Pediatric Process Paper: P.L.

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Data Collection

Child/Family Description

P.L. is the only child of two parents who are currently married, and live in Boliver, Ohio. P.L.'s parents enjoy participating in community meetings and events that help out their community. P.L. has two cats that live with them at home, named Cotton and Mittens. His maternal grandmother takes care of him while his parents are both working. His mother works in the lingerie section at a large department store at New Towne Mall and his father is a corrections officer at the Tuscarawas Jail. P.L.'s primary health insurance is Aultcare and his secondary health insurance is Buckeye Health, which both are provided through his father's place of employment. His family do not consider themselves part of any specific cultural group. His father was raised Catholic and his mother was raised Baptist, however neither of them find themselves very religious and they do not attend church. P.L. is fifteen months old and his date of birth is July 7, 2010. P.L. has a history of being hospitalized at six months old for RSV, which is believed to be the start of his asthma. He was also hospitalized in the PICU in August of 2011 for viral pneumonia, and is currently hospitalized for an asthma exacerbation with viral pneumonia.

Developmental Assessment

Currently P.L. is in Erickson's autonomy vs. shame and doubt stage, which lasts from one year of age to three years old (Ball, Bindler, & Cowen, 2010; Feldman, 2011). In this stage toddlers tend to begin finding independence. P.L. is staff anxious, especially with people he is not familiar with, and starts crying almost immediately when a stranger would come into his

room. Throughout the day I was able to start gaining his trust through play. We would play with his Elmo doll and he took an interest with my stethoscope when I checked Elmo's heart rate and respirations first. One thing that he never liked me doing, was taking an axillary temperature. I believe this is due to him trying to find independence and I needed to keep his arm down, so the temperature could be as accurate as possible. His gross motor skills appeared to be developing on track as he is able to walk and he played with his toys appropriately. He just started walking by his self one month earlier, which may be a little later than some, but not uncommon. He was developing his fine motor skills, while playing with a stethoscope and placing it on his Elmo doll to listen to the heart while I listened to his. His language appeared to be developing on track. I heard him say mama, dada, no, Elmo, balloon, and juice, and can assume that he says a lot more when not around strangers. In regards to his physical growth charts, he is within the 97% in height for his age, and 25% for weight; however this figure may be inaccurate due to his age. His body mass index was within a healthy weight at the 14.95%.

Nutritional Assessment

On a typical day P.L. eats cereal, such as Cheerios or oatmeal, which provides him with vitamins, minerals, and grains. He enjoys eating yogurt, grapes, mango, or another fruit with his breakfast. Lunch time he usually eats chicken, Parent's Choice puffs, and either broccoli or carrots. For dinner he consumes chicken and sweet potatoes, and a vegetable. For snacks throughout the day he usually has yogurt, animal crackers, or the puffs made by Parent's Choice. His mother and grandmother say he will only eat chicken for his meat and he really likes broccoli and yogurt. Toddlers can be very picky eaters, so I was pleased to hear that he likes vegetables, fruits, and yogurt. For a fifteen month old he appears to be eating adequate enough of

vegetables, fruits, and dairy in his meals. He is a very active toddler who loves to run around the house and play.

Pathophysiology

Asthma is a chronic inflammatory condition, in which the airway constricts leading to a decrease in oxygen entering the lungs. Exposure to a trigger causes the B lymphocytes to produce IgE, which attaches to mast cells and basophiles within the walls of the bronchioles (Deterding, Hay, Levin, & Sondheimer, 2010). The mast cells release inflammatory chemical mediators, histamine, bradykinin, and prostaglandins (Ball et al., 2010; Deterding et al., 2010). These mediators cause the capillaries to dilate leading to increase perfusion into extracellular space, which in turn causes the airway to become edematous. They stimulate the alpha-adrenergic receptors in the bronchi to constrict in order to prevent the allergy (trigger) from getting into the body (Deterding et al., 2010). The mediators increase mucus production, keep the ciliary from functioning correctly, and thicken the walls of the airway (Ball et al., 2010). All of this is happening simultaneously making it more difficult to breath, leading to coughing, wheezing, and or breathlessness to occur (Ball et al., 2010). Asthma remodeling can occur due to chronic inflammation of the airways (Ball et al., 2010; Deterding et al., 2010). Changes in the lungs and airway, due to remodeling are irreversible, and cannot be prevented with available medications (Ball et al., 2010).

