#### WARSZAWSKI UNIWERSYTET MEDYCZNY



#### The paediatric patient in the family doctor's practice: percentiles, respiratory diseases

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A) a 13-year-old boy weighing 40 kg and 155 cm tall, with a measured blood pressure of 126/83 mmHg B) a 5-year-old girl weighing 23 kg and 101 cm tall with a blood pressure measurement of 117/65 mmHg

Find percentiles for weight, height, BMI and BP percentile on the centile grid for:

A) 10-25c,25c, 5-85c, 90-95c/>99c B) 75-90c, <3c, >97c ~ >99c/50-90c or ~ >99c/90c













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	wysokość (cm)→	122,6	126,0	129,5	133,4	137,5	140,8	105	58	59	59	60	60	60	
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15	wysokość (cm)→	160,9	165,2	169,5	174,3	179,1	183,4	187,7	160,9	165,2	109,5	65	66	66	
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16	wysokość (cm)→	164,2	168,2	172,3	176,8	181,3	185,4	189,4	164,2	168,2	172,3	170,0	66	67	5
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	00 C	150	151	152	153	155	156	157	89	90	90	91	92	P2	

Uwaga! Zgodnie z klasyfikacją European Society of Hypertension i Polskiego Towarzystwa Nadciśnienia Tętniczego, u młodzieży od 16. r.ż. nalezy stosować klasyfikację ciśnienia tętniczego jest ≥140/90 mmHg klasyfikację ciśnienia tętniczego taką jak dla dorosłych, tzn. wartością progową dla rozpoznania nadciśnienia tętniczego jest ≥140/90 mmHg

#### STANDARDY MEDYCZNE

30

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### Rhinitis, cough and upper respiratory tract infections – most common reason for patients to see a doctor

Dry cough: the most common cause in a child is a viral Wet cough: most often associated with the second infection of the respiratory tract in the initial phase, other phase of an upper respiratory tract viral infection, but more common causes of dry cough in children are allergies can also be a symptom of **bronchitis** or **pneumonia**. The (for example to grass pollen or house dust mites), asthma, cause of a wet cough in older children may be sinusitis; foreign body aspiration. Such causes of cough, especially the secretions that appear in the paranasal sinuses flow chronic cough, should not be forgotten: psychogenic down the back wall of the throat, irritate it and stimulate (nervous) cough, post-infectious cough, reflux cough the cough reflex. Sometimes the wet cough is so intense that it provokes the child's vomiting reflex or even (associated with gastroesophageal reflux disease). vomiting. This is particularly the case with young children, who are unable to expectorate the lingering phlegm effectively and consequently swallow it, which can cause abdominal pain or vomiting.



#### \* \* \*





### Rhinitis, cough and upper respiratory tract infections – most common reason for patients to see a doctor

#### Treatment:

- Ensuring that the child is adequately hydrated = daily fluid requirements
- Taking care of the right temperature and humidity in the baby's room. An optimal temperature (18-20°C) and humidity (40-60%) can help relieve coughs, especially dry coughs. A humidifier or simply hanging laundry in the bedroom or dampened towels on the radiator overnight is a good solution, especially in winter when the heating dries out the air in the house.
- Use of honey. Honey has cough-relieving properties comparable to cough syrups. Drinking tea or water with honey can soothe an irritated throat and make expectoration easier
- Correct positioning of the child during sleep. Use an extra pillow under the head and shoulders to
  prevent secretions running down the back of the throat and waking the child up during the night. In
  the case of a wet cough: patting on the back and ... laughing. When done correctly, patting will make
  expectoration easier and is best done after a saline inhalation.
- Frequent hand washing. Prevents the spread of infection.
- Avoiding cigarette smoke. Smoking near the child can irritate the upper respiratory tract and exacerbate the cough.

#### \* \*





 first 10 kg of body weight - 100 ml/kg over 10 kg up to 20 kg body weight - add 50 ml/kg • for every additional kilogram of body weight over 20 kg - add 20 ml/kg.

## 

Calculate the daily fluid requirements of a child during an upper respiratory tract infection weighing 35 kg.





