Immunise Today

Immunise. Prevent. Stay Healthy.

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It is the beginning of a new year and what a great way to start, with a new issue of Immunise Today, after a break of more than a year – Thank you to Sanofi Pasteur for once again sponsoring this newsletter!

At this time of the year, there are many children starting school, some at boarding school, or going to university where they may be staying in residency, so our first article by Lynn Lambert is very timeous, as it discusses the risks that older children and adolescents may have, due to waning immunity. It also discusses the benefit of some vaccines given specifically to adolescents. The recent diphtheria and measles outbreaks we have seen are largely due to older children not being vaccinated or not having booster vaccines that would ensure continuous protection from the childhood vaccines. Have a look at the table at the end of the article and make sure your children are up to date.

As Lynda Steyn says at the beginning of her article on page 4, the very word "meningitis" sends chills through everyone, and especially parents. One automatically thinks the very worst when we hear that there is a case of meningitis in the neighbourhood, but there is a lot of confusion about this condition and Lynda explains the different causes and severity of it. The one message we must take from the article though, is that irrespective of the cause, urgent medical attention must be sought when meningitis is suspected, as early treatment is critical to the survival of bacterial meningitis. Prevention is better than cure and so it is advisable to have vaccines that are available against certain of the infections.

Why do we discuss the flu vaccine so early in the year – I mean it is still the middle of summer: to be prepared! Flu vaccines should be available in February and as it is advisable to have your vaccines before the flu season actually starts so that you are protected from the beginning, it is best to have all your flu vaccine questions answered beforehand. Have a look at the last article in this issue. In the first half of last year, most of the flu infections were caused by the H1N1 strain in people who had not been vaccinated. There were many stories doing the rounds about the "swine flu" epidemic that was so bad – this epidemic would not have happened if everyone had had their flu vaccine, so I urge you to have the vaccine this year.

In this issue

World Immunisation Week
23 - 29 April 2019

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Bridging the gap: Booster vaccinations for older children and adolescents

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Childhood immunisations are one of the most significant public health interventions to ensure that children grow into healthy adults. According to the World Health Organization (WHO), vaccinations save approximately two to three million lives a year.Since infants and young children are at greatest risk of infectious diseases due to their immature immune systems, most vaccines are administered early in life.

South Africa's Expanded Programme on Immunisation (EPI) offers vaccines against tuberculosis, polio, diphtheria, tetanus, whooping cough (pertussis), *Haemophilus influenzae* type B, hepatitis b, pneumococcal diseases, rotavirus and measles, thereby significantly reducing the burden of these infections among infants and children. A common misconception is that older children and adolescents (defined as ages 10 to 19 years according to the WHO), are no longer at risk of these infectious diseases because they may have been previously vaccinated or because they may no longer be at risk. While some vaccines result in long-term immunity, many will require booster doses to ensure continued immunity.

Why are booster vaccines needed for older children and adolescents?

- ***Waning of vaccine-induced immunity***
  Although routine childhood vaccines has been proven to reduce the incidence of vaccine-preventable infectious diseases, the immunity from these vaccines, particularly diphtheria, tetanus and pertussis, wanes over time. As a result, individuals including older children and adolescents who have been previously vaccinated, may no longer be immune and are therefore at risk of getting these diseases.
- ***Risk profile of older children and adolescents***
  Certain infectious diseases such as tetanus, meningococcal disease and human papillomavirus (HPV) can be a concern for older children and adolescents because of the nature of the activities many find themselves involved in. In addition, this age-group often serves as a source of infection for high-risk individuals, such as patients who are immunocompromised, very young or very old. Table 1 on page 3 outlines the risk factors in this population.
- ***Reaction to outbreaks***
  Thanks to the implementation of vaccination, diphtheria is an uncommon disease in South Africa. However, sporadic cases still occur as seen over the past four years. Fifteen cases occurred in 2015, two cases in 2016, four cases in 2017 and three cases in 2018. Some of these cases were adults who may have had waning immunity due to not having had recent boosters.

In addition to waning immunity, older children and adolescents who are unvaccinated or not fully vaccinated as infants/children are also at risk of other diseases.

In 2017, measles outbreaks around the country caused a large increase in the number of parents who rushed to their nearest clinic to vaccinate their children. It was found that most cases were in unvaccinated children or children who were not fully vaccinated.

These recent outbreaks allude to the fact that vaccination in early life may not be sufficient for older children and adolescents, identifying gaps in vaccination coverage and emphasise the need for booster vaccinations.

