Bronchiectasis Starship Clinical Guidelines

Starship Respiratory Service August 2020

This guideline covers acute care (Table) and long-term care of bronchiectasis (the remainder of the document).

Australasian guidelines give an approach to diagnosis and management up to 2015 (9, 10). These Starship Guidelines bring those up to date for NZ.

The Bronchiectasis Foundation NZ https://www.bronchiectasisfoundation.org.nz/ has a section on Resources: information pamphlets for families, preschools and schools and an Action Plan template, and a section on Research Papers.

Contents

1. Table: Acute presentation or exacerbation of bronchiectasis

History	• Increase in cough or change of character of the cough from dry to mucousy • Increased volume or production of sputum • Change in sputum colour - clear to yellow to green • Fever (not always) • Shortness of breath • Tiredness • Chest pains • Haemoptysis (rare)
Examination	• Increased respiratory rate • Increased work of breathing • Crackles • Wheeze
Investigations	• SaO_2 - may be normal, low or borderline 90-92% during the day, if borderline or normal check nocturnal oxygen saturations • Sputum - send for microscopy, bacterial culture and sensitivities. A cough suction sample (nasopharyngeal aspirate) may be useful in a younger child who is unable to expectorate sputum • Inflammatory indicators (FBC, CRP, ESR) are frequently elevated even when the child is well and may not effect management. • Chest x-ray – Generally not required. However, if pleural effusion or a pneumothorax is suspected or the child has not had a CXR in the last 12 months then a repeat CXR may be indicated.

Organisms	• The commonest reason for an acute respiratory exacerbation is a viral infection. • Three quarters of the children chronically grow *Haemophilus influenzae* (non-typeable) from their sputum. • A few children concurrently grow *Streptococcus pneumoniae* or *Moraxella catarrhalis.* • *Staphylococcus aureus* or gram-negative organisms are uncommon. • There are a small number of children who are acute **(Appendix 1)** or chronically infected with *Pseudomonas aeruginosa* and who require antipseudomonal therapy. Discuss with paediatrician
Management	• Give 2 weeks of a broad-spectrum oral antibiotic with intensification of chest physiotherapy (at least 2 treatments per day while on antibiotic). • Children who are severely unwell, hypoxic or who have pneumonia should be admitted for intravenous therapy (see below). • Even if you suspect a viral aetiology antibiotics are normally prescribed to reduce the microbial load. • Antibiotic choice - where possible should be determined by sputum bacterial culture and sensitivity. Review previous sputum results where possible. • Prescribe in maximum doses recommended in the NZ Formulary for children http://nzformulary.org/ . • *H.influenzae* is frequently found and is usually sensitive to amoxicillin/clavulanic acid or cotrimoxazole. Use amoxycillin if sensitive. • If the child is allergic to penicillin, oral cefaclor or erythromycin should be used.

	• If the child is still very productive or the sputum purulent, then a further two weeks oral antibiotic should be prescribed. • If at the end of that 2 weeks of antibiotics the child is no better, or if the child's clinical condition deteriorates during that 2 weeks of antibiotics, consideration should be given to in-patient intravenous antibiotics and more intensive chest physiotherapy. Discuss with paediatrician.
Respiratory Support	• There are a few children under the respiratory team who have very severe respiratory disease with type I or II respiratory failure. • They may be supported at home at night on oxygen which may need to be increased and monitored closely during acute exacerbations. • Some are supported on CPAP or variable or bilevel mask ventilatory support (VPAP/BiPAP) at night. • Please consult with the on call respiratory consultant for all these children.
Follow-up and Contacts	• Please ensure that you have discussed the child with the Respiratory Registrar during the day, or the on call Respiratory Consultant after hours, before admission or discharge from CED. • Please check the family have transport and a phone. If not, ensure that other measures have been taken so that contact can be made with emergency services. • Ensure they have clear instructions on when they should seek further medical review if the child's symptoms deteriorate or just don't improve. Children may be reviewed by home care nurses in the community. • Please ensure they have a follow-up bronchiectasis clinic appointment arranged.

	• If you are not sure what to do, you may contact the Bronchiectasis Nurse Specialist in working hours mobile 021412734.