#### Treatment:

- nebulisation with 0.9% NaCl and/or 3%/2,2% NaCl
- nasal spray with isotonic/hypertonic sea
- nasal spray with anti-edema and anti-inflammatory effects (xylometazoline)
- thorough nasal cleansing
- nasal ointment/spray for nasal mucosa irritation (vitamin ointment)
- antihistamines (?) (dimetinden, clemastine) / pseudoephedrine drugs
- in case of fever, antipyretics (paracetamol, ibuprofen, metamizole)
- in case of pain, analgesics (paracetamol, ibuprofen, metamizole and topically acting, e.g. lidocaine)
- nasal steroid, e.g. mometasone

Rhinitis, cough and upper respiratory tract infections – most common reason for patients to see a doctor





- Paracetamol 15mg/kg every 6 hours p.o./p.r./i.v. Ibuprofen 10mg/kg every 8 hours p.o./p.r.
- Calculate an additional quantity of syrup: 200mg/5ml and 120mg/5ml lacksquare

#### 270 mg – 11,25ml; 180mg – 4,5 ml

#### TASK

Calculate the dosage of antipyretics - ibuprofen and paracetamol - for a 2-year-old child - 18 kg.



- Acute otitis media is an inflammatory process involving the mucosa and structures of the middle ear that develops suddenly, with general and/or local signs of acute inflammation and the presence of purulent discharge in the tympanic cavity.
- Recurrent acute otitis media is diagnosed when a patient has 3 or more cases of the disease in 6 months or 4 or more cases in 12 months.

#### Otitis

A normal human right tympanic membrane



Acute otitis media







•Acute otitis media usually precedes rhinitis and symptoms of upper respiratory tract infection. Typical symptom is ear pain, but this is absent in more than 20% of patients. In infants, otitis is indicated by fever, crying, sleep disturbance, vomiting may occur, sometimes diarrhoea or leakage of purulent discharge from the ear.



•Subjective symptoms indicative of otitis media, such as pain and ear discharge, are too insensitive to exclude acute otitis media if they are not detected.

• The diagnosis of acute otitis media should be established based on the simultaneous: the occurrence of acute symptoms and the visualisation on otoscopic examination of lesions (redness, protrusion) indicative of acute otitis media.

• Analgesic treatment, ibuprofen or paracetamol, should be used in all cases of acute otitis presenting with pain. Ibuprofen, as long as there are no contraindications, should be used first. In particularly severe pain and very high fever, a combination of ibuprofen with paracetamol should be used.

• In particularly severe pain, a weak opioid can be added to the analgesic. There is insufficient evidence to support the efficacy in acute otitis media of topically administered analgesics, as well as vasoconstrictors and antihistamines, as well as steroids.





#### The immediate use of an antibiotic in acute otitis media is recommended:

- •in children under 6 months of age
- •in children with high fever (>39C), severe pain and vomiting
- •in children under 2 years of age with bilateral otitis media,
- in patients with ear discharge
- of antibiotic therapy;
- treatment and possibly prescribing it if there is no improvement

•in children with craniofacial defects, Down's syndrome, immune disorders and recurrent otitis • in children <2 years of age with unilateral otitis with moderately severe symptoms a decision should be made together with the parents: to withhold intervention or to the immediate initiation

•In other cases of uncomplicated acute otitis media, it is recommended to withhold antibiotics for 48-72 hours and administer concomitant treatment with anti-inflammatory and analgesic



- Amoxicillin is the antibiotic of choice for the treatment of acute otitis media. Dosage: 90 mg/kg/24 h in 2 divided doses (>40 kg 1.5-2g every 12 hours).
- The treatment time for uncomplicated acute otitis media can be shortened to 5 days in adults and children over 2 years of age, while it should be 10 days in children under 2 years of age.
- If a late-type allergic reaction to amoxicillin occurs, cephalosporins should be used in the treatment: cefuroxime axetil for 5 days, and in children under 2 years of age for 10 days and in more severe cases: ceftriaxone for 3 days given intravenously or intramuscularly.
- A late-type allergic reaction to all beta-lactams or an immediate reaction to any betalactam is an indication for treatment with the macrolide - clarithromycin for 10 days. Azithromycin should not be used in the treatment



for 10 days- ceftriaxone administered parenterally once daily for 3 days.

