

CONTAGIOUS COMMENTS

Department of Epidemiology

Respiratory Season 2007 – 2008 Prevent Transmission!

Susan Dolan, MS, RN, CIC, & the Respiratory Planning Meeting Attendees

Yes Virginia, there is a Respiratory Season. Whether we like it or not, the time is here once again. This edition is designed to remind you of standard basic principles and to provide you with further details on our plan for managing Patients and Visitors at The Children's Hospital (TCH) with viral respiratory symptoms / illness this season. (For more information on influenza, refer to our October 2007 issue of Contagious Comments "Influenza 2007 – 2008" <http://www.thechildrenshospital.org/news/publications/cc/index.aspx>)

This is the fall of an odd year so we expect and have seen a fair amount of parainfluenza virus circulating. This virus is responsible for causing croup in kids and can cause cold symptoms and laryngitis in adults. RSV and influenza are also being detected in Colorado and at TCH, so be sure to monitor "Bug Watch" for weekly updates.

REMEMBER THESE TOP 10 POINTS:

1. Visitation "RE-VISITED" - WE NEED YOUR HELP!

*****PLEASE*****

ADVISE YOUR FAMILIES OF THESE RESTRICTIONS WHEN REFERRING THEM TO TCH TO PREVENT ANY CONFUSION UPON THEIR ARRIVAL HERE.

**** 12/15/07 TO 4/15/08 ****

Inpatient:

- 2 visitors per bedside at one time (includes parents).
- For visitors 12 years of age and younger, we will only allow WELL siblings (no relatives or friends this age are allowed). Screening with "Apple Stickers" for illnesses will be required each day before visiting.
- No ill visitors.

Outpatient Visits & Surgery Procedure/Visits:

Due to an increase in respiratory illnesses in the community during these months, we discourage bringing siblings or friends who are 12 years of age or younger to your child's scheduled visits to these locations.

- 2. Respiratory Viruses** are spread mainly by contact with secretions and contaminated surfaces. They do not usually spread via the airborne route.
- 3. 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.

- 4. 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.
- 5.** 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 6).
- 6. Adequate hydration, upper airway suctioning, and oxygenation** are the mainstays of treatment for most infants with viral pneumonia and bronchiolitis.
- 7. Pulse Oximetry** should only be used to supplement (not as a replacement for) clinical judgment. Continuous pulse oximetry is NOT recommended for 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) is recommended.
- 8. CPT and Steroids** have not been proven to be effective therapies for the management of bronchiolitis.
- 9. Synagis (palivizumab) is for RSV prophylaxis only.** It does not prevent acquisition of RSV, nor should it be used to treat RSV infection. This medication is used to reduce the severity of RSV disease in select, high-risk patients. (Refer to table on page 6 for criteria.) Limited number of patients, who meet the strict criteria for receiving this product, will do so on a monthly basis from November through March/April. If a patient receiving Synagis 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.
- 10. HAND HYGIENE-** 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 alcohol based hand rub solutions has made this easier and quicker and we have plenty of them around the facility.

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 (some viruses can be even longer).

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. (but we have seen it this Fall) |
| Coronavirus | Common cold | Varies |
| Human Meta-pneumovirus (hMPV) | <ul style="list-style-type: none"> • Bronchiolitis • Croup • Pneumonia | Year round, but mostly late Fall to late Spring. |
| Influenza | <ul style="list-style-type: none"> • Flu • Bronchitis • Croup • Pneumonia • Secondary bacterial infections | <ul style="list-style-type: none"> • December / January. • 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 – so we have seen it this year) |
| RSV | <ul style="list-style-type: none"> • Bronchiolitis • Pneumonia • Croup | December through April. |
| Rhinovirus | Common cold | Fall and Spring. |



Cohorting

In years past, TCH used cohorting for determining patient bed placement in semi-private rooms. This was especially necessary during respiratory season due to increases in bed utilization. At the new hospital, we no longer have semi-private rooms so will not need and will not be publishing our criteria for cohorting in this edition. Should you have any questions about cohorting, you can contact Epidemiology at 720-777-6072 as we will save an archived copy of these criteria and will be happy to share them with you.



