

A Review on Respiratory Diseases and Their Treatment

Manav Agrawal*, Dr. Vijay Nigam,

Prashant Gupta, Jagrati Chaurasia

Daksh Institute of Pharmaceutical Science, (DIPS) Chhatarpur (M.P)
Madhya Pradesh, India

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ABSTRACT : Respiratory Diseases, such as Chronic Obstructive Pulmonary Disease (COPD), Pneumonia, Lung Cancer & Tuberculosis are some major problems of Respiratory System. Although share similar features of inflammation of the airways. Injury, infection, and other exposures lead to inflammation and fluid buildup in the alveolar air sacs, thus impeding gas exchange and leading to low blood oxygen levels. Lack of or low levels of oxygen in the blood impairs organ function throughout the body with the brain, kidneys, and heart being most susceptible. Tuberculosis is spread from one person to the next through the air when people who have active TB in their lungs cough, spit, speak, or sneeze. Lung Cancer is cancer that forms in tissue of Lung Usually in the cells that line the air passage. It is the leading cause of Cancer that in both Men & Women. Sometimes Lung Cancer does not produce any sign & symptoms.

COPD actually refers to a group of diseases, including emphysema, chronic bronchitis, and asthma, all of which impair ventilation. COPD often is a result of inflammation of the small airways which prevents air from reaching the alveoli and the subsequent gas exchange from taking place. The hallmark of these serious respiratory diseases is inflammation and decreased gas exchange in the alveoli, although the inflammation arises from distinct areas of the respiratory system. Due to the inflammatory nature of these diseases, treatment regimens typically focus on decreasing inflammatory mediators corticosteroids. However, corticosteroids have not been shown to be effective, and resistance to corticosteroid treatment has been observed.

KEYWORDS – Respiratory Disease, COPD, Tuberculosis, Pneumonia, Lung Cancer, Asthma, Emphysema, Chronic Bronchitis .

I. INTRODUCTION:-

Respiratory system^[1] is a biological system consisting of specific organs and structures

used for gas exchange. The respiratory surface is internalized as linings of the lungs^[2]. Gas exchange in the lungs occurs in millions of small air sacs called **Alveoli**. These microscopic air sacs have a very rich blood supply, thus bringing the air into close contact with the blood. These air sacs communicate with the external environment via a system of airways, or hollow tubes, of which the largest is the **Trachea**, which branches in the middle of the chest into the two main bronchi. These enter the lungs where they branch into progressively narrower secondary and tertiary bronchi that branch into numerous smaller tubes, the bronchioles. It is the bronchioles that generally open into the microscopic alveoli. Air has to be pumped from the environment into the alveoli by the process of breathing which involves the muscles of respiration. There are two process of respiration are as **Inspiration & Expiration**. Inspiration means inhalation of air & Expiration means exhalation of air.

Common Respiratory Problems

A type of disease^[3] that affects the lungs and other parts of the respiratory system. Respiratory diseases may be caused by infection, by smoking tobacco, or by breathing in secondhand tobacco smoke, radon, asbestos, or other forms of air pollution. Respiratory Diseases include Asthma, Chronic Obstructive Pulmonary Disease (COPD), Atelectasis, Pneumonia, Lung Cancer and Tuberculosis. Respiratory diseases called Lung Disorder and Pulmonary Disease.

List of some Common Respiratory Problems^[4] -

Various Respiratory diseases are as follows :-

1. Asthma
2. Collapse of part or all of the lung (Atelectasis)
3. Swelling and inflammation in the main passages (Bronchial Tubes) that carry air to the lungs (Bronchitis)

4. COPD (Chronic obstructive pulmonary disease)
5. Lung cancer
6. Lung infection (pneumonia)
7. Abnormal buildup of fluid in the lungs (pulmonary edema)
8. Tuberculosis.

ASTHMA

Asthma^[5] is a long-term inflammatory disease of the airways of the lungs that create difficulty in breathing.^[5] It is characterized by variable and recurring symptoms, reversible airflow obstruction, and easily triggered broncho-spasms.^{[6][7]} Symptoms include episodes of wheezing, coughing, chest tightness, and shortness of breath.^[8] These may occur a few times a day or a few times per week.^[5] Depending on the person, asthma symptoms may become worse at night or with exercise.^[5]

Asthma is caused by a combination of both genetic and environmental factors.^[9] Environmental factors include exposure to air pollution and allergens.^[5] Other potential triggers include medications such

as aspirin and beta blockers.^[5] Diagnosis is usually based on the pattern of symptoms, response to therapy over time, and spirometry lung function testing.^[10] Asthma is classified according to the frequency of symptoms, forced expiratory volume in one second (FEV1), and peak expiratory flow rate.^[11] It may also be classified as atopic or non-atopic, where atopy refers to a predisposition toward developing a type 1 hypersensitivity reaction.^{[12][13]}

There is no known cure for asthma, but its treatment is easy.^[5] Symptoms can be prevented by avoiding triggers, such as allergens and respiratory irritants, and suppressed with the use of inhaled corticosteroids.^{[14][15]} Long-acting beta agonists (LABA) or anti leukotriene agents may be used in addition to inhaled corticosteroids if asthma symptoms remain uncontrolled.^{[16][17]} Treatment of rapidly worsening symptoms is usually with an inhaled short-acting beta-2 agonist such as salbutamol and corticosteroids taken by mouth.^[18] In very severe cases, intravenous corticosteroids, magnesium sulfate, and hospitalization may be required.^[19]



Patient Suffering from Asthma^[20]

Table No.1: Allopathic Treatment For Asthma^[21]

Short-acting beta-agonists are the most common quick-relief drugs for treating asthma attacks.

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Albuterol	Bronchodilators	Oral Inhalation	2 mg or 4 mg orally three or four times a day.	Nervousness or shakiness, headache, throat or nasal irritation, and muscle aches.

2	Levalbuterol	Beta agonists	Oral Inhalation	0.63 mg 3 times daily at intervals of 6-8 hr	• Headache, cough, heart burn, vomiting, weakness
3	Mometasone furoate	Bronchodilators	Oral Inhalation	20 mg PO three/four times daily	Headache, tremor, dizziness, nausea, insomnia
4	Terbutaline	Beta agonist	Injection	3mg in 24 hrs.	Uncontrolled shaking of a part of the body, dizziness, nausea.



Terbutaline [22]



Prednisolone [23]



Methylprednisolone [24]

Table No.2: Oral steroids are not quick-relief medicines but are often given for 7 to 14 days when your symptoms flare-up. Oral steroids include:

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Prednisone	Corticosteroids	Oral	a typical dosage rarely exceeds 80 mg.	High BP, Osteoporosis, fluid retention, weight gain.
2	Prednisolone	Corticosteroids	Oral	40-60 mg/day PO in single daily dose or divided q12hr for 3-10 days	Headache, Constipation, Insomnia, nausea, increased appetite.
3	Methylprednisolone	Glucocorticoids	Oral Intravenous & Intramuscularly	Orally -16 to 64 mg/day once daily. IV- 40 to 125 mg/day given in a single daily dose	Constipation, Diarrhea, headache, insomnia, nausea. High BP.

