



# Viva Views

Fall 2014



## Dear participant,

In this edition, we highlight some of our research focused on asthma and allergies. When most of us grew up, allergies were rare, but now your child probably has at least one friend with food allergies or asthma.

We recently found that almost 6% of children in Viva reported symptoms of food allergies by age 7, and more than one-quarter had blood markers of allergic sensitization. Interestingly, mothers who ate more peanuts and other common allergens during pregnancy had children who were 15-50% less likely to have food allergies, suggesting that early exposure is important in teaching the child's immune system to tolerate these foods.

Dr. Emily Oken (Viva's co-Principal Investigator) and Dr. Diane Gold (a collaborating investigator who is an expert in allergies and lung function; see inside) are now leading a project to understand how prenatal diet and pollution exposure predicts risk of nasal allergies and asthma in the early teen years. Stay tuned for more results!

Because of all of the valuable information you have provided since your pregnancy, we are in a perfect position to understand the early causes of these and other health conditions. As ever, thanks so much for your ongoing contributions to Project Viva!

## Updates!

We are currently halfway through the Early Teen Visit. Thank you so much to everyone that has already completed a visit! We are thrilled with our progress so far and are looking forward to scheduling those of you who haven't made it in yet. **Remember**—we can even conduct visits in the evenings and on Saturdays! If you haven't heard from us yet about scheduling your visit, don't worry, we'll get in touch with you soon! You can also contact us directly to schedule a visit or update your information (see below).

Happy fall everyone! Since it's fall (and unfortunately allergy season), we thought it would be fitting to focus this edition of Viva Views on allergies. Although we are primarily interested in obesity, we also do a lot of research in other areas, like asthma and allergies.

There are several components of the Early Teen Visit that give us information about allergies:

- Nasal swabs:** One of the most important ways we gather information about allergies is by collecting nasal swabs from Viva teens. No need to be nervous, they are quick and painless! Using these swabs we will be able to see how your diet, stress, and environment affect your chances of developing allergies.
- Questionnaires:** The mom and teen questionnaires help us put your lifestyle and environmental exposures into clearer focus.
- Blood collection:** We are also able to collect information about food allergies through blood analysis, which has already produced some interesting findings (see inside)!

## What's next for you?

If you haven't already completed the Early Teen Visit, expect to hear from us soon! You can also contact us to schedule an appointment (or update your contact information) by calling the Project Viva hotline at 1-800-598-4247 ext. 86067, or by emailing the Viva inbox at [project\\_viva@hphc.org](mailto:project_viva@hphc.org).

If you have already completed the visit, thanks again! The next thing to expect from us is an Age 14 Questionnaire in the mail.

# Recent Findings

## Should pregnant women actually eat more peanut, milk and wheat?

The prevalence of both asthma and allergies have increased in the United States; an estimated 8.4% of the population has asthma and 5% have a food allergy. During the fetal period, the human immune system begins to develop by training its cells to differentiate harmful intruders from helpful or benign substances. A recent Project Viva study showed that early exposure to potential allergens through maternal diet during this critical period can be protective against childhood allergy and asthma.



Using prenatal food frequency questionnaires, mother-reported data on child asthma and allergy, and child blood antibody levels for common allergens at mid-childhood, Dr.

Bunyavanich and her team of investigators assessed the association between prenatal diet and offspring risk of allergy and asthma in mid-childhood. The study focused on five foods commonly associated with childhood allergies: egg, soy, peanut, milk, and wheat.

Children of mothers with diets higher in peanuts during the first trimester of pregnancy were at a lower risk of experiencing peanut allergic reaction in mid-childhood. Additionally, higher maternal milk intake during the first trimester was associated with reduced childhood risk of asthma and allergic rhinitis, and higher maternal wheat intake in the second trimester was associated with reduced childhood risk of atopic dermatitis. Egg and soy consumption did not show a correlation to mid-childhood allergy and asthma. This study supports the idea that a mother's diet during pregnancy helps to shape her child's immune system, and prenatal exposure to milk, wheat and peanuts through the mother's diet can protect children against allergy and asthma.

*Bunyavanich S, Rifas-Shiman SL, Platts-Mills TA, Workman L, Sordillo JE, Camargo CA Jr, Gillman MW, Gold DR, Litonjua AA. Peanut, milk and wheat intake during pregnancy is associated with reduced allergy and asthma in children. J. Allergy Clin Immunol. 2014 May;133(5):1373-82.*

## How does living near major roadways affect childhood risk of respiratory infection?

Project Viva investigators, interested in determining risk factors for childhood respiratory infections, examined how far Project Viva mothers lived from major roadways and traffic-dense areas during their pregnancies. They looked at whether the distance from a participant's home to a major roadway was associated with a doctor-diagnosed case of early life respiratory infection in her Project Viva child.

