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Evaluation Of Pertussis Knowledge Within The Child Daycare Staff And Management In The El Paso, Texas

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EVALUATION OF PERTUSSIS KNOWLEDGE WITHIN THE CHILD
DAYCARE STAFF AND MANAGEMENT IN THE EL PASO, TEXAS

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Master's Program in Public Health

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By

Diana Gomez

2017

DEDICATION

I dedicate this thesis to my parents, Josefina and Juan Gomez, who has been my number one supporters in all my academic and personal challenges throughout my life. I also dedicate this study with hope that this research will create pertussis awareness in the El Paso, Texas, community, and a healthier environment for future generations.

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DAYCARE STAFF AND MANAGEMENT IN THE EL PASO, TEXAS

BY

DIANA JAQUELINE GOMEZ, BS

THESIS

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ABSTRACT

BACKGROUND: Child daycare centers have an enormous influence on the children's health, which is important to maintain daycare staff and management informed on how to prevent communicable diseases, such as pertussis. *Bordetella pertussis* (*Bp*), the causative agent of whooping cough, is a small gram-negative bacterium that infects the nasopharynx of humans, which are the only reservoir. *Bp* is a highly contagious respiratory disease, which continues to be a severe disease in infants. The disease affects all ages and is easily transmitted from person to person, through respiratory droplets. Even though there is a vaccine available for all ages there are many factors that challenge the control of spreading of the disease. The most common source of infant pertussis infection in the United States has shift from mothers to siblings. The high demand for child daycare of children under the age of six is continually growing in our communities. The City of El Paso has a population of 835,593, with 8.2% of persons being under five years of age. During 2014, 32,971 pertussis cases were reported to CDC representing an increase of 15% compared to the pertussis cases reported in 2013, where the majority of deaths were among babies younger than 3 months old. **OBJECTIVES:** (1) Assess current level of knowledge on pertussis in staff and management personnel from selected daycare centers in three geographical areas of El Paso (West, East and Central). (2) Develop an educational intervention for the same selected participants to provide general information on pertussis and asses pre and post differences in levels of knowledge. **METHODS:** This pilot exploratory pre-post study collected data from one staff or management volunteer participant from each of the 72 selected registered childcare centers in El Paso, Texas. Selected daycare centers were located within the limits of the City of El Paso and provided services to children from newborn to four years-of-age. Daycare centers were later classified into three geographical areas for comparison.

Demographic information was collected from all participants. Study was completed in three stages. For the first stage, participants were required to complete a questionnaire to assess level of knowledge on pertussis. The second stage consisted on short training sessions on general information about pertussis. The third stage included a post-intervention test based to assess changes in level of knowledge. Participant's scores were compared from the Pre-Test questionnaire to the Post-Test questionnaire for significant differences. Furthermore, facts were also obtained to compare geographical locations on their Pre-Post average scores. **RESULTS:** Although, the area that had the highest increase of pertussis knowledge was the West area with a p-Value of 1.480E-14. The second highest area was the East with a significance p-Value of 0.00022, followed by the Central area with a p-Value of 0.0015. From the Pre-Test to the Post-Test, data suggest that the participants did increase their level of knowledge after the intervention sessions. **CONCLUSIONS AND RECOMMENDATIONS:** Participants received information on pertussis risk factors in children under the age of four attending child daycare. The West area had the highest increase of pertussis knowledge from the Pre-Test to the Post-Test. The East area had the second highest level of pertussis knowledge from the Pre-Test to the Post-Test, followed by the Central area. Increasing consciousness on health care in child daycare centers will most likely promote a better vaccination practice as well as avoiding spread of preventable diseases. Future follow up is required on the results from this intervention to assess long term impact on participants.

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CHAPTER 1: INTRODUCTION

Pertussis is a highly contagious, respiratory disease that can be very serious, especially in infants. The majority of deaths occur among neonates and children younger than three months-old (CDC, 2015). Even though there is a vaccine available for all ages there are many factors that challenge the control of spreading of the disease. The most common source of infant pertussis infection in the United States has shifted from mothers to siblings (Skoff et, at., 2015). It is very crucial that all staff and management of daycare centers are up to date on immunization requirements and be aware of the importance of how to protect the children and themselves from this disease. Protection from Tdap vaccine (Tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis) wanes substantially 2 to 4 years after vaccination (Acosta et, al., 2015). One of the biggest challenges with pertussis is that the disease is difficult to diagnose because the symptoms may be different between children and adults and may resemble other common respiratory infection such as a common cold. Thus, unidentified cases may lead to spreading of the disease.

The pertussis booster vaccine (Tdap) is highly recommended for the prevention of whooping cough in adults and adolescents, health care providers, and especially in pregnant women during their third trimester of each pregnancy, since fully vaccinated adults can acquire pertussis (Suryadevara, 2015). The first pertussis vaccine developed was a whole-cell (wP) vaccine, which was introduced in 1950 reaching worldwide coverage by 1970, this vaccine reduced the number of cases in industrialized countries by more than 95% (Wendelboe et al., 2007). However, the wP vaccine was gradually replaced by an acellular vaccine (aP) due to concerns about adverse reactions and neurological effects in children upon administration.

Replacement of the wP vaccine to the aP vaccine occurred during the 1980s and 1990s (Zhang et al., 2014; Rumbo and Hozbor, 2014).

Pertussis vaccination has been effective during the past decade, but *B. pertussis* continues to circulate. The pertussis resurgence is often attributed to the waning of childhood vaccination due to the lack of robustness of the aP vaccine and the persistent transmission of the infection by adolescents and adults who have not received booster vaccines (Rumbo, 2014). However, there are other important factors that may account for the increased number of cases such as greater awareness of pertussis infection and with the advent of modern technology such as the polymerase chain reaction (PCR), which offers higher specificity and sensitivity in diagnosis (Cherry, 2012). According to Cherry, additional aspects linked to the failure of the aP vaccine are the differences in the immunity generated by the aP vs. the wP vaccine, the incorrect balance of antigens in the vaccine and the reality that the circulation of *B. pertussis* strains genetically different than those used in vaccines.

The present study evaluated the knowledge of the staff and management of daycares centers on pertussis among the three regions of El Paso area; West, Central and East. This research study also promoted awareness and provided education about the whooping cough infection.

CHAPTER 2: BACKGROUND AND SIGNIFICANCE

Pertussis, commonly known as whooping cough, is the only vaccine preventable infection that remains endemic in the U.S. and worldwide. Pertussis is a highly contagious respiratory disease, which continues to be a severe disease in infants. The disease affects all ages and is easily transmitted from person to person, through respiratory droplets (WHO, 2016). Reports show occurrence of about 10 million infected cases with almost 400,000 pertussis-related deaths annually (Hajia et al., 2012). According to the City of El Paso Department of Public Health-Notifiable Conditions Report from 2014-2016, there was a decrease in pertussis cases. In 2014, there were 65 reported cases, compared to the 10 cases in 2016. The reported pertussis cases may not be as high as other diseases such as HIV/AIDS, or Gonorrhea, but it is important to emphasize that pertussis is a vaccine preventable disease.

***Bordetella pertussis*: What it is?**

Bordetella pertussis is the causative agent of whooping cough. *B. pertussis* is a small gram-negative bacterium that infects the nasopharynx of humans, which are the only reservoir. The bacteria infect the ciliated respiratory epithelium causing damage to cells (Rocha et al, 2015). Laboratory diagnosis of pertussis is challenging, the bacterium is highly fastidious and difficult to culture, due to the required time of 3-7 days to grow. The specimens of choice to identify pertussis are the nasopharyngeal swab or nasopharyngeal aspirates. The optimum time to isolate *B. pertussis* in culture is during the patient's acute phase, 1-10 days, of infection. However, it is during this time that the clinical symptoms are scarcely noticeable. Pertussis is most effectively diagnosed by nucleic acid amplification, which is highly sensitive and specific (Rocha et al., 2015).

***B. pertussis* cases**

Despite high vaccination coverage over the past 50 years, *B. pertussis* outbreaks continue to occur in the U.S. During 2015, 20,762 cases of pertussis were reported to the CDC, with the age incidence similar to those observed in 2012 and 2013, and the majority of deaths were among babies younger than three months old (CDC, 2015).

Diagnosed cases of *B. pertussis* must be reported it to the city and to the State utilizing the National Notifiable Diseases Surveillance System (NNDSS). However, many pertussis cases go unreported due to patients not being appropriately diagnosed or by not practicing the proper NNDSS procedures, making it difficult to identify epidemiologic trends. Pertussis is the most poorly controlled bacterial vaccine-preventable disease in the U.S., with peaks occurring every 3-5 years (CDC, 2014). Pertussis could be clinically diagnosed, if coughing persists for more than two weeks for some patients, or with other common symptoms such as paroxysms of coughing, post-tussive vomiting, inspiratory whoop, or apnea. Laboratory criteria for diagnosis consist of isolation of *B. pertussis* from a clinical specimen or positive PCR for pertussis (CDC, 2014).

Child daycare centers

In the state of Texas there are three types of child daycare centers: 1) Licensed Child-Care Centers which provide care for seven or more children under 14 years of age for less than 24 hours per day at a location other than the permit holder's home, 2) Licensed Child Care Homes, which provide care for less than 24 hours per day for seven to twelve children under 14 years of age in the permit holder's own home and 3) 24-hour Residential Care, which provide 24-hour care for thirteen or more children, under 18 years of age and may offer other programmatic services such as: transitional living or emergency care, treatment services for emotional disorders or primary medical needs (DFPS, 2016). The present study will focus on the Licensed Child-Care Centers.

Population in the U.S., Texas and the El Paso County

According to the 2016 Census, the United States has a population of 321,418,820 people, with 6.2% of the population being under five years of age (Census, 2016). The state of Texas has a population of 27,469,114, with 7.2% of persons being under five years of age (Census, 2016). The El Paso city has a population of 835,593, with 8.2% of persons being under five years of age (Census, 2016). It is important to consider that one out of eight children, under the age of five in El Paso Texas, may be at risk of acquiring pertussis infection if they are not fully vaccinated.

The high demand for child day care of children under the age of six is continually growing in our communities. Children under the age of six that are in potential need of child daycare in the United States, due to both parents working or a single-working parent, are 14,802,285 children (Child Care in America, 2016). In the state of Texas, 1,342,054 children under the age of six are in potential need of daycare due to either parents working or single-working parent (Child Care in America, 2016). In 2011, 12.5 million (61%) of the 20.4 million children under five years of age were in some type of regular child daycare center in the US (Laughlin, 2013).