Some Unani Homemade Remedies [25]

1. Drink some hot water with the juice of one clove of garlic. It is very effective in acute attack of asthma.
2. Prepare a decoction with the equal parts of root of Adusa (Adhatoda vasica), rhizome of Turmeric (Curcuma longa), stem of Giloe

(Tinospora cordifolia) and the fruit of Katai (Solanum surattense Burm. F. Syn.: S. xanthocarpum Schrad. & Wendl.). Take this decoction 20 ml internally, with one gram of powdered Filfil (Safaid/Siyah (Piper nigrum Linn.) twice a day.

3. Take a tea spoonful of Sarason ka tel along with jaggery, twice a day. It is a good remedy of asthma.

Some Siddha homemade remedies^[26]

1. Decoction of Arisi thipilli (Piper longum) and pulp of Vilampazham (wood-apple –Limonia acidissima) reduces the difficulty in breathing.

2. A cup of Venthayam (Fenugreek) decoction with a spoonful of honey and fresh ginger juice acts as an excellent expectorant.

3. Turmeric gives good result when its powder is added with a cup of milk daily.



4. Decoction of leaves of Pudhina (Mentha arvensis) and Tulsi (Ocimum sanctum), one or two times a day would be helpful.




5. Juice of Tulsi (Ocimum sanctum) leaves can be consumed with honey.

Table No.3: Commonly used Anti-Asthmatic Herbs in Siddha Medicine^[27]

Botanical Name	Family	Siddha Name	Part used
Boswellia serrata	Burseraceaea	Kundhirikkam	Gum resin
Calotropis gigantean	Apocynaceae	Erukku	Roots
Clerodendrum phlomidis	Lamiceae	Thazhuthalai	Leaves

Table No.4: Some Ayurvedic Remedies of Asthma^[28]

Serial No.	Botanical Name	Family/ Common Name	Chemical Constituents	Plant Part Taken	Uses
1	Camellia sinensis 	Theaceae family/ Herbal Tea	Epigallocatechin-3-gallate is the major constituent of green tea, whereas theaflavins are constituents of black tea and are derived from catechins as a result of fermentation. Tea leaves also contain caffeine, theanine, myricetin, quercetin, and kaempferol, which are examples of alkaloids, amino acids, and flavonols.	leaves and leaf buds	The aqueous extract of Camellia sinensis exhibited potent anti-asthmatic activity by increasing the expression level of tumor necrosis factor-beta and interferon-gamma and decreasing the expression of anti-asthmatic cytokines in the lung.
2	Curcuma longa 	Zingiberaceae family/ Curcumin Or Turmeric	The major compounds were ar-turmerone (20.50 %), β-sesquiphellandrene (5.20 %) and curcumenol (5.11 %). curcumin (diferuloylmethane, the primary constituent responsible for yellow color of turmeric), demethoxycurcumin, and bisdemethoxycurcumin.	Rhizomes	Reduction of eosinophil, neutrophil and monocyte in asthma group treated with C. longa extract and curcumin observed in the present study, suggested the anti-inflammatory effect of the plant. Therefore, this plant may have

					preventive effect on asthma by reduction of inflammatory cells and airway inflammation.
3	<p>Justicia adhatoda</p> 	Acanthaceae Family/ Adulsa	The leaves of Justicia adhatoda contains phytochemicals such as alkaloids, tannins, saponins, phenolics and flavonoids. The most important is vasicine, a quinazoline alkaloid. The vasicine yield of the herbage has been measured as 0.541 to 1.1% by dry weight.	Fresh juice of leaves	Consuming Adoosa powder along with honey is considered to be beneficial in cases of respiratory infections such as whooping cough, bronchitis, asthma as it helps promote the secretion of sputum from the air passages due to its expectorant property
4	<p>Adhotoda vasica</p> 	Acanthaceae / Vasaka	The chemical constituents of vasaca are alkaloids, tannins, flavinoids, terpenes, sugar and glucosides. The major constituents of vasaca are its several alkaloids, and the chief one is vasicine	leaves, roots, flowers and stem bark	The leaves, roots, flowers, and bark of this plant have been used in cough, colds, asthma, liquefy sputum, bronchodilator, bronchitis, and. The parts of the plant are commonly used in the forms of decoction or powder.
5	<p>Syzygium aromaticum</p> 	Myrtaceae/ Clove	The main components were found to be eugenol (76.8%), followed by β -caryophyllene (17.4%), α -humulene (2.1%), and eugenyl acetate (1.2%). Further constituents were found to be in quantities below 0.5%	flower buds	This flower also produces an essential oil that may help relieve symptoms of asthma. Clove essential oil may help reduce symptoms such as wheezing, chest pain, and difficulty breathing.

Diet Chart For Asthma Patient :

Early Morning : Drink Lukewarm Water 1-2 glass in Empty Stomach, before Brushing teeth, Drink Amla + Aloe vera Juice before breakfast.

Table No.5: Diet Plan

TIMING	DIET PLAN (VEGETARIAN)
Breakfast (8:30 AM)	1 Cup milk with Haridrakhand powder / Herbal tea with milk + 2-3 Fibre rich Biscuit / less salted Daliya (salted)/ Poha /Upma (Suji) / Sprouts / 2thin roti (Multi grain Atta) + 1 bowl vegetable (boiled). 1 plate fruit salad (Strawberries, Mango, Apple, Blackberry, Papaya).
Lunch (12:30 - 01:30 PM)	2-3 thin Chapati / Roti (Multi grains Atta) + 1 bowl green vegetables (boiled) + 1 boiled moong daal (diluted with water) + 1 plate salad.
Snacks (5:30 – 6:00 PM)	1 cup herbal tea + 2-3 Fibre rich biscuit / boiled milk with Clove + Dry Dates / Palm (Chuara) + Dates (Khajur) / Vegetables soup.
Dinner (7:00 – 8:00 PM)	1-2 thin Chapati / Roti (Multi grains atta) + 1 bowl green vegetables (mostly fibre rich) + 1bowl moong daal (diluted with water).
Bed Time (30 min before sleeping)	1 Cup milk with Haridrakhand Powder.

DO's

Cereals : Old rice, wheat, barley.

Pulses : Pigeon pea (Arahar), Green gram (Moong Dal), lentil (masur dal).

Fruits & Vegetables : Spinach, Onion, Cauliflower, Carrot, Bottle Gourd (Louki), Ridge Gourd (Torai), Bitter Gourd (Karela), Sweet Potato, Pumpkin, Pointed Gourd (Parval), Garlic, Haritaki, Brinjal, bathua, Tomatoes & green seasonal vegetables. Strawberries, Mangoes, Apple, Black Berries, Papaya

Medicines : Gudadrak, Vasa Avleha, Kantkari Avleha, Chwanprash, Amrit Rasayan, Trikatu Churna.

Others : Juice, Shatavari, Sunflower, Almonds, Barley, Cinnamon (Dalchini), dry ginger, black pepper, long pepper, honey, Luke warm water, Garlic.

Life Style : Day sleeping, sudation, therapeutic purgation, (virecana), smoking (ayurvedic dhoompan).