2. Background

- "Bronchiectasis" is defined as an abnormal, irreversible dilatation of one or more bronchi.
- When bronchiectasis is not due to cystic fibrosis (CF) it is sometimes called non-CF bronchiectasis. In this guideline we call it simply bronchiectasis.
- Without treatment bronchiectasis is almost always a progressive condition resulting in a shortened life expectancy. Progression is associated with severity of disease and the frequency of acute infective exacerbations.
- Bronchiectasis also causes high morbidity; with recurrent lower respiratory tract infections, with frequent school absenteeism, poor exercise tolerance, recurrent primary health care presentations, and repeated hospital admissions, and occasionally death in childhood.
- In New Zealand (NZ) there are very high rates of bronchiectasis in children (3) which are related to high rates of poverty and poor quality or overcrowded housing.
- The burden of this disease is predominantly seen in tamariki Māori or Pacific children. Over a quarter of the families do not speak English as their first language and interpreters may be needed to establish an adequate history.
- In NZ bronchiectasis is diagnosed at a median age of 3 years (2014 study). Most children have bilateral or generalised disease, and many presentations with acute lower respiratory tract illness before diagnosis. It is especially associated with hospitalisations for lower respiratory tract infections in the first two years of life (4).
- Early intervention may reduce the severity, or even reverse the bronchiectasis (5), therefore it is vital to have early diagnosis and optimum treatment.
- Extra effort is necessary to achieve equity of outcomes.
- Here is a NZ Bronchiectasis Foundation providing resources for people with bronchiectasis https://www.bronchiectasisfoundation.org.nz/.

3. Epidemiology

- There has been New Zealand-based research on the epidemiology of bronchiectasis in children since 2000 (3,4,6-9).The prospective national study reporting all new cases diagnosed 2001-2003 reported an incidence of 3.7/100,000 children per year: seven times higher than Finland (0.5/100,000) and 18 times higher than in the UK (0.2/100,00 (3,10).
- Eighty percent of the children were Māori or Pacific peoples indicating a disproportionate prevalence of bronchiectasis:
    - 1/1875 for Pacific peoples
    - 1/4244 for Māori
    - 1/24,900 for European/Pākehā.
- Bronchiectasis is nearly twice as common in Pacific peoples as CF is in the general population.
- This national prospective data is over a decade old – and more recent longitudinal data suggests that since 2000 there has been a 45% increase for bronchiectasis hospitalisation rates and an 88% increase in mortality for the total disease (children and adults) overall. Overall Pacific peoples were 6.2 times more likely and Maori 3.8 times more likely to be hospitalised per year than non-Maori-Pacific (11).
- There are about 200 children with bronchiectasis in the Starship Bronchiectasis Clinic.
- There were 123 new diagnoses in children < 15 years of age requiring hospitalisations in 2017, 104 in 2016 and 102 in 2015 nationwide (11).

4. Clinical features of bronchiectasis – have high index of suspicion

<u>History</u>

- A persistent or recurrent moist/wet cough with phlegm
- Production of sputum - most children less than school age are unable to expectorate sputum and usually swallow it

- Haemoptysis (rare) - reported more commonly in adults. This may be life threatening. If reported get a clear history of amount (teaspoons etc), fresh, old clots etc. Stop physiotherapy, consider tranexamic acid and consult with paediatrician.
- Shortness of breath
- Wheeze - there may be a coexistent history of asthma in approximately a third of the children with bronchiectasis. Use of inhalers and devices should be assessed as for asthma
- Family history of bronchiectasis

Examination

- May be normal except for a productive cough
- Chest wall abnormalities (60%) e.g. hyperinflation, Harrison's sulci, pectus carinatum.
- Digital clubbing (up to 50%).
- Failure to thrive is unusual in children with bronchiectasis. This may be seen in advanced disease or with specific causes (e.g. immunodeficiency or severe gastroesophageal reflux.
- Crackles - may be widespread but may be localised to the areas involved.
- Wheeze - may not be bronchospasm as can occur with airflow turbulence caused by excessive bronchial secretions.