Isolation Basic Infection Control

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

Droplet Precautions

1. Gown, glove and mask or face shield are needed whenever coming into contact with the patient or anything in the environment. **ALSO, REMEMBER TO USE EYE PROTECTION WHEN SUCTIONING OR IF 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 do not touch any items in the room!
2. 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 more involved respiratory illness should report to Employee Health Services.
3. Use good handwashing / hand hygiene after removing gloves prior to leaving the patient room.
4. Don't forget to disinfect your stethoscope between patients.
5. Patients in isolation are not allowed to leave their room unless it is for the purposes of going to another department for a procedure that cannot be performed in their room. Precautions are to be used during transport and the receiving department is to be notified in advance of the need for isolation precautions for the patient. **PLEASE** do not tell patients in isolation that they can walk in halls or go to playroom, cafeteria, etc.

DISCONTINUING ISOLATION FOR PATIENTS WITH VIRAL RESPIRATORY ILLNESS*

(This does not apply to patients with Pertussis.)

May discontinue isolation if **ALL** of the following conditions are met:

- A. Patient is currently asymptomatic.
- B. It has been at least 7 days from first positive specimen.
- C. Patient will be hospitalized at least 2 more weeks.
- D. No underlying immunodeficiency or chronic respiratory condition.¹
- E. May be removed from isolation when:
 1. The repeat rapid culture is negative and respiratory virus **DFA** is negative.
 2. IA may be used in place of DFA for influenza virus.
 3. Exception if patient is positive for rhinovirus² on first test, you must wait 14 days from the second test (or until viral culture is finalized) before declaring patient negative.

¹ If immunocompromised or with a chronic respiratory condition, then the individualized decision requires Epidemiology evaluation and consensus recommendation (at least 2 members of the Infection Control Executive Committee). Epidemiology will document recommendation in the patient record (progress notes).

² Rhino virus may take up to 14 days to grow in viral culture.

[*TCH Infection Control Policy: "Isolation and Standard Precautions \(IC-008\)."](#)



Sick Employees

Many viruses exhibit themselves in adults as a slight cold; however, large amounts of virus can be shed and when transmitted 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 with patient contact, 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 if you are ill.



Visitation

From December 15, 2007 to April 15, 2008, TCH will be implementing VISITATION RESTRICTIONS for both inpatient and outpatient areas.

Inpatient Visitation:

1. Only two visitors (including parents) per patient at any given time.
2. For children 12 years of age and younger: Only WELL siblings may visit patients or be on the inpatient units. "Apple sticker" screening for illnesses will be required each day before visiting. NO relatives or friends in this age group are allowed to visit. Please advise your patient's family of our visitation restrictions when referring them to TCH to prevent any confusion when they arrive at our facility. This really helps!
3. Visitors of patients in isolation are not allowed to be in unit playroom.
4. 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 upon entering and before leaving the room.*
5. 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.
6. Some units may implement additional restrictions for the safety of their patient population.

Outpatient Visits & Surgery Procedure/Visits:

Due to an increase in respiratory illnesses in the community during these months, we discourage bringing siblings or friends who are 12 years of age or younger to your child's scheduled visits to these areas.



Human Metapneumovirus

Human metapneumovirus (or hMPV) is a newly-described paramyxovirus first identified in 2001 in the Netherlands and is now known to cause acute respiratory disease worldwide, including Colorado. Genetically, hMPV is most closely-related to a turkey respiratory virus, but clinically it most closely-resembles RSV. Otherwise healthy children usually have mild or moderate symptoms with hMPV, but severe disease requiring hospitalization can occur, especially in very young children, premature infants, children with underlying cardiopulmonary disorders, immunocompromised individuals of any age, and the elderly. hMPV-associated infections in hospitalized children manifest primarily as bronchiolitis, with croup, pneumonia, and exacerbations of reactive airway disease also described. hMPV is a frequent co-pathogen with

other respiratory viruses, although whether other viral illnesses are worsened by hMPV is controversial. At TCH, hMPV is recoverable from a significant proportion (5-15%) of respiratory specimens during the winter-spring. Serosurveys show that all children are infected at least once by 5 years of age. Recurrent infections occur throughout life and tend to be milder than the primary infection.

Diagnosis

Specimens:

Nasopharyngeal washes or tracheal aspirates are the best specimens for most patients. BALs can also be tested. Lower respiratory tract specimens may be required for maximum sensitivity in older patients. Specimens on swabs are not recommended. Cell-rich specimens yield the highest virus recovery. For best results follow our standardized Microbiology [Nasopharyngeal Wash Procedure](#) posted on the on-line Test Directory on the TCH Intranet and TCH public website. (See "Clinical Resources, Lab and Microbiology Test Directory") The table below summarizes the tests available at TCH for wintertime respiratory pathogens. Call Microbiology (720-777-6703) if you have questions.

