Intervention study on improving antibiotic –over-prescribing among children with upper respiratory infections in rural Guangxi, China

Guidance booklet for Healthcare Provider

Table of Contents

Purpose of this booklet

This booklet is to help the clinicians from township hospitals to have fast simple guidance on appropriate antibiotic use for common upper respiratory infections (URIs). As we know most of the URIs were caused by viral infection. Over-prescribing antibiotic will lead to antibiotic resistance where bacterial infections will have less treatment choices in the future. We hope this booklet will improve the appropriate antibiotic use in township level hospitals.

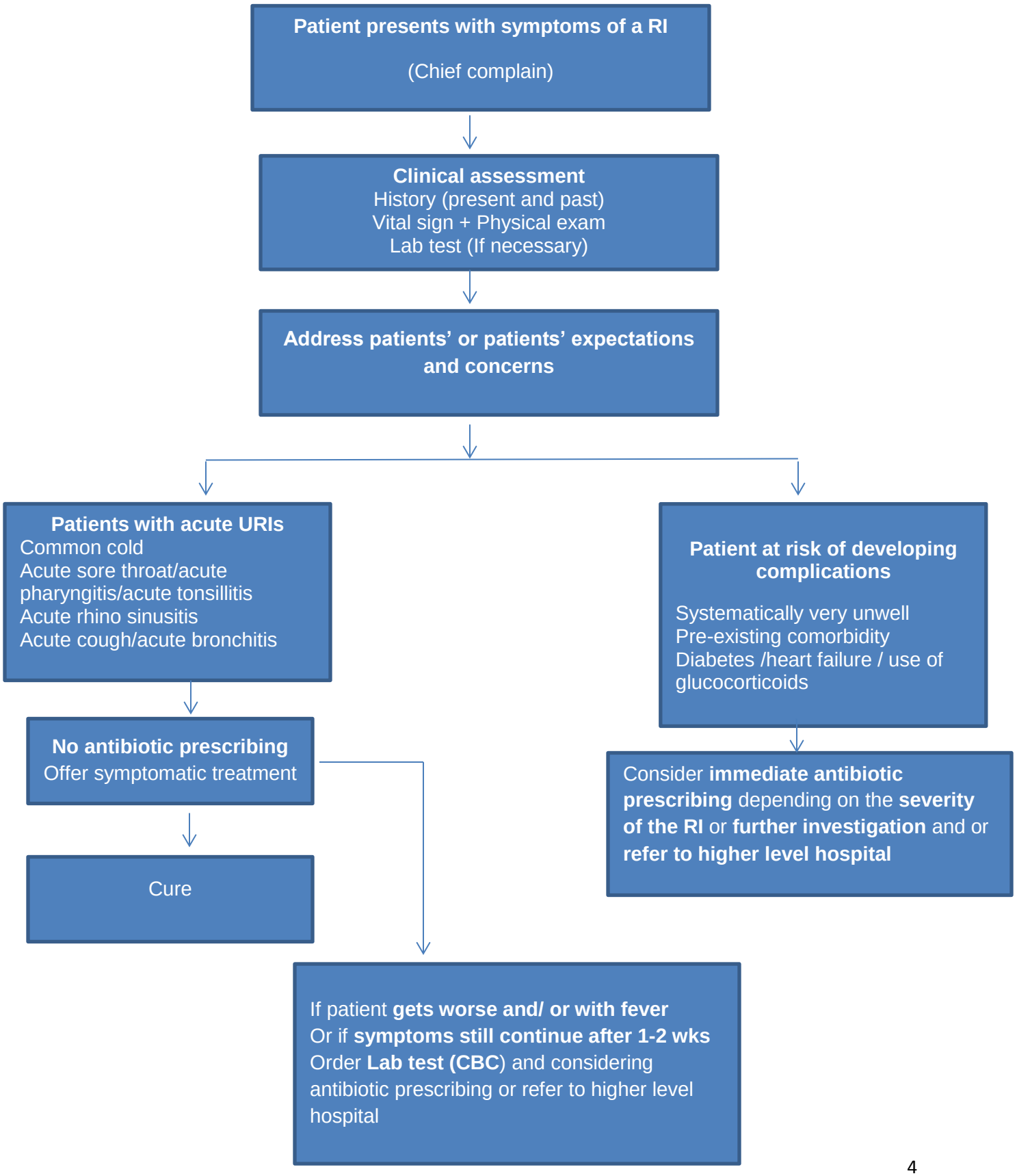
The booklet content was based on the information from USCDC ”Get Smart”, UK” TARGET”, Canada” Antibiotic Awareness”, European Surveillance of Antimicrobial Consumption and the Chinese guideline on antimicrobial medicines written by the team of “Intervention study on improving antibiotic–over-prescribing among children with upper respiratory infections in rural Guangxi, China”, which included the following institutes: The Chinese University of Hong Kong, COMDIS-HSD, Nuffield Centre for International Health and Development, Leeds University and Guangxi CDC.