Which vaccines and when?

Table 1 describes the risk profile of older children and adolescents and the vaccinations that are recommended.

Conclusion

Efforts to vaccinate older children and adolescents provides the opportunity to catch up on missed vaccines, boost waning immunity as well as introduce new vaccines that they may benefit from. Through these efforts, not only are the older children and adolescents protected from vaccine-preventable diseases, this will also reduce the spread of these diseases to others including, high-risk individuals. Outbreaks have identified gaps in vaccination coverage therefore pro-active vaccination especially in older children and adolescents encourages optimal vaccine coverage thereby potentially reducing the burden of these vaccine-preventable diseases in South Africa.

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References 10-18 available on request.

<table>
<tr><th colspan="2">Table 1. Risk profile of older children and adolescents and recommended vaccines</th></tr>
<tr><th>Risk factors in older children and adolescents</th><th>Recommended vaccines</th></tr>
<tr><td colspan="2">Tetanus, diphtheria, pertussis</td></tr>
<tr><td>Tetanus
• Waning immunity from previous vaccinations
• Behavioural:
- Sports and outdoor activities; motorbike or other accidents
- Cultural practices; circumcision
Diphtheria
• Waning immunity from previous vaccinations
• Living in crowded conditions
Pertussis
• Waning immunity from previous vaccinations
• Absence of the classic “whoop” in older patients resulting in pertussis being undiagnosed
• This age group serves as a reservoir for infection for infants and children who are vulnerable to severe illness and even death</td><td>Tetanus, diphtheria, pertussis-containing vaccine boosters
The choice of vaccine depends on the age of the child or adolescent and whether the child is receiving vaccines from the public or the private sector

Private sector:
• A paediatric strength of tetanus, diphtheria, acelluar pertussis and inactivated polio (TDaP-IPV) combination vaccine is now available for use as a booster dose at 6 years of age up to 12 years of age
• Two other booster vaccines containing reduced strength tetanus, diphtheria, acelluar pertussis and inactivated polio (TdaP-IPV) in combination are available for a further booster dose
Public sector:
• A product against tetanus and reduced strength diphtheria (Td) is available, which is usually given at 6 and 12 years of age
• Following the booster dose at 12 years of age, routine booster doses of a tetanus-containing vaccine would be necessary every 5 to 10 years</td></tr>
<tr><td colspan="2">Meningococcal disease</td></tr>
<tr><td>• Living in close quarters such as university residences, boarding school
• Prolonged time in crowded conditions such as nightclubs, pubs, discos
• Sharing drinking glasses, water bottles or eating utensils
• High nasopharyngeal carriage rate of meningococcal bacteria
• Kissing
• Smoking or exposure to smoke</td><td>The vaccine available in South Africa protects against four of the serogroups of meningococcal bacteria (A, C, W, Y). In addition, the vaccine reduces the nasopharyngeal carriage rate of the bacteria

Older children and adolescents at risk for meningococcal disease need one dose of the meningococcal ACWY vaccine. According to the recommendations for South Africa, revaccination may be necessary every five years if at risk</td></tr>
<tr><td colspan="2">Measles, mumps and rubella</td></tr>
<tr><td>• Unvaccinated or incomplete vaccination</td><td>To ensure protection against measles as well as mumps and rubella, older children and adolescents should have an additional dose of MMR vaccine if they have not previously had two doses of the MMR vaccine.

Unvaccinated individuals should receive 2 doses of MMR vaccine, with a minimum interval of 4 weeks</td></tr>
<tr><td colspan="2">Human papillomavirus</td></tr>
<tr><td colspan="2">Statistics indicate that in South Africa, cervical cancer, caused by HPV, is the 2nd leading cause of female cancer, and is the most common female cancer in women aged 15 to 44 years. Increasing evidence suggests that HPV may also be a relevant factor in ano-genital cancers (anus, vulva, vagina and penis).</td></tr>
<tr><td>• Early age of sexual intercourse and sexual behaviour
• Use of oral contraceptives
• Smoking</td><td>HPV vaccines are available which offer protection against the cancer-causing strains of HPV, and are most effective if given before a person becomes sexually active. Both males and females can benefit from the HPV vaccines

Two HPV vaccines are available in South Africa:
Bivalent HPV vaccine
• Indicated from 9 years in both males and females
• From 9 to 14 years: 2 doses with a minimum interval of 6 months between the 2 doses
• From 15 years of age, a 3-dose series is indicated at 0, 1 and 6 months

