My name is Ramon Guevara. I'm an epidemiologist and here to present "Efforts to update and perform health education on listeriosis in Los Angeles County, California, by the County of Los Angeles Department of Public Health."

The objectives of this talk are to describe our efforts to more effectively communicate the risks of listeriosis not just to those who are vulnerable to the disease, but also to those who might know or even take care of them; and to describe the impact of these efforts.

Listeriosis became a relatively well-known disease in Los Angeles County, or LA County, after the large southern California outbreak in 1985. The take-home message from this outbreak was that listeriosis was associated with pregnant Hispanic women and consuming Mexican-style fresh cheese. This take-home message influenced and continues to influence listeriosis outbreak investigations and health education in the United States. Twenty years later, the tasks of keeping the general population and medical community properly educated on listeriosis have not been easy with public health priorities shifting across topics such as bioterrorism preparedness, MRSA/CAMRSA, SARS, West Nile Virus, avian influenza, and most recently H1N1 influenza.

From 2002 to 2004, I performed the case investigation and surveillance of listeriosis in LA County and I noticed that most of the cases were not pregnant Hispanic women. Most of the cases were non-perinatal, which means pregnancy was not involved with these cases. But the most striking thing to me was that there were listeriosis deaths among young people without the classic risk factors like cancer and steroid medication. The two most memorable cases to me involved an 18 year old girl and a 23 year old girl. The only risk factor they had was lupus. After speaking with their families, I realized that they had little knowledge or awareness of listeriosis risk. So I asked our health educators, "What do our health education materials say about listeriosis?"

And all we had was this. A Fact Sheet on Listeriosis. I had to separate it into two slides. Here it starts off with, "Don't let Listeria infection harm your unborn baby, your newborn infant, or you." The first Clip Art picture you see is of a prenant woman in a green dress. You also see a picture of pregnant woman in the kitchen.

In the second half of the sheet, you see "Why is a Listeria infection so dangerous?" It reads, "Early in pregnancy, it can cause a miscarriage. Later in pregnancy, it can cause a baby to be born prematurely. After birth, it can cause serious infection or death in a newborn baby." Under "What are the symptoms of a Listeria infection?" you see a pregnant woman in a red dress with her physician. Under "What can I do if I become ill?" you see a mother with her newborn and her physician. And the last line of substance that you read on this sheet is, "Antibiotics given promptly to the pregnant woman can prevent Listeria infection of the fetus or newborn." How would the families and caretakers of the

elderly, or of those stricken with cancer, or of those taking steroid medication, or of those with autoimmune diseases like lupus, know about listeriosis from this fact sheet?

Here are the incidence rates of listeriosis in LA County from 1986-2008. The left axis measures perinatal listeriosis, which is shown by the blue line with triangles. The right axis measures nonperinatal listeriosis, which is shown by the red line with circles. Just by comparing the Y-axes, we can see perinatal listeriosis has much higher incidence rates than nonperinatal listeriosis. In 1986, perinatal listeriosis occurred, as shown by the left Y-axis, at 27 cases per 100,000 live births. However, nonperinatal listeriosis, as shown by the right Y-axis, occurred at 0.6 cases per 100,000 LA County residents. Over the years, the decline of perinatal listeriosis, from 27 to 1.45 cases per 100,000 live births per year, was greater than the decline for nonperinatal listeriosis, 0.6 to 0.2 cases per 100,000 LA County residents per year.

However, when looking at the number of incident cases, we see the epidemiology changed after 1993. Nonperinatal listeriosis is represented by the red bars and perinatal listeriosis is represented by the blue bars. Before 1993, the number perinatal and nonperinatal cases were comparable. In 1992 and 1993, they are very similar, and in 1989 there were more perinatal cases than nonperinatal. But starting with 1994, perinatal listeriosis always occurs at a much lower number than nonperinatal listeriosis. **So what does this mean in regards to health education? … This means we need to include information for nonperinatal listeriosis cases.**

I expressed my concerns to one of our health educators, and she made this brochure for listeriosis in 2005. Note, for now on, when I show slides of brochures they work like this. [Demonstrate with actual broschure.] The first slide represents the cover on the right, and backsides of the brochure in the middle and left. The cover always is on the right panel. The second slide will show the inside of the brochure. For this 2005 brochure, the cover reads, “PREVENT LISTERIOSIS: Keep your unborn baby safe; keep you family and friends safe.” Under “Who is at risk of listeriosis?” it adds, “and adults with weakened immune systems, including, persons 65 years of age and older, persons with AIDS, persons who take steroids, persons with cancer, diabetes, or kidney disease.” Now this was a step in the right direction. But I wanted much much more. For one, I don’t think the cover is very attractive.

