

Strategic Approach to studying Communicable Diseases for Community Medicine Theory Exam

Disclaimer: *This article is primarily aimed at my students, but is of a general nature and may be useful to others as well.*

Some students have expressed difficulty studying the large number of communicable diseases described in the standard textbook. ***This article presents a strategic approach to studying about communicable diseases for the theory examination that is primarily intended for struggling students. The aim of the strategy is to enable students to rapidly cover large portions of the textbook in a relatively short span of time and retain enough information to be able to obtain 50% mark on a short answer question.*** The following kinds of students are most likely to benefit from this strategy:

- Those who are unable to read details of communicable diseases due to lack of time
- Those who are unable to retain details due to lack of familiarity with microbiology/medicine, etc.

I will present the strategy as a series of steps for ease of understanding and clarity. The steps must preferably be followed in sequence, but if one is already familiar with initial steps, one may start with later steps as appropriate.

Step 1: Learn how diseases are grouped

In the textbook diseases are grouped as

- I. Respiratory infections
- II. Intestinal infections
- III. Arthropod-borne infections
- IV. Zoonoses
- V. Surface infections
- VI. Emerging and re-emerging infectious diseases
- VII. Hospital acquired infections

The first step is learning which diseases fall under Respiratory infections, intestinal infections, etc.

If one examines the list of diseases, the following are listed under Respiratory infections:

- Smallpox
- Chickenpox
- Measles
- Rubella
- Mumps
- Influenza
- Diphtheria
- Whooping cough
- Meningococcal meningitis
- Acute respiratory infections
- SARS
- COVID-19
- Tuberculosis

The important point to note is that diseases are grouped based on the mode of transmission. Thus, although meningococcal meningitis affects the central nervous system, it is transmitted by droplet infection.

Learning how diseases are grouped enables one to quickly identify the primary mode of transmission. In the case of respiratory infections, the mode of transmission is usually droplet infection and droplet nuclei, with direct contact and fomites also contributing in some diseases.

At the end of Step 1, learners should be able to

1. State which disease falls under a particular group and vice-versa.
2. State the primary mode of transmission

Precaution: Some diseases are known by more than one name (Measles is also called Rubeola, for instance). Therefore, when learning names, all names of a disease condition must be learned. This will prevent confusion when alternative names are employed in the question paper.

Step 2: Learn the name and type of disease agent

This step builds on the previous step by adding to the basic information already committed to memory. Here, learners must memorize the type of disease agent- bacteria/virus/parasite, etc. and the exact biological name of the disease agent. Some students may be familiar with names of disease agents from Microbiology. Regardless, it is necessary to know the exact name of the agent(s).

Continuing with the example of respiratory infections, one must learn the following (for instance):

Name	Agent type	Agent name
Smallpox (Variola)	Virus	Variola virus
Chickenpox (Varicella)	Virus	Varicella-zoster virus
Measles (Rubeola)	Virus	Measles virus (Rubeola virus)
Rubella (German Measles)	Virus	Rubella virus

Table 1. Partial list of disease agent type and agent name for selected respiratory infections.

By the end of Step 2, learners should be able to do the following:

1. State which disease falls under a particular group and vice-versa.
2. State the primary mode of transmission
3. State the agent type and agent name

Precaution: Do not spend time on agent factors at this stage- you can always return to learn agent factors if time permits after completing all steps. Remember, the emphasis is on speed and topic coverage that is sufficient to write a reasonable short answer on any communicable disease mentioned in the textbook.

Step 3: Identify key Host factors associated with each disease

Generally, host factors include Age, Sex and Immunity. Learners should have a broad sense of how these vary with diseases.

The key method is pattern recognition- we want to identify all the common features between one or more diseases, and also how similar diseases differ. The common features will be mentioned for all diseases except the exceptions to the rule (which will be mentioned separately). This is similar to Pharmacology, where a prototype drug for the drug class is identified and studied in detail. Other drugs in the same class are compared for similarities and differences. These form the basis of answers for any drug in the class.

Name	Age	Sex	Immunity
Smallpox (Variola)	All ages	M=F	Lifelong among survivors (*Eradicated)
Chickenpox (Varicella)	<10 years (y)	M=F	Durable- 2 nd attacks rare (zoster)
Measles (Rubeola)	<5 y (6m-3y)	M=F	Lifelong
Rubella (German Measles)	3-10y; >15y	M=F	Lifelong
Seasonal influenza	Infection: All ages ↑Mortality: <18m, >65y, DM,CVD	M=F	Subtype specific- no cross protection. Immunity may be partial; Antigenic drift: mild illness if previous Antibodies present

Table 2. Key host factors for selected diseases

From the table it is evident that while other diseases mentioned result in robust immunity, seasonal influenza does not. Similarly, there is a difference in terms of susceptibility to infection and dying from seasonal influenza. Such differences must be identified beforehand and highlighted in answers.

