Respiratory Season 2009 – 2010
Prevent Acquisition & Transmission!
Susan Dolan, MS, RN, CIC, Christine Robinson, PhD, & the Respiratory Season Planning Group

While we all plan for the upcoming holiday season, we need to also prepare for the unforgiving reality of the viral respiratory season. Even before the decorations and lights go up here at TCH, we prepare for the arrival of the usual winter viruses that fill our clinics and our inpatient beds with sick children. Given the presence of novel H1N1 this fall, specifics for that virus were covered in a previous Contagious Comments edition so will focus this edition on other respiratory viruses.

Each year, a multidisciplinary group of TCH clinicians meet to review virus epidemiology data from years past and also what viruses we expect we will see circulating this year and to what extreme. Preventative strategies are also discussed to determine what will be implemented this year to minimize the spread of these infections here at TCH.

Our influenza vaccination campaign has been in full swing for several weeks but that alone is not enough. This edition will provide you with reminders about standard basic principles as well as new information on virus testing, patient management, visitation practices and prevention. Throughout the season, be sure to monitor “Bug Watch” so you can see what viruses we are detecting in our lab from TCH patient and community specimens.

Important information for this season:

Visitation Restrictions: October 1, 2009 - April 15, 2010

Inpatient Visitor Screening and Restrictions—On October 1, 2009 we initiated our visitation restrictions on the inpatient units to help protect these patients from ill visitors. This year, the restrictions started earlier than usual due to H1N1. Our visitation hours are 9a – 9p. The visitation restrictions program includes the following:

1) No ill visitors.
2) Children 12 years old and under are not allowed to visit. (This includes siblings.)
   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) Only 4 visitors (this number includes the parents) at a patient bedside at a given time.
4) New this year is that ALL parents and visitors will be screened daily before entry into the inpatient units. Each unit has a screening station located at the entry to the unit. All visitors who meet criteria and are not ill will be given an apple sticker to wear indicating they have been screened.
5) Visitors are to adhere to any isolation precautions noted on the patient room door sign and are to wash hands before leaving the room. Exception: Parents may refrain from wearing isolation apparel, but need to wash hands each time upon entering and before leaving the room.
6) In the event the primary caretaker (parent/guardian) has a respiratory illness, he / she is requested to wear a mask and wash hands when outside the room and to limit activity (and wear a mask) during the following:
   a. Obtaining food in cafeteria (should return to patient room to eat, if possible).
   b. Avoid crowded areas in hospital (e.g., gift shop).
   c. Avoid high-risk patient visitation (if possible); if unavoidable (primary caregiver only), must wear a mask, gown and gloves. Discourage “close” patient contact.
7) Some of our higher risk units (ICUs, BMT) have more stringent visitor restrictions that may affect the number allowed at the bedside or may include an approved visitor list for each patient.
8) Decreasing the number of people visiting a single patient will decrease exposure risks and also provide an opportunity to educate a select group of visitors on the important steps to prevent transmitting infectious illnesses to our patients.

Outpatient Clinic /Therapy & 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.

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).

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### Epidemiology

<table>
<thead>
<tr>
<th>Organism</th>
<th>Illnesses</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenovirus</td>
<td>Pharyngitis, Tonsillitis, Croup, Bronchiolitis, Pneumonia, Keratoconjunctivitis, Common cold</td>
<td>Late Winter through Summer. <em>(but we have seen it this Fall)</em></td>
</tr>
<tr>
<td>Coronavirus</td>
<td>Common cold</td>
<td>Varies</td>
</tr>
<tr>
<td>Human Metapneumovirus (hMPV)</td>
<td>Bronchiolitis, Croup, Pneumonia</td>
<td>Year round, but mostly late Fall to late Spring.</td>
</tr>
<tr>
<td>Influenza (seasonal)</td>
<td>Flu, Bronchitis, Croup, Pneumonia, Secondary bacterial infections</td>
<td>Late Dec/Jan/Feb Spring. <em>(Another strain could circulate.)</em></td>
</tr>
<tr>
<td>Parainfluenza</td>
<td>Croup, Bronchiolitis, Bronchitis, Pneumonia, Common cold</td>
<td>Type 1 - Fall. <em>(We saw some activity this fall.)</em> Type 2 - year round Type 3 - Spring</td>
</tr>
<tr>
<td>RSV</td>
<td>Bronchiolitis, Pneumonia, Croup</td>
<td>December through April.</td>
</tr>
<tr>
<td>Rhinovirus</td>
<td>Common cold</td>
<td>Fall and Spring.</td>
</tr>
</tbody>
</table>

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**Isolation**

**Basic Infection Control**

For patients with symptoms of a “suspected” or a “proven respiratory” illness

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**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. **N95 masks should be used for staff performing cough inducing procedures such as nasal suctioning.**

3. Hospital staff with respiratory illnesses should report to Employee Health Services (EHS) for evaluation to help determine if you should be working with patients or are too ill to be at work. Employee Health is open Mon 0700-4:30pm and Tues- Fri 0700 5:30pm. After hours you should call the on call EHS nurse at 303-855-0024.