Secondly, inside you see only ClipArt and too many words. This is not inviting. When you look at the people in this ClipArt picture, how can you identify with them? They don’t have faces!

I asked one of the health educators to partner with me in making new health education materials for listeriosis. To do this, I set forth the following. We needed to target the general population. We had to improve the appeal of our health

education materials so that all kinds of people would want to pick them up, or stop and read them. To define a standard of attractiveness that we could try to achieve, I searched the internet for various health education materials and advertisements. We had to make this a multidisciplinary approach to be successful. From case investigators, we needed to know the individual stories and lessons learned from interviewing cases, case family members, and health care providers. From epidemiologists, we needed to know the trends and potential risk factors that should be tracked. From health educators, we needed the expertise in translating the information from case investigations and population analysis into public health messages. From public health nurses, we needed the ability to connect to the patients, physicians, infection control preventists, and laboratory staff in order to gauge the appeal and usefulness of our new health education materials. And finally, from the general population, we needed opinions to determine the potential effectiveness of our new brochure.

I set this as the standard of attractiveness. It's from a CDC brochure on folic acid. I said, "We have to make something that looks as appealing as this. Everyone, including women of child-bearing age, has to have a hard time deciding which brochure to pick up, this one or ours."

We considered various formats for our health education materials. Ultimately, partly because of budget, we decided to use brochures, posters, and handout fact sheets. We considered many different ways to present our health messages on listeriosis risk; however, our messages had to verbally and photographically communicate what is listeriosis, who is at risk, what are they symptoms of listeriosis, what are the risk foods, what are health practices to prevent listeriosis, and where can someone get answers to further questions on the disease.

To make sure we were not duplicating what another agency or health group was doing, we had to keep in touch with what was going in the community regarding listeria. During 2005-2006, we collaborated with the Women, Infants, Children (WIC) Program and with the Comprehensive Perinatal Service Program (CPSP) of the California State Department of Public Health. These two programs sought to make health education materials geared towards pregnant women regarding which cheeses increased the risk of perinatal listeriosis. I also got involved with Environmental Health agencies that investigated illegal cheese vendors that made soft cheese in their bathtubs and sold them to the general public. In dealing with these agencies, I tried to identify if there were specific demographics or geographic areas that the illegal vendors targeted. Perhaps, the most effective way we kept in touch was to have focus groups involving public health nurses and the general public to determine how well drafts of our health education materials were received.

The first draft from Manuel, the health educator I teamed up with, was this. It has faces of actual people.

On the inside, it looks particularly clean and sharp.

The first draft I made used a lot pictures on the cover to represent various demographic groups. I also added a question to engage interaction: “Do you think these foods are safe?” I then listed some popular risk foods

On the inside I have picture of an elderly couple holding hands and walking the beach with the words, “Be aware when you, your family, or friends might be at high risk of listeriosis.”

But those were early drafts. Our final brochure is this.

The cover has a picture of five people from different races and genders. They have nice looking faces. The bottom picture is of an elderly couple to expand the target audience to older age groups. The words, “Knowledge is power to protect those we love” occurs throughout the cover to catch people’s attention. There is no mention of listeriosis on the cover in order attract as many people as possible.

When you open up the brochure, there is a clean, uncrowded layout with a decent number of sharp colorful pictures, and the first panel asks, “Do you think these foods are safe?” After a list of food items that have been associated with listeriosis, it reads inside a big red box, “**If so**, you, your family, and friends may be at risk of listeriosis.” And then in very simple language we describe listeriosis: “Listeriosis is a serious illness caused by a germ called *Listeria*.” [read the rest if time is allotted.] We list common symptoms and describe the incubation period by saying, “People can feel sick between 3 days and 2 months after eating food and drink that has *Listeria*.” In the last inside panel, we describe risk groups and individuals under “Who is at risk?” .. “Everyone has an immune system. It is the body’s ability to fight off disease and protect our health. People with weakened immune systems are at highest risk of listeriosis. These include people who are: pregnant, 65 years old or older, less than one month old, less healthy because they have other diseases like cancer, kidney disease, diabetes, AIDS, or lupus; taking medications that weaken the immune system such as steroids (ex. Prednisone), chemotherapy, radiation therapy, antibiotics, and antacids.”