By the end of Step 3, learners should be able to do the following:

1. **State which disease falls under a particular group and vice-versa.**
2. **State the primary mode of transmission**
3. **State the agent type and agent name**
4. **Describe key host factors associated with diseases**

Step 4: Identify key Environmental factors associated with each disease

Generally, environmental factors include seasons, and overcrowding. In turn, seasons are important due to variations in temperature, humidity, vector behaviour, etc. For the purpose of this strategy, learners need to only determine if there is any seasonal variation in disease occurrence. In addition, the role of overcrowding (if any) should also be known.

As in previous steps, learners should consciously try to identify patterns within groups of diseases, and use that information while writing answers.

Name	Season	Overcrowding
Chickenpox (Varicella)	Tropics: Coolest, driest months	Imp. if susceptible
Measles (Rubeola)	Any season; Tropics: Dry season Epidemics every 2-5y	Important
Rubella (German Measles)	Temperate: late winter-spring Epidemics every 4-9 y	Important

Table 3. Key environmental factors for selected diseases

By the end of Step 4, learners should be able to do the following:

1. **State which disease falls under a particular group and vice-versa.**
2. **State the primary mode of transmission**
3. **State the agent type and agent name**
4. **Describe key host factors associated with diseases**
5. **Describe key environmental factors associated with diseases**

Step 5: Identify major clinical features associated with diseases

This step is linked to the first step in the sense that learners may guess clinical features based on the grouping of diseases. Of course, this is not fool-proof, but will work in most situations.

For instance, one expects some respiratory manifestations in respiratory infections. Common manifestations include cough, breathlessness, and fever (fever is common to all infections). Some diseases also have accompanying rash- Measles, Chickenpox, Rubella, etc. Learners must know which diseases have fever with rash and learn the characteristics of each rash since questions on rash are common (Questions may either be limited to a single disease, or require students to distinguish between the rashes of two diseases.). As mentioned previously, care must be taken to identify diseases that do not fit the general pattern- meningococcal meningitis has primarily CNS manifestations although it is listed as a respiratory infection based on the mode of transmission.

To save time, learners may first prepare a list of manifestations that they expect in a disease (based on disease group), then quickly skim the textbook to confirm the same. Here, too, the emphasis is on identifying key words, not learning lot of details. During the examination, students must briefly expand on the key words to create short sentences.

By the end of Step 5, learners should be able to do the following:

1. **State which disease falls under a particular group and vice-versa.**
2. **State the primary mode of transmission**
3. **State the agent type and agent name**
4. **Describe key host factors associated with diseases**
5. **Describe key environmental factors associated with diseases**
6. **Describe key clinical features of diseases**

Step 6: Identify diagnostic approaches for diseases

Another common question pertains to the diagnosis of diseases. Therefore, learners must make a note of key diagnostic approaches/ methods for diseases.

Diagnosis may be based on

- Clinical features only (for epidemiological/ surveillance purposes [Eg. Syndromic approach in STDs])
- Laboratory investigations only (Drug resistant TB)
- Clinical features and laboratory investigations (Most diseases)

Where diagnosis is largely based on clinical features, learners must identify the pathognomonic features in step 5.

Where diagnosis is largely based on laboratory investigations, learners must make a list of test names and/or methods for use as key words in the examination.

Learners are advised to prioritize learning diagnostic approaches for diseases that are major public health problems first- Tuberculosis, Leprosy, HIV, etc.

By the end of Step 6, learners should be able to do the following:

1. **State which disease falls under a particular group and vice-versa.**
2. **State the primary mode of transmission**
3. **State the agent type and agent name**
4. **Describe key host factors associated with diseases**
5. **Describe key environmental factors associated with diseases**
6. **Describe key clinical features of diseases**
7. **List key diagnostic approaches for diseases**

For struggling students the above six steps should be sufficient to write reasonable answers on any communicable disease mentioned in the textbook. I assume that such students will not have the time to learn additional details, given time constraints. As mentioned previously, the aim is to get to the point where learners are confident in their ability to answer questions on communicable diseases. Naturally, I do not expect students following this approach to answer all questions. However, I am confident that this approach will provide them with a framework for preparation and help them write reasonable answers in the examination.

Students may find this approach useful when they are commencing their preparations, and can expand it to include prevention and control as the seventh step.

Suggestions to improve the strategic approach are most welcome.