CHAPTER 3: LITERATURE REVIEW

The bacterial infection caused by *Bordetella pertussis* (*B. pertussis*) has been known by different names over the years. One of the most popular names is the whooping cough due to the peculiar sound that an infected person does when coughing and trying to breath. It was first recognized in the Middle Ages and since then various epidemics have been described (Kuchar et al, 2016). The first epidemic recorded was in Paris in 1578. However, the causative agent, *Bordetella pertussis*, was isolated not until 1906 by Jules Bordet and Octave Gengou (Kuchar et al., 2016).

B. pertussis is a small gram-negative bacterium that causes a highly contagious acute respiratory disease. Humans are the only reservoir. The course of the disease can be divided in four stages: (1) An incubation period of 7–14 days, (2) A catarrhal phase of 7–10 days, which resembles a simple cold with mild cough and in most cases without fever, (3) A paroxysmal phase of 4–6 weeks involving cough, particularly severe at night and frequently followed by vomiting. In young infants, pertussis may cause apnea and cyanosis without cough, whereas in adolescents and adults, uncharacteristic, persistent cough may be the only manifestation of the disease, and (4) the final stage is a convalescence phase of 6–7 weeks (Guiso, 2013).

Pertussis is the only vaccine preventable infection still endemic in the U.S., and in the world. Even though there has been an extensive vaccination programs in the U.S., pertussis infection outbreaks continue to occur (CDC, 2015). In the U.S. during the 1940s the whole cell pertussis vaccine was introduced to the pediatric population, decreasing pertussis cases dramatically, as shown in Figure 1. This whole cell pertussis vaccine protected children from the infection as well as to the decline in exposure to the community. The a-cellular pertussis (aP) vaccine was developed due to a raise concern reported on neurological and other side effects in

children that were vaccinated with the whole-cell vaccine (wP) in the late 1980s, therefore the wP was completely replaced by the aP during the 1980s and 1990s (Rumbo et al., 2014). However, at the beginning of the 1980s there was a gradual increase in reported pertussis cases in the US, with cyclical peaks observed every 3-4 years, particularly among the adolescents and adults (Suryadevara, 2015). According to Rumbo, in non-human model it was shown that aP protect against disease but fail to prevent infection and transmission. Since the modification of the pertussis vaccination from whole-cell vaccine to the Diphtheria-Tetanus-acellular Pertussis (DTaP), children are more at risk of acquiring pertussis in comparison to infants who received the whole-cell vaccine (Sedighi, 2016).

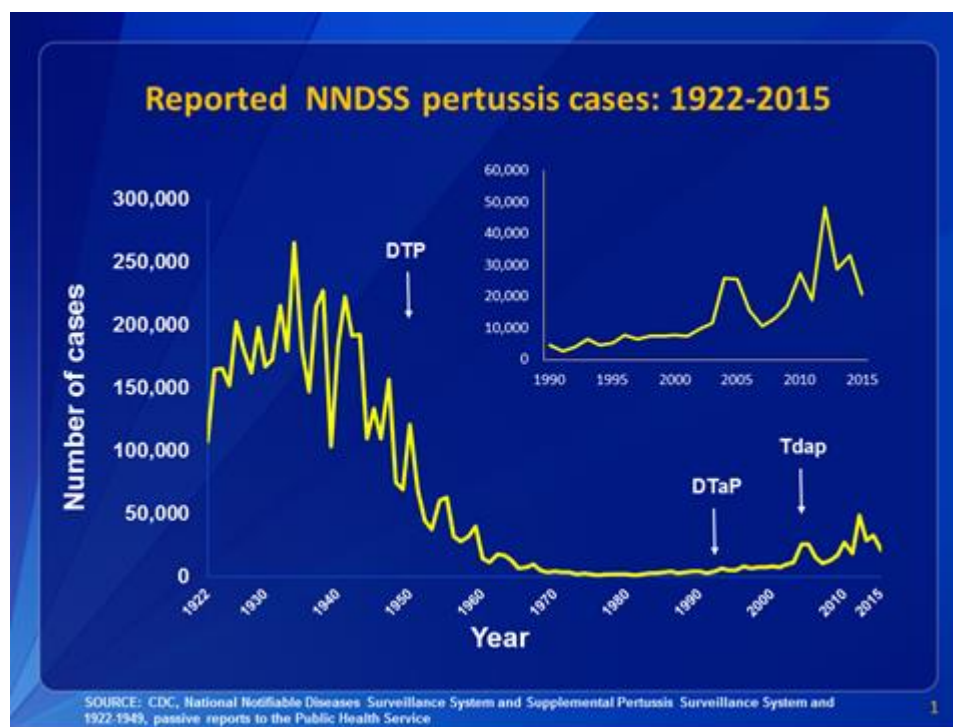


Figure 1. Reported NNDSS pertussis cases: 1922-2015. DTP vaccine introduced in 1940's as indicated by the arrow resulted in a sharp decline of Pertussis cases. DTaP was introduced in the 1980's, indicated by the arrow. As the number of cases started to increase a booster vaccine was introduced in 2005.

Five doses of the DTaP vaccination should be given in the following ages: 2, 4, 6, and 15 through 18 months and at 4 through 6 years of age (CDC, 2016). The tetanus-diphtheria (Td)

vaccines are given to adolescents and adults every 10 years as a booster or after being exposed to tetanus. On the other hand, the Tdap is very similar to the Tetanus diphtheria (Td) the only difference that the Tdap vaccine also offers protection for pertussis. According to the Centers for Disease Control and Prevention, the Tdap is recommended for adolescence between 11 through 18 years old. Pregnant women are recommended to receive the Tdap during the 27 through 36 weeks of pregnancy (CDC, 2016). Pertussis immunization does not provide immunity for life, therefore, it is necessary for immunization boosters to be administered to adults especially for those who work or live with children.

There are a number of factors that contribute to the high number of pertussis cases. The two most common are the following: the whooping cough vaccine received as a child eventually wanes, leaving teenagers and adults susceptible to re-infection. Secondly, children that are not fully vaccinated with at least three shots, leave children at greatest risk of contracting pertussis (Mayo, 2015). In 2014, the United States reported the highest number of cases occurring within people between 11 to 19 years of age, and adults older than 22 years (Table 1). However, more than half of the reported pertussis deaths in 2014 were infants younger than three months. In Texas alone, there were 2,576 cases per 100,000 (CDC, 2014). According to the Texas Department of State Health Services, in 2015 there were 300 pertussis cases in children under the age of 1, and 287 cases in children between ages 1 and 4. This is the age group in which most cases occurred in Texas for the past few years. According to the City of El Paso Department of Public Health, El Paso County had 73 cases of pertussis in 2013. Even though the numbers of pertussis cases are relatively low compared to other cities in Texas, there is a potential for misdiagnosis or non-reported cases.

Child daycare centers have been part of many families for many centuries. In the United States, daycare centers have existed for centuries as in many other countries, daycare centers are

fundamental support for the parent(s) to fulfill with their economical responsibilities. In 1893, a group of prominent New York philanthropists led by Josephine Jewell Dodge, set up a Model Day Nursery in the Children's Building at the World's Columbian Exhibition in Chicago, which led to create the National Federation of Day Nurseries (NFDN). This was the first nationwide organization devoted to the child daycare issue in 1898 (Michel, 2011). This organization created a different perspective towards daycare centers for many people. Daycare centers were seen as unthinkable because people could not agree that someone outside a family member could care for a child. Even in the 21st century, many people still do not agree or believe that daycares are a necessity, although more and more families are depending on daycare centers.

According to the Texas Department of Family and Protective Services, in the El Paso County there are 202 Licensed Center-Child Care Centers. However, this number is expected to increase as the population of El Paso county is projected to grow by a 69.7 % between 2000 and 2040 (The BorderPlex Alliance, 2010). As the child daycare services increases in demand, it is vital for this type of business to follow proper health care policies. Prior to entry, attendance, or transfer to a child-care facility the following immunizations are required: DTaP, Polio, HepB, Hib, CV, MMR, Varicella, and HepA, are required according to the child's age (DFPS, 2016).

Child daycare centers require that their employees fulfill with training hours in promoting a healthier environment for everyone in the daycare. According to Title 40, Social Services & Assistance, Part 19, Department of Family and Protective Services, "Minimum Standards for Child-Care Centers" states: Required Postings While there are no clock hour requirements for the topics in this subsection, the annual training hours must also include training on "Preventing and controlling the spread of communicable diseases, including immunizations (DFPS, 2016). Child daycare centers have an enormous influence on the children's health, which is important to maintain daycare staff and management informed on how to prevent communicable diseases.

CHAPTER 4: GOALS AND OBJECTIVES

Goal

The goal of this study was to promote awareness of pertussis within daycare staff and management in the three areas of El Paso, Texas. In addition, providing educational intervention about pertussis infection and related risk factors in children under the age of four attending a child daycare in El Paso, Texas.

Objective

The objective of this study was to: 1) investigate pertussis knowledge among the staff and management of daycare centers in El Paso, located in the West, East and Central areas, and 2) create an educational program as the intervention tool between the Pre-Test and the Post-Test.

CHAPTER 5: STUDY AIMS AND QUESTIONS OF INTEREST

Study Aims

This study evaluated the knowledge of pertussis in daycare centers' staff and management in El Paso, Texas. In addition, the findings were compared within the three areas of El Paso, Texas: West, Central and East, in order to investigate if there was a significant difference between the areas. The purpose of this study was to 1) utilize a test to evaluate the knowledge of pertussis infection in daycares in the El Paso area, 2) determine the level of knowledge, 3) compare the data collected among the three geographic areas of El Paso, Texas, and 4) create an educational program.

Questions of Interest

This study conducted a Pre-Test and a Post-Test investigation to all the volunteered participants, as a knowledge scale for pertussis knowledge. These both tests contained the same five questions of interest that were utilized to compare a possible increase of pertussis knowledge in all three areas of El Paso, Texas. The questions of interest were the following: 1) Are you familiar with pertussis? (Whooping cough), 2) Is Pertussis contagious?, 3) What are the symptoms of Pertussis in children? 4) Does immunity to pertussis vaccination last forever? and 5) How do you find out if you have pertussis?

CHAPTER 6: METHODS AND MATERIALS

Study Population

Proportional random sampling technique was used to recruit selected daycares from all three geographic areas West, Central and East El Paso (Figure 1). Staff and management from different daycare centers were provided with an informed consent form if they accept to participate in the study.