Viral pneumonia occurs due to a virus entering the upper respiratory tract. Once there the virus is able to travel into the alveoli, via the bronchi, where they start to replicate. After replicating they “burst out forcefully” killing the cells that surround them (Ball et al., 2010). As a result the airway becomes inflamed and abnormal secretions are produced, leading to the airways

becoming obstructed (Ball et al., 2010). The virus's cells continue to invade and replicate the surrounding tissue within the lungs.

Treatment

Asthma is treated with different types of medications and with prevention of or decreasing the risk of coming in contact with one's triggers. A patient with asthma usually is provided with an individualized asthma action plan. The plan includes medications, the amount, and it specifies in which circumstances you would take them (Caban, Chaffin, Jarlsberg, & Tyne, 2008). Medications are matched to the patient's severity of asthma in order to provide long-term control and management of asthma flares (Ball et al., 2010). Medications for long-term control are anti-inflammatory drugs (Castillo, 2008). These include budesonide, which is a corticosteroid, and leukotriene modifiers, such as montelukast. P.L. is taking Pulmicort Respules (a budesonide) and Singulair (a montelukast) in order to control and manage his asthma. Brochodilators, include short-acting Beta adrenergic agonists, corticosteroids, and anticholinergics, these are used in order to relax the muscles in the bronchials causing the airway to open up (Castillo, 2008). These medications are used as rescue drugs when the patient needs them. P.L. is taking the corticosteroid prednisolone (Pediapred) as his rescue medication in case of an asthma attack occurs. He also has ventolin HFA (Albuterol) treatments every two hours while in the hospital with asthma exacerbation. Patients may also be on inhaled corticosteroids for daily management of their asthma. P.L. is on two different medications for this reason, and they are fluticasone (Flonase) and mometasone (Nasonex). These medications reduce edema in airways, controls seasonal and allergic allergies, and exercise induced asthma (Ball et al., 2010).

Patients may also be given an individualized management plan, which may be based on FEV_1 or PEF parameters. These parameters try to quantify a patient's asthma severity; however the parameters do not include young children like P.L. (Boluyt, Brandy, Moyer, Offringa, & van der Lee, 2007). Patient's are encouraged to drink plenty of fluids to help thin the mucus in the bronchioles so that it can be expectorated and to prevent dehydration (Ball et al., 2010). P.L. also needs rest since he still tries to be active and play, but he has retractions and an increase in respiratory effort. Patients are educated on how to reduce triggers within their home, school, and surrounding environment. Families are encouraged to wash bedding and stuff animal toys weekly in hot water (Deterding et al., 2010). If the patient has pets that are not removed from the home, as P.L. does, then the animals should be kept out of the bedroom (Deterding et al., 2010). Carpet and upholstery should be removed from the bedroom, and a HEPA filter should be brought into the bedroom in order to reduce allergens. Peak flow meters (PFM) can be used for self-monitoring for exacerbations and medication effectiveness (Deterding et al., 2010). According to an article only 14% are people who have a PFM actually use it on a daily basis, versus 40% who only use it during an asthma exacerbation (Bohm, Brown, Korzeniewski, & Reeves, 2006). Families and patients need to be taught how to monitor their asthma with peak flow expiratory rate (PFER), especially to make sure the child is managing their asthma appropriately or if the child is too young to do so correctly. P.L.'s main trigger is respiratory infections, so I educated his family on frequent hand washing and hygiene. Influenza vaccinations should be administered to P.L. and other person's diagnosed with asthma (Sondheimer, 2008). It is also important for P.L. and other children to eat nutritionally, because it can help improve P.L.'s immune system and keep him healthier for fighting infections.

Supportive treatment for viral pneumonia is oxygen administration, fluids, nutrition, and fever control (Sondheimer, 2008). If the patient is high risk then antivirals may be given and the facility may want to isolate the child to prevent spreading the virus to other individuals (Sondheimer, 2008). In P.L.'s case, he was not in isolation and was not given and antiviral medications. He was given oxygen via blow-by due to not willing to keep nasal cannula or mask on his face. He was prescribed ibuprofen for a fever, and fluids and nutrition was emphasized to the family.