Quadrivalent HPV vaccine (also effective against the strains causing genital warts)
• Indicated from 9 to 26 years in males and from 9 to 45 years in females
• From 9 to 13 years: 2 doses with a minimum interval of 6 months between the 2 doses
• From 14 years of age, a 3-dose series is indicated at 0, 2 and 6 months</td></tr>
<tr><td colspan="2">Influenza</td></tr>
<tr><td>The most significant reason to prevent flu in this age group is that they represent a source of transmission to other high-risk populations</td><td>The flu vaccine is recommended annually to all individuals</td></tr>
</table>

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The many faces of meningitis

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Meningitis. The very word strikes fear into every adult or parent. Did you know that the word "meningitis" actually means "inflammation of the meninges" (the membranes which surround the brain and spinal cord)? When these membranes become inflamed, symptoms typical of meningitis, such as headache, fever and stiff neck typically occur.

There is a mad scramble to get "the meningitis vaccine" as soon as one hears of a suspected case of meningitis in the area. But, as you will see, there are many different causes of meningitis, some of which resolve on their own and others which may be deadly. Not all types of meningitis can be prevented through vaccination.

Infections of the meninges are most commonly caused by viruses, and less frequently, by bacteria. Rarely, meningitis may also be caused by fungi or parasites.

The management of meningitis depends on the type of meningitis that is diagnosed. Determining the cause of the meningitis is essential, however, as bacterial meningitis may be life-threatening.

This article will help you understand a little more about the different causes of meningitis, as well as the treatment and prevention thereof.

Viral meningitis is caused by certain viruses. Although it is much more common than bacterial meningitis, it also less severe than bacterial meningitis.

Viruses known as enteroviruses are the most common cause of viral meningitis. While these viruses will usually cause respiratory illnesses in older children and adults, they may cause meningitis in children under the age of 5 years, (especially under one month of age), as well as in people with weakened immune systems. These viruses are usually spread directly, e.g. through direct contact with faeces during nappy changing, or indirectly, e.g. by touching a surface that an infected person has touched.

Viruses that typically cause illnesses such as measles, mumps, chickenpox, shingles and flu, may sometimes cause complications, such as viral meningitis.

If a family member, or close contact is exposed to someone who has viral meningitis, they are more likely to develop the disease itself, e.g. they will get measles or flu, and not meningitis.

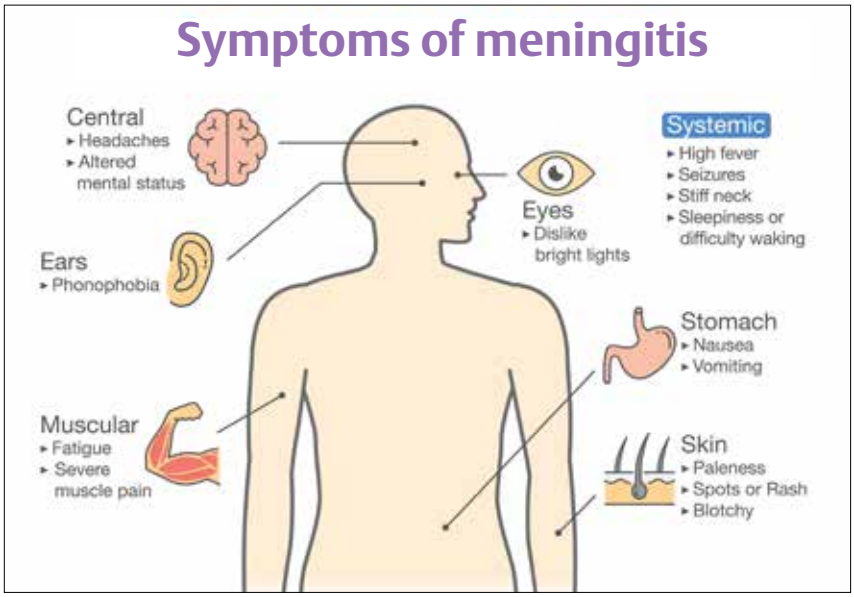
While no vaccine is available to prevent enterovirus infection, there are vaccines available to prevent viral diseases such as polio, measles, mumps, chickenpox, shingles and flu. Viral meningitis cannot be treated with antibiotics and people are usually treated according to their symptoms.

Bacterial meningitis, although less common than viral meningitis, has a greater risk of being fatal. Bacterial meningitis is not as infectious as viral meningitis and is usually spread only after lengthy contact with the infected person, such as a household contact.