Yoga Pranayam and Meditation : 1.Bhastrika 2.Kapaalbharti 3.Bahyapranayaam 4.Anulom Vilom 5.Bhramari 6.Udgeeth 7.Ujjaayi 8.Pranav Jap

Asanas : 1. Gomukhasana 2. Marktasana 3. Bhujangasana 4. Singhasana.

DONT's

Cereals : New rice, maida

Pulses : Pea(Matar), Chickpea (Kabuli chana), Urad dal.

Fruits & Vegetables : Potato and other tuber, mustard leaf vegetables.

Others : Dust, smoke, cereals causing burning sensation and acidity with poor digestion (vidhai anna), fish, Excessive use of oil and clarified

butter, Betel nut, extra salt cold food, contaminated/ rotten food, unsuitable – incompatible contaminated water, cold food stuff, cold water, dry, Fried and difficult to digest food.

Strictly Avoidable : Oil spicy food, Non- Veg & Non-Veg Soup, ghee, excess salt, cold drink, bakery products alcohol, fast food, pickles, soft drinks, canned food, junk food, bakery products.

Life Style : Adhyasana (Repetition of food intake after meals, within 1-2 hours repeating), excess exercise & anger, fear, hurry, worry, cold water, excessive intake of food, Day sleeping, suppression of natural urges.

Yoga Pranayam and Meditation : As per Doctors Advice

Asanas : As per Doctors Advice

Advice : 1 Cup Herbal Tea is issued or consumed by patients, in case if/she is habitual of tea and coffee (It is substitute for it).

Do as Regular : THANKS TO GOOD FOR FOOD

1. Eat fresh light warm food slowly, in peaceful place with silent, positive and happy mind.
2. Eat 3-4 times at regular time in a day. Don't skip meals & avoid overeating. Fast once in a week.
3. Eat leaving 1/3rd or 1/4th of stomach empty (full satisfaction of meal can be consider as one's khuchi / stomach). Chew food properly and slowly. Walk 3-5 min after taking meal.
4. Use Tulsi , Cloves, Celery(Ajmod), Almond, Walnut.
5. Black pepper and Mulethi you have to chew slowly.
6. Adequate calories and warm food.

7. Avoid cold and raw uncooked food and other kaphaja substances.
8. Promote Lukewarm spiced water for drinking.
9. Avoid buttermilk, ice creams, too much of sweets and fatty meals.
10. Bitter leafy vegetables.
11. Dietary supplements and Rasayana recipes viz. Gudardraka, Chyavanaprasa, Haridrakhand, Sirisadi Avaleha, Kantkari Avaleha.

COPD (Chronic Obstructive Pulmonary Disease)

Chronic obstructive pulmonary disease (COPD) is a Chronic inflammatory Lung Disease that causes obstructed airflows from the lungs. COPD is characterized by long-term respiratory symptoms and airflow limitation^[29]. The main symptoms of COPD Such as shortness of breath and a cough which may or may not produce mucus^[30]. COPD progressively worsens with everyday activities such as walking or dressing becoming difficult^[31].

The two most common conditions of COPD are Emphysema and Chronic Bronchitis, and they have been the two classic COPD phenotypes^[32]. Emphysema is defined as enlarged airspaces (Alveoli) whose walls break down resulting in permanent damage to the lung tissue. Chronic bronchitis is defined as a productive

cough that is present for at least three months each year for two years. Both of these conditions can exist without airflow limitation when they are not classed as COPD. Emphysema is just one of the structural abnormalities that can limit airflow and can exist without airflow limitation in a significant number of people.^{[33][34]} Chronic bronchitis does not always result in airflow limitation but in young adults who smoke the risk of developing COPD is high.^[35] Many definitions of COPD in the past included emphysema, and chronic bronchitis, but these have never been included in GOLD report definitions.³² Emphysema and chronic bronchitis remain the predominant phenotypes of COPD but there is often overlap between them, and a number of other phenotypes have also been described.^[32]

The most common cause of COPD is tobacco smoking. Other risk factors include indoor and outdoor pollution, exposure to occupational irritant substances such as dust from grains, and cadmium dust or fumes, and genetics. In developing countries, common sources of indoor air pollution are the use of coal, and biomass such as wood and dry dung as fuel for cooking and heating. Most people living in Foreign cities are exposed to damaging levels of air pollution. The diagnosis is based on poor airflow as measured by spirometry.^[30]



Patient Suffering From COPD^[36]

Allopathic Treatment For COPD

Bronchodilators^[37] help open patient airways to make breathing easier. Doctor may prescribe short-

acting bronchodilators for an emergency situation or for quick relief as needed. Patient can take them using an inhaler or nebulizer.

Table No.6: Examples of short-acting Bronchodilators include:

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Albuterol	Bronchodilators	Oral Inhalation	2mg or 4mg orally 3 or 4 times a day	Nervousness or shakiness, headache, throat or nasal irritation, and muscle aches.
2	Levalbuterol	Beta agonists	Oral Inhalation	0.63mg 3 times daily at intervals of 6-8 hrs	Headache, cough, heart burn, vomiting, weakness.
3	Ipratropium	Bronchodilators	Oral Inhalation	2 actuations (34 mcg) q6hr 3 or 4 times in a day	Pain when urinating, nausea, constipation, frequent need to urinate.

Table No.7: The long-acting Bronchodilators currently available are:

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Acclidinium	Bronchodilators	Oral Inhalation	400 mcg (1 actuation) inhaled PO BID	stuffy nose, cough, • diarrhea, sinus infection, vomiting.
2	Formoterol	Long- Acting Beta Agonists	Oral Inhalation	12 mcg (1 inhalation) orally every 12 hours	Headache, uncontrollable shaking of a part of the body, dry mouth, muscle cramps, nausea.
3	Glycopyrrolate	Anticholinergics	Injection	0.2mg/ml	vision problems. loss of taste. • headache. • nervousness. • confusion. • drowsiness.
4	Indacaterol	Long- Acting Beta Agonists	Orally Inhaled	1 inhalation (75 mcg) once a day	• sore throat,nausea. • shaking of a part of the body that you cannot control, difficulty falling asleep or staying asleep.
5	Tiotropium	Bronchodilators	Oral Inhalation	5 mcg (2 actuations; 2.5 mcg/actuation) inhaled PO qDay	• Vomiting, indigestion, muscle pain, nosebleed, runny nose.



Albuterol^[38]



Tiotropium^[39]



formoterol^[40]

Ayurvedic Formulations used For COPD :


Ayurvedic^[41] product for lungs diseases contains herbal medicines like Swans Vati, Sanjeevani Vati, and Lungs care churna and Maha Amritam churan. The herbal package is helpful in all types of lung problems such as asthma and lung infection.




- **Swans Vati** manufactured by Ayurved Pratishan Nasik Private Ltd India which is the essential ayurvedic remedies in the Lungs Care Package that provides relief in the lung problem.
- **Sanjeevani Vati** manufactured by Shrimad Herbal Company in India which improves the


immune system more reliable, and it also increases the metabolism of the body.