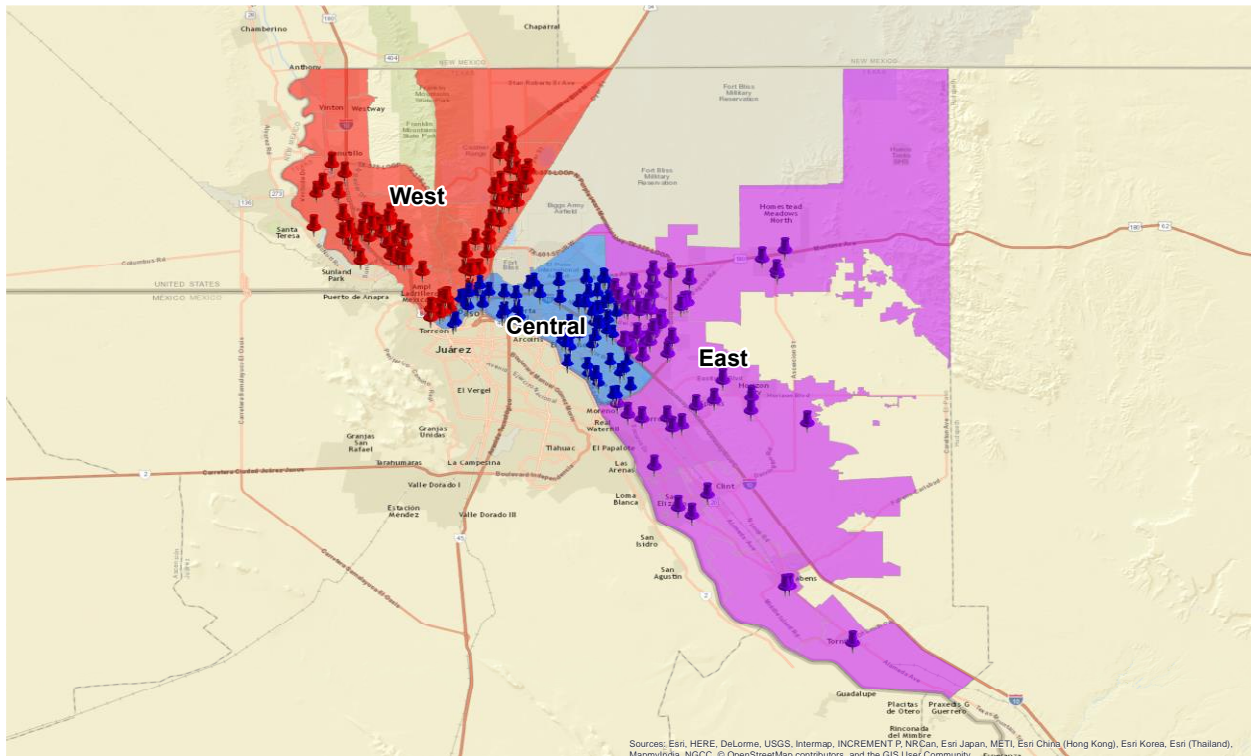


Figure 2. El Paso Texas Region: the red is the West, the blue is the Central area and the purple is the East area.

Study of Participants

A daycare map of the El Paso Texas region was created including only fully accredited daycare centers, registered under the Department of Family and Protective Services in Texas, that provide services to children under the age of four. The El Paso, Texas region were divided into three areas: West, Central and East based on the zip codes where the centers are located as shown in Table 1.

Table 1. El Paso Texas Licensed Center-Child Care grouped by zip codes.

Zip Codes	West	Central	East
	79902, 79904, 79912, 79922, 79924, 79930, 79932, 79934	79901, 79903, 79905, 79907, 79915, 79925, 79935	79836, 79838, 79849, 79853, 79927, 79928, 79936, 79938

Proportional random sampling was calculated utilizing the rule of three equations for each of the three areas (Table. 2). The Sample Population number was calculated with a confidence level of 95% and a confidence interval of five for a population number of 202 daycare centers, with an estimated population sample of 133 facilities to participate in the study, which they will be randomly selected by the operational system in the website Random.org. The participants were comprised of the staff and management of centers providing services to children from newborn to four years old, registered with the Department of Family and Protective Services. One participant per center was invited to participate in the study.

Table 2. El Paso Texas Licensed Center-Child Care facilities based on zip codes.

Participation	West	Central	East	Total
Licensed-Center Child Care Programs (Full Permit)	76	68	58	202
Sample Population %	38%	33%	29%	100%
Sample Population #	50	44	39	133

Test administration

The tests were administered from December 2016 to February 2017, by the investigator. The Pre-Test and the Post-Test were utilized to evaluate the pertussis knowledge in selected centers, during the participant's working hours. Prior to asking the participants a formulary of questions, they were asked to sign a consent form as a requirement to participate in this investigation.

Study Design

This is a pilot quantitative pre-post study design. Each variable has a descriptive analysis consisting of tables and figures to best describe the knowledge of pertussis infection among the staff and management of daycare centers. Participants scores were compared from the Pre-Test to the Post-Test, after completing the educational intervention in order to analyzed the scores for a significant difference. The data obtained from the three geographic areas were compared and analyzed using the SPSS statistical program. This investigation utilized a multivariate analysis.

This study was completed in three stages. For the first stage (Pre-Test), participants were asked to complete a questionnaire to assess level of knowledge on pertussis and also demographic information. The second stage consisted of an intervention composed of a short educational presentation on general information on pertussis, immediately after completing the Pre-Test. The investigator provided the participants with a brief PowerPoint handout, and a pertussis pamphlet, designed by the CDC, as shown in Appendix 3. At the completion of the intervention, that in average took five minutes, the participants were introduced to the third stage (Post-Test). The Post-Test was provided to the participants to assess changes in level of knowledge from the Pre-Test level. Participant's scores were compared from the Pre-Test questionnaire to the Post-Test questionnaire to identify a significant difference. Furthermore, data was obtained also to compare geographical locations on their Pre-Post average scores. The investigator was present while the tests were being administered in case of further questions on the investigation.

Tests Scores

In both tests (Pre-Test and Post-Test), the participants will be asked the same five questions of interest. The participant has the opportunity to acquire one point for each question he or she obtains right, with the maximum score of five points per test, as shown in Appendix 1.

Question one asked; how familiar are you with pertussis? This is a question that shows how aware the participant is on pertussis. The participant had the opportunity to obtain one point if they selected: “Somewhat familiar” or “Very familiar”. Although if the participant selected “Not sure what pertussis is”, no points were obtained.

Question two asked; is pertussis contagious? Is crucial to know that pertussis is an extremely contagious disease, in order to take the proper measures in preventing possible exposures. Three answers were offered to the participant; “No”, “Yes”, and “I do not know”. One point was only acquired for this questions if they answered “Yes”.

Question three asked; what are the symptoms of pertussis in children? Being able to identify the symptoms of pertussis can prevent future exposure and proper treatment. The participants were given the following answers: runny nose, fever, occasional cough, apnea, paroxysms (fits of cough), vomiting, and exhaustion, with the option in selecting more than one answer. If all the options were selected, it was considered “Correct”, but if they had selected at least one answer, it was considered “Partially Correct”. One point was obtained if it was answered correctly or partially correctly, no points were given in the question was left unanswered.

Question four asked; is immunity to pertussis vaccination last forever? Immunity to pertussis due to vaccination does not last forever, it is required for adults to receive the “Booster” vaccination every ten years and for pregnant women to have the vaccination during their third trimester. Three answers were presented to the participant; “No”, “Yes”, and “I do not know”. One point was only acquired for this questions if they answered “No”.

Question five asked; how do you find out if you have pertussis? Recognizing the proper techniques used to diagnose pertussis is essential to promote early detection. The participants were given these answers: Nose or throat culture, Chest X-ray, and Observational judgment by

clinician. With the option in selecting more than one answer. If all the options were selected, it was considered “Correct”, but if they had selected at least one answer, it was considered “Partially Correct”. One point was obtained if it was answered correctly or partially correctly, no points were given in the question was answered “I do not know”.

CHAPTER 7: RESULTS

Based on the 133 centers that were randomly selected and invited from the sample population for the West, Central and East areas of El Paso, Texas only 72 (54%) centers agreed to participate in the study. Forty centers agreed to participate from the West area, 17 from Central and 15 from the East area, as shown in Table 3.

Table 3. Child daycare center rate of participation by area.

Participation	Central	East	West	Total
Invited Centers	44	39	50	133
Participating Centers	17	15	40	72
Participating Percentage	39%	39%	80%	54%

Table 4 shows the demographical characteristics of the participants; almost 96% of participants were female, more than half of the participants were staff, over 83% were Hispanic and 43% of them had 6 to 10 years of experience working in a child daycare. Although, there is no study that correlates demographics to pertussis knowledge.

Table 4. Participants Demographic Characteristics

Parameter	Level	Central (n=17)	East (n=15)	West (n=40)	Total (N=72)
Gender	Female	17	13	38	69
	Male	0	1	2	3
Job Title	Staff	12	13	26	51
	Management	5	12	14	21
Ethnic Group	Hispanic	16	13	31	60
	Non-Hispanic	1	2	9	12
Age range (years)	18-30	6	1	4	11
	31-40	2	10	14	26
	41-50	5	3	15	23
	51-60	4	1	5	10
	>61	0	0	2	2
Highest Education Level	High School diploma/GED	6	6	15	27
	Some College	8	6	14	28
	Associate degree	3	3	8	14
	Bachelor degree	0	0	3	3
Years of Experience	<5	4	8	8	20
	6-10	4	5	22	31
	11-20	7	2	6	15
	>21	2	0	4	6

Figure 3. shows the percentages from question one in the Pre-Test and Post-Test: “Are you familiar with pertussis?” For the Pre-Test, the East area had the highest number of participating answering either “Somewhat Familiar”, compared to the West and Central area. The Pre-Test-Total shows that 51% answered “Somewhat Familiar”. In the Post-Test, the West area had the highest percentage of “Somewhat Familiar”, compared to the Central and East area. The Post-Test Total demonstrated that over 88% of all the participants, answered “Somewhat Familiar”, an increase of 37% from the Pre-Test Total to the Post-Test-Total.

