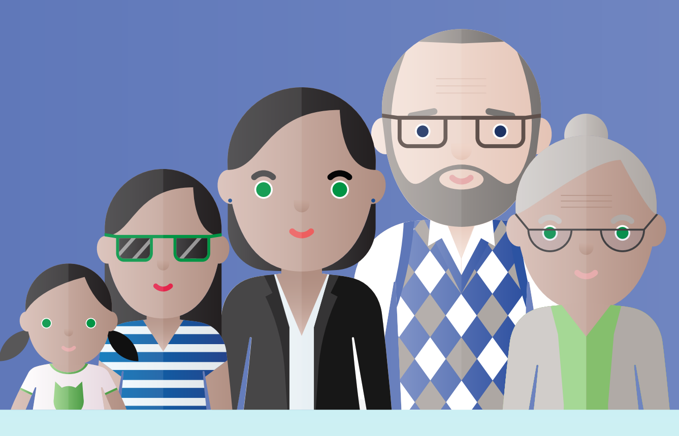
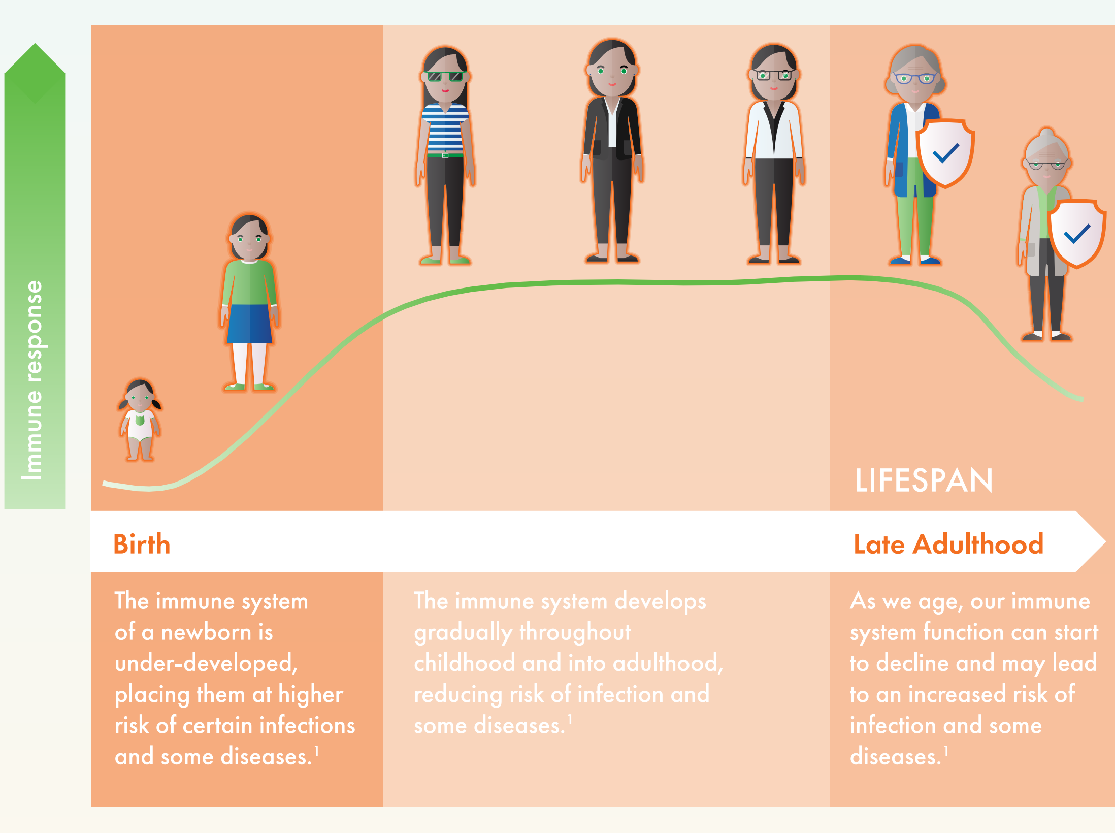
The immune system and healthy ageing



The human immune system changes across a person's lifetime. Weaker immune defences are often observed early on in life among babies and young children, and then again later in life among older adults.[1]