During the study period (2014-2016), the booklet first users will be the clinicians from the intervention townships, after the study period, it can be used for other townships.

Clinicians should monitor and follow the child’s symptoms closely as each case may not always follow the typical flow. Simply replying on the advice in this booklet is not acceptable.

“No action today No cure tomorrow”-----WHO

Part 1 Self-limiting respiratory infections flow chart



Part 2 Clinical assessment of Pediatric Respiratory tract infections (RIs)

- **Medical history assessment**
  - Present symptoms
  - Past history (medical history, hospitalization history, relevant comorbidies, medicine allergy history, family medical history)
- **Common symptoms:**
  - The most common symptom: Cough, it may bring up phlegm and mucus.
  - Other symptoms: fever, headaches, a stuffy or runny nose, a sore throat, sneezing and muscle ache; a tight feeling in your chest, increased rate of breathing, breathlessness and wheezing.
  - **Location:** nose, sinuses, throat and ears.

- **Physical exam:**
  - Normal T or high temperature, Normal breath rate or a bit quick breath rate.
  - Check the relevant place: nose (rhinorrhea), sinuses(nasal discharge), throat (red, white exudate) and ears (effusion, ear pain, bulging or red tympanic membrane)

- Children tend to get more upper RTIs than adults because they have not yet built up immunity (resistance) to the many viruses that can cause these infections.

- **Lab test:** Urine strip test, no nitrite or high white cells Complete blood cell (CBC): white blood cell normal or high; Absolute neutrophil count normal or high C reactive protein

Part 3 Fever

Common Management:

- Have plenty of rest
- Drink enough fluid
- Pain relief

Management:

- It's important to keep them **hydrated by giving them plenty of cool water to drink**. Even if your child isn't thirsty, try to get them to drink little and often to keep their fluid levels up.
- To help reduce your child's temperature you can also:
    - **keep them cool if the environment is warm** – E.g. you can just cover them with a lightweight sheet (but they should be appropriately dressed for their surroundings)
    - **keep their room cool** – 18°C is about right (open a window if you need to)
    - **give them children's *paracetamol or ibuprofen*** – you can't give them both at the same time, but if one doesn't work you may want to try the other later. These are painkillers that also act as antipyretics, meaning they help to reduce fever
- Antipyretics aren't always necessary – for example, if your child isn't distressed by the fever or underlying illness.
    - Always read the patient information leaflet that comes with the medication, find the correct dose and frequency for your child's age or weight.
    - DO NOT give aspirin to children.

When to get further investigator or refer higher level hospital:

Sometimes, a high temperature in children is associated with more serious signs and symptoms such as:

- Breathlessness
- Vomiting
- Rash
- Fits or seizures

Possible serious bacterial illnesses include:

- Meningitis – infection of the meninges (the protective membranes that surround the brain and spinal cord)
- Septicaemia – infection of the blood
- Urinary tract infection (UTI)
- Pneumonia – inflammation of the lung tissue, which is usually caused by an infection

It's important to remember that potentially serious causes of fever are relatively rare.

Part 4 Diagnosis and Treatment

I Rhinitis and Sinusitis

Diagnosis:

- In uncomplicated colds, cough and nasal discharge may persist for 14 days or more – long after other symptoms have resolved;

- Though most viral URIs involves the paranasal sinuses, only a small minority are complicated by bacterial sinusitis.