- **Lungs Care Churna** manufactured by Jeena Sikho Life Care Pvt Ltd India which is an ayurvedic product that is beneficial for various diseases like liver problems, lung problems, ulcers, and relieves pain.
- **Maha Amritam Churan** manufactured by Shri Seva Nikunj Ayurvedic Pharmacy India which is another ayurvedic remedy that plays a vital role in the treatment of COPD.

Table No.8: Ayurvedic Remedies For COPD :

Serial No.	Botanical Name	Family/Common Name	Chemical Constituent	Plant Part Taken	Uses
1	Salvia miltiorrhiza 	Lamiaceae/red sage	salvianolic acid (or salvianolic acid B), dihydrotanshinone, miltirone, tanshinone I, and tanshinone IIA. Tanshinone IIA is one of the most abundant constituents of the root of Salvia miltiorrhiza.	Leaf	It is help reduce inflammation in chronic conditions like COPD by driving harm-causing neutrophils away

2	<p>Curcuma longa</p> 	<p>Zingiberaceae family/ Curcumin Or Turmeric</p>	<p>The major compounds were ar-turmerone (20.50 %), β-sesquiphellandrene (5.20 %) and curcumenol (5.11 %). curcumin (diferuloyl methane, the primary constituent responsible for yellow color of turmeric), demethoxycurcumin, and bisdemethoxycurcumin.</p>	<p>Rhizome</p>	<p>Reduction of eosinophil, neutrophil and monocyte in asthma group treated with C. longa extract and curcumin observed in the present study, suggested the anti-inflammatory effect of the plant. Therefore, this plant may have preventive effect on asthma by reduction of inflammatory cells and airway inflammation.</p>
3	<p>Eucalyptus globules</p> 	<p>Myrtaceae /gum trees or stringy bark trees</p>	<p>monoterpenes and sesquiterpenes, and aromatic phenols, oxides, ethers, alcohols, esters, aldehydes and ketones</p>	<p>Fresh or partially dried leaves and young twigs.</p>	<p>Eucalyptus oil can destroy harmful bacteria in respiratory tract.</p>
4	<p>Solanum xanthocarpum</p> 	<p>Solanaceae/ Yellow-berried Nightshade</p>	<p>plant contains alkaloids, sterols, saponins, flavonoids and their glycosides and also carbohydrates, fatty acids, amino acids etc.</p>	<p>Whole plant and fruits</p>	<p>It is found to be very effective in respiratory tract diseases like Bronchial Asthma, COPD, allergic rhinitis etc.</p>

5	Panax ginseng 	Araliaceae/ ginseng	ginseng includes carbohydrates, nitrogen-containing compounds, fat-soluble substances, minerals, and ginseng saponin (ginsenoside),	Taproot	It is used for treating lung inflammatory disorders.
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LUNG CANCER

Lung Cancer, also called as **Bronchial Carcinoma**,^[42] is cancer that forms in tissue of the lungs, usually in the cells that lines the air passage. It is leading cause of cancer death in both male and female. Lung cancer since about 98–99% of all lung cancers are Carcinomas, is a malignant lung tumor which is characterized by uncontrolled growth of cells in the tissues of the lungs.^[43] Lung carcinomas derive from transformed, malignant cells that originate as epithelial cells, or from tissues composed of epithelial cells. Other lung cancers, such as the rare sarcomas of the lung, are generated by the malignant transformation of connective tissues (i.e. nerve, fat, muscle, bone), which arise from mesenchymal cells. Lymphomas and melanomas (from lymphoid and melanocyte cell lineages) can also rarely result in lung cancer.

In time, this uncontrolled growth can spread beyond the lung – either by direct extension, by entering the lymphatic circulation, or via the hematogenous, bloodborne spread – the process called metastasis – into nearby tissue or other, more distant parts of the body.^[44] Most of the cancers that start in the lung, known as primary lung cancers, are carcinomas. The two main types

are small-cell lung carcinoma (SCLC) and non-small-cell lung carcinoma (NSCLC).^[45] some common symptoms are coughing (including coughing up blood), weight loss, shortness of breath, and chest pains.^[46]

The vast majority (85%) of cases of lung cancer are due to long-term tobacco smoking.^[47] About 10–15% of cases occur in people who have never smoked.^[48] These cases are often caused by a combination of genetic factors and exposure to radon gas, asbestos, second-hand smoke, or other forms of air pollution. Lung cancer may be seen on chest radiographs and computed tomography (CT) scans.^[49] The diagnosis is confirmed by biopsy, which is usually performed by bronchoscopy or CT-guidance.^[50]

Worldwide in 2020, lung cancer occurred in 2.2 million people and resulted in 1.8 million deaths. It is the most common cause of cancer-related death in men and second-most common in women after breast cancer.^[51] The most common age at diagnosis is 70 years.^[52] In the Foreign Countries, five-year survival rate is 20.5%,^[53] while in Other it is 41.4%.^[54] Outcomes typically are worse in the developing world.^[55]



Patient Suffering From Lung Cancer^[56]

Allopathic Treatment For Lung Cancer :

List^[57] of cancer drugs approved by the Food and Drug Administration (FDA) for lung cancer. The list includes generic and brand names. This page also lists common drug combinations used in lung cancer. The individual drugs in the

combinations are FDA-approved. However, the drug combinations themselves usually are not approved, although they are widely used. The drug names link to NCI's Cancer Drug Information summaries. There may be drugs used in lung cancer that are not listed here.

Table no.9: Drugs Approved for Non-Small Cell Lung Cancer.

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Afatinib	Kinase Inhibitor	Oral	40mg PO qDay	<ul style="list-style-type: none"> Vomiting, diarrhea, mouth sores, acne, itchiness.
2	Brigatinib	Kinase Inhibitor	Oral	90mg orally once in a day	<ul style="list-style-type: none"> Vomiting, constipation, Tiredness, rash, headache.
3	Capmatinib Hydrochloride	Kinase Inhibitor	Oral	400mg orally twice in a day	<ul style="list-style-type: none"> Chest pain, clay colored stools, decreased or loss of appetite, labored breathing, general feeling of discomfort or illness.
4	Pralsetinib	Kinase Inhibitor	Oral	400mg orally once in a day	<ul style="list-style-type: none"> fever, chills, worsening cough, shortness of breath, chest pain, severe headache, dizziness, confusion, trouble speaking, any wound that will not heal.

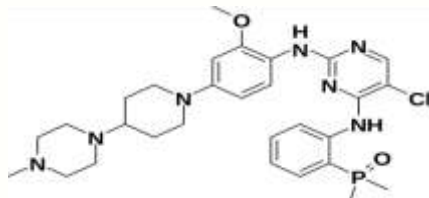
Table No.10: Drug Combinations Used to Treat Non-Small Cell Lung Cancer

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Carboplatin-Taxol	alkylating agent & plant alkaloids	Injection	135 mg/m ² IV over 24 hours q3Weeks	<ul style="list-style-type: none"> Bruising and bleeding. This treatment can reduce the number of platelets in your blood, Anaemia , Feeling sick, Feeling tired, Hair loss.
2	Gemcitabine-Cisplatin	Antimetabolites & platinum-	Injection	1000 mg/m ² IV infusion	<ul style="list-style-type: none"> Nausea, vomiting,

		containing compounds.		over 30 minutes	Infection, especially when white blood cell count is low, Anemia which may require blood transfusions, Bruising, Kidney damage which may cause swelling, may require dialysis.
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Table No.11: Drugs Approved for Small Cell Lung Cancer.