5. Causes of bronchiectasis

- Bronchiectasis can be caused by a variety of respiratory insults. Even after extensive investigations the cause of bronchiectasis remains unknown in 50%. Twenty five percent of cases seen at the Starship clinic are related to previous severe childhood pneumonia. Other causes include primary immune deficiency, immunosuppression with oncology or transplant treatment, recurrent aspiration (chronic dysphagia, gastroesophageal reflux or foreign body inhalation), and other rare causes (6).

6. Diagnosis of bronchiectasis

- The diagnosis can be made clinically with features of history and examination findings.
- Exclude CF – normal sweat test. If not obtainable or high risk then CF mutations need to be done.
- Chest Xray may be normal
- High Resolution CT scan (HRCT) – the gold standard of diagnosis, with a ratio of bronchus to adjacent artery diameter ≥1 and/or airways visible extending to the lung periphery. These investigations should be done at a time of health stability (after appropriate ambulatory treatment has been undertaken for 6-8 weeks) to enable the best views for interpretation and an accurate baseline. This may require general anaesthesia in young children (< 5 years of age) or those who cannot co-operate.

7. Investigation of bronchiectasis or suspected bronchiectasis

Review investigations to determine if there is an underlying cause known and to determine if the investigations are complete. See Starship Guidelines on cough https://www.starship.org.nz/guidelines/cough**, (Appendix 2)**

8. Antibiotics

- See Table for acute treatment
- Azithromycin is occasionally prescribed prophylactically to reduce bronchiectasis exacerbations. The Ministry of Health provides up to 2 years fully subsidised Azithromycin for specific indications, on Special Authority applied for by a Paediatrician. Children need to have definitively proven bronchiectasis and three or more infective exacerbations or hospitalisations in the preceding 12 months and be less than 18 years of age **(Appendix 3).**
- Some children with frequent exacerbations require other chronic prophylactic antibiotics or nebulised antibiotics(12). Discuss with a respiratory or immunology specialist.

10. Airway Clearance Techniques (Chest physiotherapy)

- Airway clearance techniques are central to treatment and prevention of disease progression, and this needs to be prescribed by a physiotherapist.
- Adherence can be an issue and education around bronchiectasis and the importance of airway clearance is essential.
- Chest physiotherapy helps to un-stick, mobilise and shift secretions to the larger airways and expel them using an expiratory manoeuvre such as a huff and cough.
- Most children should be performing chest physiotherapy once daily. In those with more productive and /or severe disease twice daily is recommended, and at least twice daily during exacerbations as per their action plan.
- Young children or those with developmental delay are often treated with percussion in modified postural drainage positions (to avoid head down positions which can aggravate gastro-oesphageal reflux). When they are old, or developmentally mature, enough they can be taught positive expiratory pressure (PEP) by blowing bubbles (Bubble-PEP).
- Older children are usually prescribed PEP devices (TheraPEP or Pari PEP) or oscillatory PEP devices like an Acapella or Bubble-PEP.
- Children with more severe bronchiectasis may be also treated with nebulised hypertonic saline (7%) to moisten secretions, using a Pari nebuliser, preceding or together with PEP.
- Pulmozyme (Dornase) ***should not be used*** as it may make symptoms worse.
- Exercise forms an important part of physiotherapy as this benefits the child's overall health and can be used as a supportive airway clearance technique
- Exercise tests such as the 6 minute walk test or modified shuttle test are often used to test cardiorespiratory endurance, assess symptoms and can be used to monitor disease (13).

11. Immunisations

- Ensure immunisations are completed as per NZ schedule.
- Annual influenza immunisation is strongly recommended.

- If child was born before July 2008 they will have missed out on routine pneumococcal vaccine. Children with chronic pulmonary disease are eligible for an extended pneumococcal immunisation programme. https://www.health.govt.nz/publication/immunisation-handbook-2017 Pneumococcal vaccination in bronchiectasis is summarised in **Appendix 4**

12. Housing

Poor quality (damp mould, cold) or crowded housing are risk factors for bronchiectasis, and many patients live in such a home. New Zealanders often live in unhealthy housing, and conditions are worse in private rental housing. Some families are homeless. Ask about housing and unhealthy features (crowding, cold, damp, mouldy, unflued gas heater). Provide the family and whānau with information about having a healthy home (https://www.asthmafoundation.org.nz/your-health/healthy-homes). Refer for healthy housing assessment https://www.health.govt.nz/our-work/preventative-health-wellness/healthy-homes-initiative