Medications

Table 1

Medication (Generic /or Trade)	**Classification & Action**	**Why is your patient taking this drug?**	**Dosage Ordered What's the safe dose Is it safe for P.L.?**	**Side Effects**
acetaminophen (Tylenol)	Classification is analgesic, antipyretic, and nonopioid analgesic. Action is that it inhibits prostaglandin synthesis and inhibits hypothalamic heat- regulator center.	This was administered to P.L. in the emergency room. It was discontinued while P.L. was on the unit. I believe it was given for a fever and pain associated with overuse of chest wall.	Safe dose: 10 – 15 mg/kg/dose Patient's safe dose: 10 mg(10.8 kg) = 108 mg/dose 15 mg (10.8 kg) = 162 mg/dose Dose given in E.R. = 200 mg PO This dose does	Hepatic failure, Hepatotoxicity(overdose), Rash Nausea Vomiting Anorexia Hypoglycemia Oliguria Urticaria Hemorrhage Leucopenia Pancytopenia Renal failure w/ high

			not appear to be safe for P.L.'s weight and age.	doses and chronic use
budesonide (Pulmicort Respules)	Classification: Intranasal glucocorticoid Action Locally acting anti-inflammatory and immune modifier.	Patient is taking for maintenance of asthma.	Safe dose: 0.5 mg bid (Max dose is 1 mg/day) Dose ordered: 0.5 mg bid Yes, patient is on a safe dose.	Headache Otitis media Anaphylaxis Rash Dry nasal mucosa Sinusitis Cough Decreased growth Pharyngitis Rhinitis adrenal suppression
fluticasone nasal (Flonase)	Classification: Corticosteroid Action Locally acting anti-inflammatory and immune modifier.	Patient is taking for allergies that may trigger his asthma.	Safe dose: 1 spray per nostril (Max of 2 sprays per nostril) Dose ordered: 2 sprays Yes, patient is on a safe dose.	Headache Epistaxis Nasal burning Nasal Irritation Pharyngitis Nausea Vomiting Growth restriction Rash Anaphylaxis Adrenal suppression
ibuprofen (Motrin)	Classification: NSAID, propionic derivative. Action is that it inhibits prostaglandin synthesis causing a reduced inflammatory	My patient was ordered this medication for fever.	Safe dose: 5 -10 mg/kg/day (not to exceed 40 mg.kg/d). Patient's safe dose: 4 (10.8 kg) = 43.2 mg/d 10 (10.8 kg) =	Headache GI bleed hepatitis Constipation Nausea Vomiting Dermatitis Dizziness Hypertension Arrhythmias Anaphylaxis Steven-Johnson

	process. End result is pain relief, anti-inflammatory effect, and reduces fever.		108 mg/d 40 (10.8 kg) = 432 mg/d max dose per day. Patient ordered 100 mg PO Yes, this dose is safe for treatment of fever.	Syndrome
mometasone furoate (Nasonex)	Classification: Intranasal glucocorticoid Action Locally acting anti-inflammatory and immune modifier.	Patient is taking for maintenance of asthma.	Safe dose: 1 spray/nostril Dose ordered: 50 mcg/ inhalation, 1 spray/day Yes, patient is on a safe dose.	Headache Vomiting Nasal burning and or irritation Dry nasal mucosa Sinusitis Cough Decreased growth Pharyngitis Rhinitis Adrenal suppression
montelukast (Singulair)	Classification: Bronchodilator, Leukotriene receptor Agonist Action: Binds with leukotriene receptors to inhibit smooth muscle contraction and bronchoconstric-tion.	Patient is taking in order to manage asthma by preventing bronchoconstrict-ion.	Safe dose:4 mg/day Ordered dose: 4mg/ day in a chewable tablet Yes, this is a safe dose for P.L.	Suicidal thoughts Eosinophic condition Fever Headache Fatigue Nasal congestion Sore throat Influenza Abdominal pain Rash
prednisolone (Pediapred)	Classification: Short-acting corticosteroid,	Patient is taking this to help suppress immune	Safe dose: 1-2 mg/ kg/ day divided in 2	Depression Euphoria Headache