Over half of the 1,263 Project Viva children included in this analysis had one or more doctor-diagnosed respiratory infections by the Age 3 (Early Childhood) visit. This count included cases of bronchiolitis, bronchitis, pneumonia and croup, but not cases of the common cold, ear infections or sinusitis. The results of the study indicate that living near a major roadway during pregnancy or at the time of birth is associated with a higher risk of doctor-diagnosed respiratory infection by early childhood.



As most Project Viva mothers did not move during pregnancy, we cannot say whether the pre- or early post-natal traffic exposure was responsible for the association between distance to roadway and childhood respiratory infection.

Regardless, this finding is important because it can potentially motivate policy change on controlling traffic pollution and may help doctors identify children at risk of respiratory infection, such as those who live near major roadways.

*Rice MB, Rifas-Shiman SL, Oken E, Gillman MW, Ljungman PL, Litonjua AA, Schwartz J, Coull BA, Zanobetti A, Koutrakis P, Melly SJ, Mittleman MA, Gold DR. Exposure to traffic and early life respiratory infection: A cohort study. Pediatr Pulmonol. 2014 Mar 27.*

# Visit Spotlight: Measuring Nitric Oxide

What a cool looking machine! . . . But, what does it actually do? This machine measures the amount of nitric oxide (NO) in a person's exhaled breath. Everyone has a small amount of nitric oxide in their bodies naturally. If someone has asthma or inflammation, the amount of nitric oxide in that person's breath will increase. Doctors are starting to use this machine to improve the diagnosis and treatment of asthma and to make sure people who have asthma are using their medicine properly. Project Viva investigators are interested in trying to figure out why some people develop asthma, which is why Viva teens that come in for their Early Teen Visits perform this measurement using the cool-looking machine!



It is a really easy (and fun!) measurement to complete. Using a clean mouthpiece, you will blow into the machine and keep the cloud on the screen afloat for 10 seconds. That's it! Haven't completed your Early Teen Visit yet? Come on in to have your nitric oxide levels measured!

**Inflammation:**  
your body's reaction to things like infection, injury, or irritation, characterized by redness, pain, and swelling

## Investigator Spotlight: Diane Gold

In this edition of Viva Views we asked one of our investigators, Dr. Diane Gold to tell us a bit about herself.

### How did you get started with Project Viva?

**Dr. Gold:** I have been with Project Viva since its beginning---I started off helping to figure out how to understand what influences neonatal immune function that might relate to later responses to allergens.



We are all really grateful to the families participating in Project Viva, who have contributed so much to public health.

### What led to your specific interests in asthma/allergies?

**Dr. Gold:** In college in the U.S. I became interested in documenting the experiences of women who worked in factories. Later, when I worked in a hospital in England, I became interested in occupational lung diseases of people working in factories processing cotton, in factories using asbestos, and in work places using chemicals, some of which caused or worsened asthma. When I returned to the U.S. I began working in East Boston, trying to understand what exposures in the environment influenced allergies and asthma.

### Have you used any of the Project Viva findings in your own life?

**Dr. Gold:** Well, I walk or bike to work, so keeping fit is a part of my own life. My fish intake may have been influenced by the project.

### Can you tell us a bit more about your professional career outside of Project Viva, and what you like best about it?

**Dr. Gold:** As well as doing research I teach at Harvard School of Public Health. I also used to take care of patients in the Medical Intensive Care Unit. I love getting to talk with the children, to teach and work with the research assistants, and contributing to public policy that may lead to improvements in peoples' health.

# About Project Viva

Established in 1998, Project Viva—"A Study of Health for the Next Generation"—is a groundbreaking longitudinal research study of women and children based in eastern Massachusetts. The aims of the research are to examine how factors during pregnancy and after birth may affect the long-term health of a mother and her child. Project Viva enrolled over 2,600 mothers during pregnancy and has continued to follow them and their children for more than a decade. Matthew W. Gillman, MD, SM, is Project Viva's Principal Investigator. He, along with Co-Principal Investigator Emily Oken, and colleagues conduct the study out of the Department of Population Medicine, jointly sponsored by Harvard Medical School and Harvard Pilgrim Health Care Institute. Project Viva is funded primarily by the National Institutes of Health (NIH), with additional funding from other agencies. The ultimate goal of Project Viva is to improve the long-term health of children by ensuring the well-being of their mothers.