• If there is no response to amoxicillin or an early recurrence of the infection (up to 7) days after the end of treatment), it is recommended to use:- amoxicillin with clavulanate





- Viral infections account for approximately 70-85% of causes of acute pharyngitis and tonsillopharyngitis in children over 3 years of age.
- They are most commonly caused by rhinoviruses, coronaviruses, adenoviruses, Epstein-Barr viruses, Coxsackie viruses, Herpes simplex viruses and influenza and paragrpa viruses.
- The bacteria responsible for 15-30% of infections in children are, in the vast majority of cases: Streptococcus pyogenes (group A beta-haemolytic streptococci), while group C and G streptococci are found much less frequently, in 5-11% of cases.
- Acute pharyngitis and tonsillopharyngitis is one of the most common causes of visits to the GP, in some countries, reaching approximately 200 consultations per year per 1,000 people
- The incubation period for viral pharyngitis is usually 1-6 days, and infection occurs by the droplet route and by contact with nasopharyngeal secretions from the affected person (also contaminating hands)

also known as streptococcal sore throat







Modified Centor Criteria (McIsaac)	Score
Fever	1
Tonsillar Exudate	1
Absent Cough	1
Anterior Cervical LAD	1
Age 3-14 years	1
Age 15-44 years	0
Age >44 years	-1



Points	Probability of Strep	Management			
1 or fewer	<10%	No antibiotic or culture nee			
2	11–17%	Antibiotic based on culture or			
3	28–35%				
4 or 5	52%	Empiric antibiotics			







 In order to limit the spread of infection, a patient with streptococcal pharyngitis or tonsillitis should not have contact with other people in kindergarten, school or at work for a period of 24 hours after taking the effective antibiotic.



- •For the treatment of acute pharyngitis and tonsillitis caused by Streptococcus pyogenes phenoxymethylpenicillin should be used orally.
- phenoxymethylpenicillin should be used orally.
  In the event of poor patient co-operation or difficulty in taking antibiotics orally, it is recommended a single intramuscular administration of benzathine benzylpenicillin.
- In the corrected treatment of streptococcal pharyngitis and tonsillitis, the following can be used: cefadroxil or cephalexin.
- In streptococcal pharyngitis and tonsillitis, macrolides should be reserved only forpatients with immediate hypersensitivity to beta-lactams





#### Scarlet fever

- Affects children between five and 15 years of age
- The signs and symptoms include a sore throat, fever, headache, swollen lymph nodes, and a characteristic rash
- The rash occurs as a result of capillary damage by exotoxins produced by S.pyogenes.





### Bronchitis

# symptoms such as wheezing, rhonchi or coarse crackles (rales).



•Acute bronchitis (AR) is a respiratory infection whose predominant symptom is a cough, dry or with expectoration of secretions, lasting no longer than 3 weeks, which may be accompanied by auscultatory





### Bronchitis

- changes) no further diagnosis is necessary.
- asthma is recommended.
- headache.

•Acute bronchitis is diagnosed on the basis of clinical symptoms, primarily coughing, which may be accompanied by rhonchi, coarse crackles (rales) or wheezing. When acute bronchitis is suspected and no symptoms of pneumónia are found (such as tachycardia (in adults above 100/min), tachypnoe (in adults above 24/min), body temperature > 38 degrees C and focal auscultatory

•In patients with acute bronchitis who present with wheezing, coughing attacks and/or dyspnoea, or symptoms related to allergen exposure, a diagnosis for

•The diagnosis of influenza virus infection can be made on the basis of clinical examination during an epidemic increase in cases with high fever, cough and



### Bronchiolitis

- considerations.

 Acute bronchiolitis is diagnosed on the basis of clinical symptoms indicating narrowing of the small airways in the form of expiratory dyspnoea, wheezing, rales and hypoxia, appearing for the first time in life in the course of arespiratory infections in children under 2 years of age.