13. Smoke exposure

Ask about smoke exposure including vaping. Encourage reducing tobacco smoke exposure in the child's environment (home and car) and recommend smoking cessation. If appropriate, give advice and refer to a local smoking cessation service, or Quitline (0800 778 778). Provide Health Sponsorship Council's pamphlet *A Guide to Making Your Home and Car Smokefree* https://www.healthed.govt.nz/

14. Income

- Assume that most families struggle with income and ask about it.
- Inquire about the ability to access the doctor, a pharmacy, and pay prescription costs.
- Children with bronchiectasis meet criteria for Child Disability Allowance https://www.workandincome.govt.nz/products/a-z-benefits/child-disability-allowance.html.

- Encourage all family and whānau members to use the same pharmacy to reduce prescription co-payments https://www.health.govt.nz/your-health/conditions-and-treatments/treatments-and-surgery/medications/prescription-charges
- If the family are struggling financially, (ask about food security, paying the rent) ensure that they have all their income entitlements, whether in paid work or on a benefit. The social worker can help with this and a referral should be made through the Bronchiectasis Nurse Specialist.

15. Nutrition

If a child needs a dietician review and are currently an inpatient then the medical team can refer them to a dietician. If the child is seen as an outpatient and a community dietician referral is required then they must meet the following criteria: faltering growth, medically fragile or obesity with BMI>98th percentile (patients not meeting this criteria can be considered on a case by case basis). A Green Prescription is a good idea for obese children with obese family members https://www.health.govt.nz/our-work/preventative-health-wellness/physical-activity/green-prescriptions

16. Bronchiectasis Clinics

- The Starship Bronchiectasis clinics are held weekly on a Tuesday morning with a multidisciplinary team including specialist nurse, physiotherapist and docter. They are coordinated by the Bronchiectasis Nurse Specialist.
- Most children are seen 3-6 monthly and some have shared care between the respiratory service and their primary general paediatrician.
- There are paediatric bronchiectasis clinics in Waitematā DHB (led by Dr Karen Munro & Dr Anna Murphy) and Counties Manukau DHB (led by Dr Richard Matsas & Dr Adrian Trenholme) and many centres in the country https://www.bronchiectasisfoundation.org.nz/contact-us.html
- At clinics lung function is tested regularly in children 6 and over, as this is gives and additional guide to the child's progress.

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Appendix 1

Pseudomonas aeruginosa initial infection in non-cystic fibrosis bronchiectasis in children
Practical points

Starship Bronchiectasis Service

August 2020

Pseudomonas aeruginosa is a rare organism to be detected in young children with non-cystic fibrosis bronchiectasis, and is more likely to be detected in older children with severe disease – even then it is very uncommon, whereas it is common in adults.

See Starship Guideline on Bronchiectasis
https://www.starship.org.nz/guidelines/bronchiectasis

Underlying causes/situations:
Ensure that cystic fibrosis is ruled out. Higher risk in:

- primary ciliary dyskinesia (PCD)
- immunodeficiency
- aspiration
- tracheostomy in situ
- severe bronchiectasis
- not responding to prolonged courses of antibiotics

When *Pseudomonas aeruginosa* is first detected, discuss with respiratory specialist regarding suitability for eradication treatment. Ideally obtain a second specimen.

Treatment one course only - check NZ Formulary for dosing

Either Outpatient oral therapy for mild illness

Oral ciprofloxacin for 2 weeks Tablets: 250mg, 500mg and 750mg

Liquid formulation of ciprofloxacin is not subsidised on the PHARMAC Community Schedule and can only be accessed via Section 29 for those leaving hospital inpatient setting or Pharmac;s Named Patient Pharmaceutical Assessment (NPPA) application.