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Atezolizumab	Monoclonal Antibodies.	Intravenous infusion	820mg IV q2Weeks, 1200 mg IV q3Weeks ,1680 mg IV q4Weeks	<ul style="list-style-type: none"> Back , neck, or joint pain. Rash, itching, trouble staying asleep, extreme tiredness.
2	Doxorubicin Hydrochloride	Anthracyclines.	Intravenously , intravesically	60-75 mg/m ² IV q21Days, 60 mg/m ² IV q14Days, 20 mg/m ² /dose qweek .	<ul style="list-style-type: none"> missed menstrual periods, darkening of your skin or nails, weakness, tiredness, eye redness.
3	Lurbinectedin	Anti-neoplastic Agent.	Intravenous	3.2 mg/m ² IV q21Days	<ul style="list-style-type: none"> bloody urine, bone, joint, or muscle pain, chest pain, labored breathing, general feeling of discomfort, hoarseness.
4	Nivolumab	Monoclonal Antibodies.	Intravenous infusion.	240 mg IV q2Weeks , 480 mg IV q4Weeks	<ul style="list-style-type: none"> low blood sodium level, increased alkaline, phosphatase ,rash ,severe itching ,cough , upper respiratory tract infection.



Brigatinib formula^[58]



Lurbinectedin^[59]



Nivolumab^[60]

Ayurvedic Formulations For Lung Cancer :



This^[61] herbal package is prepared with various herbs beneficial for all the issues related to the lungs. In **Ayurvedic treatment for lung cancer**, there is an Ayurvedic Lungs Care Package that helps to cleanse your lungs in natural ways such as:




Swans Vati manufactured by Ayurved Prathishan Nasik Private Ltd India which is a beneficial herbal remedy in the Lungs Care Package that is beneficial for improving lung problems. One of the essential ayurvedic herbs in the Lungs Care Package that provides relief in lung problems. The main ingredient of Swans Vati is Mulethi. Mulethi helps to boost the immunity of the body. Swans Vati is beneficial for respiratory tract disorders and also lowers cholesterol levels.

Lungs Care Churna manufactured by Jeena Sikho Life Care Pvt Ltd India which is another natural herb that is important in getting relief from various lung disorders. It is beneficial for diseases like jaundice and hepatic dysfunction etc. Terminalia bellerica, Eclipta alba, are the main ingredients of lungs care churna. These ingredients are beneficial for lung diseases and disorders.

Sanjeevani Vati manufactured by Shrimad Herbal Company in India which is an Ayurvedic herb that helps the immune system of the body healthy is known as Sanjeevani Vati. This natural herb increases the metabolism of the body. It consists of main ingredients like Shatavari, Shankhpushpi, Ashwagandha that provide multiple health benefits.

Table No.12: Ayurvedic Remedies For Lung Cancer :

Serial No.	Botanical Name	Family/Common Name	Chemical Constituent	Plant Part Taken	Uses
1	Allium sativum 	Amaryllidaceae /	Allicin	Bulb	Raw garlic intake was associated with lower risk of development of lung cancer
2	Tinospora cordifolia 	Menispermaceae / Giloy	Arabinogalactan, syringine, cordial, cordioside, tinosporaside, columbin, tinosporic acid etc.	Stem, root, leaf.	The stem powder or juice of the herb is used for many types of cancer including lung cancer. This immunomodulatory herb helps to control the growth of

					cancer cells.
3	Ginkgo biloba 	Ginkgoaceae / Ginkgo	Ginkgetin, ginkgolides A and B	Whole plant.	Ginkgo biloba extract decreases non-small cell lung cancer cell migration by downregulating metastasis-associated factor heat-shock protein 27.
4	Terminalia arjuna 	Corbretaceae/Arjuna	Phenolic acid (galliv acid, ellagic acid)	Bark	Arjuna is useful to manage lung problems like lung cancer and bronchitis.
5	Catharanthus roseus 	Apocynaceae/Vinca	Vincristine and vinblastine	Whole plant	Vincristine is used in the treatment lung cancer. Vinblastine is used in the treatment of lung cancer, and other types of cancer.

PNEUMONIA (Lung Infection)

Pneumonia is an infectious disease of the lung that primarily affecting the small air sacs known as Alveoli.^{[62][63]} Main Symptoms of Pneumonia includes some combination of productive or dry cough, chest pain, fever, and difficulty breathing.^[64] The severity of the condition is variable.^[64]

Pneumonia is usually caused by infection with viruses or bacteria, and less commonly by other microorganisms. Identifying the responsible pathogen can be difficult. Diagnosis is often based on symptoms and physical examination.^[65] Chest X-rays, blood tests, and culture of the sputum may help confirm the diagnosis.^[65] The disease may be classified by

where it was acquired, such as community- or hospital-acquired or healthcare-associated pneumonia.^[66]

Various Risk factors for pneumonia include cystic fibrosis, chronic obstructive pulmonary disease (COPD), sickle cell disease, asthma, diabetes, heart failure, a history of smoking, a poor ability to cough (such as following a stroke), and a weak immune system.^{[67][68]}

Vaccines to prevent certain types of pneumonia (such as those caused by Streptococcus pneumoniae bacteria, linked to influenza, or linked to COVID-19) are available.^[69] Other methods of prevention include hand washing to prevent spread of infection, not smoking, and social distancing.^[69]



Patient Suffering From Pneumonia^[70]

Table No.13: Allopathic Treatment For Pneumonia^[71]

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Side Effects
1	Ciprofloxacin	Antibiotic	Oral, Injection	250-750 mg 2 times a day	Diarrhea, numbness, usual bleeding
2	Levofloxacin	Antibiotic	Oral	250-750mg once per day	Diarrhesa, nerve damage, behavioral changes.
3	Doxycycline	Antibiotic	Oral	40mg daily in an empty stomach	Nausea, allergic reaction, headache.
4	Zanamivir	Antibiotic	Oral Inhaler	2 inhalations twice per day for 5 days.	Difficult breathing, swelling of your lips, face or throat.



