



CONTAGIOUS COMMENTS

Department of Epidemiology

Survival Tips

Respiratory Season 2003 - 2004

Susan Dolan RN, MS, CIC; Carlos Perez-Velez, MD;
Christine Robinson, PhD; Marsha Lehr, RN

The purpose of this respiratory season edition is to remind you of standard basic principles and to provide you with further details on our plan for managing patients at The Children's Hospital (TCH) with viral respiratory symptoms/illness this season.

By now we are all well aware that influenza reared its ugly head in early November, peaked in late November / early December, and basically subsided as of early January. While we were pleased to see it exit, we know another strain could still circulate during the later winter / spring months - only time will tell! For more information on influenza, refer to our October 2003 issue of Contagious Comments (<http://www.thechildrenshospital.org/publications/cc/index.cfm>).

RSV has arrived in its usual fashion, however, we are also detecting other viral culprits that contribute to respiratory illnesses (adenovirus, rhinovirus, etc.).

Remember these top 10 points:

- 1. Respiratory Viruses** are spread mainly by contact with secretions. They do not spread via the airborne route.
- 2. Droplet Precautions** (gown, mask and gloves) should be used for all patients with respiratory symptoms. All staff must comply if having contact with the patient or the room environment.
- 3. Do not order viral testing unless it will alter your medical management of the patient.** Testing of already hospitalized patients with new onset of respiratory symptoms may prove useful for epidemiologic purposes and perhaps patient management in certain circumstances.
- About 2/3 of the time, **nebulized bronchodilator** use in children with RSV does NOT benefit, and can actually make the patient worse. Remember: "*prove it (works) or don't use it.*" (Refer to therapy evaluation tips on page 4).
- Adequate hydration, upper airway suctioning, and oxygenation** are the mainstays of treatment for most infants with pneumonia and bronchiolitis.
- Pulse Oximetry** should only be used to supplement (not as a replacement for) clinical judgment. Continuous pulse oximetry is not recommended in the non-ICU setting. Baseline oximetry in room air followed by spot checks every 8 hours for the first day and daily thereafter, unless clinical

signs indicate (e.g., worsening clinical score, deciding on need for home O₂).

- 7. CPT and Steroids** have not been proven to be effective therapies for the management of bronchiolitis.
- 8. The newer RSV Immune Products** (RespiGam and Synagis) are for prophylaxis only. They do not prevent acquisition of RSV, nor are they used to treat RSV infection. These medications are used to reduce the severity of RSV disease in select, high-risk patients. (Refer to table on page 5 for criteria.) Limited number of patients, who meet the strict criteria for receiving these products, will do so on a monthly basis from November through April. If a patient receiving one of the RSV immune products develops RSV, they should continue to get their monthly dose during the remainder of "the season" as it is possible that the child could get subsequently re-infected with a similar or different strain of RSV.
- 9. Cohorting of Patients** with like-respiratory symptoms does not increase the risk of transmission as long as everyone adheres to the isolation procedures. Also, ill visitors / siblings should NOT be visiting the hospital. Children 12 years of age and younger may not visit in the Pediatric Intensive Care Unit (PICU), Cardiac Intensive Care Unit (CICU), Newborn Intensive Care Unit (NICU), Infant Care Center (ICC), or Bone Marrow Transplant (BMT).
- 10. Handwashing...Handwashing...Handwashing...**



You need to remove your gloves and WASH YOUR HANDS between patients and before going to common areas. It is the most important step in preventing the spread of infection. The use of the new alcohol based hand rub solutions has proven to be effective as well.



Respiratory Infection Tips & Tools

Mode of Transmission of Most Respiratory Agents

Transmitted in large droplets by:

- Direct or close contact with secretions (e.g., close face to face contact), or
- Touching contaminated objects in the environment and inoculating self or others (e.g., hand-to-eye, hand-to-mouth).

Remember...

RSV Persists:

- Up to 30 minutes for secretions in facial tissues.
- 30 minutes or more on hands.
- Up to 6 hours on surfaces.

Incubation Period is 2 - 8 days (4 - 6 days most common).