*Thank You!*

## **Moving?**

Please call us with your new address and phone number at 1-800-598-4247 ext. 86067 or email us at: [Project\\_Viva@hphc.org](mailto:Project_Viva@hphc.org)

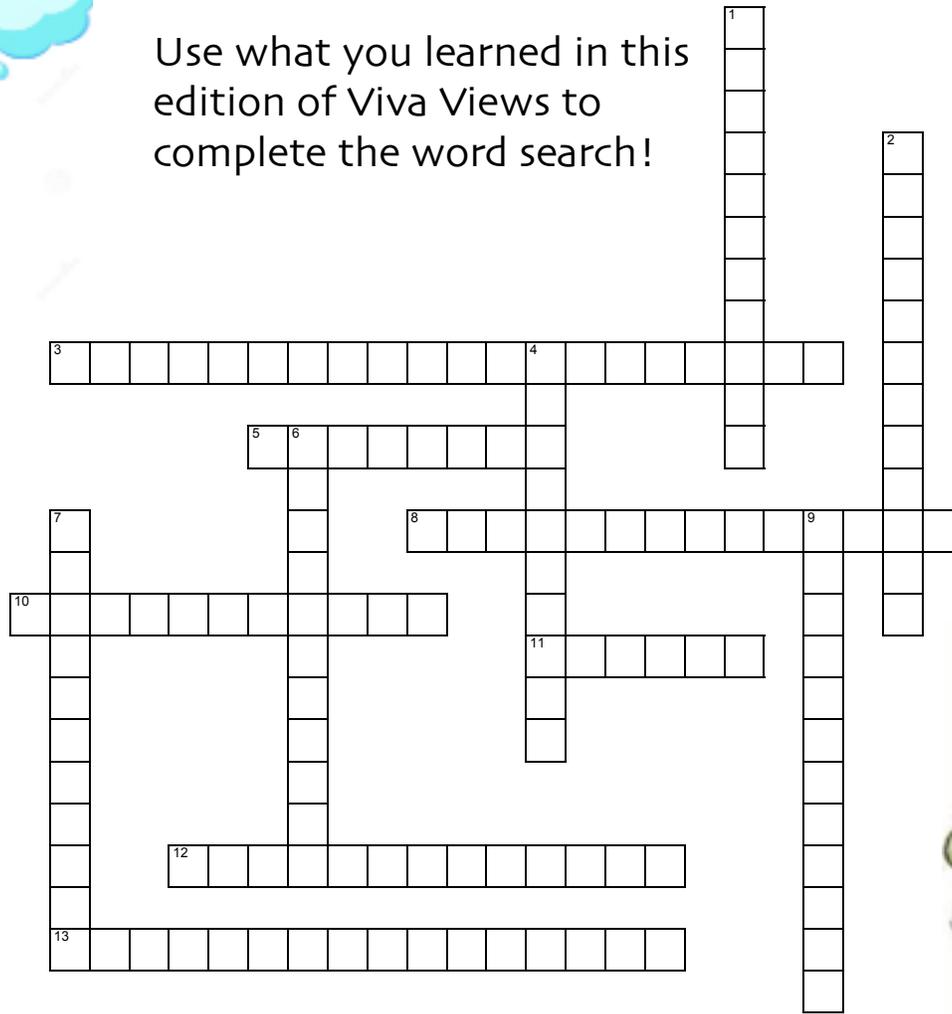


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Boston, MA 02215

# Test Your Wits!



Use what you learned in this edition of Viva Views to complete the word search!



**Words:**  
food allergy  
nasal swabs

respiratory infection  
lung capacity  
questionnaire

nitric oxide  
allergic rhinitis  
Project Viva

inflammation  
epigenetics  
Early Teen Visit

asthma  
genetics

## ACROSS

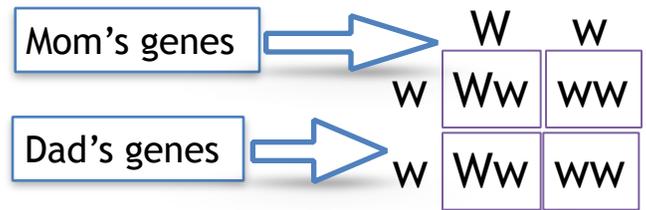
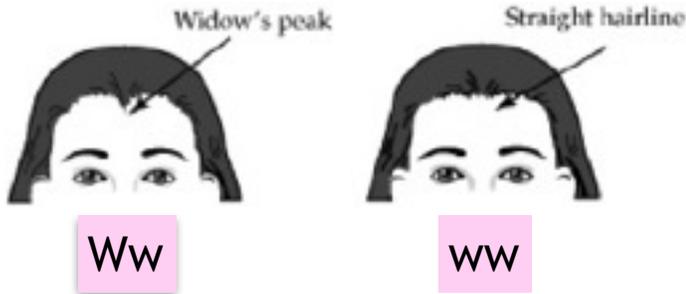
3. Distance to major roadways has been shown to be related to this type of medical condition which includes bronchiolitis, bronchitis, pneumonia, and croup
5. The study of parts of DNA that carry hereditary information passed from parents to children.
8. What you may or may not have completed yet that involves measuring nitric oxide, nasal swabs, questionnaires, and other visit components
10. The five most common of these include eggs, peanuts, soy, milk, and wheat
11. A condition in which your airways narrow, swell, and produce extra mucus, making breathing more difficult
12. These, completed by both mom and child, help us put lifestyle and environmental exposures into clearer focus
13. When your immune system overreacts to particles in the air, causing symptoms like sneezing or runny nose