Management:

- Antibiotics should not be given for viral rhinosinusitis
- Mucopurulent rhinitis (thick, opaque, or discolored nasal discharge) frequently accompanies viral rhinosinusitis. It is not an indication for antibiotic treatment unless it persists without improvement for more than 10-14 days.
- Symptom relief treatment

When to consider antibiotics:
Note that:

- Changes in mucous to yellow, thick, or green are the natural course of viral URI, NOT an indication for antibiotics.
- Treating viral URI will not shorten the course of illness or prevent bacterial infection.

- **Sinusitis**: Symptoms of rhinorrhea or persistent daytime cough lasting **more** than 10 - 14 days **without improvement or**
  - Severe symptoms of acute sinus infection
  - fever (> 39 C) with purulent nasal discharge
  - facial pain or tenderness
  - periorbital swelling

- **Appropriate antibiotic use:**

- Target likely organisms with first-line drugs: Amoxicillin, Amoxicillin/ Clavulanate (80–90 mg/kg per day of the amoxicillin component with 6.4 mg/kg per day of Clavulanate in 2 divided doses with a maximum of 2 g per dose)
- Use shortest effective course: Should see improvement in 2-3 days. Continue treatment for 7 days after symptoms improve or resolve (usually a 10 - 14 day course).
- Consider referral to ENT imaging studies in recurrent or unclear cases if necessary :But remember that some sinus involvement is frequent early in the course of uncomplicated viral URI - 如果出现了….转给耳鼻喉医生 Rhinorrhea, fever, and cough are symptoms of viral URI

II Pharyngitis

Diagnosis:

- Prominent rhinorrhea, cough, hoarseness, conjunctivitis, suggest a VIRAL etiology
- Antigen tests (rapid Strep kits) or culture **negative** if Lab test available

Management:

- Antibiotics should not be given to a child with pharyngitis in the absence of diagnosed group A streptococcal infection.

When to consider antibiotics:

Group A streptococcal pharyngitis diagnosed by using a laboratory

- Use a penicillin as treatment for group A strep.
- NO group A strep are resistant to penicillin. Treatment is 90% effective at elimination of strep, and may be higher in the prevention of acute rheumatic fever (ARF). Carriers are at very low risk for both ARF and spreading infection.
- Use erythromycin if penicillin allergic

III Otitis Media

1, Otitis media with effusion (OME)

Diagnosis:

- Presence of effusion (including immobility of the tympanic membrane)
- *WITHOUT* Signs or symptoms of acute infection (such as fever, swollen lymph nodes sore throat, muscle pain, malaise).
- Nonspecific signs and symptoms (rhinitis, cough, diarrhea) are often present

Management:

- Antibiotic treatment has not been demonstrated to be effective in long-term resolution of OME.
- Explain when the risks of using antibiotics outweigh the benefits.
- Avoiding unnecessary treatment of OME would save up to 6-8 million courses of antibiotics each year.

When to consider antibiotics:

- A single course of treatment for 10-14 days may be used when a parent or caregiver expresses a strong aversion to impending surgery.
- Treatment may be indicated if bilateral effusions persist for 3 months or more.

2, Acute otitis media (AOM)

Diagnosis:

- Ear pain, fever, and bulging yellow or red TM
- History of acute onset of signs and symptoms (such as fever, swollen lymph nodes, sore throat, muscle pain, malaise) . *WITH*
- The presence of middle ear effusion (indicated by bulging of the TM or limited/absent TM mobility or ear discharge or air-fluid level) *WITH*
- Signs or symptoms of middle-ear inflammation (indicated by distinct erythema of the TM or distinct ear pain)

A certain diagnosis of AOM meets all 3 criteria:

- Rapid onset,
- Signs of middle ear effusion, and
- Signs and symptoms of middle-ear inflammation.