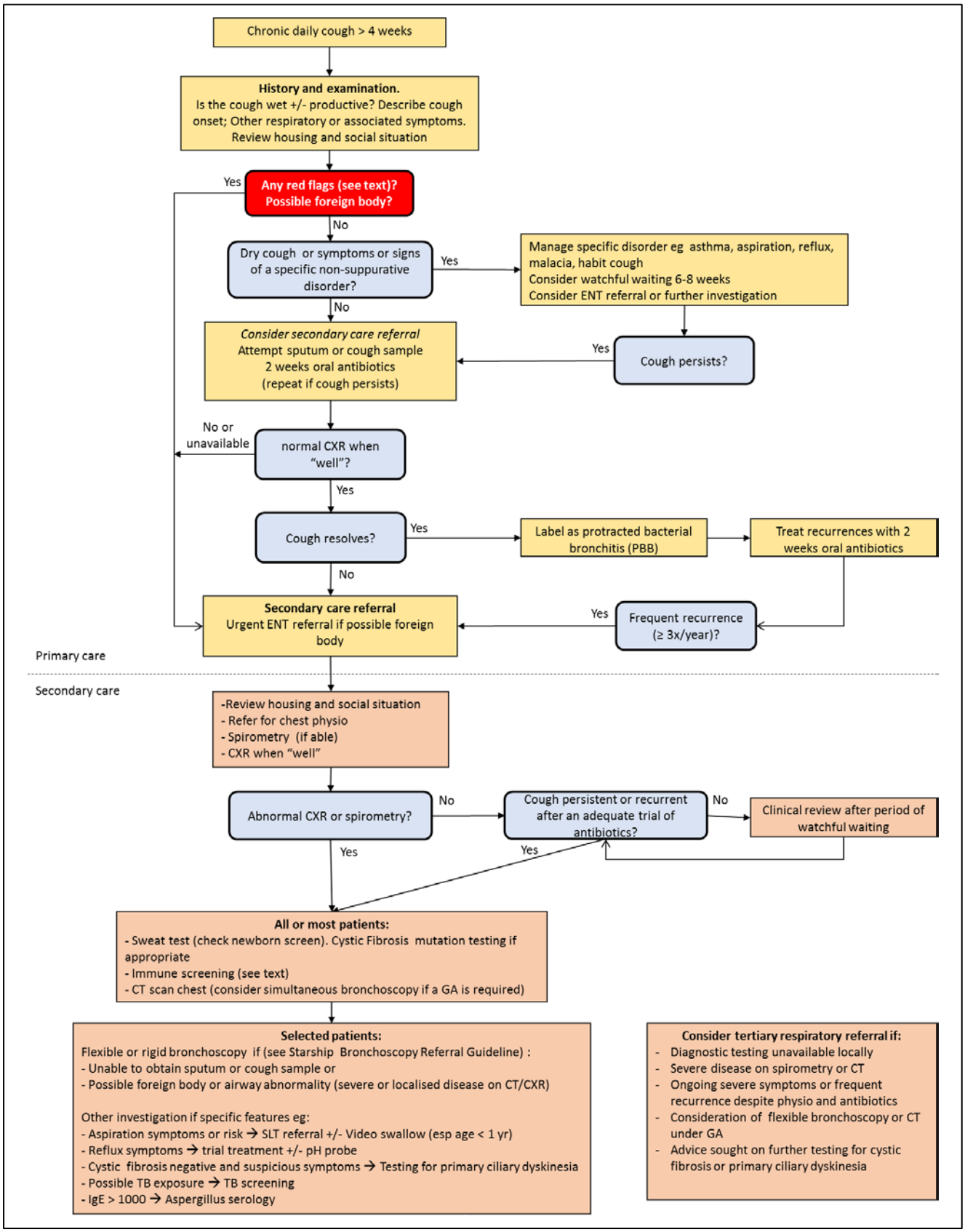
Making liquid from tablets: Ciprofloxacin tablets can be halved then crushed and dispersed in a small volume of water or food to administer to young children. The tablets are not soluble in water so part doses cannot accurately be given. For this reason, it is preferable to round doses to the nearest half tablet size where possible.
Or Inpatient/ moderate to severely unwell: IV ceftazidime and tobramycin 2 weeks

Reference

Chang AB, Bell SC, Byrnes CA, Grimwood K, Holmes PW, King PT, et al. Chronic suppurative lung disease and bronchiectasis in children and adults in Australia and New Zealand. Medical Journal of Australia. 2010;193(6):356-65.