4. Use good handwashing / hand hygiene after removing gloves (prior to leaving the patient room).

5. Don’t forget to disinfect your stethoscope and any other equipment that is used between patients.

6. 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.**

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**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.
E. If repeat Direct Stain and/or PCR tests are negative. PCR (not direct stain) is required if virus was enterovirus/rhinovirus or adenovirus.

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). For BMT patients, refer to the “BMT Respiratory and Enteric Disease Isolation Guidelines” P&P (ONC-001A) in the IC manual on Planet TCH.

*“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 (by sneezing/coughing, etc) 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 patients (e.g. BMT, organ transplant, and immunocompromised).
2. No ill employees allowed in the BMT unit.
3. WASH YOUR HANDS after removing gloves.

Avoid contact with high-risk patients if you are ill.

**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 [page 5].

**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.
2010 RESPIRATORY PATHOGEN TESTS

Viruses: See algorithm on next page for guidance with test selection

<table>
<thead>
<tr>
<th>Tests</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Rapid&quot; Flu A/B Immunoassay With Backup Resp. Virus PCR</td>
<td>Rapid: ≤2 hours, 24/7</td>
<td><strong>Rapid:</strong> Detects influenza A (seasonal or 2009 H1N1) and influenza B. Only 50-60% sensitive for 2009 H1N1; higher for seasonal virus.</td>
</tr>
<tr>
<td></td>
<td>PCR: 1-2 days</td>
<td><strong>PCR:</strong> Automatically performed if rapid is negative. Detects influenza A and its seasonal H-subtypes, influenza B, RSV A/B, HMPV, adenovirus, parainfluenza 1-4, enterovirus/rhinovirus, and 4 coronaviruses. May miss some adenoviruses.</td>
</tr>
</tbody>
</table>

| Respiratory Virus DFA (Direct Stain) with Backup Resp. Virus PCR      | DFA: M-F: Twice daily. In by 7 am; out 9 am. In by noon, out 3 pm. Sat-Sun: Once per day. Results in pm. PCR: 1-3 days | **DFA:** Detects RSV, influenza A and B, HMPV, parainfluenza 1-3 (combined), and adenovirus. Is 70-85% sensitive (30-50% for adenovirus.)  |
|                                                                      |                          | **PCR:** Detects viruses listed above. Performed only if DFA is negative.                      |

| Respiratory Virus DFA with Concurrent Resp. Virus PCR                 | Stain: As above         | **DFA:** Detects viruses listed above.                                                          |
|                                                                      | PCR: 1-2 days           | **PCR:** Detects viruses listed above. Performed even if DFA is positive to identify co-infections and H-subtype of influenza A. |

| Respiratory Virus DFA with Concurrent Resp. Virus PCR and CMV/HSV Rapid Culture | Stain: As above         | **DFA:** Detects viruses listed above.                                                          |
|                                                                                  | PCR: 1-2 days           | **PCR:** Detects viruses listed above. Performed even if DFA is positive to identify co-infections and H-subtype of influenza A. |
|                                                                                  | Culture: 1-3 days       | **Culture:** To detect new or reactivated CMV or HSV infections.                               |

Other Pathogens:

<table>
<thead>
<tr>
<th>Tests</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. pertussis PCR</td>
<td>2-3 days</td>
<td>Nasal wash.</td>
</tr>
<tr>
<td>Chlamydia trachomatis culture</td>
<td>2-3 days</td>
<td>Nasal wash. Children less than 2 years of age</td>
</tr>
<tr>
<td>Chlamydia pneumoniae culture</td>
<td>3-10 days</td>
<td>Throat swab in MT medium. Children older than 2 years.</td>
</tr>
<tr>
<td>Mycoplasma pneumoniae PCR, IgM</td>
<td>PCR: 2-3 days. IgM: Daily</td>
<td><strong>PCR:</strong> Throat swab in MT medium. IgM: Red top.</td>
</tr>
</tbody>
</table>