[Switch back to previous slide.] On the back of the brochure, we provide some safety tips to protect high risk people. “Avoid eating **or serving** raw milk, raw milk products, unpasteurized Mexican-style fresh cheese, and other risk food. Avoid food from street vendors. Choose pasteurized food over raw food. Pasteurized food is food that has been heated to kill germs. Heat food like hot dogs until steaming hot. Prevent fluid from food like hot dogs and deli meats from getting on other foods. Wash hands, utensils, and food preparation areas often to get rid of germs and prevent them from spreading. On the last panel, we have general tips for cleaning and sanitizing. The last one is, “The single most important thing we can do to keep ourselves and others from getting sick is to wash our hands.”

We end by saying, “For more information, contact” and provide the contact information for our program office.

This is the brochure in Spanish.

We also made a poster specific towards preventing perinatal listeriosis. To catch the attention of pregnant women we start by asking, “Are you pregnant?” We then describe what listeriosis is. We describe what the symptoms are. And then we list ways to prevent listeriosis [read some]. We made this to accompany the brochure on cheeses by WIC and CPSP. We also made this poster into a flyer about the same size as our folded brochure.

So did we accomplish our goal? Which brochure would you pick up first? I believe we made a quality product that rivals the attractiveness of the brochure with the baby.

How did our health education materials get introduced to the general population? During August to November 2006, there was a rise in perinatal listeriosis. A health advisory went out to 20,000 medical personnel in mid-November and this generated print, radio, and TV new coverage. We had 11,000 English and 40,000 Spanish brochures printed. 9,600 English and 37,000 Spanish brochures went to WIC distribution centers. We printed 800 English/ Spanish double-sided posters. Education materials samples and order forms were sent to more than 500 CPSP providers. More than 60 order forms were returned to us requesting more materials.

So what impact did this have?

Since 2000, perinatal cases numbered less than 10 per year. Perinatal listeriosis incidence rose from 3 cases in 2005 to 12 cases in 2006. Nonperinatal incidence remained the same between 2005 and 2006, which was 25 cases. After our health education efforts in the last half of 2006, perinatal listeriosis incidence dropped from 12 cases to 6 cases in 2007, and to 2 cases in 2008. Also, nonperinatal listeriosis incidence dropped from 25 cases to 21 cases in 2007 and 20 cases in 2008.

Interestingly, when the H1N1 influenza pandemic emerged in April 2009, the second most common searched term in our program’s website during that month was “Listeriosis” … there were 1,246 searches for this term. The most common search term was “sintomas”, “MRSA” had 617 searches, “Listeria” had 281 searches, and “Flu” had 218 searches. Furthermore, the Spanish brochure on listeriosis was the most requested disease-specific product of our program office with 2503 requests. The English version of the brochure had 129 requests in April 2009. The reason for so much interest in listeria during this month might have been from our health advisory in which I recommended health care providers educate patients on listeriosis especially in April since listeriosis has an

average incubation period of about one month and the incidence of listeriosis in LA County typically increases in May.

Another impact of our efforts was to provide a template and perhaps a greater standard for our health education products.

This brochure came out in 2008. From the cover, I have no idea what disease it's about. But inside there is a very attractive layout with very familiar looking pictures. This brochure is on enterovirus and pregnant women. We had an outbreak of enterovirus among this population. I was not involved in making this brochure or in the outbreak investigation, but I think it's a great looking product.

In closing, the lessons learned from our experience were that the multidisciplinary approach and use of focus groups worked very well for us. It was critical to pull together the front line investigations of case investigators, big picture considerations of the epidemiologists, communication skills of health educators, medical community perspectives from public health nurses, input of different Spanish-speaking translators, and feedback from various members of the general population. Gathering all this expertise to make health education products and sharpening these products with feedback from samples of the general population allowed us to provide effective health education on listeriosis.

I'd like to acknowledge key members of my program office that played a substantial role in this project. Thank you for your attention.