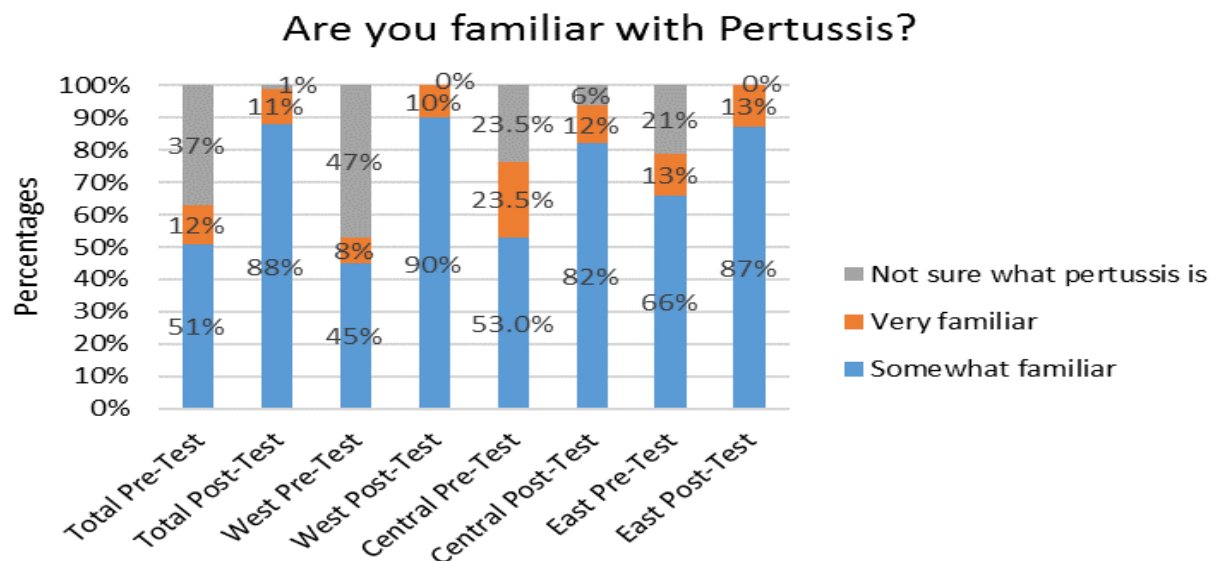


Figure 3. Comparison between areas in Pre-Test and Post-Test results to question 1

Figure 4. shows the results from question two in the Pre-Test and Post-Test: Is pertussis contagious? The Pre-Test results shows that the West area had the highest percentage of participants answering “Yes”, compared to the East and Central area. The Pre-Test Total shows that 50% of the participants answered “Yes”. The Post-Test results displays that the West and

Central areas both had the same highest percentage with 88% of participants answering “Yes”, when compared to the East area. The Post-Test Total shows that over 85% of all the participants, answered “Yes” an increase of 35% from the Pre-Test Total.

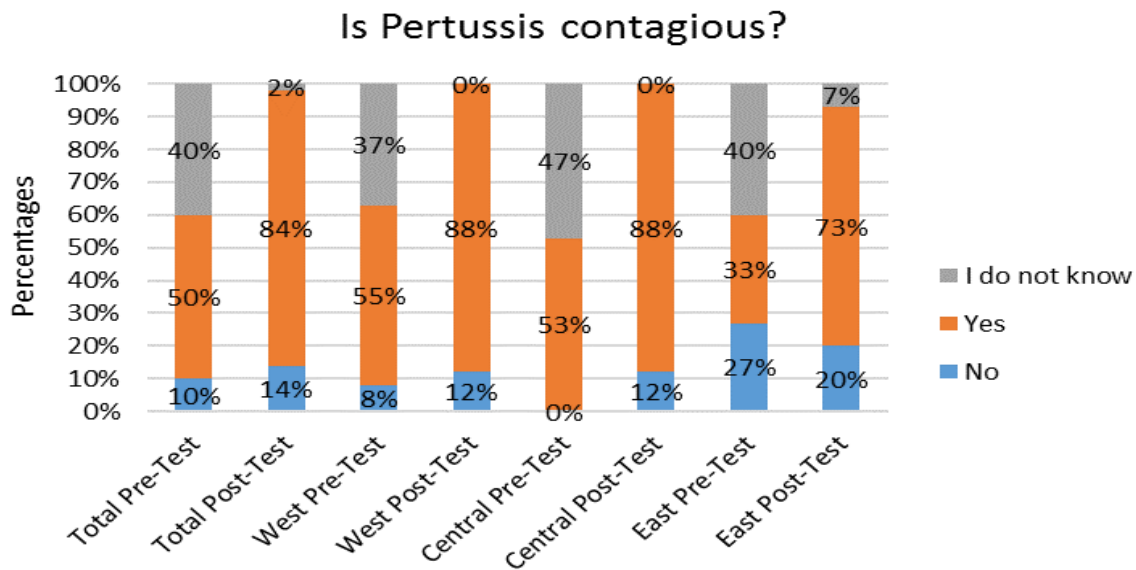


Figure 4. Comparison between areas in Pre-Test and Post-Test results to question 2

Figure 5. shows the results from question three in the Pre- Test and Post-Test: What are the symptoms of pertussis? The Pre-Test display that the East area had 100% of participating answering “Partially Correct”, compared to the West and Central area. The Pre-Test Total shows that 93% of the participants answered “Partially Correct” and 5% answered “Correct”. Although, the results from the Post-Test shows that the Central area had 100% of the participants answering “Correct”, when compared to the West and East area. The Post-Test Total shows that 76% of the participants answered “Correct” an increase of 71% from the Pre-Test Total.

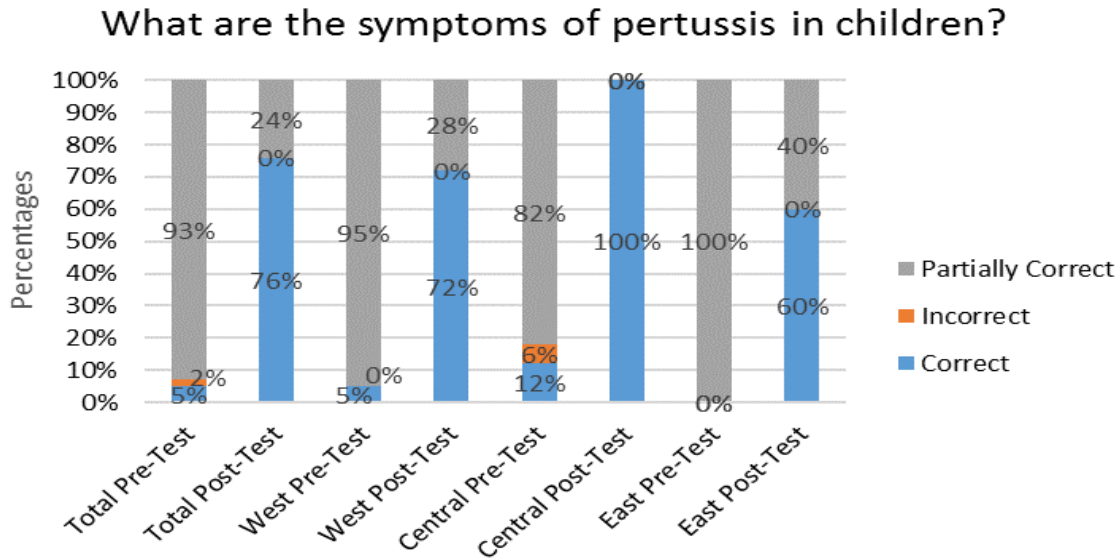


Figure 5. Comparison between areas in Pre-Test and Post-Test results to question 3

Figure 6. shows the results from question four in the Pre-Test and the Post-Test: Does immunity to pertussis vaccination last forever? The Central area had the highest percentage of participants answering “No”, compared to the West and East area. The results from the Post-Test shows that the West area had the highest percentage, although the Central and East area were tight with the same 94% of participants answering “No”. The Post-Test Total shows that 94% of the participants, answered “No”, an increase of 55% from the Pre-Test Total.

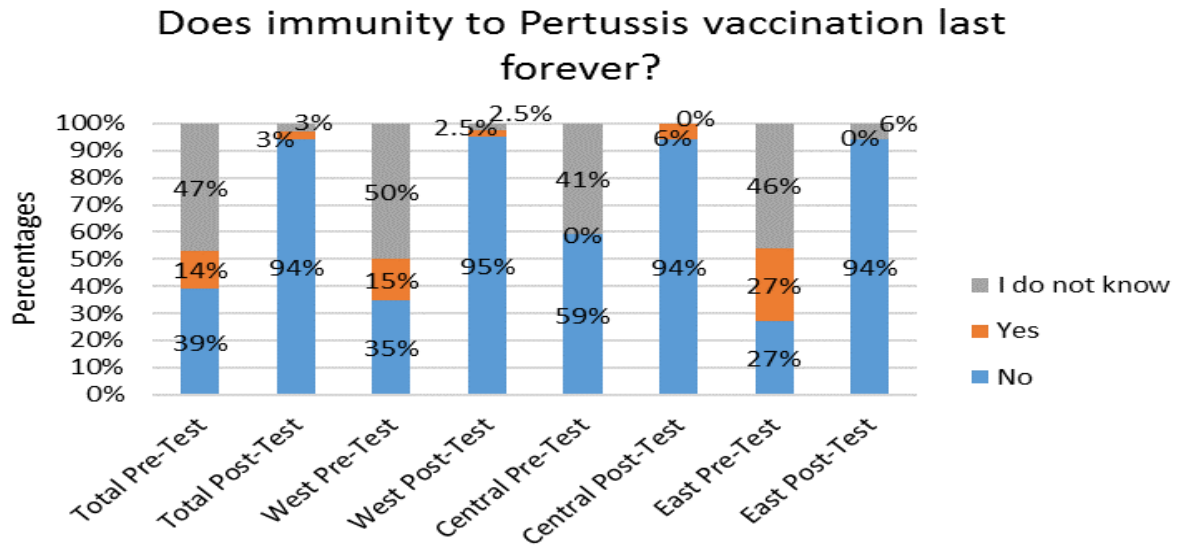


Figure 6. Comparison between areas in Pre-Test and Post-Test results to question 4

Figure 7. shows the results from question five in the Pre-Test and Post-Test: How do you find out if you have pertussis? The Pre-Test demonstrated that the West and East area had 100% of the participants answered “Partially Correct”, compared to the Central area. The Post-Test shows that the Central area had 100% of the participants answered “Correct”, compared to the West and East area. The Post-Test Total shows that 82% of the participants answered “Correct”, an increase of 75% from the Pre-Test Total.