Epidemiology		
Organism	Illnesses	Season
Adenovirus	<ul style="list-style-type: none"> Pharyngitis Tonsillitis Croup Bronchiolitis Pneumonia Keratoconjunctivitis Common cold 	Late winter through summer.
Coronavirus	<ul style="list-style-type: none"> Common cold 	Varies
Influenza	<ul style="list-style-type: none"> Flu Bronchitis Croup Pneumonia Secondary bacterial infections 	<ul style="list-style-type: none"> December / January. (Nov/Dec this year) Spring. (Another strain could circulate.)
Parainfluenza	<ul style="list-style-type: none"> Croup Bronchiolitis Bronchitis Pneumonia Common cold 	<ul style="list-style-type: none"> Type 3 - Spring Type 1 - Fall. (Odd years)
RSV	<ul style="list-style-type: none"> Bronchiolitis Pneumonia Croup 	<ul style="list-style-type: none"> December through March.
Rhinovirus	<ul style="list-style-type: none"> Common cold 	<ul style="list-style-type: none"> Fall and Spring.

Note: You also need to consider two non-viral players in your work-up of patients with cough - *Bordetella pertussis* and *Mycoplasma pneumoniae*.



Cohorting

At TCH, cohorting based on symptoms has proven very effective in the past in preventing the nosocomial spread of infection. This is supported by current CDC isolation guidelines (1996), which does not require viral testing to determine room placement.

2003 - 2004 Cohorting Guidelines	
Patients with like Symptoms May be Cohorted	
<ul style="list-style-type: none"> Respiratory symptoms/illnesses (e.g., croup, bronchiolitis, URI).** Asthma / RAD: <ul style="list-style-type: none"> No Isolation: If > 3 years old, the temp. should be <38.5 in the previous 3 days without antipyretics and there should be no clinical signs and symptoms of viral infection. Isolation: Any asthmatic patient with fever and/or URI symptoms and those asthmatic patients ≤ 3 years old w/o fever or URI symptoms require isolation. Pertussis - lab confirmed only. Acute Gastroenteritis - (polys or blood, or pus <u>not</u> present in stool). Chronic Diarrhea. (Note: Do not cohort acute with chronic.) R/O Sepsis - Patients may have fever. Wound (dirty) - May not cohort with clean / surgical wounds. Cellulitis. Non-infectious conditions / diagnoses: <ul style="list-style-type: none"> Newborns with BPD High-risk cardiac conditions. Clean surgical cases. Immunodeficiency (hypogam, chronic steroids). 	
** Rapid viral testing is <u>not</u> required to determine cohorting.	


2003 - 2004 Cohorting Guidelines	
Patients with the following conditions (known or suspected) May Not be cohorted.	
<ul style="list-style-type: none"> MRSA (methicillin resistant <i>Staph aureus</i>). VRE (vancomycin resistant enterococcus). Other significant drug resistant organisms. (See “Drug Resistant Organisms, Guidelines for” policy.) http://planetech/policies/general/pdf/446.pdf <i>Haemophilus influenzae type B. (H flu type B)**</i> Cystic Fibrosis. (Except CF siblings may be cohorted.) Immunodeficiency. (Solid organ and BMT transplant patients or patients on chemotherapy.) Pulmonary patients with a 30%-40% loss in lung function (as determined by the Pulmonary attending MD). Zoster. (Recurrent shingles.) <ul style="list-style-type: none"> – “Regular” in normal host. – “Disseminated” in any host.* – “Regular” in immunocompromised host.* “<i>Neisseria meningitides</i>”.** Tuberculosis.* HIV. Hepatitis A. Varicella. ((Primary Chickenpox)*) Measles. (Rubeola)* 	
* Requires that the patient be in a negative pressure room.	
** Isolate until 24 hours of effective antibiotics.	



Isolation – Basic Infection Control

The following policy is for patients with a “suspected” or a “proven respiratory” infection from any cause and includes:

Droplet Precautions



- Gown, glove and mask or face shield whenever coming into contact with the patient or anything in the environment. **ALSO, REMEMBER EYE PROTECTION WHEN SUCTIONING OR IN CLOSE CONTACT WITH A COUGHING PATIENT.** If no such contact occurs, and you are not within a few feet of the patient, you are exempt as long as you are healthy and nothing in the room is touched!
- Hospital personnel with even a mild respiratory illness **SHOULD NOT CARE FOR HIGH-RISK, UNINFECTED PATIENTS**, and should wear a mask / face shield and gloves during any patient contact. Employees with serious respiratory illness should report to Employee Health Services.
- Use good handwashing / hand hygiene after removing gloves prior to leaving the room and/or between patients if two patients are cohorted in the same room.