•In cases of acute bronchiolitis in children not requiring hospitalisation, laboratory tests are generally not necessary as it does not affect the clinical course and prognosis. In children with bronchiolitis, admitted to hospital, additional investigations aim to exclude other conditions, such as pneumonia, to assess the severity of the disorder and epidemiological





#### Bronchiolitis – when refer to the hospital?

- When deciding whether to hospitalize children with acute bronchiolitis, the number of breaths per minute, intercostal retraction, the degree of hemoglobin oxygen saturation and risk factors for the severe course of the infection should be considered
- Risk factors mainly include chronic respiratory and cardiovascular diseases, immune deficiencies and difficulties in hydration





Age	Norma (beats	al heart rate per minute)	Normal respiratory rate (breaths per minute)				
	Range <sup>[34]</sup>	Typical example	Range <sup>[35]</sup>	Typical example			
Newborn	100–160 <sup>[36]</sup>	130	30–50	40			
0–5 months	90–150	120	25–40	30			
6–12 months	80–140	110	20–30	25			
1–3 years	80–130	105	20–30	25			
3–5 years	80–120	100	20–30	25			
6–10 years	70–110	90	15–30	20			
11–14 years	60–105	80	12–20	16			
15–20 years	60–100	80	12-30 <sup>[37]</sup>	20			

#### Vitals - children

AGE	RR
<2 mo	>60
2-12 mo	>50
2-5 yo	>40
>5 yo	>30

\*

×

Kawalec, Kulus

Wikipedia





### **Bronchitis/Bronchiolitis**

- bronchiolitis.
- macrolide) for 10 to 14 days.

• In acute bronchitis, routine performance of additional tests is not justified • In acute bronchiolitis in children treated at home, routine performing radiological, biochemical and microbiological tests is not justified Routine use of the antibiotic is not recommended in acute bronchitis or

•For cough prolonged beyond 14 days, it may be advisable to administer a macrolide, especially if pertussis is suspected. In young children with a productive cough persisting for more than 4 weeks without a decreasing trend a diagnosis of chronic bacterial bronchitis is made and then the administration of an antibiotic (amoxicillin with clavulonic acid



### **Bronchitis/Bronchiolitis**

- adverse effects.
- beta2-mimetics may be considered.
- •Saturation ??? <90%

• The routine use of bronchodilators (beta2-mimetics or cholinolytics) in acute bronchitis is not recommended. The use of these drugs may be considered in patients with acute bronchitis who are found to be wheezing, if the benefits of their use are likely to outweigh the risk of

• In individual cases of acute bronchiolitis short-term use of epinephrine or

•Hypertonic salt solutions (3% NaCl) may facilitate airway clearance probably by rehydrating secretions and reducing mucosal oedema







### Pneumonia

- suspected.
- in children.

• The diagnosis of pneumonia in children is made on the basis of clinical symptoms. Radiological examination is indicated when complications are

• Most sensitive and specific symptoms for pneumonia in children are: tachypnoe, fever above 38 degrees C, intercostal retraction, and by auscultation the presence of crackles especially unilateral. Failure to identify these symptoms significantly reduces the likelihood of pneumonia

### Pneumonia - etiology

#### Tabela I. Etiologia pozaszpitalnego zapalenia płuc w zależności od wieku [1]

Wiek Age	Etiologia Etiology
Noworodki (do 20 dnia życia) Newborns up to 20 days	Paciorkowce grupy B Enterobacteriaceae Cytomegalowirus <i>Listeria monocytogenes</i>
3 tydzień – 3 miesiąc 3 weeks to 3 mo	Chlamydia trachomatis RSV, wirus paragrypy Streptococcus pneumoniae Bordetella pertussis Staphylococcus aureus
4 miesiąc – 4 rok życia 4 mo to 4 yo	RSV, wirusy grypy i paragrypy, adenowirusy, rinowirusy – Viral Streptococcus pneumoniae Haemophilus influenzae Mycoplasma pneumoniae
5–15 rok życia 5yo to 15 yo	Streptococcus pneumoniae Mycoplasma pneumoniae Chlamydophila pneumoniae