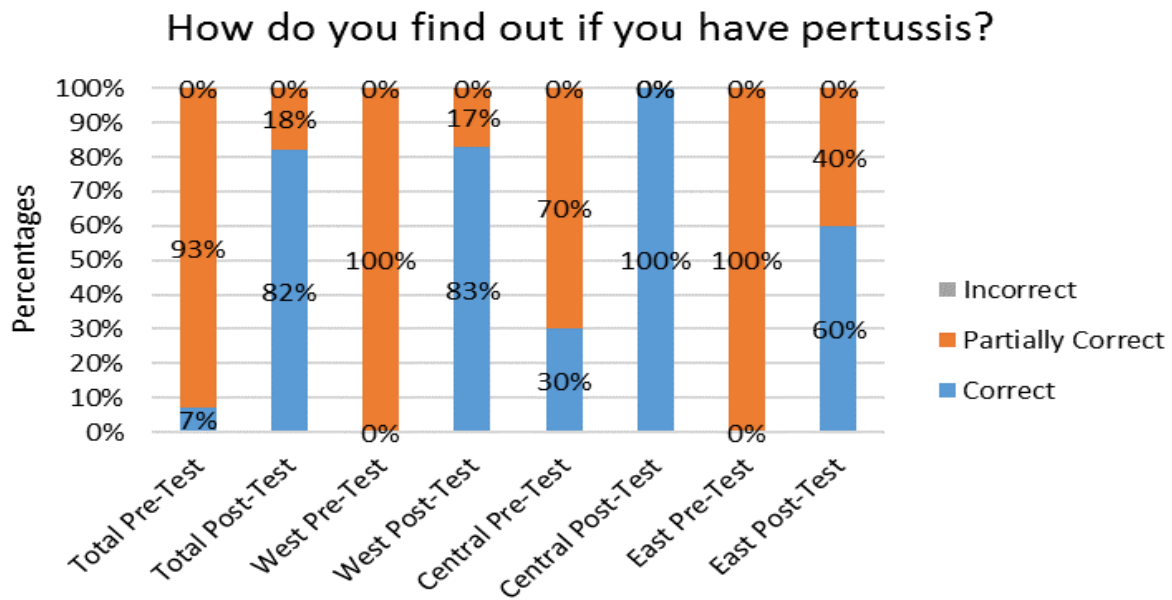


Figure 7. Comparison between areas in Pre-Test and Post-Test results to question 5

According to the participating child daycare scores from all three areas of El Paso Texas, the West area had the lowest pertussis knowledge average score of 3.42 out of 5, from the Pre-Test scores. The Central area had the highest score of 3.82 out of 5, followed by the East area with a 3.46 score in the Pre-Test scores. However, the West area had the highest increase of pertussis knowledge with a score of 4.8 out of 5 in the Post-Test scores, followed by the Central area with a 4.76 and the East side with a 4.66 score, as shown in Table 5.

Table 5. Pre-Score and Post-Score: Participants pertussis knowledge scores

Parameter	Level	Central (n=17)	East (n=15)	West (n=40)	Total (N=72)
PRE-SCORE	1 of 5 Correct- Lowest Score	0	0	0	0
	2 of 5 Correct	3	3	6	12
	3 of 5 Correct	2	5	14	21
	4 of 5 Correct	7	4	17	28
	5 of 5 Correct- Highest Score	5	3	3	11
PRE-SCORE AVG.		3.82	3.46	3.42	3.57
POST-SCORE	1 of 5 Correct- Lowest Score	0	0	0	0
	2 of 5 Correct	0	0	0	0
	3 of 5 Correct	1	0	0	1
	4 of 5 Correct	2	5	8	15
	5 of 5 Correct- Highest Score	14	10	32	56
POST-SCORE AVG.		4.76	4.66	4.8	4.74

Data suggest that the participants did learn from the positive exposure “Intervention”, from the Pre-Test to the Post-Test. There was a significant difference answering correctly from the Pre-Test to the Post-Test in all three areas of El Paso, Texas. The West area had a p-Value of 1.480E-14, the Central area had a p-Value of 0.0015, and the East area had a p-Value of 0.00022, which are less than the level of significance ($\alpha = 0.05$).

CHAPTER 8: DISCUSSION

Based on the 72 participating daycares, the awareness of pertussis in the El Paso, Texas, community is alarming. The results demonstrated that during the Pre-Test the participants had a lower knowledge of pertussis than in the Post-Test results. This indicates that the level of education on pertussis that these daycare centers are being provided, if any, is not enough. The Pre-Test average score difference of pertussis knowledge in the participants from all three areas were only decimals apart, as well as in the Post-Test score average, all three areas had a difference of decimals. This is an opportunity for future research to be conducted on what is the criteria to make policy changes in daycare staff and management on preventable diseases. Prior to the Pre-test being conducted, the majority of the participants felt unprepared and many unwilling to answer due to not being familiar with pertussis.

However, the daycares that refused to participate were due to many reasons, but the most common was due to not wanting to sign the consent form. It was explained to the participant that the investigation was anonymous, and that there was not going to be any records of the center's name being associated with the test's results, but there was still hesitation. Many of the participants when they were half way through reading the consent form, expressed that they did not feel comfortable providing their names and that the consent form was not friendly. Even though it was explained to them the reason why their name was required, the majority of them still refused to signing the form. Due to the fact that participation in this study was voluntary, it was very challenging to motivate possible participants since grand majority of them have never been part of a study like this before.

Educational programs should be offered to this type of care providers in El Paso communities. The positive increase of pertussis knowledge in all three areas of El Paso,

demonstrates that there is a willing to learn preventative measures, if there is more exposure in their workplace. Creating importance between disease awareness information and daycare centers is crucial in increasing alertness and lowering spread of preventable diseases in children. The presentation that was provided to the participants by the investigator proved to have significantly increased pertussis awareness in the daycare staff and management.

Potential Strengths and Limitations

The strength of this investigation is that there has not been a study conducted on pertussis knowledge in the child daycare centers in El Paso, Texas. This study provided awareness and education, and potentially reduced cases of pertussis in the El Paso area. A limitation of this study is the possible biases obtained from the data collected due to self-reported answers. Since many of the participants were in charge of more than one children at a time, the Post-Test was given right after the intervention was completed, due to the time limit, that may have also affected as a time bias. An additional limitation of this study was that the outcomes may not represent other geographical areas. The investigator decided to include the consent form in the study, in order to keep documentation of participants agreeing to participate in the study. Although, the consent form became a limitation as many possible participants hesitated to sign the form due to not feeling comfortable providing their names. Another limitation was that many of the staff members were in charge of taking care of more than 4 children and did not had the time to complete the entire study. Finally, outcomes from this study may not be suitable to other child daycare facilities throughout the United States due to following different standards, and State laws.

CHAPTER 9: CONCLUSION

This study investigated the pertussis level of knowledge in three areas of El Paso, Texas, with a participation of 72 child daycare centers. The Pre-Test and Post-tests were created to evaluate a potential increase on pertussis knowledge level from the pertussis presentation. It was expected for participants to have low pertussis knowledge since is not a requirement for their daycare license to attend any preventative disease classes or presentations. According to the results of this study, the participating centers showed to have increased their awareness to the pertussis infection from the Pre-Test to the Post-Test. Due to the increase of pertussis awareness, participants learned general information and risk factors for children under the age of four. All three areas of El Paso, Texas, had a significant difference of pertussis knowledge from the Pre-Test to the Post-Test. According to the results from this investigation, data suggest that the participants did learn from the presentation's positive exposure, with significant difference in participants answering correctly. In addition, the results also demonstrated that there was an interest from the participants in learning about pertussis.

There is a necessity for this type of occupation to have more access to educational trainings in preventative care, especially when working with vulnerable population such as children. Collaboration with local Public Health departments, is a possible solution in overcoming barriers of knowledge and access to services near them. Child daycare management should reach out to health care providers for possible educational presentation for their staff, with the ultimate goal in creating awareness. It is alarming that many of the child daycare providers did not considered pertussis to be contagious, which led to the assumption that they also do not know how deadly this disease can be to children.

More studies need to be conducted in the community of El Paso, Texas, because there have not been any studies done on daycare facilities in this border region that investigates preventable diseases knowledge. As previously mentioned, the city of El Paso is continuously growing, which also increases the demand on more centers in a community where both parents, or single parents work. Every child deserves to grow in a healthy environment, which means that everyone in the community needs to work together in making this community a better place for future generations.

STRATEGIC FRAMEWORK

The Healthy People platform has established benchmarks as well as maintained progress over three decades, on a science-based program that aims to improve all American's health. Healthy People follow a 10-year agenda in identifying health improvements nationwide, creating measurable objectives and goals applicable at national, state, and local levels. Healthy People 2020 objectives that relate to pertussis prevention measures will be examined in this study. The Immunization and Infectious Disease objectives focused on pertussis in children and adolescents include: a) reduce cases of pertussis among children under 1 year of age, b) reduce cases of pertussis among adolescents aged 11 to 18 years, c) maintain the vaccination coverage level of 4 doses of diphtheria-tetanus-acellular pertussis (DTaP) vaccine for children in kindergarten, d) maintain an effective vaccination coverage level of 4 doses of the diphtheria-tetanus-acellular pertussis (DTaP) vaccine among children by age 19 to 35 months, e) increase the vaccination coverage level of 1 dose of tetanus-diphtheria-acellular pertussis (Tdap) booster vaccine for adolescents by age 13 to 15 years (Healthy People, 2016).

MPH CORE COMPETENCIES

Biostatistics: Biostatistics is the development and application of statistical reasoning and methods in addressing, analyzing and solving problems in public health; health care; and biomedical, clinical and population-based research.

Biostatistics will assist in applying descriptive techniques to summarize public health data in the child daycare centers about pertussis knowledge among staff and management. Interpretations of results from statistical analysis will be instrumental in the comparison and evaluation of pertussis knowledge within the three regions of El Paso, TX. In addition, biostatistics will assist in applying basic informatics techniques in public health records for the description of the El Paso TX population characteristics.

Epidemiology: Epidemiology is the study of patterns of disease and injury in human populations and the application of this study to the control of health problems.

Epidemiology will assist in identifying the public health problems with pertussis in terms of cases, and possible lack of awareness within child daycare centers in the three regions of the El Paso, Texas, area. Furthermore, epidemiology will contribute in calculating measures such as comparing pertussis cases in the United States, Texas, and in the city of El Paso.

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APPENDIX 1

Pertussis also called Whooping Cough Test

You are being asked to participate voluntarily in a research project. Please take your time to read carefully the study, before you decide to participate. Please read the consent form before making your decision on accepting to be part of this research project. Please do not hesitate to ask the investigator for any concerns you may have regarding the questionnaire or any information about the investigation. After reading carefully the study and signing the consent form, you are accepting to answer a questionnaire and complete it with the best of your knowledge. Please read the questions very carefully and answer them by checking in the blank box next to the right answer for all questions. There will be questions that may have more than one answer.

Population: Child Daycare Centers in El Paso Texas.