Sick Employees

Many viruses exhibit themselves in adults as a slight cold; however, large amounts of virus can be shed and can cause severe disease in our patients. If you have mild URI symptoms (minus fever), you may work if you wear a mask (changed frequently throughout the day), wear gloves, and wash hands frequently or use alcohol based hand rub.

Exceptions:

1. You should not care for high-risk, uninfected patients.
2. No ill employees allowed in the BMT unit.



WASH YOUR HANDS after removing gloves.
Avoid contact with high-risk patients.



Visitation

From November 20, 2003 to December 19, 2003, TCH restricted visitation due to the unusual flu season. On December 19th, we lifted the restriction only partially (as we knew RSV was on the increase).

The following restrictions will remain in place until further notice:

1. Only two visitors (including parents) per patient at any given time.
2. Visitors must adhere to isolation precautions on the door sign and are to wash hands before leaving the room. Exception: Parents and siblings may refrain from wearing isolation apparel, but need to wash hands each time before leaving the room.
3. Ill visitors are discouraged from visiting. In the event the primary caretaker has a respiratory illness, he / she is requested to wear a mask when outside the room and to limit activity (and wear a mask) during the following
 - Obtaining food in cafeteria (should return to patient room to eat, if possible).
 - Avoid crowded areas in hospital (e.g., gift shop).
 - Avoid high-risk patient visitation (if possible); if unavoidable (primary caregiver only), must wear a mask, gown and gloves. Discourage “close” patient contact.
4. Children 12 years of age and younger **may not** visit in the PICU, NICU, ICC, CICU and BMT.
5. **Please advise your patient’s family.** Sibling and child visitation is discouraged during this time of year. All children 12 years of age and younger are to be screened by unit personnel before visiting each day to check for symptoms and exposures (“red and green apple” stickers). Ill children are **not** to visit. Child visitors of patients in isolation are restricted from using play areas. Also note #4 above.



Diagnosis

Specimens

Nasopharyngeal washes or tracheal aspirates are acceptable specimens for most patients. BALs can also be tested. Lower respiratory tract specimens may be preferable for older patients. Specimens on swabs cannot be tested. Well-collected specimens are needed to maximize virus recovery, so for best results, follow our new standardized Nursing and Microbiology Nasopharyngeal Wash Procedure and consult Microbiology’s Specimen Collection Guide. Both are located on the TCH Intranet.

The table below lists our test for wintertime respiratory pathogens. Call Microbiology (303-861-6703) if you need requisitions or have questions.

Ordering Tests

Tests for respiratory viruses should be done ONLY if the results will be used for patient management. Testing should NOT be done for cohorting, since respiratory viruses are all transmitted in a similar fashion and many patients are infected simultaneously with other viruses. Otherwise normal children who are admitted during the peak of RSV or flu season with typical symptoms may not need virus tests at all!