Rekomendacje postępowania w pozaszpitalnych zakażeniach układu oddechowego 2016 Hryniewicz et al



#### Pneumonia - indications for referral to hospital

- severe course (symptoms of sepsis or shock),
- circulatory failure,
- respiratory rate >70/min in infants and >40/min in older children,
- heart rate >160/min in infants or >140/min in older children,
- leucocytosis >20,000 or <3,000,
- PaO2 <60 mmHg, SaO2 <92% and PaCO2 >50 mmHg,
- neurological symptoms, disturbances of consciousness and convulsions,
- dehydration and other water-electrolyte disturbances,
- laboratory findings indicative of significant infection and inflammation,
- extensive pulmonary lesions and pleural reaction on radiological examination,
- coexistence of other serious diseases, e.g. asthma, heart defect,
- age < 6 mo,
- poverty and psycho-educational problems.

#### Pneumonia - treatment

- and, above all, providing a supply of cool, moist air is necessary.
- acquired pneumonia, as their beneficial effect has not been proven (?)

• In alleviating cough in out-of-hospital pneumonia in children, proper care • The use of antihistamines is not recommended in children with community-

#### Pneumonia – treatment 3 weeks to 3 mo

- Out-of-hospital pneumonia in children aged between 3 weeks and 3 months:
- cefuroxime: 75-100 mg/kg/day or 100-150 mg/kg/day in more severe infections, in divided doses given every 8 hours intravenously;
- amoxicillin with clavulanate in divided doses given every 6-8 hrs, so that the dose of amoxicillin is 100 mg/kg/day intravenously;
- in severe, life-threatening cases, the administration of cefotaxime (50-180 mg/kg/day in divided doses given every 6-8 hours) or ceftriaxone (50-100 mg/kg/day given as a single daily dose), in combination with cloxacillin (100 mg/kg/day in divided doses given every 6 hours) intravenously;
   if the clinical picture is suggestive of atypical disease, a first-line drugmay
- if the clinical picture is suggestive of be a macrolide

#### Pneumonia – treatment 3 mo to 5yo

- years :
- considered
- 3 doses every 8 hours orally;
- forms, treatment for 7-10 days

• Out-of-hospital pneumonia in children aged between 4 months and 5

• mild course and without high fever, and in particular in a child vaccinated with pneumococcal conjugate vaccine, the omission of antibiotics may be

amoxicillin 75-90 mg/kg/day is recommended for outpatient treatment in

 in milder cases treated on an outpatient basis, the duration of treatment of out-of-hospital pneumonia can be shortened to 5 days; in more severe

#### Pneumonia – treatment 5 yo to 15 yo

- Amoxicillin, ampicillin are recommended
- In more severe forms of infection, it is recommended to combine an betalactam antibiotic with anti-pneumococcal activity (amoxicillin/ampicillin, ceftriaxone, cefotaxime) with a macrolide
- In children weighing more than 40 kg, amoxicillin should be administered orally at a dose of 75-90 mg/day in three divided doses (i.e. every 8 hours), or in the hospital setting ampicillin intravenously 1-2 g every 6 hours;
- In children weighing less than 40 kg, amoxicillin is administered orally at a dose of 75-90 mg/kg/day in three divided doses (i.e. every 8 hours), and in more severe cases, intravenous ampicillin at a dose of 100-200mg/kg/day, in four divided doses (i.e. every 6 hours, no more than 4g/day);

#### Pneumonia – Adjusted treatment

- Adjusted treatment applies to the following situations:
- lack of improvement or clinical deterioration after first-line treatment,
- resolution),
- allergy to beta-lactam antibiotics.

Lack of improvement after treatment may be due to the following reasons: resistance of the microorganism to the antibiotic used, non-adherence to the antibiotic dosage recommendations, occurrence of complications of pneumonia; misdiagnosis of bacterial pneumonia; concomitant medical conditions.