Management:

- Management should include assessment of pain → if pain is present, clinician should recommend treatment to reduce pain.
- Follow the age and the severity of the illness
    - Age less than 6 months: certain and uncertain diagnosis- antibacterial therapy
    - Age 6 months to 2 years: certain diagnosis - antibacterial therapy uncertain diagnosis - antibacterial therapy if severe illness; observation option* if non severe illness
    - Age 2 years or older: certain diagnosis - antibacterial therapy if severe illness; observation option* if non severe illness uncertain diagnosis - Observation option*

        - *Observation is an appropriate option only when follow-up can be ensured and antibacterial agents started if symptoms persist or worsen.
        - Non severe illness is mild ear pain and fever <39°C in the past 24 hours.
        - Severe illness is moderate to severe ear pain or fever > 39°C.
- * If decision is made to treat with an antibacterial agent, the clinician should prescribe amoxicillin for most children.

If the patient **fails** to respond to the initial management option within **48-72** hours, clinician must reassess to confirm AOM and exclude other causes of illness. If AOM is confirmed in:

- Patient initially managed with observation, begin antibacterial therapy.

- Patient initially managed with antibacterial agent, change the agent.

IV Cough Illness / Bronchitis

Diagnosis:

- Cough illness/bronchitis is principally caused by viral pathogens. Airway inflammation and sputum production are non-specific responses and do not imply a bacterial etiology.

Management:

- Antibiotic treatment of upper respiratory infections **do not** prevent bacterial complications such as pneumonia.
- Do not use antibiotics for: Cough <10-14 days in well-appearing child without physical signs of pneumonia

When to consider antibiotics:

- Suspected pneumonia, based on fever with focal exam, infiltrate on chest x-ray, tachypnea, or toxic appearance: Symptoms can vary, depending on whether your pneumonia is bacterial or viral.
    - The initial symptoms of viral pneumonia are the same as influenza symptoms: fever, a dry cough, headache, muscle pain, and weakness. Within 12 to 36 hours, there is increasing breathlessness; the cough becomes worse and produces a small amount of mucus. There is a high fever and there may be blueness of the lips.
    - In bacterial pneumonia, your temperature may rise as high as 105 degrees F(40.5℃) . This pneumonia causes profuse sweating, and rapidly increased breathing and pulse rate. Lips and nailbeds may have a bluish color due to lack of oxygen in the blood. A patient's mental state may be confused or delirious.
- Prolonged cough (>10-14 days without improvement) may suggest specific illnesses (e.g. sinusitis) that warrant antibiotic treatment.
- Treatment with a macrolide (erythromycin) may be warranted in the child older than 5 years when mycoplasma or pertussis is suspected.

Part 5 Special consideration ("traffic lights" guide)

Upper respiratory infections

In a child under 5 years presenting with either cough/cold, or sore throat, or sore ears, or other symptoms of an upper respiratory infection (URI)

Ask if a **fever,** by history, or has a temperature >37.5 C, or feels hot to touch

Look for ABCDE, signs of serious infection needing referral to Paediatrician:

Activity; responds, smiles, awake, normal cry?

Breathing; appearance of difficult breathing, and rate normal for age?:
6 – 12 months > 50/ min
12 months to 5 years, > 40/ min
[5 – 12 years > 30/min, 12 + years > 20/min]

Colour/ circulation; normal skin, lips and tongue capillary refill time < 3 seconds

Dry; moist tongue, normal skin and eyes, or is signs of dehydration?

Every other; specific/ local sign

- See signs of serious illness, **'traffic lights' table below** (refer if an amber or a red sign)
- if **no** amber or red danger sign, then

Assess if needs an antibiotic for a specific bacterial infection

- painful, red ear or bulging ear drum? If present treat with amoxicillin
- white exudate on tonsils, if present give penicillin V
- other local signs of possible bacterial,

- urine strip (especially if no 'localising' sign of source of the infection in child with fever);
  - nitrite or white cells positive?, treat for a UTI, or
  - refer to hospital Paediatrician for investigation of fever > 5 days of unknown cause or you are otherwise concerned about the child.

If not localising signs of bacterial infection and no amber or red danger signs:
Manage as a viral URI illness:

- symptomatic treatment; Paracetamol/ Ibuprofen etc. *and if*
- explain serious symptoms or signs, and if any occur to go urgently to hospital emergency dept.
- if fever or otherwise ill, give an appointment in 2 days to for reassessment, otherwise say return if symptoms persist or get worse.