1. What category does your job title fall under?

- ☐ Staff
- ☐ Management

2. What gender do you consider yourself?

- ☐ Female
- ☐ Male
- ☐ Prefer not to answer

3. Your age range is?

- ☐ 18- 30 years of age
- ☐ 31- 40 years of age
- ☐ 41- 50 years of age
- ☐ 51- 60 years of age
- ☐ Older than 61 years of age

4. What is your ethnicity?

- ☐ Hispanic
- ☐ Non-Hispanic
- ☐ Unknown
- ☐ Preferred not to answer

5. What is your race?

- ☐ White
- ☐ Black
- ☐ Asian/Pacific Islander
- ☐ Native American
- ☐ Unknown
- ☐ Preferred not to answer

6. What is your highest level of education?

- ☐ Less than high school
- ☐ High school diploma/ GED
- ☐ Some College
- ☐ Associate degree
- ☐ Bachelor degree
- ☐ Graduate degree
- ☐ Doctoral degree

7. How many years of experience do you have working at a Child daycare?

- ☐ Less than 5 years
- ☐ 6 – 10 years
- ☐ 11- 20 years
- ☐ More than 21 years

8. What age group does your Daycare provide services to?

- ☐ New born to 18 months
- ☐ 2 years to 4 years
- ☐ 4 years and older
- ☐ All

9. Are you familiar with Pertussis? (Whooping cough)

- ☐ Somewhat familiar
- ☐ Very familiar
- ☐ Not sure what Pertussis is

10. Have you received information about pertussis in your job?

- ☐ Yes
- ☐ No
- ☐ I do not remember

11. Is Pertussis contagious?

- ☐ Yes
- ☐ No
- ☐ I do not know

12. What are the symptoms of Pertussis in children?

(You can select more than one answer)

- ☐ Runny nose
- ☐ Fever
- ☐ Occasional cough
- ☐ Apnea
- ☐ Paroxysms (Fits of cough)
- ☐ Vomiting
- ☐ Exhaustion

13. Does your Daycare require DTaP vaccination?

- ☐ No
- ☐ Yes
- ☐ I don't know

14. What are the age ranges required for DTaP vaccination at your Daycare Center?

(Select all those that apply)

- ☐ 2 months
- ☐ 4 months
- ☐ 6 months
- ☐ 15-18 months
- ☐ 4-6 years
- ☐ I don't know

15. Are you required to have a booster vaccination for Pertussis?

- ☐ Yes
- ☐ No
- ☐ I do not know

16. Is there a minimum number of days when a child could return to Daycare after showing Pertussis like symptoms?

- ☐ Yes, how many days? _____

- ☐ No
- ☐ I do not know

17. How often are the children's immunization records updated in the daycare system?

- ☐ Monthly
- ☐ Bimonthly
- ☐ Quarterly
- ☐ Annually
- ☐ Other
- ☐ I do not know

18. Do you know if your Daycare has experienced a Pertussis case before?

- ☐ Yes
- ☐ No
- ☐ I do not know

19. Does immunity to Pertussis vaccination last forever?

- ☐ Yes
- ☐ No
- ☐ I do not know

20. How do you find out if you have pertussis? (May select more than one)

- ☐ Nose or throat culture
- ☐ Chest X-ray
- ☐ Observational judgment by clinician
- ☐ I do not know

Encuesta sobre Tos ferina

Se le ha pedido participar voluntariamente en un proyecto de investigación por favor lea la forma de consentimiento antes de tomar una decisión. Si tiene cualquier duda favor de preguntar a la persona que lleva a cabo la encuesta. Al firmar su autorización usted acepta contestar el cuestionario lo más honestamente posible de acuerdo a la información que usted tiene. Favor de leer las preguntas con mucho cuidado. Hay preguntas que tienen más de una selección.

1. Cuál de las siguientes categorías representa su ocupación?

- ☐ Personal de guardería
- ☐ Supervisor

2. Cuál de las siguientes opciones considera su sexo?

- ☐ Femenino
- ☐ Masculino
- ☐ Prefiero no responder

3. Cuál es su edad?

- ☐ 18- 30 años
- ☐ 31- 40 años
- ☐ 41- 50 años
- ☐ 51- 60 años
- ☐ Mayor de 61 años

4. Cuál es su etnicidad?

- ☐ Hispano
- ☐ No-Hispano
- ☐ Desconocido
- ☐ Prefiero no responder

5. Cuales su raza?

- ☐ Blanca
- ☐ Negra
- ☐ Asiático/ Isleño del Pacifico

- ☐ Indígena Americano o nativo de Alaska
- ☐ Desconocido
- ☐ Prefiero no responder

6.Cuál es su nivel más alto de educación?

- ☐ Menos de Preparatoria
- ☐ Preparatoria/ Diploma equivalente
- ☐ Diplomados/ Título técnico
- ☐ Licenciatura
- ☐ Maestría
- ☐ Doctorado

7. Cuál es su experiencia laboral en guardería?

- ☐ Menos de 5 años
- ☐ 6 – 10 años
- ☐ 11- 20 años
- ☐ Más de 21 años

8. A que grupo de edades proporcionan servicios en su guardería?

- ☐ Recién nacidos a 18 meses
- ☐ 2 años a 4 años
- ☐ 4 años y mayores

9. Que sabe sobre la tos ferina?

- ☐ Algo
- ☐ Definitivo
- ☐ Para nada

10. Ha recibido información sobre la tosferina en su trabajo?

- ☐ Si
- ☐ No
- ☐ No recuerdo

11. Usted considera que la tos ferina es contagiosa?

- ☐ Si
- ☐ No
- ☐ No se

12. Sabe usted cuales son los síntomas de la tos ferina en niños? (Más de una respuesta es correcta)

- ☐ Catarro
- ☐ Fiebre
- ☐ Tos repentina
- ☐ Falta de aire
- ☐ Ataque fuerte de tos
- ☐ Vomito después de toser

13. Requiere su guardería la vacuna de la DTaP?

- ☐ Si
- ☐ No
- ☐ No se

14. Que grupo de edades requiere la vacuna de DTaP en su guardería?

- ☐ 2 meses
- ☐ 4 meses
- ☐ 6 meses
- ☐ 15 – 18 meses
- ☐ 4 – 6 años
- ☐ No se

15. Es requerido por su guardería tener la vacuna de refuerzo para la tos ferina?

- ☐ Si
- ☐ No
- ☐ No se

16. Hay algún mínimo de días en el cual los niños no pueden ser admitidos en la guardería por síntomas de la tos ferina?

- ☐ Si, ¿cuantos días? ____
- ☐ No
- ☐ No se

17. Con que frecuencia se actualizan los registros de inmunización en su guardería?

- ☐ Mensual
- ☐ Cada dos meses
- ☐ Cada cuatro meses

- ☐ Anual
- ☐ Otro
- ☐ No se

18. Han tenido un caso de tos ferina en su guardería?

- ☐ Si
- ☐ No
- ☐ No se

19. Después de ser vacunado de la tos ferina se adquiere inmunidad de por vida?

- ☐ Si
- ☐ No
- ☐ No se

20. Como sabe usted que tiene tosferina? (Más de una respuesta es correcta)

- ☐ Cultivo de nariz o garganta
- ☐ Rayos X de pulmón
- ☐ Diagnostico por medico basado en observación
- ☐ No se

Post - Pertussis Test

Please do not hesitate to ask the investigator for any concerns you may have regarding the questionnaire or any information about the investigation. Please read the questions very carefully and answer them by checking in the blank box next to the right answer for all questions. There will be questions that may have more than one answer.

1. Are you familiar with Pertussis? (Whooping cough)

- ☐ Somewhat familiar
- ☐ Very familiar
- ☐ Not sure what Pertussis is

2. Is Pertussis contagious?

- ☐ Yes
- ☐ No
- ☐ I do not know

3. What are the symptoms of Pertussis in children?
(You can select more than one answer)

- ☐ Runny nose
- ☐ Fever
- ☐ Occasional cough
- ☐ Apnea
- ☐ Paroxysms (Fits of cough)
- ☐ Vomiting
- ☐ Exhaustion

4. Does immunity to Pertussis vaccination last forever?

- ☐ Yes
- ☐ No
- ☐ I do not know

5. How do you find out if you have pertussis? (May select more than one)

- ☐ Nose or throat culture
- ☐ Chest X-ray
- ☐ Observational judgment by clinician
- ☐ I do not know

Post - Encuesta sobre Tos ferina

Si tiene cualquier duda favor de preguntar a la persona que lleva a cabo la encuesta. Al firmar su autorización usted acepta contestar el cuestionario lo más honestamente posible de acuerdo a la información que usted tiene. Favor de leer las preguntas con mucho cuidado. Hay preguntas que tienen más de una selección.

1. Que sabe sobre la tos ferina?

- ☐ Algo
- ☐ Definitivo
- ☐ Para nada

2. Usted considera que la tos ferina es contagiosa?

- ☐ Si
- ☐ No
- ☐ No se

3. Sabe usted cuales son los síntomas de la tos ferina en niños? (Más de una respuesta es correcta)

- ☐ Catarro
- ☐ Fiebre
- ☐ Tos repentina
- ☐ Falta de aire
- ☐ Ataque fuerte de tos
- ☐ Vomito después de toser

4. Después de ser vacunado de la tos ferina se adquiere inmunidad de por vida?

- ☐ Si
- ☐ No
- ☐ No se

5. Como sabe usted que tiene tosferina? (Más de una respuesta es correcta)

- ☐ Cultivo de nariz o garganta
- ☐ Rayos X de pulmón
- ☐ Diagnostico por medico basado en observación
- ☐ No se

APPENDIX 2

IRB Approval Letter



THE UNIVERSITY OF TEXAS AT EL PASO
Office of the Vice President for Research and Sponsored Projects
Institutional Review Board
El Paso, Texas 79968-0587
phone: 915 747-8841 fax: 915 747-5931

FWA No: 00001224

DATE: March 18, 2016

TO: Diana Gomez

FROM: University of Texas at El Paso IRB

STUDY TITLE: [880809-1] Evaluation of Pertussis knowledge within the Child daycare staff and management in the El Paso, Texas.

IRB REFERENCE #: College of Health Sciences

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: March 18, 2016

REVIEW CATEGORY: 45 CFR 46.101(b)(2)

APPENDIX 3

Intervention (Pertussis presentation: English)



What is Pertussis?

Presented by:
Diana J. Gomez

THE UNIVERSITY OF TEXAS
AT EL PASO

What is Pertussis?