• recurrence of pneumonia (recurrence of symptoms after a period of

#### Pneumonia – Adjusted treatment

- If no improvement is found after first-line antibiotic treatment, chest radiography is recommended, and in case of further ambiguity, a CT scan is recommended.
- The choice of a second-line antibiotic depends on the age of the child, the antibiotic therapy used so far and the antibiotic therapy to date and the complications identified.
- Corrected treatment in children between 5 and 15 years of age: in case of relapse or use of an antibiotic within the last month for any reason, the use of amoxicillin-clavulanate (7:1 or 14:1) is recommended, so that the dose of amoxicillin is 90 mg/kg/day in 3 doses every 8 hours.

#### Pneumonia – Adjusted treatment

- should be used:
- every 12 h or
- mg/day) and then for 4 days 5 mg/kg/day (not to exceed 250 mg/day)
- in the case of intolerance or non-immediate allergy to amoxicillin, use:
- or cefotaxime
- in cases of immediate allergy to amoxicillin, use clarithromycin

 If there is no clear improvement after amoxicillin/ampicillin or amoxicillin/clavulanate and a suspected atypical etiology clarithromycin

• in children weighing less than 40 kg at a dose of 15 mg/kg/day in 2 doses

• azithromycin at a single daily dose of 10 mg/kg/day (not to exceed 500 - cefuroxime axetil orally in children weighing less than 40 kg at a dose of 20-30 mg/kg/day in 2 doses every 12 hours not exceeding 500 mg/day; in severe cases of out-of-hospital pneumonia in children, use ceftriaxone

- count and platelets, reticulocytes, red blood cell sedimentation reaction (ESR). specific antigen
- glucose, quantitative determination of calcium, quantitative determination of amylase.
- method.
- Coagulation tests: INR, APTT, fibrinogen.
- stool culture for Salmonella and Shigella, SARS-CoV-2 antigen test.

Haematological tests: peripheral blood count with platelets, peripheral blood count with platelet

Biochemical and immunochemical tests: sodium, potassium, ionised calcium, irontotal iron binding capacity (TIBC), transferrin concentration, glycated haemoglobin concentration (HbAlc), urea, creatinine, glucose, glucose load test, total protein, proteinogram, albumin, Creactive protein (CRP), uric acid, total cholesterolcholesterol-HDL, cholesterol-LDL, triglycerides (TG), total bilirubin, direct bilirubin, alkaline phosphatase (ALP), aspartate aminotransferase (AST), alanine aminotransferase (ALT), gammaglutamyltranspeptidase (GGTP), amylase, creatine kinase (CK), total acid phosphatase (ACP), rheumatoid factor (RF), antistreptolysin O (ASO), TSH, HBs-AgHBs antygen, VDRL, FT3, FT4, PSA - Total prostate

Urinalysis: general urinalysis with evaluation of physical, chemical properties and microscopic evaluation of the sediment, quantitative determination of protein, quantitative determination of

Faecal examination: general examination, parasites, occult blood - by immunochemical

Microbiological examinations: urine culture with antybiogram, throat culture with antybiogram,







- Electrocardiography (ECG) at rest.
- Ultrasound: of the thyroid and parathyroid glands, salivary gland, of the kidneys, ureters, urinary bladder, of the abdomen and retroperitoneal space, including initial evaluation of the prostate gland, of peripheral lymph nodes.
- X-ray: chest in AP and lateral projection, bone: spine, limbs and pelvis in AP and lateral projection, skull, sinus, abdominal.
- Referral to: gastroscopy, colonoscopy, computed tomography of the lungs.
- Additionally:
- Ferritin, vitamin B12, folic acid, anti CCP, CRP rapid quantitative test, anti-HCV antibodies, total immunoglobulin E (IgE), specific immunoglobulin E (IgE): inhalation: hazel, alder, birch, grasses, rye, mugwort, house dust mites, dog, cat, altenaria; oral: milk, eggs, wheat, soya, peanuts, hazelnuts, fish, seafood - shellfish, carrots, apple, H. pylori antigen in faeces - cassette test, H. pylori antigen in faeces - laboratory test, streptest.







## THANK YOU

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