The types of bacteria that typically cause meningitis may also differ according to age of the patient.

Bacteria known to cause bacterial meningitis include ***Neisseria meningitidis*, *Streptococcus pneumoniae*, Group B Streptococcus, *Haemophilus influenzae* type b (Hib), *Escherichia coli*, *Listeria monocytogenes* and *Mycobacterium tuberculosis***.

"Students living in university dormitories or children going to boarding school, or any place where there are groups of people living in close quarters, are at increased risk of bacterial meningitis caused by N. meningitidis."



Meningococcal meningitis is a very serious type of bacterial meningitis caused by Neisseria meningitidis. This bacterium also causes septicaemia (infection in the blood or blood poisoning). There are many different strains of *Neisseria meningitidis* that can cause meningococcal meningitis or meningococcal disease. A vaccine is available in South Africa that can prevent four (not all) of the strains commonly known to cause meningococcal meningitis or meningococcal disease.

Pneumococcal meningitis is meningitis caused by the bacterium *Streptococcus pneumoniae*. As is the case with *Neisseria meningitidis*, there are many different strains that cause pneumococcal meningitis. There are vaccines available that prevent many of the common strains known to cause pneumococcal meningitis.

Haemophilus influenzae type b used to be a common cause of bacterial meningitis (especially in children under 5 years of age), but the introduction of a vaccine against this bacteria has greatly reduced this risk.

The Bacillus Calmette–Guérin (BCG vaccine) is usually given at birth to prevent tuberculosis, caused by bacterium *Mycobacterium tuberculosis*, from spreading to other areas, such as the brain.

Who is more vulnerable to meningitis?

Although meningitis may affect anyone at any age, there are certain age groups and conditions which increase the risk.

Babies are at a higher risk of contracting bacterial meningitis compared to other age groups.

Students living in university dormitories, or children going to boarding school, or any place where there are groups of people living in close quarters, are at increased risk of bacterial meningitis caused by *Neisseria meningitidis*. It is usually spread from one person to the next through close contact with an infected person over a period of time.

People with chronic illnesses, or weakened immune systems, are at a higher risk of developing bacterial meningitis. High risk groups include people who are undergoing certain types of surgery, people with serious head injuries, cochlear implants or people that have had their spleen removed. HIV positive people, especially those with AIDS, have a very high risk of developing tuberculosis (TB). This combination of HIV and TB infection increases their risk of developing tuberculous meningitis (TBM).

Travellers to areas where there are large gatherings of people, e.g.travel for Hajj or Umrah, or travellers to areas where there is a higher occurrence of outbreaks, e.g. the meningitis belt in sub-Saharan Africa, are at a higher risk of contracting bacterial meningitis from *N. meningitidis*.

Missing or incomplete vaccination schedules leads to ineffective protection against these bacteria or viruses.

How does one reduce the risk of meningitis when exposed?

People who have had close contact with a person infected with bacterial meningitis caused by ***Haemophilus influenzae* type b** or ***Neisseria meningitidis*** (meningococcal meningitis), should receive an antibiotic as soon as possible (preferably within 24 hours) to prevent contracting meningitis. The vaccines preventing these types of meningitis are not usually given to close contacts to prevent meningitis at this stage, as the vaccines are not immediately effective.

The signs and symptoms of meningitis are very similar for both bacterial and viral meningitis. If meningitis is suspected, it is very important to seek medical help immediately. Meningitis caused by bacteria is treated as a medical emergency in order to prevent serious complications or death. It usually takes about 48 to 72 hours before results are available and often a case of suspected meningitis will be treated with antibiotics, until proven otherwise. It is essential that there is no delay in treatment of bacterial meningitis, as the risk for serious illness and death is very high. However, even with medical treatment, many suffer with long-term complications even after recovery. For these reasons, it is important to reduce any risk of bacterial meningitis by having the appropriate vaccines.

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The flu vaccine: Your questions answered

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Q: Why should one have the 'flu vaccine every year?

Annual vaccination against influenza is recommended for two reasons:

- Influenza viruses undergo constant changes in their characteristics. To ensure that the vaccine will be effective, the strains in the vaccine each year are based on those currently circulating.
- Influenza vaccines induce protection of a relatively short duration, especially in the elderly.

Q: Why do the strains in the 'flu vaccine change every year and how do they choose which strains to put in the vaccine?