Ordering Tests:

Tests for respiratory viruses should be sent **ONLY** if the results will be used for patient management. Otherwise healthy children who are admitted during the peak of RSV season with typical symptoms may not need virus tests at all! See algorithm below.

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, a multiplex Respiratory Virus DFA (Direct immunoFluorescent Assay) is available to detect RSV, influenza, parainfluenza virus, human metapneumovirus (hMPV) and adenovirus. It is the preferred rapid test for hospitalized patients. An Influenza ImmunoAssay (IA) is available around the clock for clinic and emergency room patients to guide antiviral use.

Respiratory virus DFA is available in 3 workups:

- DFA only. For patients who will not be hospitalized long enough to benefit from slower culture results.
- DFA with culture backup. For more seriously ill, admitted patients whose treatment will be altered based on the result.
- DFA with concurrent culture. The test of choice for BALS and for immunocompromised or other high-risk patients with an underlying condition (e.g HIV/AIDS, transplant) requiring all viruses to be detected, even if results will take days-weeks.

2007 – 2008 Lab Tests for Respiratory Pathogens:

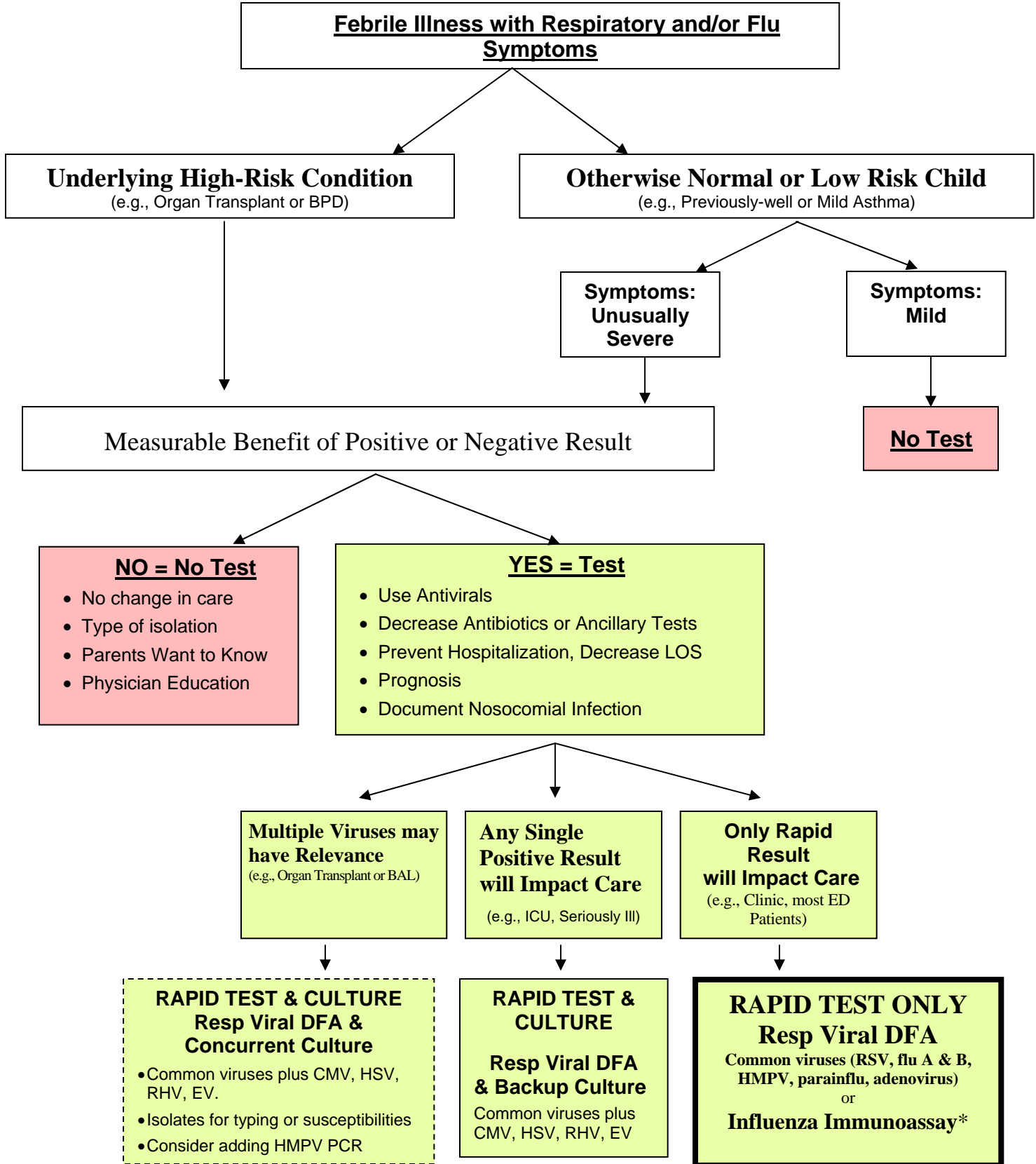
Viruses:

| Tests | Results | Comments |
|---------------------------|---|--|
| Respiratory Virus DFA | <p>Twice daily M-F: In by 7 AM, out by 9 AM. In by 1 PM, out by 3 PM.</p> <p>Once daily Sat and Sun: Afternoon.</p> | <p>Detects RSV, influenza, parainfluenza, human metapneumovirus (HMPV), and parainfluenza with high sensitivity (greater than 85%) and specificity (greater than 95%). Less sensitive for adenovirus (50%).</p> <p>Order alone, or with backup or concurrent culture. Only RSV, HMPV, influenza and preliminary detection of other viruses will be called. Final ID in computer.</p> |
| Flu A & B IA | Available STAT (less than 1 hour) when DFA is not available, flu is suspected and patient to be treated if positive. | Detects and differentiates flu A vs. flu B. Flu A sensitivity 70 - 80%; flu B sensitivity lower. DFA is more sensitive, detects other viruses causing "flu"-like symptoms, and is preferred for inpatients. |
| Respiratory Virus Culture | <p>Rapid culture: 2-3 days</p> <p>Standard Culture: 2 wks</p> | DFA is always done first. Detects 10 - 15% more viruses than DFA, as well as rhinovirus, enterovirus, CMV, and HSV. Will not recover HMPV. Not needed for most short-stay patients |
| Human metapneumovirus PCR | <p>Thursdays.</p> <p>In by 7 AM, out by 5 PM.</p> | DFA must be HMPV-negative before PCR can be performed. |

Other Pathogens:

| Tests | Results | Comments |
|---------------------------------------|--|--|
| <i>B. pertussis</i> PCR | 1-3 days | Nasal wash. |
| <i>Chlamydia trachomatis</i> culture | 2-3 days | Nasal wash. Children less than 1 year. |
| <i>Chlamydia pneumoniae</i> culture | 3-10 days | Throat swab in MT medium. Children more than age 2. |
| <i>Mycoplasma pneumoniae</i> PCR, IgM | <p>PCR: 3-10 days.</p> <p>IgM: Daily</p> | <p>PCR: Throat swab in MT medium.</p> <p>IgM: Red top.</p> |

RESPIRATORY VIRUS TESTING ALGORITHM



* Influenza IA is available ONLY in flu "season" and is less sensitive than DFA. Consider DFA if IA is negative and clinical condition warrants.



Therapies

Supportive Therapy: Adequate hydration, upper airway suctioning, and oxygenation are the mainstays of treatment for most infants with viral pneumonia and bronchiolitis.

Bronchodilators: Consider these if Severity Classification is moderate or severe. First Choice: Racemic Epinephrine. Alternate Choice: Albuterol via nebulizer. (See *Clinical Care Guidelines*, <http://planetch.thechildrenshospital.org/policiesfitz/general/pdf/538.pdf>.)