## DOWN

1. Everyone has a small amount of this in their bodies naturally. If someone has asthma or inflammation, the amount of this will increase.
2. The amount of air your lungs can hold
4. One of the most important ways Project Viva measures allergies, involving cleaning out the nasal cavity with q-tips
6. This controls which genes are turned on and off in response to your diet, stress, and environment
7. The study that you have been a part of since birth, that looks at how maternal and early life influences affect child outcomes
9. Your body's reaction to things like infection, injury, or inflammation, characterized by redness, pain and swelling

# Genetics:

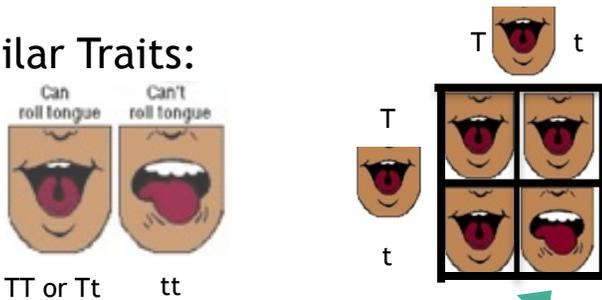
Genes carry information that determine your traits - the features and characteristics that are passed on to you by your parents. Everyone has two copies of a gene: one from their mother and one from their father. Most genes can be either dominant or recessive. A dominant gene is expressed more often than a recessive gene. See the example below to get a better understanding of dominant and recessive genes.



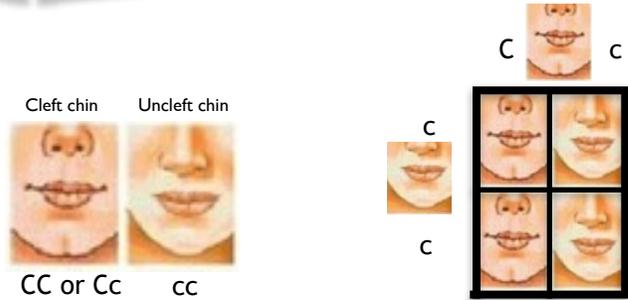
If you have the gene for a Widow's Peak (W) from your mom or dad you will have this hairline, even if you also have a gene for straight hairline (w) from your other parent. This is because the Widow's Peak gene is "dominant". If you do not have that gene you will always have a straight hairline. This is called "recessive."

You have a 50% chance of having a widow's peak if your mom has one gene for widow's peak (dominant) and one for a straight hairline (recessive) and your dad has two recessive straight hairline genes. Your chances change based on the pairs of genes your parents have.

## Similar Traits:



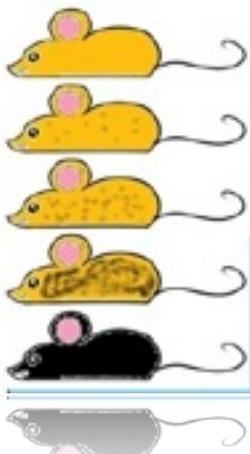
25% chance you can't roll your tongue, if both parents have one dominant and one recessive gene



50% chance of a cleft chin, if one parent has one dominant and one recessive gene, and the other has two recessive genes

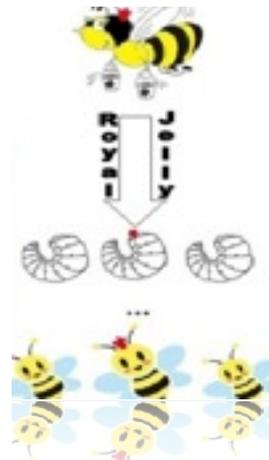
Our physical features are not JUST controlled by our DNA, the genetic material inherited by our parents and unique to each person. Epigenetic signals control which genes are turned on and off in response to your diet, stress, and environment. Nutrition during early development is a factor that impacts our epigenetic signaling. Here are some examples of epigenetic studies!

# Epigenetics



## Agouti Mice

These genetically identical mice range from yellow to black as a result of their mothers' diet during pregnancy! Babies born to mothers that consumed nutritional supplements were more likely to be black.



Honeybee Queens and their workers have an identical genetic code. Queen larvae are nourished with "royal jelly" during development. This larvae food changes the expression of the honeybee's genes, causing it to grow larger and develop into a Honeybee Queen.