Part 6 Practice Tips

When parents ask for antibiotics to treat viral infections:

- Explain that unnecessary antibiotics can be harmful.
    - Tell parents that based on the latest evidence, unnecessary antibiotics CAN be harmful, by promoting resistant organisms in their child and the community.
    - Most RTIs will pass without the need for treatment. You can treat your symptoms at home by taking over-the-counter painkillers such as paracetamol or ibuprofen, drinking plenty of fluids and resting.
    - Antibiotics are not recommended for most RTIs because they are only effective if the infection is caused by bacteria.
    - The symptoms of an upper RTI usually pass within one to two weeks.
- Share the facts.
    - Explain that bacterial infections can be cured by antibiotics, but viral infections never are.
    - Explain that treating viral infections with antibiotics to prevent bacterial infections does not work.
- Build cooperation and trust.
    - Convey a sense of partnership and don't dismiss the illness as "only a viral infection".
- Encourage active management of the illness.
    - Explicitly plan treatment of symptoms with parents. Describe the expected normal time course of the illness and tell parents to come back if the symptoms persist or worsen.
- Be confident with the recommendation to use alternative treatments.
    - Prescribe analgesics and decongestants, if appropriate.
    - Emphasize the importance of adequate nutrition and hydration.
    - Consider providing "care packages" with no antibiotic therapies.
    - Create an office environment to promote the reduction in antibiotic use.

Appendix Traffic lights guide

To identify the risk of serious illness in children with fever. Adapted from NICE UK. Is highly sensitive (94%) to pick up possible bacterial/ serious infections.

	Green — low risk Manage as below	**Amber — intermediate risk Refer to hospital Paediatrician**	**Red — high risk, urgent transfer to Paediatrician**
Activity/ alertness	Responding normally to social cues. Content, smiling. Stays awake or awakens quickly. Strong normal cry or not crying.	Not responding normally to social cues. Waking only with prolonged stimulation. Decreased activity. No smile.	No response to social cues. Appears ill to the doctor. Unable to rouse or if roused does not stay awake. Weak, high-pitched, or continuous crying.
Breathing	No nasal flaring No chest indrawing Breathing rate and pulse is not rapid Chest clear.	Nasal flaring. Breathing is rapid: *6–12 months of age:* BR > 50 per minute. *> 12 months of age:* BR > 40 per minute. Oxygen saturation = < 95% in air. Crackles heard in chest.	Grunting. Very rapid breathing (BR* > 60 breaths per minute). Moderate or severe chest indrawing
Colour/ circulation	Normal colour of skin, lips, and tongue. Pulse rate normal	Pallor CRT† >= 3 seconds. Reduced urine output‡. Pulse rapid/beats per minute: >160 b/min under 1 years age >150 b/min 1–2 years age >140 b/min 2– 5 years age	Pale, mottled, ashen, or blue.
De- hydration	Normal skin and eyes. Moist mucous membranes.	Dry mucous membrane. Poor feeding in infants.	Reduced skin turgor
Every other	None of the amber or red symptoms or signs. …… Urine strip nitrite and white cells, if positive treat UTI. If not possible to do, and has fever - refer.	Fever for >= 5 days. Rigors 3–6 months of age, or temperature >=39°C. …… ……. Swelling of limb or joint. Non-weight-bearing/not using an extremity. New lump > 2 cm	*0–3 months of age,* temperature >= 38°C. …… Non-blanching rash. Bulging soft spot on head of infants. Neck stiffness. Status epilepticus. Focal neurological signs or seizures.

*BR = respiratory rate. † CRT = Capillary refill time. ‡ In infants, ask about wet nappies.
If no red signs, and a *localising symptoms and signs* of a bacterial infections are found, but no red signs, e.g. a UTI or pneumonia (rapid breathing rate and/or crackles heard in the chest, and an X-ray suggestive of pneumonia), treat with an antibiotic.
If no localising signs, do not 'blindly' give antibiotics; refer to a paediatrician for investigations including blood culture.

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