Evaluating Clinical Status and Response to Treatment:

1. On initial assessment, determine Severity Classification
2. Decide on intervention (based on Care Algorithm (Figure. 2))
3. Repeat severity classification to determine if intervention was helpful

Respiratory Severity Classification:

| | |
|-------------------------|---|
| <u>Mild Disease</u> | <ul style="list-style-type: none">• Alert, active, feeding well• None to minimal retractions• RR normal to mildly elevated (less than 50) |
| <u>Moderate Disease</u> | <ul style="list-style-type: none">• Alert, consoles, feeding decreased• Minimal to moderate retractions• RR is mildly to moderately elevated (50-70) |
| <u>Severe Disease</u> | <ul style="list-style-type: none">• Fussy, difficult to console, poor feeding• Moderate to severe retractions,• RR is moderately to severely elevated (greater than 70) |

Supportive Care - Routinely Indicated:

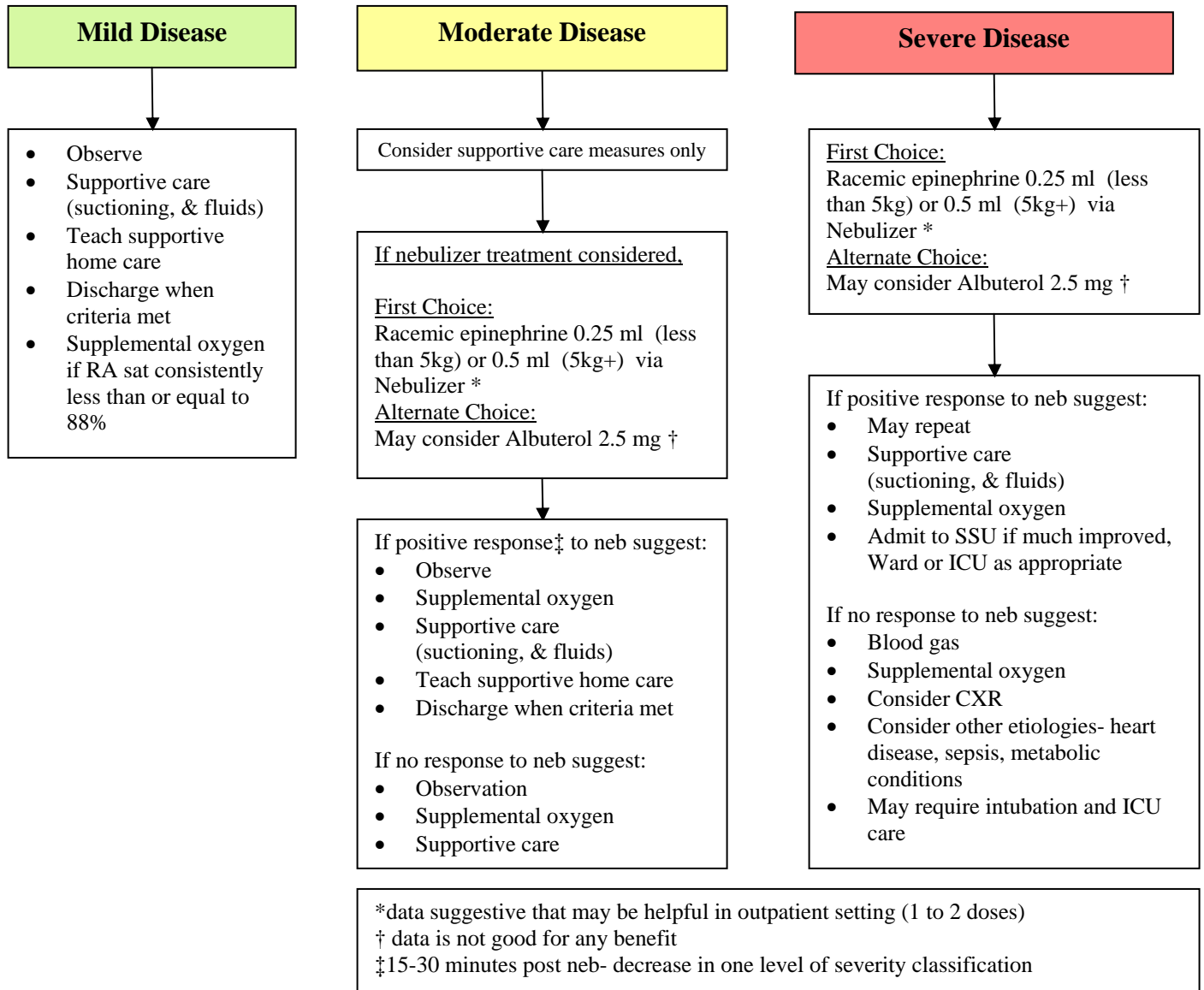
Oxygen is probably the most effective therapy in infants and children with bronchiolitis and/or viral pneumonia.