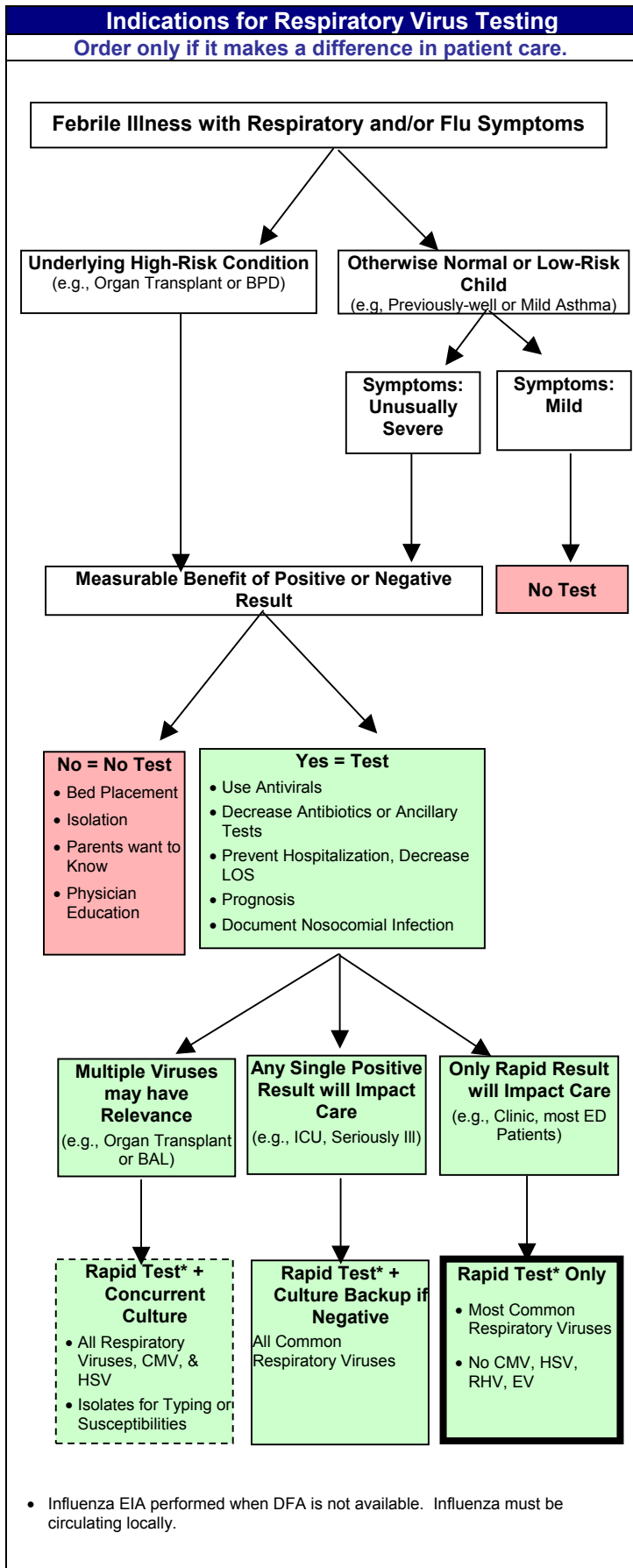
Testing MAY be indicated for:

- Severely ill or immunocompromised patients who may need antiviral therapy or who may be started on multiple antibiotics, and a positive virus test might permit modification or discontinuation of antibiotics.
- An unusually-severe illness in an otherwise normal child.
- Monitoring efficacy of antiviral therapy in high-risk patients who cannot be assessed by symptoms alone.

If testing is indicated, there are new test choices! Our main test is now the Respiratory Virus DFA or Direct immunoFluorescent Assay for RSV, flu, parinfluenza virus and adenovirus antigen detection. Testing is performed twice daily during the week and once a day on weekends. After hours, an Influenza ImmunoAssay (IA) is available if flu is suspected and a STAT result would influence patient care, e.g., guide antiviral use. RSV EIA is no longer offered.

There are also the following three types of respiratory virus test work-ups to better tailor testing to the needs of the patient:

- Rapid test (Respiratory DFA or Flu IA after hours). Only for patients who can benefit from a rapid result.
- Rapid test with culture backup for only those more seriously ill admitted patients whose treatment will be altered based on the result.
- Rapid test with concurrent culture when patients have an underlying condition requiring all viruses to be detected, even if results will take days-weeks.



2003 – 2004 Lab Tests for Respiratory Pathogens		
Viruses		
Tests	Results	Comments
Respiratory Virus DFA	Twice daily, M-F: In by 9 AM, out by 11 AM. In by 1 PM, out by 3 PM. Once daily Sat & Sun: Afternoon	Detects RSV, influenza and parainfluenza with high sensitivity (>85%) and specificity (>95%). Less sensitive for adenovirus (50%). Order alone or with culture.
Flu A & B IA	Available STAT (< 1 hour) when DFA is not available, flu is suspected and patient to be treated if positive..	Differentiates flu A from flu B. More flu and other viruses causing similar symptoms can be detected by DFA.
Respiratory Virus Culture	Rapid Culture: 2 - 3 days. Standard Culture: 2 weeks.	Detects 10 -1 5% more DFA viruses plus rhinovirus, enterovirus, CMV, HSV and many adenoviruses. Not needed for most short-stay patients!
SARS	No schedule currently.	Test for common pathogens first! Available ONLY after consultation with Epidemiology, Infectious Disease, and State Health Department (test site). Respiratory, blood, and fecal specimens required. Sensitivity and specificity problematic.
Other		
<i>B. pertussis</i> PCR	1 - 3 days	Nasal wash.
<i>Chlamydia trachomatis</i> Culture	2 - 3 days.	Nasal wash. Children < 1 year.
<i>Chlamydia pneumoniae</i> Culture	3 - 10 days.	Throat swab in MT medium. Children ≥ age 2.
<i>Mycoplasma pneumoniae</i> PCR, IgM	PCR: 3 - 10 days. IgM: Daily.	PCR: Throat swab in MT medium. IgM: Red top.