- ✓ Pertussis is a respiratory infection that is very contagious, caused by the bacterium *Bordetella pertussis*
- ✓ Commonly known as the “whooping cough”
 - ✓ Due to the gasping for air after a fit of coughing
- ✓ Pertussis is predominant in all ages
 - ✓ It can cause serious illness in all age groups specially in babies


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Pertussis Transmission

The whooping cough disease can be transmitted person to person through droplets by coughing or sneezing.

Pertussis is a disease that only affects humans

Pertussis may also be transmitted when sharing breathing space with an infected person



Figure 3: Pertussis (Whooping Cough) Quick Facts, Indiana State Department of Health, August 3, 2016. <http://www.in.gov/isdh/72446.htm>


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Pertussis Symptoms

Early Symptoms

- Low-grade fever
- Mild cough
- Runny nose
- Apnea- Pause in breathing (specially in babies)

Later – Stage Symptoms

- Paroxysms (high – pitched “whoop”)
- Vomiting (after or during coughing)
- Exhaustion


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Pertussis Diagnosis

- **Chest X-ray:** for presence of inflammation or fluid in the lungs, that may lead to pneumonia
- **Nose or throat culture test:** the sample is taken from where the nose and throat meet for evidence of presence of pertussis
- **Observational judgment by clinician:** if the clinician sees that the patient is experiencing commonly known symptoms, further testing should be required before starting any treatment.

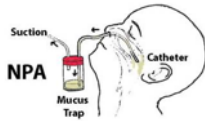


Figure 2: Nasopharyngeal Aspiration (NPA). Clinical Practice Resources & Guidelines. 26 June, 2014. <http://www.cdc.gov/eid/pertussis/NPA.htm>



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How to prevent pertussis?

- The Tdap is for preteens, teens, and adults
 - A single dose of Tdap is recommended for people 11 through 64 years of age
 - Commonly known as the “booster” due to the recommendation to be given every 10 years



Figure 4: “Pertussis: A Known Villain. Are You Protected?” Centers for Disease Control and Prevention. 20 Mar. 2015. <https://www.cdc.gov/publichealthmatters/2015/06/pertussis-are-you-protected/>



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How to prevent pertussis?

- The most efficient method to prevent pertussis is by vaccination:
 - The Diphtheria, Tetanus, and Pertussis (DTaP) vaccination is for babies and children
 - To prevent possible lead to pneumonia, seizures, brain damage, and death
 - Children should get 5 doses of DTaP vaccine, one dose at each of the following ages:
 - 2 months
 - 4 months
 - 6 months
 - 15–18 months
 - 4–6 years
 - DTaP may be given at the same time as other vaccines.



Figure 3: Help Protect Babies from Whooping Cough. Center for Disease Control and Prevention. February 11, 2016. <https://www.cdc.gov/features/pertussis/>



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Vaccines

- DTaP: provides protection against diphtheria, tetanus, and whooping cough
- Tdap: provides protection against tetanus, diphtheria, and whooping cough
- Upper-case letters in these abbreviations denote full-strength doses of diphtheria (D) and tetanus (T) toxoids and whooping cough (P) vaccine. Lower-case “d” and “p” denote reduced doses of diphtheria and whooping cough used in the adolescent/adult-formulations.
- The “a” in DTaP and Tdap stands for “acellular,” meaning that the whooping cough component contains only parts of the bacteria instead of the whole cell.



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Conclusion

- Pertussis is a very contagious respiratory disease that can affect all age groups
- Vaccination is the most effective way to prevent pertussis
- There are two types of vaccinations:
 - DTaP: For children under the age of six (5 doses)
 - Tdap: For teens and adults commonly known as a “booster” (every 10 years)
- There is no immunity for pertussis
- Pertussis diagnosis consists of nose and throat culture, x-ray, and observational judgment by clinician



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Questions



Figure 5



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References

- Diseases and Conditions: Whooping cough. *Mayo Clinic*. (2015) Retrieved from <http://www.mayoclinic.org/diseases-conditions/whooping-cough/basics/definition/con-20023295>
- Pertussis Vaccination. Pertussis (Whooping Cough). *Center for Disease Control and Prevention*. (2015). Retrieved from <https://www.cdc.gov/pertussis/vaccines.html>
- **Figure 1:** Pertussis (Whooping Cough) Quick Facts. *Indiana State Department of Health*. August 1, 2016. <http://www.in.gov/isdh/25446.htm>
- **Figure 2:** Nasopharyngeal Aspiration (NPA). *Clinical Practice Resources & Guidelines*. 26 June, 2014. <http://acuclinic.com.au/pocit/NPA.htm>
- **Figure 3:** Help Protect Babies from Whooping Cough. *Center for Disease Control and Prevention*. February 11, 2016. <https://www.cdc.gov/features/pertussis/>
- **Figure 4:** "Pertussis: A Known Villain. Are You Protected?" *Centers for Disease Control and Prevention*. 20 Mar. 2015. blogs.cdc.gov/publichealthmatters/2012/06/pertussis-are-you-protected/.
- **Figure 5:** Ellen Kay Lettings & Managements Services Ltd. (2015) Retrieved from <http://www.ellen-kay.co.uk/blog>



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Intervention (Pertussis presentation: Spanish)



¿Que es la tos ferina?

Presentado por:
Diana J. Gomez

¿Que es la tosferina?

- ✓Es una enfermedad muy contagiosa causada por un tipo de bacteria llamada *Bordetella pertussis*
- ✓Esta bacteria se adhieren al aparato respiratorio superior
 - ✓Hacen que las vías respiratorias se inflamen
- ✓La tosferina es muy comun en todas las edades
- ✓Pero los bebés son los mas propensos a que la tosferina sea más crónica



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Transmisión de tosferina

La tosferina es una enfermedad muy contagiosa que solo se encuentra en los seres humanos, de persona a persona es la transmisión

La enfermedad de tosferina se transmite a los demás al toser o estornudar, o al pasar mucho tiempo en contacto cercano con personas infectadas, compartiendo el espacio donde respiran.



Figura 1. Pertussis (Whooping Cough) Quick Facts. Indiana State Department of Health. August 1, 2015. <http://www.in.gov/odh/25446.htm>



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Síntomas de la tosferina

Síntomas comunes en niños

Etapas tempranas de la enfermedad

- Moqueo
- Fiebre baja
- Catarro
- Apnea: una pausa en la respiración (en los bebés)

Etapas avanzadas de la enfermedad

- Ataque fuerte de tos
- Vomito después de toser
- Cansancio



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Diagnóstico de tosferina

- **Rayos – X de pulmon:** para detectar inflamación o fluidos en los pulmones
- **Cultivo de nariz y garganta:** la muestra es tomada de donde se une la nariz y la garganta para coleccionar presencia de tosferina
- **Diagnóstico por observacion de representate clinico.** Si el doctor ve que el paciente padece de sintomas comunes de la tosferina, el o ella debe de promover más exámenes antes de empezar con el tratamiento de la tosferina



Figura 2. Nasopharyngeal Aspiration (NPA) Clinical Practice Resources & Guidelines. 26 June, 2014. <http://accuSite.com.au/poc/npa.htm>



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Como prevenir la tosferina

- La mejor manera de prevenir la tosferina es vacunándose:
 - La vacuna contra la tosferina recomendada para bebés y niños se llama (DTaP) para la difteria, el tétanos y la tosferina
 - Ayuda a prevenir posible neumonía, convulsiones, daño cerebral, y muerte
 - Niños menores de seis años deben de tener 5 dosis de la vacuna DTaP, una dosis en las siguientes edades:
 - 2 meses
 - 4 meses
 - 6 meses
 - 15-18 meses
 - 4-6 años
 - DTaP puede ser dada al mismo tiempo que otras vacunas



Figura 3. Help Protect Babies from Whooping Cough. Center for Disease Control and Prevention. February 11, 2015. <https://www.cdc.gov/features/pertussis/>



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Como prevenir la tosferina

- La vacuna Tdap es para pre-adolescentes, adolescentes, y adultos
 - Una dosis de la vacuna Tdap es recomendada para gente de 11 años hasta la edad de 64 años
 - Comunmente conocida como la vacuna "booster" por la razón que es recomendada que se de cada 10 años



Figura 4: "Pertussis: A Known Villain. Are You Protected?" Centers for Disease Control and Prevention. 20 Mar. 2015. blogs.cdc.gov/publichealthmatters/2012/06/pertussis-are-you-protected/.



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Vacunas

- DTaP: Ofrece protección contra la difteria, el tétanos y la tosferina
- Tdap: Ofrece protección contra el tétanos, la difteria, y la tosferina
- La abreviatura de la letra en mayúscula significa máxima fuerza la dosis de la difteria (D) y el tétanos (T) toxoides y la tosferina (P). La minúscula "d" y "p" significa dosis reducidas de la difteria y tosferina utilizadas para los adolescentes y adultos
- La "a" en DTaP y Tdap representa "acelular," que significa que la vacuna solo contiene partes de la bacteria de la tosferina, no la bacteria completa



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Conclusión

- Es una enfermedad muy contagiosa causada por un tipo de bacteria llamada *Bordetella pertussis*
 - La mejor manera de prevenir la tosferina es vacunándose
 - Hay dos tipos de vacunas:
 - DTaP: Para niños menores de seis años (5 dosis)
 - Tdap: Para adolescentes y adultos conocida como "booster" (cada 10 años)
 - No hay inmunidad para la tosferina
- El diagnóstico de tosferina consiste de: Rayos – X de pulmón, Cultivo de nariz y garganta, y Diagnóstico por observación de representante clínico.



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¿Preguntas?



Figura 5: Ellen Kay Lettings & Management Services Ltd. (2015) Retrieved from <http://www.ellen-kay.co.uk/blog>



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Referencias

- Tosferina- Vacunas. Center for Disease Control and Prevention. (2015). Retrieved from <https://www.cdc.gov/pertussis/about/prevention/index-sp.html>
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- Figura 1: Pertussis (Whooping Cough) Quick Facts. Indiana State Department of Health. August 1, 2016. <http://www.in.gov/isdh/25446.htm>
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- Figura 5: Ellen Kay Lettings & Management Services Ltd. (2015) Retrieved from <http://www.ellen-kay.co.uk/blog>



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Intervention (Pertussis information: English-Pamphlet)

Anyone can get Pertussis.



VALUABLE INFORMATION TO HELP
STOP THE SPREAD OF PERTUSSIS

[also known as whooping cough]

ProtectTexas™
Texas Department of Health

Immunization Division
1100 W. 49th Street
Austin, TX 78756-3199
www.ImmunizeTexas.com

CAN ANYONE GET PERTUSSIS?

Adults and teens get pertussis and often give it to babies, causing serious complications.