- Oxygen to achieve SaO₂ at or above 90%
- P.O. / I.V. fluids as needed
- Suction upper airway (use saline PRN):
 - Prior to feeding
 - Prior to clinical assessment
 - PRN evidence of upper airway obstruction

Figure 2

Bronchiolitis Care Algorithm

All Patients should receive upper airway suctioning prior to classification of disease severity.
Do not use treatment algorithm in the toxic appearing patient.





Ribavirin

Ribavirin is a FDA approved synthetic nucleoside analogue for treatment of moderate to severe RSV disease. Ribavirin is a very expensive drug that may be irritating or toxic to healthcare workers exposed to the aerosol. Treatment protocols are initiated on an inpatient basis for the delivery of this intermittently aerosolized medication, but Ribavirin remains controversial because of conflicting results of efficacy trials.

2007 – 2008 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. | Observe patients carefully. Ribavirin may be considered under critical care monitoring conditions if severely ill or rapidly deteriorating.* |

| Category | Patients | Guidelines |
|----------------|---|------------------------------------|
| 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

The Synagis Clinic began in early November to ensure that first dose injections would be completed by December 1.

Infants with hemodynamically insignificant heart disease are **not** at increased risk from RSV. Such patients are generally **not qualified** for treatment.

Any patient who is more than six months of age should have an influenza vaccination before or at the first visit at the Synagis clinic. Parents will be asked to bring proof of vaccination. Second influenza vaccinations (one month after the first one) are indicated for young children if they have not had an influenza vaccination the previous year. Influenza vaccination is best provided at the primary care physician's office (if available), but will also be available in the Synagis clinic.

For Synagis Clinic clinical questions or concerns, please contact Dr. Maya Bunik at 720-777-2740. All other

questions, concerns or patient referrals should be forwarded to Liz Gonzales or Mary Navin at 720-777-6311 or by e-mail at navin.mary@tchden.org. There will be satellite locations for doses 2 – 6; the first dose needs to be done in the clinic at the Hospital. Marsha Lehr/Special Care Clinic will provide Synagis for their special needs patients; she can be reached at 720-777-2783.

When the number of positive RSV tests fall below 10% of the number run, TCH will stop giving Synagis. This information will be placed in the comment section of Bug Watch.

Patients who are hospitalized on their scheduled day to receive Synagis may get it in the clinic on their discharge day, before leaving the Hospital; the insurance provider should be contacted. Premies discharged from the hospital should receive Synagis before discharge.

The following indications are approved for Synagis (palivizumab) use at The Children's Hospital:

- Any infant less than 2 years of age with chronic lung disease (defined as a history or persistent oxygen requirement during the first month of life) AND has required one of the following medical managements within the past 6 months:
 - Supplemental oxygen
 - Use of inhaled or oral bronchodilators
 - Corticosteroid therapy
 - Regular or intermittent use of diuretics to treat pulmonary disease
- Any infant born at 28 weeks or less with or without chronic lung disease who is less than 12 months of age
- Any infant born at 29-32 weeks gestational age with or without chronic lung disease who is less than 6 months of age
- Any infant born at 32 to 35 weeks gestational age who is less than 6 months of age AND meets at least 2 risk factors:
 - Attends day care
 - School-age siblings
 - Exposure to environmental air pollutants (excludes tobacco smoke, which is a controllable risk factor by the family or caregiver of the infant)
 - Congenital anomalies of the airways
 - Severe neuromuscular disease
- Any infant up to 2 years of age with hemodynamically significant heart disease defined as having one or more of the following:
 - Receiving medication to control congestive heart failure (antihypertensive, diuretics)

(Continued on next page...)

- Diagnosed with moderate to severe pulmonary hypertension
- Diagnosed with cyanotic heart disease

(All the 'risk factors' can be checked on all patients - - these were added this year to accentuate the need for Synagis in worthy candidates)



Some Final Thoughts

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 (720-777-6412) to begin receiving your personal copy.

VISITATION REMINDER! 12/15/07 TO 4/15/08

Inpatient:

- 2 visitors at bedside at one time (includes parents).
- For child visitors 12 years of age and younger: Only WELL siblings will be allowed. No relatives or friends in this age group will be allowed to visit.
- NO sick visitors, please!

Outpatient:

Due to an increase in respiratory illnesses in the community during these months, we discourage bringing siblings or friends who are 12 years of age or younger to your child's scheduled visits to these areas.

Thank You!



The Children's Hospital Association

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