term cohort	19	36	0	0	1	1
Total	29	88	13	14	4	1

*Note: all *Urea* and *M. hominis* were obtained from 2 premature infants' weekly nose/throat swabs while still in the NICU

Conclusion: The TAC cards detected all 23 pathogens in control and validation experiments. Although preliminary, we were able to detect both normal bacterial flora and respiratory viruses in this cohort. Possible pathogens related to premature birth were also detected.