Ciprofloxacin^[72]








Doxycycline^[73]



Zanamivir^[74]

Table No.14: Ayurvedic Remedies For Pneumonia:

Serial No.	Botanical Name	Family/ Common Name	Chemical Constituent	Plant Part Taken	Uses
1	Mentha piperita 	Lamiaceae/ Peppermint	The main constituents were menthol (40.7%) and menthone (23.4%). Further components were (+/-)-menthyl acetate, 1,8-cineole, limonene, beta-pinene and beta-caryophyllene.	Leaves	These herbs may help break up mucus and ease the pain and inflammation caused by pneumonia.
2	Glycyrrhiza glabra 	Fabaceae/ mulethi or licorice root	Glycyrrhizic acid 20%, glycyrrhizinic acid 10%, isoflavones, glabrolide etc.	underground stems and roots	Licorice root may have potent antioxidant, anti-inflammatory, and antimicrobial effects. Early research suggests that, as a result, it may ease upper respiratory infections
3	Zingiber officinale 	Zingiberaceae/ ginger	The phenolic compounds in ginger are mainly gingerols, shogaols, and paradols. In fresh ginger, gingerols are the major polyphenols, such as 6-gingerol, 8-gingerol, and	Rhizome	Ginger extract reduces delayed gastric emptying and nosocomial pneumonia in adult respiratory distress syndrome patients hospitalized in an

			10-gingerol		intensive care unit
4	<p>Piper nigrum</p> 	Piperaceae/black pepper	Black pepper is composed of carbohydrate of 37.4%, proteins of 25.5%, fibres of 23.6%, moisture of 4.7% and fat of 5.3%, as well as minerals, including 0.66% potassium (K), 0.20% calcium (Ca), 0.16% phosphorus and 0.16% magnesium (Mg)	runner shoots of field grown vines	Black pepper has been reported to improve the swallowing reflex by increasing the release of substance P in the pharynx to prevent aspiration. In this study, we examined whether black pepper alone is sufficient to reduce the risk of aspiration, thereby reducing antibiotic use and the incidence of aspiration pneumonia.
5	<p>Echinacea</p> 	Asteraceae / Coneflower	The complex chemical composition of the roots and herbs of Echinacea involves alkaloids, ketoalkenes, caffeic acid derivatives, polysaccharides, and glycoproteins, which are believed to be responsible for noted immunostimulatory and anti-inflammatory	flowers, leaves, stems and roots	echinacea extract was found to reduce the risk of recurrent respiratory tract infections and decrease complications like pneumonia, tonsillitis, and ear infections

			y activities.		
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TUBERCULOSIS

Tuberculosis (TB) is an infectious disease usually caused by Mycobacterium tuberculosis (MTB) bacteria.^[76] Tuberculosis mostly affects the lungs, but can also affect other parts of the body.^[76] Most of the infections does not show any symptoms, in which case it is known as latent tuberculosis.^[76] About 10% of latent infections progress to active disease which, if left untreated, kills about half of those affected.^[76] Typical symptoms of active TB are a chronic cough with blood-containing mucus, fever, night sweats, and weight loss.^[76] It was historically called consumption due to the weight loss.^[77] Infection of other organs can cause a wide range of symptoms.^[78]

Tuberculosis is spread from person to the next person through the air when people who have active TB in their lungs cough, spit, speak, or sneeze.^{[76][79]} People with Latent TB do not spread the disease.^[76] Active infection occurs more often in people with HIV/AIDS and in those who smoke.^[76] Diagnosis of active TB is based

on chest X-rays, as well as microscopic examination and culture of body fluids.^[80] Diagnosis of Latent TB relies on the Tuberculin Skin Test (TST) or Blood Tests.^[80]

About^[81] one-fourth of the world's population has a TB infection, which means people have been infected by TB bacteria but are not ill with the disease and cannot transmit it. People infected with TB bacteria have a 5–10% lifetime risk of falling ill with TB. Those with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a higher risk of falling ill.

When a person develops active TB disease, the symptoms (such as cough, fever, night sweats, or weight loss) may be mild for many months. This can lead to delays in seeking care, and results in transmission of the bacteria to others. People with active TB can infect 5–15 other people through close contact over the course of a year. Without proper treatment, 45% of HIV-negative people with TB on average and nearly all HIV-positive people with TB will die.



Patient Suffering From Tuberculosis^[82]

Table No.15: Allopathic Treatment For Tuberculosis^[83] :

Serial No.	Drug Name	Drug Class	Administration Route	Standard Dosage	Uses
1	Isoniazid	Anti-Tuberculosis Agents	orally or intramuscularly or intravenously	>30 kg: 300 mg PO qDay x9 months	Isoniazid is an antibiotic that fights bacteria. Isoniazid is used to treat and to prevent tuberculosis (TB)
2	Rifampin	Anti-Mycobacterials	Orally or Intravenous	The recommended single daily dose in tuberculosis is 8-12mg/kg.	Rifampin is an antibiotic that is used to treat or prevent tuberculosis (TB).
3	Ethambutol	Anti-Mycobacterial Antibiotics	Orally	15 to 25 mg per kg (6.8 to 11.4 mg per	Ethambutol eliminates certain bacteria that cause tuberculosis

				pound) of body weight once a day	(TB). It is used with other medicines to treat tuberculosis and to prevent you from giving the infection to others.
4	Pyrazinamide	Anti-Tubercular Agents.	Orally	Once a day dosing: 15 to 30 mg/kg orally once a day	Pyrazinamide kills or stops the growth of certain bacteria that cause tuberculosis (TB).



Isoniazid^[84]








Rifampin^[85]



Pyrazinamide^[86]

Table. No.16: Ayurvedic Remedies For Tuberculosis^[87]

Serial No.	Botanical Name	Family/Common Name	Chemical Constituent	Plant Part Taken	Uses
1	Adhotoda vasica 	Acanthaceae /Adulasa or Vasaka	The chemical constituents of vasaca are alkaloids, tannins, flavinoids, terpenes, sugar and glucosides. The major chemical constituents of vasaca are its several alkaloids, and the chief one is vasicine	leaves, roots, flowers and stem bark	The leaves, roots, flowers, and bark of this plant have been used in cough, colds, asthma, liquefy sputum, broncho dilator, bronchial catarrh, bronchitis, and tuberculosis. The parts of the plant are commonly used in the forms of decoction or powder.
2	Centella asiatica 	Apiaceae/ gotu kola	Centella Asiatica is made of four main active ingredients: asiatic acid, madecassic acid, asiaticoside and madecassoside	Whole plant	gotu kola can be used to suppress the toxic side effects of the antibiotic isoniazid. Isoniazid is used to treat and prevent tuberculosis.
3	Catharanthus roseus	Apocynaceae/	Vincristine and	Whole	Reserpine

		Vinca	vinblastine	plant	showed potential antimycobacterial activity against Mycobacterium tuberculosis, strain H37Rv, and antioxidant activities. Reserpine displays 55% of growth inhibition of M. tuberculosis
4	Aloe barbadensis 	Asphodelaceae/Aloe vera	Aloe vera contains approximately 98.5% water, while the mucilage or gel consists of about 99.5% water. The remaining 0.5 – 1% solid material consists of a range of compounds including water-soluble and fat-soluble vitamins, minerals, enzymes, polysaccharides, phenolic compounds and organic acids	Leaves	Aloe vera can suppress the production of TNF-a and the percentage of Th17 cells as a result of antituberculosis drug administration. Thus, Aloe vera can be a useful alternative to natural materials in the successful treatment of tuberculosis through the inhibition of side effect.
5	Piper longum 	Piperaceae/ Indian Long Pepper	The plant contains essential oil, which consists of sesquiterpene hydrocarbons and ethers (bisabolene, β -caryophyllene, β -caryophyllene oxide, and α -zingiberene) and saturated aliphatic hydrocarbons such as	Fruit	It showed in vitro anti-tubercular activity against Mycobacterium tuberculosis. a good remedy for treating tuberculosis and respiratory tract infections

			pentadecane, tridecane, and heptadecane.		
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II. CONCLUSION

Respiratory infections represent the third most frequent health problem now a days due to mostly people smoke and some people suffered due to they are working in mining of some minerals where fine particles of dust enters in their lungs and create problems in Respiration. Above we discuss some of the major problems of Respiratory Disease with their Allopathic Treatment and Ayurvedic Remedies of Asthma, COPD, Lung Cancer, Pneumonia & Tuberculosis (TB). Some important medicines and herbal drugs are describes above so with the help of these medicines or drugs patient can recover from these disease easily and soon. All the Respiratory Disease effect the several Physiological Function of Human Body . Main function of Respiratory System to supply the proper amount of oxygen to the body cells and remove CO₂ from the cells so Mitochondria of the cell which is known as Power of the Cell form Energy in the form of ATP in the presence of Oxygen .So that all the function of the body can work properly. Without energy formation in the Body, Organ can't work properly which can create several problems in our body.