Appendix 2

Chronic Cough in Children Management Pathway



Cough is a common symptom in children that is usually short-lived. However, a daily cough of 3 weeks or longer is unusual and is defined as chronic. Daily cough for greater than 4-6 weeks may mean there is an underlying lung disease. A comprehensive clinical history and examination together with appropriate investigations and follow up are recommended. These guidelines are intended for use at Starship Children's Health but may be used with caution by other clinicians.

Assessment of chronic cough is based on identifying a cause for the chronic cough. The history and examination should identify the type of cough, presence of red flags, any signs of a specific diagnosis, and signs of chronic or systemic disease. The presence of stridor indicates an upper airway disorder which may require ENT referral. An inhaled foreign body should always be considered and referred urgently to ENT if suspected.

The type of cough may be a pointer to a specific cause eg honking or brassy cough in malacia, cough associated with wheeze in asthma, wet cough in Protracted Bacterial Bronchitis (PBB) or bronchiectasis. A dry cough often indicates a non-specific cause and can usually be managed with a period of watchful waiting; however, a chronic dry cough may also be seen in asthma, reflux and aspiration.

A dry chronic cough without recurrent pneumonia or bronchiolitis is less likely to require investigation. A wet or productive cough or a chronic cough associated with recurrent pneumonia or bronchiolitis is likely to require further investigation.

Red flags include:

- Neonatal onset of cough
- Coughing or choking during feeding
- Stridor
- Sudden onset of cough or a history of choking (query foreign body),
- Systemic signs or symptoms (shortness of breath, hypoxia or cyanosis, night sweats, weight loss, haemoptysis)
- Signs of chronic disease (clubbing, poor growth, chest wall deformity).

Social Determinants of Health

Ensure housing is insulated, dry, has heating and is not overcrowded. Minimise exposure to tobacco smoke and to infectious contacts eg preschool. Ensure whanau is getting supports they require to maximise the child's well-being.

Antibiotics

Antibiotics should be prescribed for 2 weeks at a time for patients with suspected PBB and should be directed against local sensitivities for strep pneumoniae, haem influenzae and moraxhella. eg amoxycillin, amoxycillin/clavulonate, co-trimoxazole

CT scan and CXRs should be performed when "well" if possible; ie at least 6-8 weeks after an acute exacerbation and after a prolonged period of antibiotic +/- age appropriate chest physiotherapy treatment.

Children with bronchiectasis on chest CT scan should be managed as per guidelines
Children without bronchiectasis on CT may be labelled as PBB and recurrences treated with 2 weeks of antibiotics

Children with PBB and frequent recurrences ≥3/yr should be investigated and treated the same as those with bronchiectasis and according to bronchiectasis guidelines.

Recommended Immune Screening

Initial screen: FBC & differential, Immunoglobulins, Total IgE.
Common Variable Immune Deficiency may fully develop after 6 years of age and repeat testing should be considered if initial screening was performed at a young age.

Further immune testing: If raised clinical concern due to severe symptoms, frequent recurrences ≥ 3/yr or any chronic sequelae such as bronchiectasis then add conjugate vaccine responses (diptheria, tetanus, haemophilus influenzae B)
.
Extended immune testing: If above screening abnormal, severe disease or increased likelihood of immune deficiency then consult with an immunologist regards HIV* serology, pre & post Pneumovax23 responses*, DHR/NBT* test and lymphocyte subsets testing
(*tertiary services may consider performing some of these tests without needing to consult)

Pneumovax23 responses require careful co-ordination
i) Before giving Pneumovax take blood, write on lab form "*Pre-pneumovax pneumococcal antibodies. Hold serum to send away for serotype specific levels if indicated*"
ii) Give Pneumovax or ask GP to give on the same day as or a few days after 1.
iii) 4-6 weeks after Pneumovax given (emphasise to family that it must be done during this period), have second blood test. On that form, write "*Post-pneumovax pneumococcal antibodies. Send with pre- sample for serotype specific levels if indicated*."

Note that responses to the standard conjugate pneumococcal vaccine are different from those to the polysaccharide Pneumovax23 vaccine and do not add further information beyond routine vaccine response testing.