	anti-asthmatic Action is that it suppresses inflammation and the normal immune response.	systems reaction to an asthmatic trigger. May also be taking it to decrease inflammation process.	doses (Max of 60 mg/day) Patient's safe dose: 1 mg (10.8kg) = 10.8 mg/day 2 mg (10.8) = 21.6 mg/day Ordered: 10 mg q 12 hours Yes this dose is safe because 10 mg (2 doses/day) = 20 mg/day.	Hypertension Anorexia Nausea Vomiting Acne Decrease wound healing Eccymoses Hirsutism Thromboembolism Petechiae Fragility Adrenal suppression muscle wasting osteoporosis Cushingoid appearance.
ventolin HFA (Albuterol)	Classification: $Beta_2$-adrenergic agonist Action is that it stimulates the $Beta_2$ adrenergic receptors in lungs, which relaxes the bronchial smooth muscles.	Patient is taking this for bronchodilation for treatment of asthma.	Safe dose of 0.15 – 0.3 mg/kg q 1-4 hrs (Max of 10 mg) Patient's safe dose: 0.15 mg (10.8 kg) = 1.62 mg 0.3 mg (10.8 kg) = 3.24 mg Patient ordered 2.5 mg Yes, this is a safe dose for P.L.	Nervousness Restlessness Tremor Bronchospasm Palpitations Chest pain Nausea Vomiting Headache Hyperactivity

Physical Assessment

Upon observation of P.L., I could see retractions, and that he had an increased respiratory effort. He was alert and oriented to his surroundings, and did not have an IV in place. His apical pulse was ranged from 124 when calm up to 144 when upset and crying. The normal pulse rate is 60-110 bpm, therefore his pulse was increased throughout the day. This could be a result of the Albuterol treatments that he received every two hours. P.L.'s respiratory rate was between 38-46 respirations per minute. The normal respiratory rate for a 15 month old is 24-40 respirations per minute, therefore his rate of respirations were elevated at times (Ball et al., 2010). This may have been caused by his asthma exacerbation. His pulse ox remained pretty steady at 95 % on 6 liters of blow-by air. His temperature remained steady at 37.1°C throughout the day. I was never able to obtain a blood pressure on P.L. due to his staff anxiety and the machine not cooperating.

P.L.'s mouth appeared pink and moist, with no abnormal findings. His ears did not have any drainage and parents stated that there have been no ear infection problems with him. Neurologically he moved all extremities well, and pedal pulses where bilaterally equal and strong. He had increased respiratory effort, with observable suprasternal, substernal, and intercostal retractions. Coarse crackles could be auscultated in bilaterally in all lung fields, with diminished lung sounds in left lower lobe. I could also hear P.L. wheezing throughout the day. The coarse crackles decreased in the afternoon to mild crackles with the Albuterol treatments that he received. His abdomen was soft and non-tender with bowel sounds present in all four quadrants. His intake for the day was 540 cc, and his output was 368 cc.

Lab Values and Diagnostic Tests

A chest radiograph was performed on P.L. in order to see whether viral pneumonia was present. The findings of the procedure were that there was an increase in perihilar prominence

without focal consolidation. The findings were compatible with viral pneumonia (Sondheimer, 2008). If it was consolidated, it would have indicated bacterial pneumonia, but it was not (Sondheimer, 2008).

Normal Growth and Development

P.L.'s growth is going to be affected by the long-term use of oral and inhaled corticosteroids that he is on. With the oral corticosteroids (Prednisolone) there is a decrease risk in bone mineral accretion and an increase risk of osteopenia (Covar et al., 2008). P.L. is also at a higher risk because of his male gender (Covar et al., 2008). There is a smaller chance of P.L. having decrease in bone mineral accretion, and no he has no increase risk for osteopenia with the inhaled corticosteroids Flonase and Nasonex (Covar et al., 2008). Currently there probably is not much of a decrease in bone mineralization for P.L., because he is so young and has not been on these medications for any great length of time. One could only assume that his healthcare providers will be monitoring his growth even more closely than they would with a child that is not on these types of medications.