Therapies	
Supportive Therapy	Hydration, oxygenation, and upper airway suctioning are the mainstay of treatment for most babies, even those who are hospitalized with pneumonia and bronchiolitis.
Bronchodilators	Conditionally indicated if RDS ≥ 4 with ongoing documented objective benefit per Bronchiolitis/Viral Pneumonia Care Algorithm. (See Clinical Care Guidelines, http://planettch/policies/general/pdf/538.pdf .)

Evaluating Response to Medication/CPT & Other Therapies	
1.	Suction upper airway first to eliminate all upper airway secretions / noises.
2.	Determine RDS score. (<i>See below.</i>)
3.	Maintain same position – child at rest.
4.	Give single treatment. (No CPT or suction.)
5.	Re-evaluate clinical score after 15 minutes.
6.	Be objective: <ul style="list-style-type: none"> • Don't be confused by transmitted upper airway noise! • Don't assume nebs work.

Respiratory Distress Score (RDS) Tool				
Component	0	1	2	3
Retractions	None	Lower chest wall retractions	Marked lower chest wall retractions	Marked lower chest wall and xiphoid +/- suprasternal retractions
Inspiratory: Expiratory Ratio	≤ 1:1	1:2	≥ 1:3	N/A
Wheezing	None	Localized or intermittent expiratory	Generalized continuous	Audible wheeze w/o stethoscope
Crackles	None	Inspiratory	Inspiratory and expiratory	N/A

Suction upper airway prior to each assessment.
Mild 0 - 4; Moderate 5 - 6; Severe ≥ 7

Oxygen Therapy / Pulse Oximetry	
O ₂ is probably the most effective therapy in infants and children with bronchiolitis and/or viral pneumonia.	
<ul style="list-style-type: none"> • Oxygen to achieve SaO₂ ≥ 92%. (Room air O₂ sat spot checks are recommended BID and for clinical change - not continuous monitoring.) • Suction upper airway (use saline PRN): <ul style="list-style-type: none"> ➢ Prior to feeding ➢ During clinical assessment ➢ PRN evidence of upper airway obstruction 	



Ribavirin
Ribavirin is a FDA approved synthetic nucleoside analogue for treatment of moderate to severe RSV disease. Ribavirin is a <u>very expensive</u> drug and treatment protocols are initiated on an inpatient basis for the delivery of this intermittently aerosolized medication. The Red Book Committee of the AAP has previously modified its recommendations. Ribavirin remains controversial because of conflicting results of efficacy trials.

2003 – 2004 TCH Guidelines for Ribavirin Use (Suspected or Proven RSV)		
Category	Patients	Guidelines
I High Risk	<ul style="list-style-type: none"> • Complicated Congenital Heart Disease (including pulmonary hypertension). • Children on chronic oxygen therapy (i.e., CHD, BPD, CF and other chronic lung infections, etc.). • Transplant or intensive chemotherapy. • Other conditions significantly affecting cardiopulmonary or immune system (useful guidelines include blood gas concentrations and response). • BMT with proven infection. (This product in combination with respigam has been shown to decrease mortality.) 	Observe patients carefully. Ribavirin may be considered under critical care monitoring conditions if severely ill or rapidly deteriorating.*
II Low Risk	Previously healthy kids, children with intermittent RAD, children with underlying disease not affecting cardiopulmonary or immune system.	Ribavirin is <u>not</u> indicated.
* See separate guidelines for BMT / severely immune suppressed Oncology patients available from BMT / Pharmacy.		