More extended testing such as proliferation studies should only be performed by or under the direction of an immunologist

Aspiration
Children with chronic cough should be routinely screened for symptoms of antegrade aspiration (coughing or choking on drinking; worsened wheeze or cough after drinking) and symptoms of reflux related aspiration. In infants with recurrent exacerbations or persistent xray change aspiration should be considered and investigated even in the absence of symptoms

Primary Ciliary Dyskinesia
Children with chronic cough should be routinely screened for symptoms of primary ciliary dyskinesia (PCD). Those with at least 2 of the 4 key clinical features for PCD should undergo diagnostic testing (see separate guideline)

- Unexplained neonatal respiratory distress in term infant
- Year-round daily cough beginning before 6 months of age
- Year-round daily nasal congestion beginning before 6 months of age
- Organ laterality defect

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Appendix 3

Azithromycin in Non-Cystic Fibrosis Bronchiectasis in Children

Starship Bronchiectasis Service

August 2020

Macrolide molecules offer the advantage of anti-inflammatory and immunomodulatory properties in addition to their antibacterial properties.

Azithromycin is more effective in reducing bronchiectasis exacerbations than other macrolides. The prolonged half-life makes intermittent (2-3 times weekly) administration possible and therefore enhances adherence. It has a high cellular accumulation, particularly in phagocytes. Subsequently, high concentrations of azithromycin are targeted to sites of infection and inflammation (1,2,3).

Ministry of Health provides up to 2 years fully subsidised Azithromycin for specific indications – see below.

Practice points

- All children should have an ECG before starting Azithromycin, looking for prolongation of QTc corrected for heart rate (2). Review concurrent medicines to ensure no interaction with other QTc prolonging medicines.
- Hearing impairment in particular sensorineural hearing loss may be a relative contraindication for long term azithromycin. This is because sensorineural hearing loss may rarely occur after macrolides, even at standard oral doses (4). If patient already has deafness, they should have hearing test at initiation of treatment and three monthly while on treatment, and straight away if any suspicion of hearing loss.
- Antibiotic resistance
  - is a common and important consequence of taking azithromycin therefore its use is restricted(2).
- Improved adherence may lower the chance of resistance developing.
- For those with severe lung disease it may be important to establish non-tuberculous mycobacteria colonisation or infection is excluded as monotherapy treatment with macrolide will lead to resistance in mycobacteria
- Ensure equity of access to this important medicine – recent audit shows proportionately fewer Māori and Pacific children have Special Authority than European (Kim S, Byrnes C and Best E, personal communication 2020).
- Associate Professor Cass Byrnes is leading research in this medication

Special Authority

Through Ministry of Health, from respiratory specialist or paediatrician, to receive fully subsidised Azithromycin

Once Special Authority obtained, please:

- print off Special Authority and send to 3M
- record the date obtained the exact full number and expiry date in the letter

Indications to Initiate:

For prophylaxis in children 18 years and under

AND Patient has had 3 or more exacerbations of their bronchiectasis within a 12 month period

or Patient has had 3 acute admission to hospital for treatment of infective respiratory exacerbations within a 12 month period.

Indications to Renew:

The patient has completed 12 months of azithromycin treatment for non-cystic fibrosis bronchiectasis

AND Following initial 12 months of treatment, the patient has not received any further treatment for non-cystic fibrosis bronchiectasis for a further 12 months, unless clinically inappropriate to stop treatment

AND the patient will not receive more than a total of 24 months cumulative treatment.

Note: No further renewals will be subsidised. A maximum of 24 months of azithromycin treatment for non-cystic fibrosis bronchiectasis will be subsidised.

Prescribing Azithromycin

Dosing:

3 doses per week, Mon, Wed, Fri

Under 40ks 10mg/kg up to 250mg 3 times per week

Over 40 kg 500mg 3 times per week

Notes

a. Enquiries about Special Authority on a particular patient: customerservice@health.govt.nz.
b. Cancellation of Special Authority can be achieved if it has not been given or there becomes a contraindication – contact customerservice@health.govt.nz.
c. Cost of unsubsidised Azithromycin July 2020