Children with asthma miss on average two additional school days than their peers (Castillo, 2008). This accumulates to 12.8 -15 million school days per year that are associated with asthma (Ball et al., 2010; Castillo, 2008). Therefore, asthmatic children may fall further behind in their school work and education than other children. Asthmatic children may not be able to do well in school because of a lack of sleep, leading to a decrease in ability to pay attention. Many children have trouble sleeping and staying asleep because of coughing, wheezing, or feeling breathless, so their quality of sleep is decreased (Castillo, 2008). This can lead to daydreaming and problems with functioning through-out the day. P.L. is currently a

pretty active toddler, however as he grows and starts to run and jump he may find it more difficult to keep up with his peers. His asthma may be exacerbated with sports and playing, which may affect his social abilities. Many children have emotional problems, such as sadness, despair, frustration, and even anger in relation to their condition and feeling different (Castillo, 2008). P.L. may be too young to have these feelings now, but as he gets older and starts school, he will face many of the problems that other asthmatic children face day to day.

Data Grouping and Interpretation

Nursing Diagnosis # 1

P.L.'s primary nursing diagnosis is ineffective airway clearance related to airway inflammation. This is supported by expiratory wheezing, coarse crackles, diminished left lower lobe, cough, suprasternal retractions, intercostal retractions, substernal retractions, and administration of six liters of oxygen via blow-by. The wheezing and coughing is a result of the inflammatory response in the lungs (Ball et al., 2010; Deterding et al., 2010). The cough occurs due to the mucus that is produced and needs to be expectorated. The wheezing is from the bronchoconstriction, which reduces the airway passage (Ball et al., 2010; Deterding et al., 2010). All three types of retractions where visible due to P.L. using his accessory muscles to breathe (Ball, 2010, p. 221). The administration of oxygen to P.L. is evidence, because he is demonstrating difficulty with breathing with use of his accessory muscles (Ball, 2010).

Nursing Diagnosis # 2

P.L.'s second nursing diagnosis is activity intolerance due to imbalance between oxygen supply and demand. This diagnosis is supported by a pulse oximeter reading of 95% with six liters of oxygen, dyspnea, and tachypnea, where he has increased respirations at 38-46 per

minute. The oxygen administration supports the diagnosis because he is not receiving enough oxygen for tissue perfusion (Ball et al., 2010). The dyspnea and tachypnea, are both visible, and increased with activity. Both of these are considered supporting data, because he is trying to maintain adequate oxygen levels and it his effort increased with activity level.

Table 2

Primary Nursing Diagnosis	**Nursing Diagnosis #2**
Ineffective airway clearance r/t airway inflammation AEB…	Activity intolerance r/t imbalance between oxygen supply and demand AEB…
Supporting Data Expiratory wheezing Coarse crackles Diminished left lower lobe Cough Suprasternal retractions Intercostal retractions Substernal retractions Oxygen via blow-by	**Supporting Data** Pulse ox 95%, 6 Liters of blow-by Dyspnea Increase respirations (Tachypnea) at 38-46 resps/minute.
Short Term Goal Patient will maintain patent airway with breath sounds clearing, as evidenced by lung sounds clearing by end of day.	**Short Term Goal** Patient will achieve measurable increase in activity tolerance, evidence by normal vital signs, and activity tolerance increase by end of day.
Long Term Goal Patient will be free of signs of infection, as evidenced by absence of crackles, diminished lung sounds, and retractions within two weeks.	**Long Term Goal** Patient will return to normal activity level, as evidenced by normal vital signs, and parents report within two weeks.
Interventions and Rationales 1) Ausculate breath sounds with stethoscope tid and half hour after every respiratory treatment. - To identify breath sound changes (Ball et al., 2010). 2) Assess and monitor respiratory rate tid and	**Interventions and Rationales** 1) Evaluate P.L.'s activity response. - Helps identify his capabilities and what he is now doing while or after playing in the toy room or in his room (Luxner, 2008) 2) Provide a quiet environment and try to limit how many times we enter his room as