The influenza virus is very intelligent and is able to change its genetic make-up in order to evade the human's immune system. Almost every year there are slight changes in two of the proteins on the surface of the virus, known as haemaglutinin (HA) and neuraminidase (NA). A surveillance system throughout the world monitors for these changes and identifies which strains are circulating. The strain composition of the vaccine is discussed at WHO headquarters twice a year, in February for the Northern hemisphere and September for the Southern hemisphere. The strains are selected to match as closely as possible those circulating in the population or what is predicted to circulate in the forthcoming winter, to ensure that the vaccine will have an optimal efficacy. The strains chosen for the Northern hemisphere vaccines and the Southern hemisphere vaccines often differ.

Q: When should the vaccine be given?

Everyone should be vaccinated as soon as the vaccine becomes available, but it is never too late in the season to administer the vaccine. Immunity renders protection around two weeks after vaccination and although the level and duration of protection may vary, it usually lasts for the duration of the influenza season.

Q: How is the 'flu vaccine made?

There are a number of different types of influenza vaccines but in South Africa we currently only have the trivalent inactivated vaccine. As the name suggests, it contains 3 different strains (two type As and one type B). The virus is grown in eggs and then extracted and inactivated. The important antigens (proteins) are then removed and made into the vaccine. A quadrivalent inactivated vaccine may also be available this year, which will have two type As and two type Bs.

Q: If someone gets respiratory symptoms during winter, does it mean that the 'flu vaccine that they had, failed?

Not necessarily. The 'flu vaccine will only protect against the strains of 'flu that are in the vaccine. A different strain might have been circulating, for which the vaccine has no protection. Another cause may be that the patient was already incubating the 'flu when he had the vaccine. The vaccine takes about two weeks to be effective and the incubation of 'flu is only about 1-4 days (with an average of two days). Respiratory symptoms are not only caused by influenza, but may be due to other viral infections or bacterial infections. The 'flu vaccine has no efficacy against these infections.

Q: Is the 'flu vaccine a live vaccine and can it cause 'flu?

The 'flu vaccines that are available in South Africa are made from killed viruses as described above. They therefore cannot cause 'flu

Q: What can a persistent cough in someone who had the 'flu vaccine, mean?

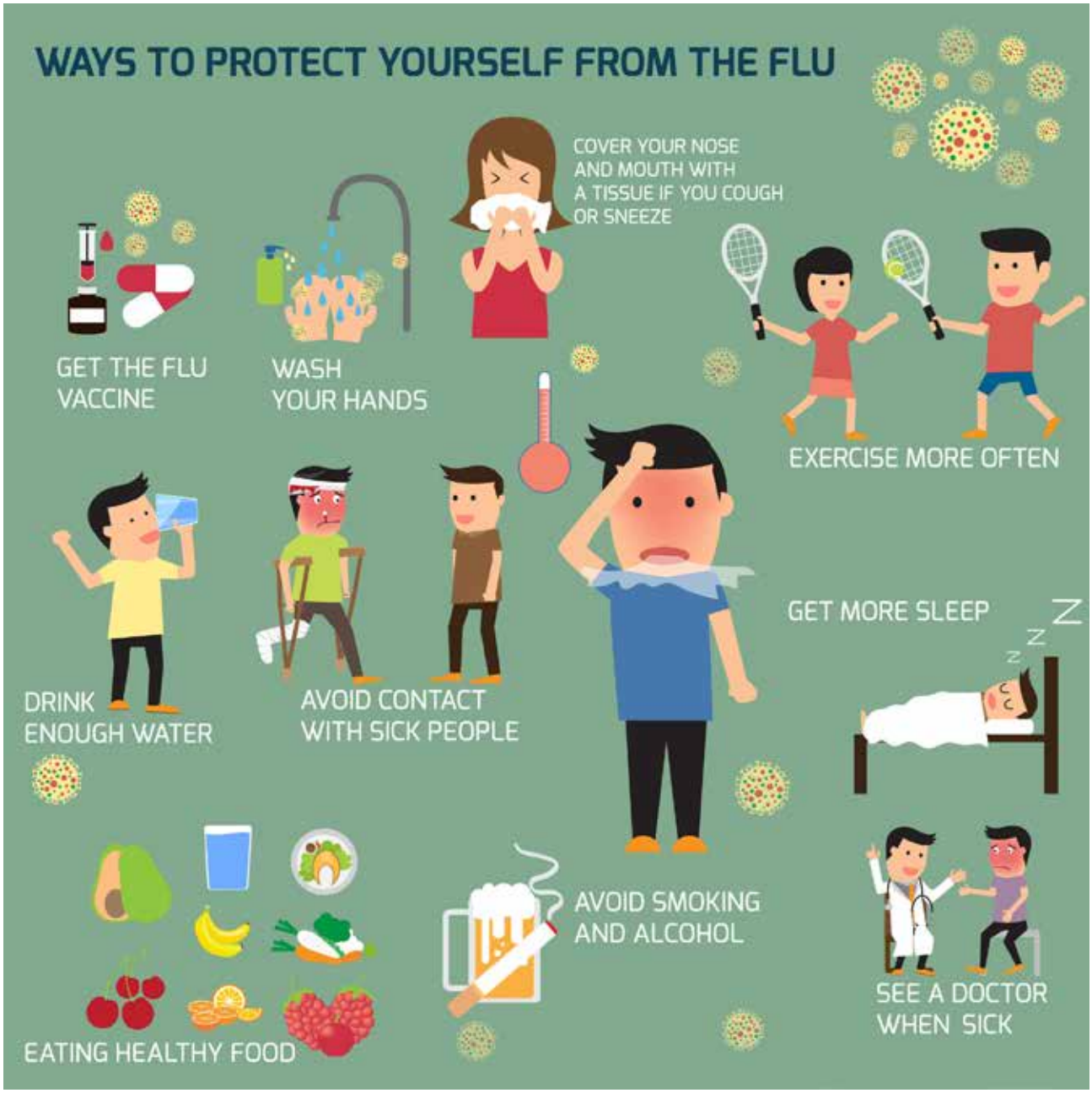
A persistent cough is not usually indicative of influenza, but it may be due to pertussis (whooping cough) infection, as this often presents in adults as a persistent cough that goes undiagnosed. It is advisable to be tested for pertussis if one has a persistent cough.