Zithromax 200mg/5ml	$14.38 per 15 ml = $5.93 per 250mg
Apo-Azithromycin tabs 250mg	$0.93c per 2 tabs = $0.47 per 250mg
Apo-Azithromycin tabs 500mg	$8.19 per 30 tabs = $0.14 per 250mg (can cut these in half to deliver 250mg)

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Appendix 4

Pneumococcal Immunisation in non-CF Bronchiectasis in Children - practical points

Starship Bronchiectasis Service

August 2020

Note:

New Immunisation Handbook coming out on 1 October 2020, and the planned update in schedule is included in this document

2017 Book available here https://www.health.govt.nz/publication/immunisation-handbook-2017

Pneumococcal immunisation was introduced on the National Immunisation schedule in July 2008 and is currently administered as PCV10 (10 valent pneumococcal conjugate vaccine) as '2+1' given at ages 6 weeks, 3 months and 15 months (this 'toddler' dose is changing on 1 Oct 2020 to age 12 months).

Children with chronic pulmonary disease are eligible for an extended pneumococcal immunisation programme, with 2 other pneumococcal vaccines, providing extra serotype coverage:

1.Prevenar 13 (**PCV13**) is a pneumococcal capsular polysaccharide conjugate vaccine covering 13 serotypes: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F & 23F.

- Conjugation of the different capsular polysaccharides to a highly immunogenic carrier protein permits both stronger antibody responses and induction of immune memory, giving long term protection
- This type of vaccine was first developed in 2000.

2.Pneumovax 23 (**23PPV**) is a pneumococcal capsular polysaccharide unconjugated vaccine covering the same serotypes as PCV13 (except 6A) plus serotypes 2, 8, 9N, 10A, 11A, 12F, 15B, 17F, 20, 22F, 33F.

- 23PPV induces antibody responses but does not induce T cell responses so immune memory is not strong
- there are 11 serotypes in 23PPV which are not in PCV13 so it can be used to broaden serotype protection and to evaluate serotype-specific antibody responses.

- This type of vaccine was first developed in 1977.

PCV13 and 23PPV in bronchiectasis

The number of doses required depends both on age of child at diagnosis and prior pneumococcal vaccine history.

See Immunisation Handbook Chapter 15, Tables 15.3 and 15.4 for detailed recommendations.

Children with bronchiectasis born before July 2008 should be given PCV13, but caution on timing in regard to 23PPV:

- If you have given 23PPV for testing of the pneumococcal immune response and now need to give PCV13 an interval of at least 8 weeks is recommended (1 year for adults) as there is a risk of blunting of PCV13 antibody responses when vaccines are given in this order. By contrast, if PCV13 is given first the antibody levels to the 12 serotypes in common with PPV23 are strongly boosted by giving PPV23 at least 8 weeks later.
- 23PPV or PCV13 serological response is measured at baseline and 4-6 weeks after the relevant vaccine is given. Use the form below:

BAR CODE
Lab Use Only

AUCKLAND CITY HOSPITAL
Pneumococcal Serology Request Form
Lab PLUS
FORM CC7030

Copy to:
Location:

Family Name | First Name | Received Lab
NHI Number | Gender | Date of Birth
Ward
AFFIX PATIENT LABEL

Time Taken
Date Taken
Collector:

The following fields marked * are mandatory. This form must accompany the usual laboratory request for pneumococcal serotypes to be sent away.

Specimen Collection: Clearly labelled Pre and Post blood samples are required as well as details of the time and type of vaccination given.

Collect: 3.5mL SST Serum

***Sample:** Pre Vaccine [PNES] ☐
Post Vaccine [PNES] ☐

***If Post Vaccine:**

***Vaccines Administered:** PNEUMOVAX ☐ PREVNAR ☐

***Date Administered:** ....

These samples are batched and sent to:
Rachel Marimla
Murdoch Children's Research Institute
8th Floor
Main Building
Parkville
Melbourne
Vic 3052
AUSTRALIA

Clinician Ordering Tests ..... *NZMC# or Practitioner Code#* .....

Mobile / Locator Number: ..... *Email address* .....

Department: ..... *SMO in Charge:* .....

Date ..... *Signature* .....

MARCH 2020

v1.0

Note

Do not forget these children are also eligible for funded annual influenza immunisation. This is also recommended for household members, but not currently funded unless they meet eligibility criteria.