after every respiratory treatment. - To check to see if there is breathing difficulties (Ball et al., 2010, p 885) 3) Elevate HOB. -Helps make the work of breathing easier for the child (Ball et al., 2010, p 887) 4) Monitor skin and mucus membranes at least tid. -To check for cyanosis, which would indicate decrease tissue perfusion and worsening of symptoms (Ballet al., 2010) 5) Administer supplemental oxygen via blow-by as needed. -Help increase oxygen supply to tissues (Ball et al., 2010) 6) Increase fluid intake and supplement with popsicles and juices as needed. -Maintains fluid balance and thins and breaks up mucus in airways (Ball et al., 2010, p. 887). 7) Keep bedroom environment free from dust, smoke, the two cats and feather pillows. -Prevents triggers from exacerbating asthma especially in the home, while sleeping (Ball et al., 2010, p. 879) 8) Instruct family of preventive measures in order to reduce respiratory infections during teaching and as needed. - Helps decrease the risk of P.L. getting a respiratory infection, which is his main trigger (Ball et al., 2010, p. 879)	indicated. -Helps decrease his stress and his staff anxiety (Ball et al., 2010, p. 888). 3) Assist to a comfortable position for rest and sleep when needed. - Needs to rest in order to let body get well, and avoids disturbing child so he can rest when exhausted from the labored breathing (Ball et al., 2010, p. 888). 4). Check vital signs after playing in his room or in the playroom. -Helps identify level of activity intolerance and exacerbation (Ball et al., 2010, p. 884). 5) Evaluate for accelerating activity intolerance daily and as needed. - Identifies worsening of symptoms (Ball et al., 2010, p. 885). 6) Provide rest periods during activities when needed. - Helps decrease intolerance and provide rest for P.L (Ball et al., 2010, p. 888). 7) Explain the importance of rest during teaching and as needed. - Helps the conserve energy for healing and decreases metabolic rate (Luxner, 2008) 8) Assist with self-care activities as necessary. - Helps balance oxygen supply and demand needs and minimizes exhaustion (Ball et al., 2010).
Evaluation **STG:** Goal met, patient maintained patent airway with breath sounds clearing by end of day. **LTG:** Unable to assess due to length of time spent with patient.	**Evaluation** **STG:** Goal met, patient achieved measurable increase in activity tolerance, evidence by decrease in respiration rate, and activity tolerance increase by end of day. **LTG:** Unable to assess due to amount of time spent with patient.

References

Ball, J. W. & Bindler, R. C. & Cowen, K. J. (2010). *Child health nursing: Partnering with children and families*. Upper Saddle River, NJ: Pearson Education.

Bohm, S.R., Brown, M., Korzeniewski, S.J., Reeves, M.J. (2006). Asthma care and management before Emergency Department visit in children I Western Michigan: How well does does care adhere to guidelines? *Pediatrics, 117(Supplement),* S118-S126. doi: 10.1542/peds. 2005-20001

Boluyt, N., Moyer, V.A., Offringa, M., van der Lee, J.H. (2007). State of the evidence on acute asthma management in children: A critical appraisal of systemic reviews. *Pediatrics, 120(6),* 1334-1340. doi: 10.1542/peds. 2006-3381

Caban, A.M., Chaffin, C., Clark, N., Jarlsberg, C., Thyne, S. (2008). Selective Provision of asthma self-management tools to families. *Pediatrics, 121(4),* e900-e905. doi: 10.1542/peds. 2007-1559

Castillo, Christine L. (2008). *Children with complex medical issues in schools: Neuropsychological descriptions and interventions.* New York, NY: Springer Publishing Company. p 1-31. http://site.ebrary.com/lib/kentstate/Doc?id=10265432&ppg=50

Cover, R.A., Green, R.P., Kelly, H.W., Strunk, R.C., Tonascia, R.C., Van Natta, M.L. (2008). Effect of long-term corticosteroid use on bone mineral density in children: A prospective longitudinal assessment in the childhood asthma management program (CAMP) study. *Pediatrics, 122(1),* e53-e61. doi: 10.1542/peds. 2007-3381

Deglin, J.H., & Vallerand, A.H. (2008). *Davis' drug guide for nurses.* Philadelphia: F.A. Davis.

Deterding, J.M., Hay, W.W., Levin, M.J., Sondheimer. J.M. (2010). *Current pediatric diagnosis and treatment.* McGraw-Hill Professional.

Feldman, R.S. (2011). *Development across the life span.* (6th ed.) Upper Saddle River, NJ: Prentice Hall.

Luxner, K. (2008). *Delmar's pediatric nursing care plans* (3rd ed). Clifton Park, NY: Cengage Learning.

Sondheimer, J.M. (2008). *Current essentials pediatrics.* (1 ed., pp 8-18). McGraw-Hill Medical.