REFERENCE

1. https://en.wikipedia.org/wiki/Respiratory_system
2. Campbell, Neil A. (1990). *Biology* (2nd ed.). Redwood City, Calif.: Benjamin/Cummings Pub. Co. pp. 834–835. ISBN 0-8053-1800-3.
3. <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/respiratory-disease>
4. <https://medlineplus.gov/ency/article/000066.htm>
5. "Asthma Fact sheet №307". WHO. November 2013. Archived from the original on June 29, 2011. Retrieved 3 March 2016.
6. NHLBI Guideline 2007, pp. 11–12
7. GINA 2011, p. 20,51
8. British Guideline 2009, p.4
British Guideline 2009, p. 4
9. Martinez FD (January 2007). "Genes, environments, development and asthma: a reappraisal". *The European Respiratory Journal*. 29 (1): 179–84. doi:10.1183/09031936.00087906. PMID 17197483.
10. GINA 2011, p. 20,51
11. Yawn BP (September 2008). "Factors accounting for asthma variability: achieving optimal symptom control for individual patients" (PDF). *Primary Care Respiratory Journal*. 17 (3): 138–47. doi:10.3132/pcrj.2008.00004. PMC 6619889. PMID 18264646. Archived (PDF) from the original on 2009-03-26.
12. Kumar, Vinay; Abbas, Abul K.; Fausto, Nelson; Aster, Jon, eds. (2010). *Robbins and Cotran pathologic basis of disease* (8th ed.). Saunders. p. 688. ISBN 978-1-4160-3121-5. OCLC 643462931.
13. *Stedman's Medical Dictionary* (28 ed.). Lippincott Williams & Wilkins. 2005. ISBN 978-0-7817-3390-8.
14. NHLBI Guideline 2007, pp. 169–72
15. GINA 2011, p. 71
16. GINA 2011, p. 33
17. Scott JP, Peters-Golden M (September 2013). "Antileukotriene agents for the treatment of lung disease". *American Journal of Respiratory and Critical Care Medicine*. 188(5): 538–44. doi:10.1164/rccm.201301-0023PP. PMID 23822826.
18. NHLBI Guideline 2007, p. 214
19. NHLBI Guideline 2007, pp. 373–75
20. https://www.google.com/url?sa=i&url=https%3A%2F%2Fdepositphotos.com%2Fstock-photos%2F asthma.html&psig=AOvVaw2d2E6R_fCfG4IkUttWAL7d&ust=1638980608646000&source=images&ccd=vfe&ved=0CAgQjRxqFwoTCPiugOeM0vQCFQAAAAAdAAAAABAD
21. Bergstrom J, Kurth SM, Bruhl E, et al. Institute for Clinical Systems Improvement website. Health Care Guideline: Diagnosis

- and Management of Asthma. 11th ed. www.icsi.org/wp-content/uploads/2019/01/Asthma.pdf. Updated December 2016. Accessed February 3, 2020.
22. <https://img.medscapestatic.com/pi/features/drugdirectory/octupdate/ATP08011.jpg?output-quality=50>
 23. <https://tajgenerics.com/wp-content/uploads/Prednisolone-5mg-tablets-2.jpg>
 24. <https://bizimages.withfloats.com/actual/5b0be1b5f1a73e0bf0a5f779.jpg>
 25. https://www.nhp.gov.in/Zeeq-un-Nafas-Shoabi-Bronchial-Asthma_mtl
 26. https://www.nhp.gov.in/eraippu-erumal-bronchial-asthma-_mtl
 27. Vetha merlin kumara H, Adhathodai chooranam: siddha medicine indicated for iya eraippu noi (bronchial asthma) –a review, *World Journal of Pharmaceutical Research*, volume 4, issue 3, 802-848.
 28. <https://www.adityabirlacapital.com/healthinsurance/active-together/2017/05/05/10-ayurvedic-mixes-for-asthmatics>
 29. Gold Report 2021, pp. 4–6, Chapter 1: Definition and overview.
 30. Gold Report 2021, pp. 20–23, Chapter 2: Diagnosis and initial assessment.
 31. "Chronic obstructive pulmonary disease (COPD)". www.who.int. Retrieved 1 July 2021.
 32. Myc LA, Shim YM, Laubach VE, Dimastromatteo J (April 2019). "Role of medical and molecular imaging in COPD". *Clin Transl Med*. 8 (1): 12. doi:10.1186/s40169-019-0231-z. PMC 6465368. PMID 30989390.
 33. "ICD-11 - ICD-11 for Mortality and Morbidity Statistics". icd.who.int. Retrieved 30 June 2021.
 34. Martini K, Frauenfelder T (November 2020). "Advances in imaging for lung emphysema". *Ann Transl Med*. 8 (21): 1467. doi:10.21037/atm.2020.04.44. PMC 7723580. PMID 33313212.
 35. Gold Report 2021, pp. 8–14, Chapter 1: Definition and overview.
 36. <https://www.clinicbarcelona.org/uploads/media/default/0002/83/c2b5bf6ef9a7a61724d08c1bd42bf3a31df3e7e6.jpeg>
 37. <https://www.healthline.com/health/copd/drugs#short-acting-bronchodilators>
 38. <https://5.imimg.com/data5/FF/WH/MY-21575320/albuterol-inhaler-500x500.jpg>
 39. <https://www.indiamart.com/proddetail/tiotropium-bromide-inhalation-solution-21023144091.html>
 40. https://www.rightbreathe.com/wp-content/uploads/2016/06/Easyhaler_Formoterol_12mcg_pack_image.jpg
 41. <https://shuddhi.com/role-of-ayurveda-in-copd/>
 42. White V, Ruparelia P (2020). "28". Kumar & Clark's Clinical Medicine. Elsevier. p. 975. ISBN 978-0-702078705.
 43. "Non-Small Cell Lung Cancer Treatment – Patient Version (PDQ®)". NCI. 12 May 2015. Archived from the original on 29 February 2016. Retrieved 5 March 2016.
 44. Falk S, Williams C (2010). "Chapter 1". *Lung Cancer – the facts* (3rd ed.). Oxford University Press. pp. 3–4. ISBN 978-0-19-956933-5.
 45. Lu C, Onn A, Vaporciyan AA, et al. (2017). "Chapter 84: Cancer of the Lung". *Holland-Frei Cancer Medicine* (9th ed.). Wiley Blackwell. ISBN 9781119000846.
 46. Horn L, Lovly CM (2018). "Chapter 74: Neoplasms of the lung". In Jameson JL, Fauci AS, Kasper DL, Hauser SL, Longo DL, Loscalzo J (eds.). *Harrison's Principles of Internal Medicine* (20th ed.). McGraw-Hill. ISBN 978-1259644030.
 47. Alberg AJ, Brock MV, Samet JM (2016). "Chapter 52: Epidemiology of lung cancer". *Murray & Nadel's Textbook of Respiratory Medicine* (6th ed.). Saunders Elsevier. ISBN 978-1-4557-3383-5.
 48. Thun MJ, Hannan LM, Adams-Campbell LL, Boffetta P, Buring JE, Feskanich D, et al. (September 2008). "Lung cancer occurrence in never-smokers: an analysis of 13 cohorts and 22 cancer registry studies". *PLOS Medicine*. 5 (9): e185. doi:10.1371/journal.pmed.0050185. PMC 2531137. PMID 18788891.
 49. "Lung Carcinoma: Tumors of the Lungs". Merck Manual Professional Edition, Online edition. July 2020. Retrieved 21 July 2021.
 50. Collins LG, Haines C, Perkel R, Enck RE (January 2007). "Lung cancer: diagnosis and management". *American Family Physician*. 75 (1): 56–63. PMID 17225705. Archived from the original on 29 September 2007.

51. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F (May 2021). "Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries". *CA: A Cancer Journal for Clinicians*. 71 (3): 209–49. doi:10.3322/caac.21660. PMID 33538338.
52. "Surveillance, Epidemiology and End Results Program". National Cancer Institute. Archived from the original on 4 March 2016. Retrieved 5 March 2016.
53. Thandra KC, Barsouk A, Saginala K, Aluru JS, Barsouk A (2021). "Epidemiology of lung cancer". *Contemporary Oncology (Poznan, Poland)*. 25 (1): 45–52. doi:10.5114/wo.2021.103829. PMC 8063897. PMID 33911981.
54. "Japanese Medical Center Finds Five-Year Survival Rate for Cancer Is 66.4%". nippon.com. Retrieved 2 February 2020.
55. Majumder S (2009). *Stem cells and cancer (Online-Ausg. ed.)*. New York: Springer. p. 193. ISBN 978-0-387-89611-3. Archived from the original on 18 October 2015.
56. <https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.everydayhealth.com%2Fflug-cancer%2Fexercise-prehab-can-help-lung-cancer-patients%2F&psig=AOvVaw3cu6A0q7GLzgt-B1Y4VEfi&ust=1638986347798000&source=images&cd=vfe&ved=0CAGQjRxqFwoTCMij1Iyi0vQCFQAAAAAdAAAAABAD>
57. <https://www.cancer.gov/about-cancer/treatment/drugs/lung>
58. https://www.cancerquest.org/sites/default/files/assets/drugs/images/Correct_brigatinib.svg.png
59. <https://www.clinicaltrialsarena.com/projects/zepezca-lurbinectedin/>
60. <https://assets.medpagetoday.net/media/images/86xxx/86264.jpg>
61. <https://shuddhi.com/ayurvedic-treatment-for-lung-cancer/>
62. McLuckie A, ed. (2009). *Respiratory disease and its management*. New York: Springer. p. 51. ISBN 978-1-84882-094-4.
63. Pommerville JC (2010). *Alcamo's Fundamentals of Microbiology (9th ed.)*. Sudbury, MA: Jones & Bartlett. p. 323. ISBN 978-0-7637-6258-2.
64. Ashby B, Turkington C (2007). *The encyclopedia of infectious diseases (3rd ed.)*. New York: Facts on File. p. 242. ISBN 978-0-8160-6397-0. Retrieved 21 April 2011.
65. "How Is Pneumonia Diagnosed?". NHLBI. 1 March 2011. Archived from the original on 7 March 2016. Retrieved 3 March 2016.
66. "Types of Pneumonia". NHLBI. 1 March 2011. Archived from the original on 5 February 2016. Retrieved 2 March 2016.
67. "Who Is at Risk for Pneumonia?". NHLBI. 1 March 2011. Archived from the original on 7 March 2016. Retrieved 3 March 2016.
68. "Complications and Treatments of Sickle Cell Disease | CDC". Centers for Disease Control and Prevention. 12 June 2019. Retrieved 6 May 2020.
69. "How Can Pneumonia Be Prevented?". NHLBI. 1 March 2011. Archived from the original on 7 March 2016. Retrieved 3 March 2016.
70. https://en.wikipedia.org/wiki/File:Chest_radiograph_in_influenza_and_H_influenzae,_posteroanterior,_annotated.jpg
71. <https://www.singlecare.com/conditions/pneumonia-treatment-and-medications>
72. <https://5.imimg.com/data5/EO/PZ/NF/SELLER-10335408/ciprofen-ciprofloxacina-500-mg-tablet-500x500.jpg>
73. https://www.pharmaceutical-technology.com/wp-content/uploads/sites/10/2017/11/Doxycycline_1738646444-e1599207148248.jpg
74. <https://5.imimg.com/data5/SELLER/Default/2021/8/HX/ZD/RJ/129552839/zanamivir-relnza-inhaler-500x500.jpg>
75. <https://shuddhi.com/ayurvedic-treatment-for-pneumonia/>
76. "Tuberculosis (TB)". who.int. Retrieved 8 May 2020.
77. *The Chambers Dictionary*. New Delhi: Allied Chambers India Ltd. 1998. p. 352. ISBN 978-81-86062-25-8. Archived from the original on 6 September 2015.
78. Adkinson NF, Bennett JE, Douglas RG, Mandell GL (2010). *Mandell, Douglas, and Bennett's principles and practice of infectious diseases (7th ed.)*. Philadelphia, PA: Churchill Livingstone/Elsevier. p. Chapter 250. ISBN 978-0-443-06839-3.



79. "Basic TB Facts". Centers for Disease Control and Prevention (CDC). 13 March 2012. Archived from the original on 6 February 2016. Retrieved 11 February 2016.
80. Konstantinos A (2010). "Testing for tuberculosis". *Australian Prescriber*. 33 (1): 12–18. doi:10.18773/austprescr.2010.005.
81. <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>
82. <https://editorial01.shutterstock.com/wm-preview-1500/8551917c/5091280e/world-tuberculosis-day-in-peshawar-pakistan-shutterstock-editorial-8551917c.jpg>
83. <https://www.cdc.gov/tb/topic/treatment/tbdis-ease.htm>
84. <https://5.imimg.com/data5/QO/FM/CN/SELLER-5907702/isoniazid-tablets-300mg-500x500.png>
85. https://imgcdn.mckesson.com/CumulusWeb/Images/High_Res/982221.jpg
86. <https://5.imimg.com/data5/SELLER/Default/2021/2/XP/EE/GN/122822982/p-zide-1000-tablet-500x500.jpg>
87. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5723184/#:~:text=It%20was%20concluded%20that%20administration,the%20inhibition%20of%20side%20effect.>