WHAT ARE THE SYMPTOMS?

Pertussis resembles a cold: runny nose, sneezing, mild fever, and a cough that slowly gets worse.

A cough that lasts several weeks may be the only symptom in adults and teens. After one or two weeks, an infected person may develop "coughing fits" which may last six weeks or longer. Usually, there is no fever. After coughing, infected persons may vomit, have difficulty catching their breath, or become blue in the face from lack of air. The cough is often worse at night, and cough medicines usually do not help. Between coughing spells, an infected person may not appear sick.

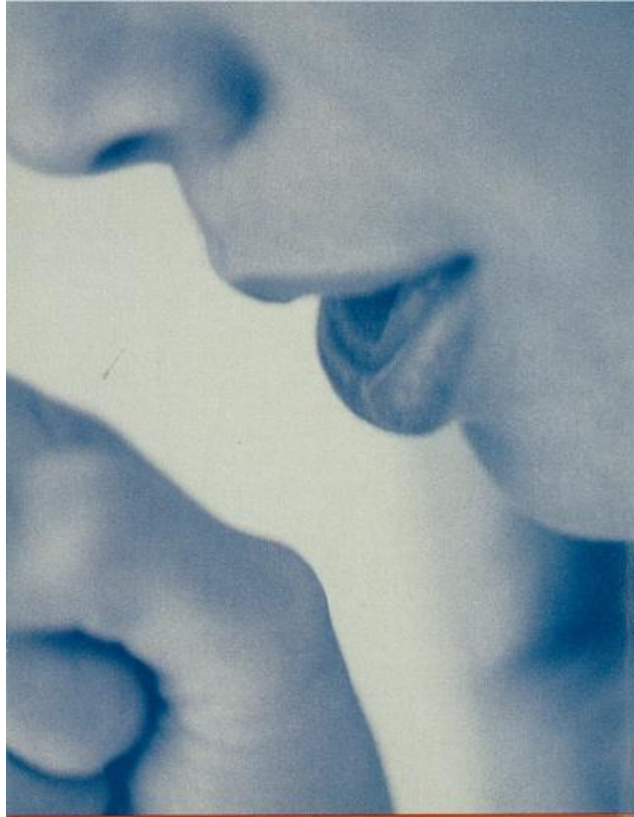
Adults, teens, and vaccinated children often have milder symptoms that mimic bronchitis or asthma. In some cases, babies may develop apnea (failure to breathe) and may die.

*If a cough persists for more than
two weeks, consult your doctor.*



TEENS AND ADULTS CAN GET PERTUSSIS, TOO

"COUGHING FITS" COULD LAST SIX WEEKS OR LONGER



DON'T COUGH AROUND BABIES

HOW IS PERTUSSIS DIAGNOSED?

A doctor may diagnose a patient with pertussis from the symptoms. To confirm the diagnosis, the doctor will swab the back of the nose for laboratory testing. It is important to remember that a patient may have pertussis even though the laboratory test is negative.

HOW DOES PERTUSSIS SPREAD?

Like a cold, pertussis spreads into the air when an infected person sneezes, coughs, or talks. That's when others nearby can inhale the bacteria. Touching a tissue or sharing a cup used by someone with pertussis can also spread the disease. The first symptoms usually appear within 5 to 21 days after the initial infection.

CAN PERTUSSIS BE PREVENTED?

Vaccination of children beginning in early infancy can prevent pertussis. The pertussis vaccine is given in the same shot as the diphtheria and tetanus vaccines (called DTaP). Vaccine cannot be given to babies less than six weeks old or to anyone seven years of age or older. Vaccine protection fades over time.

Household members and others in close contact with an infected person can reduce their chances of getting pertussis by taking antibiotics. Persons who have been exposed to pertussis should take antibiotics even if they have been vaccinated against the disease.

PERTUSSIS IS PREVENTABLE



HOW CAN BABIES BE PROTECTED?

Most hospitalizations and deaths from pertussis occur in infants under three months of age. That's why it is very important to protect them. So, have babies vaccinated, take them to a doctor when they are sick, and keep them away from anyone who coughs.

And remember, a doctor should see any baby that has a cough.

KEEP BABIES AWAY FROM ANYONE WHO COUGHS

IS THE PERTUSSIS VACCINE SAFE?

The pertussis vaccine is safe for most children. Doctors recommend that children get vaccinated at 2, 4, 6, and 15 to 18 months old with an additional shot at four to six years old, for a total of five doses. There is a slight risk of side effects caused by the vaccine, but this risk is small when you consider that pertussis is a very serious disease.

Pertussis causes about 10 to 20 deaths each year in the United States. That's why experts recommend that all babies and children get a full series of DTaP vaccine, unless there are medical reasons not to do so.

WHERE CAN YOU GET MORE INFORMATION?

*Call the Texas Department of Health
Immunization Division at (800) 252-9152*

*or call your doctor, nurse,
or local health department.*

VACCINATE BABIES AT 2, 4, 6 AND 15-18 MONTHS

Intervention (Pertussis information: Spanish-Pamphlet)



¿Es sólo una tos?

¿O es tos ferina?

DEBE VACUNARSE A LOS 2, 4, 6 Y 15 - 18 MESES

ProtectTexas™
Texas Department of Health
División de Inmunización
1100 W. 49th Street
Austin, TX 78756-3199
www.immunizetexas.com

Stock No. TI-11836A - 4/03

¿A quién le da la tos ferina?

La tos ferina le puede dar a cualquiera persona, pero es más común y especialmente peligrosa en los bebés. A veces, los bebés contraen la tos ferina de niños más grandes o de adultos.



¿Cuáles son los síntomas de la tos ferina?

La tos ferina empieza como un resfriado, con mucosidad nasal, estornudos, fiebre ligera y una tos que poco a poco va empeorando. Después de una o dos semanas, la tos por lo general empieza a presentarse en periodos de fuertes "ataques" que pueden durar seis semanas o más. Durante este período generalmente la persona no tiene fiebre. Después de un ataque de tos, la persona infectada podría tener dificultad para respirar normalmente, podría vomitar o la cara podría ponerse de color azul debido a la falta de aire. Con frecuencia la tos empeora por la noche y las medicinas contra la tos por lo general no tienen ningún efecto. En niños pequeños los ataques de tos frecuentemente vienen acompañados por un silbido que les sale del pecho cuando tratan de recuperar el aliento. Los ataques de tos podrían ser tan fuertes que pueden impedirles comer, beber, o respirar. En los periodos sin ataques de tos, la persona frecuentemente parece no estar enferma. El único síntoma de tos ferina que algunos bebés podrían tener es apnea (dejar de respirar). Los adultos, adolescentes y niños vacunados frecuentemente tienen síntomas más ligeros que se parecen a los de la bronquitis o el asma.

POR FAVOR, LLÉVAME A VACUNAR

DEBE VACUNARSE A LOS 2, 4, 6 Y 15 - 18 MESES

¿Cómo se contagia la tos ferina y es peligrosa?

La bacteria de la tos ferina habita en la nariz, boca y garganta y se esparce en el aire en forma de rocío cuando una persona infectada estornuda, tose o habla. Es entonces cuando otras personas cercanas pueden aspirar las bacterias.

Si una persona toca un pañuelo o usa el mismo vaso que usó una persona con tos ferina, también puede contagiarse. Los primeros síntomas generalmente se presentan dentro de un período de 5 a 21 días después de que la persona haya sido contagiada.

La tos ferina puede ocasionar problemas para respirar (apnea), neumonía e hinchazón del cerebro (encefalitis), lo cual ocasiona convulsiones y lesiones en el cerebro. La muerte debido a la tos ferina es poco común, pero se ve más en los bebés.

Los síntomas generalmente se presentan de 5 a 21 días después de que la persona haya sido contagiada.

¿Cómo se diagnostica la tos ferina?

Un doctor puede diagnosticar la tos ferina por medio de los síntomas. Para diagnosticarla de manera definitiva, el doctor toma una muestra de la parte posterior de la nariz para ser analizada por el laboratorio. Es importante recordar que los resultados de estos análisis podrían ser negativos a pesar de que el paciente ya tenga la enfermedad.



LA TOS FERINA PUEDE SER PELIGROSA

DEBE VACUNARSE A LOS 2, 4, 6 Y 15 - 18 MESES

¿Puede prevenirse la tos ferina?

Sí. El contagio de la tos ferina se puede prevenir entre las personas que viven en la misma casa y tienen contacto cercano con personas infectadas si las personas expuestas reciben un tratamiento con antibióticos, aunque ya estén vacunadas.

Vacunar a los bebés también puede prevenir la tos ferina. La vacuna contra la tos ferina se administra en combinación con las vacunas contra la difteria y el tétano en la misma inyección (en inglés se le llama DTaP). La vacuna no puede administrarse a niños mayores de siete años.

Los adultos, así como los niños, a medida de que van creciendo, van perdiendo la protección que brinda la vacuna. La mayoría de las hospitalizaciones y muertes causadas por esta enfermedad son de niños menores de tres meses de edad. Siempre que sea posible, a los bebés se les debe mantener alejados de personas que estén tosiendo. Es importante llevar a los bebés al doctor si se les presenta cualquier tipo de tos.

Mantenga a su bebé alejado de personas que estén tosiendo.

¿Es segura la vacuna contra la tos ferina?

La vacuna contra la tos ferina es segura para la mayoría de las personas, aunque sí existe un riesgo muy pequeño de que en ciertos casos cause alguna reacción negativa, pero la tos ferina es una enfermedad sumamente grave.

En Estados Unidos la tos ferina causa alrededor de 10 a 20 muertes al año. Los expertos recomiendan que todos los bebés y niños se vacunen con la serie completa de la vacuna DTaP a menos que existan razones médicas para no hacerlo.

¿Dónde se puede obtener más información?

Llame a su médico, personal de enfermería, o departamento local de salud de la División de Inmunización del Departamento de Salud de Texas al (800) 252-9152

LA TOS FERINA PUEDE PREVENIRSE

DEBE VACUNARSE A LOS 2, 4, 6 Y 15 - 18 MESES

VITA

Diana J. Gomez was born in El Paso, Texas. Diana is the second child of Josefina Gomez and Juan A. Gomez. She concluded her Bachelor of Science in Biology with a Minor in Chemistry at the University of Texas at El Paso on May 14th 2011. She has previously worked as a Pharmacy Technician since 2012. She is now working at the Department of Public Health under the Emergency Preparedness Program. Fall of 2014 Diana got accepted to the Master of Public Health program at the University of Texas at El Paso.

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This thesis was typed by Diana J. Gomez.