ORGANOPHOSPHATE PESTICIDES & CHILD HEALTH:
A Primer for Health Care Providers

CASE PRESENTATION

A 6 month-old girl is irritable and congested.

Rosa brings her 6 month-old daughter to your rural clinic. She is new to the community, having arrived from Mexico about one month ago. She came to join her husband who recently established a steady job as a pesticide applicator on a large orchard.

History of Present Illness

About 4 days ago Rosa's baby, Isabella, developed a thick whitish nasal discharge and irritability. This has persisted, and 2 days ago she developed more frequent, loose bowel movements (4 diaper changes in last 24 hours) and felt warm to mom's touch. For the last 24 hours she has refused breastfeeding or other foods and now seems listless. Neither the parents nor the child's uncle, who lives with them, has been ill. This is their first child and the baby is cared for at home by her mother.

Birth and Developmental History

With further history taking, you learn the following about Isabella's birth and early childhood development:

- The birth was at full-term by normal spontaneous vaginal delivery without complications.
- Routine care was received in a small town in rural Mexico.
    - Normal growth recorded
    - Last set of vaccinations received at age 4 months
- The early developmental milestones have been met including:
    - Vocalizing with repetitive babbling sounds

- Rolling over at age 4 months

- Sitting without support

- Crawling initiated

- She has had no previous health problems or illnesses and takes no medications

Physical examination reveals a lethargic infant with the following growth parameters and vital signs:

Weight	25th Percentile
Height	50th Percentile
Head Circumference	50th Percentile
Temperature	Normal
Blood Pressure	96/65 mm Hg

Her head is normocephalic and her anterior fontanelle is flat. Her pupils are reactive and equal. Ear, nose and throat exam reveals clear mucous in the nares, normal thyroid and ear examination, and dry mucous membranes. No adenopathy is noted. Her lungs are clear to auscultation. She is not working hard to breathe but her respiratory rate is increased at 50 breaths per minute. Her heart rate is slightly elevated at 150 beats per minute with a regular rhythm and no murmurs. Her abdomen is soft, non-distended and non-tender. No hepatosplenomegaly is noted. Her joints have full range of motion and no signs of inflammation. Her hands and feet feel cool and have a capillary refill count of 3 seconds. She is lethargic with reduced overall tone, but her neurologic exam is otherwise nonfocal and her reflexes are normal. Her skin is without rashes or marks indicating trauma.

What differential diagnoses are you considering?

What other information do you need?

Diagnosis and Treatment

Your working diagnosis is an upper respiratory infection with dehydration. You decide a thorough work-up for more serious systemic bacterial infection

and intravenous rehydration is merited. You contact your colleague at the nearby local emergency department (ED) and arrange a transfer. At the ED, Isabella receives an initial a bolus of IV fluid and labs are sent (including a complete blood count, determinations of serum electrolytes, blood urea nitrogen, glucose, and creatinine). A catheterized urine specimen and blood sample are collected for culture. Results include the following abnormal elevations:

	Test Results	Normal Range
White Blood Cell Count	18,000	6000-17,500
Platelet Count	873,000	150,000-400,000
Sodium (MEQ/L)	160	139-146
Chloride (MEQ/L)	127	95-105

The white blood cell differential did not demonstrate a left shift and the hematocrit was normal. A chest and abdominal x-ray are also obtained and are normal. The urine analysis does not suggest a urinary tract infection.

After the IV fluid, Isabella becomes less lethargic and shows interest in breastfeeding. While under continued observation, she successfully breastfeeds twice. Given the clinical improvement and reassuring work up, Isabella is sent home with her parents. A follow-up appointment is scheduled to re-check the infant's hydration and clinical status the next morning. The parents are advised regarding what to do should Isabella's condition worsen.

Later that night the child's condition deteriorates; paramedics are called and Isabella is transported back to the ED. Physical examination now reveals lethargy, moderate dehydration, and heme-positive, black, foul smelling stools, which were collected for culture. Laboratory tests are repeated and expanded to include a lumbar puncture for cerebrospinal fluid analysis and culture. No new abnormalities are found. A computed tomography of the head is normal. An antibiotic (IV ceftriaxone for meningitis dosing) is started and the patient is admitted to the pediatric intensive care unit.

You visit the infant and family in the hospital. To date, all analyses and cultures for infectious sources (i.e., cerebrospinal fluid, blood, urine, stool) are negative.

You are puzzled by the severity of her symptoms and lack of a clear etiology and discuss the case with a colleague you encounter in the hallway.

Your colleague suggests that you consider pesticide exposure in the differential. She describes a similar clinical scenario that involved a toddler who had ingested a garden product containing an organophosphate pesticide.

How does this information change your clinical decision-making?

You recognize that you need additional information so you return to the patient's room and expand your exposure history taking to include possible pesticide exposure.