RSV Prophylaxis
<p>Synagis & RespiGam (RSVIG) Dosing Guidelines/Restrictions</p> <p>Principle: RSV immune products will be given based on scientific, “evidence based,” nationally accepted recommendations or as an element of a funded research study.</p> <ol style="list-style-type: none"> Indications for <u>prophylaxis</u> with RSV immune products: <ul style="list-style-type: none"> • Infant who is < 2 years of life and has chronic lung disease (CLD: as defined as a history of persistent oxygen requirement during the first month of life) and who has required medical management (oxygen, steroids, diuretics) within the last 6 months. • Infant born < 31 weeks gestational age with or without bronchopulmonary dysplasia or chronic lung disease who is < 12 months of age (born after 10/30/00). • Infant born at 32 weeks gestational age or less with or without bronchopulmonary dysplasia (BPD) or CLD who is < 6 months of age (born after 4/30/01). • Infant born between 32 and 35 weeks who presents with any of the following multiple additional risk factors: multiple birth, households with 4 or more individuals, attending daycare (> 5 children) or sibling who attends daycare or school, smokers (especially mother) in the household. Cardiac patients and palivizumab: <ul style="list-style-type: none"> • Children who are 24 months of age or younger with hemodynamically significant cyanotic and congenital heart disease (CHD) will benefit from monthly injections (x5) of palivizumab (15mg/kg).

- Prophylaxis (with palivizumab) for patients with congenital heart disease should be based on degree of physiologic cardiovascular compromise.
- Infants \leq 12 mo with CHD most likely to benefit from palivizumab prophylaxis are those (a) receiving meds to control CHF; (b) moderate to severe pulmonary hypertension; and (c) cyanotic heart disease.
- Note: RSV-IGIV (Respigam) is not used in cardiac patients.

3. RSV immune products **will not be used for the treatment** of RSV infections.

Exception: Respigam is being used in combination with Ribavirin for treatment of RSV infection in BMT patients.

Prophylaxis with RSVIG for BMT patients is not currently recommended outside the setting of a funded clinical investigation.

4. Presentation with RSV infection does not preclude continuing prophylactic therapy with Synagis or RespiGam.

5. Ordering any RSV immune product for prophylaxis:

- Respigam or Synagis has been given to inpatients prior to discharge **IF** the case manager for the particular patient has received approval for its payment from the patient's insurance company. This is TCH Pharmacy's procedure prior to dispensing (since some of these patients are hospitalized for a long time and need the medication).
- First dose administration of Synagis or RespiGam needs to occur in a controlled setting where there is physician back-up.
 - TCH Special Care Clinic (for SCC patients only).
 - TCH Synagis / RespiGam Clinic.

6. In the event that a patient does not meet the above criteria for use of RSV immune products, a subcommittee of the Pharmacy and Therapeutics Committee will be available to review individual cases. These special patient cases for consideration should be forwarded to the P&T Committee Secretary (Jerrod Milton, Director of Pharmacy, Box 375). Requests for use outside the recommended guidelines must be supported by convincing, evidence-based literature.

Special patient case individuals must be participating in an active research protocol.

Contraindications for RespiGam Prophylaxis

- A history of a severe reaction with prior IG preparation.
- Selective IgA deficiency.
- Cyanotic heart disease.

Contraindications for Synagis Prophylaxis

A history of severe reaction to a previous Synagis dose.

Adverse Reactions

Fever, vomiting, respiratory distress, wheezing, rashes. (Some reactions may be related to the rate of administration if RespiGam prophylaxis is selected.) For severe reactions, administer Epinephrine (1:1000) or Benadryl as directed.

Finally, remember to adhere to infection control practices and isolation procedures. Avoid inappropriate use of antibiotics for viral illness and now that you are knowledgeable about the management of patients with viral bronchiolitis etc., you can help to dispel the many widely prevalent myths regarding ineffective therapies and patient management.



Bug Watch

Up-to-date information on currently circulating respiratory and enteric viruses and *B. pertussis* detected by the TCH Laboratory provided to you weekly. Posted on the TCH Internet <http://www.thechildrenshospital.org/pro/publications/bug.pdf> and/or sent by broadcast FAX. Contact Carolyn Brock by e-mail brock_carolyn@tchden.org or phone (303-861-6412) to begin receiving your personal copy.



NON-PROFIT
ORGANIZATION
U.S. POSTAGE
P A I D
DENVER, CO
PERMIT NO. 1050

EDITOR:

Diane Carter, Staff Assistant III
The Children's Hospital, Department of Epidemiology, B-276
1056 E. 19th Avenue, Denver, CO 80218
Phone: 303-861-6072; FAX: 303-837-2631

Carter.Diane@tchden.org
www.thechildrenshospital.org
We Recycle!