Q: Is it safe and advisable for a pregnant woman to have a 'flu vaccine?

The Strategic Advisory Group of Experts (SAGE) of the World Health Organization (WHO) has identified five priority groups who need to be vaccinated annually, and the highest priority group recommended by them is pregnant women, irrespective of the stage of pregnancy. The 2018 South African influenza guidelines also reflect this.This is because influenza has a significantly higher rate of hospitalisation as well as death in pregnant women, including otherwise healthy pregnant women. In addition there is a very valuable advantage in offering protection via passive transfer of immunity to the infant before it is eligible to receive the first dose of influenza vaccine at six months.

Q: Can children have the 'flu vaccine and from what age?

Yes, children from six months of age should get the 'flu vaccine. However, some products are only indicated



for older age groups. From six to 36 months, the dose is half that of an adult. From six months to nine years, the child will need two doses four weeks apart, if it is the first year that they are receiving the 'flu vaccine.

Q: Are all H1N1 strains the same?

No, not at all. There are three types of Influenza viruses and they are classified based on their antigenicity (the protein components of the virus which elicit an immune response following infection or vaccination). These are types A, B and C. (Type C causes minor respiratory infections and we don't bother making a vaccine against it.) The most important of the types is type A, which is also widely distributed in birds (its main reservoir) and animals and is also the cause of the occasional pandemics of influenza.

Type A is subdivided into subtypes based on the antigenicity of the outermost proteins of the virus – hemagglutinin (H) and neuraminidase (N). To date 18 different H's and 11 different N's have been identified – but only three different combinations of H and N are normally found in humans – H1N1, H2N2 and H3N2.

When there is a shift in the genetics of these subtypes, you get a different strain of the subtype. The following are examples of different strains of subtype H1N1:

- A/New Caledonia/20/99(H1N1)
- A/Brisbane/59/2007 (H1N1)
- A/California/7/2009 (H1N1) pdm09

Q: What is the composition of our 'flu vaccine this year?

Our trivalent vaccines will contain:

- an A/Michigan/45/2015 (H1N1) pdm09-like strain
- an A/Switzerland/8060/2017 (H3N2)-like strain
- a B/Colorado/06/2017-like strain

A quadrivalent vaccine will have the same strains as above plus

- a B/Phuket/3073/2013-like strain

References available on request.

Meningococcal Disease (MD) is a devastating illness which can rapidly progress to death[1]

Make vaccination a priority.

Reference: 1. Thompson MJ, Ninis N, Perera R et al. Clinical recognition of meningococcal disease in children and adolescents. Lancet. 2006;367:397-403.

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