Please see the Respiratory Virus Testing Algorithm On the following page
PATIENT WITH RESPIRATORY OR INFLUENZA-LIKE SYMPTOMS

DO NOT TEST

Hospitalized or High-Risk Outpatient

DO NOT TEST

Clinical Benefit of Testing

Lower Respiratory Tract Specimen or Critical Care or Immunocompromised Patient

Influenza Virus Circulating

RESP DFA WITH CONCURRENT RESP PCR AND CMV/HSV CULTURE

RESP DFA WITH CONCURRENT RESP PCR

RESP, DFA WITH BACKUP RESP PCR (if DFA is negative)

"RAPID" INFLUENZA IMMUNOASSAY WITH BACKUP RESP PCR (if rapid is negative)

Reasons Not to Test:
- Parents want to know
- Physician education
- Classic non-treatable illness in "season"

Reasons To Test:
- Use antivirals
- Limit antibiotics/ancillary testing
- Decrease LOS
- Document nosocomial infection

Yes

No

Yes

No

Yes

The Children's Hospital DPLM C. Robinson Ph.D. 121709
Bronchiolitis Care Algorithm

**Mild Disease**
- Observe
- Supportive care (suctioning, & fluids)
- Teach supportive home care
- Discharge when criteria met
- Supplemental oxygen if RA sat consistently less than or equal to 88%

**Moderate Disease**
- Consider supportive care measures
- If nebulizer treatment considered,
  - **First Choice:** Racemic epinephrine 0.25 ml (less than 5kg) or 0.5 ml (5kg+)
    via Nebulizer*
  - **Alternate Choice:** May consider Albuterol 2.5 mg †
- If positive response‡ to neb suggest:
  - Observe
  - Supplemental oxygen
  - Supportive care (suctioning, & fluids)
  - Teach supportive home care
  - Discharge when criteria met
- If no response to neb suggest:
  - Observation
  - Supplemental oxygen
  - Supportive care

**Severe Disease**
- **First Choice:** Racemic epinephrine 0.25 ml (less than 5kg) or 0.5 ml (5kg+)
  via Nebulizer *
- **Alternate Choice:** May consider Albuterol 2.5 mg †
- If positive response‡ to neb suggest:
  - May repeat
  - Supportive care (suctioning, & fluids)
  - Supplemental oxygen
  - Admit to SSU if much improved, Ward or ICU as appropriate
- If no response to neb suggest:
  - Blood gas
  - Supplemental oxygen
  - Consider CXR
  - Consider other etiologies- heart disease, sepsis, metabolic conditions
  - May require intubation and ICU care

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*Always check intranet for latest version: http://planettch/policiesfitz/general/index.cfm?CategoryID=9

**Figure 2** (see page 7 “Evaluating Clinical Status and Response to Treatment”)

*data suggestive that may be helpful in outpatient setting (1 to 2 doses)
† data is not good for any benefit
‡15-30 minutes post neb- decrease in one level of severity classification
Therapies

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


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:

| Mild Disease | Alert, active, feeding well |
| None to minimal retractions |
| RR normal to mildly elevated (less than 50) |

| Moderate Disease | Alert, consoles, feeding decreased |
| Minimal to moderate retractions |
| RR is mildly to moderately elevated (50-70) |

| Severe Disease | 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

RSV Prophylaxis
In 2009, the American Academy of Pediatrics Committee on Infectious Diseases (Redbook) updated their recommendations on prophylactic therapy for respiratory syncytial virus (RSV) in an effort to ensure optimal balance of benefit and cost of this intervention. The recommendations were based on additional data regarding seasonality of RSV disease as well as limitations in available data on risk factors for identifying children at increased risk of serious RSV lower respiratory tract disease.

To view these new recommendations please use the following link: http://www.cdc.gov/rsv/clinical/prophylaxis.html

Some Final Thoughts
Finally, remember to adhere to infection control practices and isolation procedures. Avoid inappropriate use of antibiotics for viral illness, continue vaccination for influenza 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 detected by the TCH Laboratory and B. pertussis detected statewide provided to you weekly. Posted on the TCH Internet at: http://www.thechildrenshospital.org/news/publications/bug.aspx 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!
10/01/09 TO 4/15/10

Inpatient Units:
No ill visitors
Children 12 yrs of age and younger may not visit.
All visitors will be screened for contagious illnesses before allowed entry into unit.

Outpatient clinics/Network of Care sites:
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!