Figure 1: Changes in immune response across lifespan[1*]



The immune system of a newborn is under-developed, placing them at higher risk of certain infections and some diseases.[1]

The immune system develops gradually throughout childhood and into adulthood, reducing risk of infection and some diseases.[1]

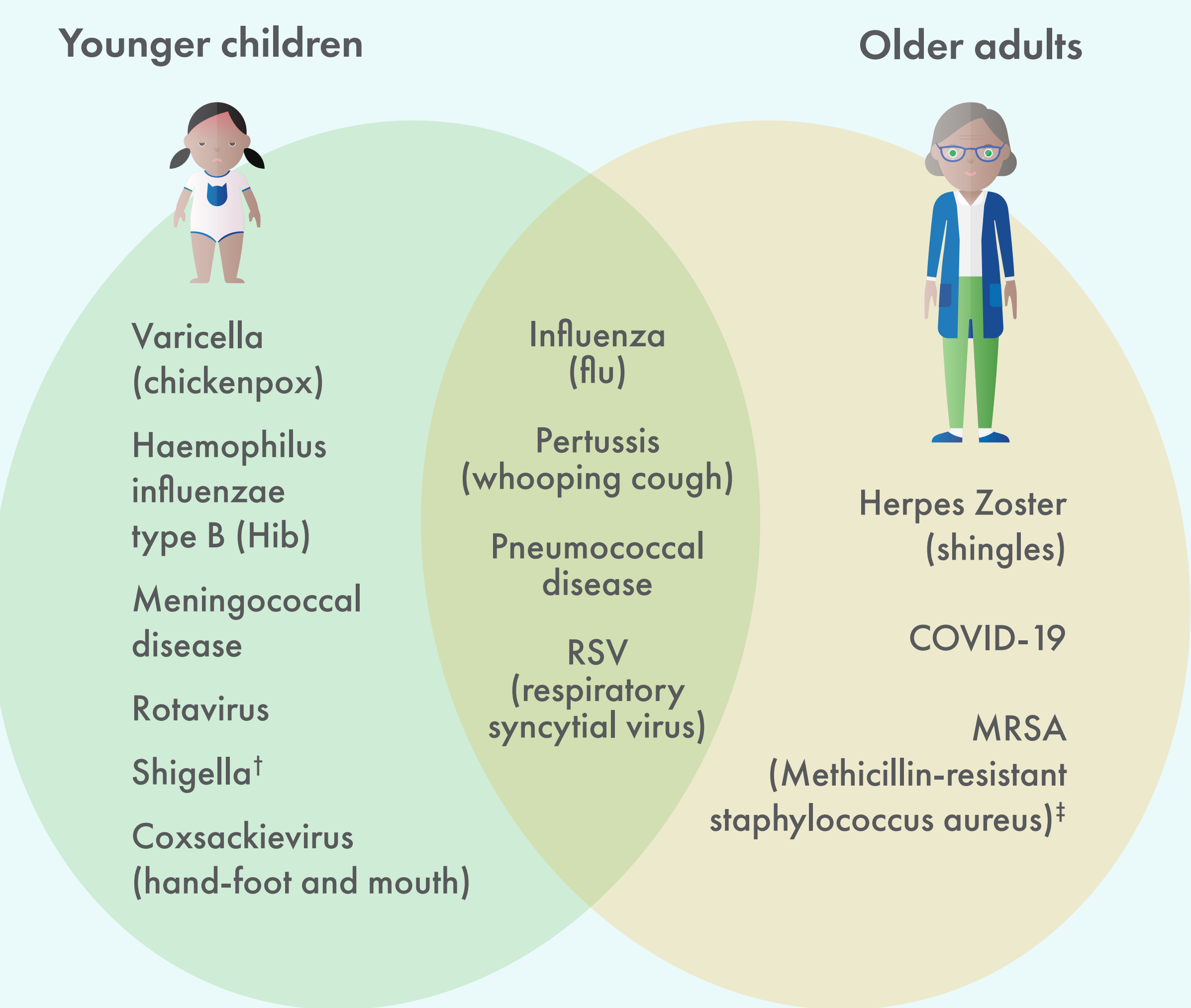
As we age, our immune system function can start to decline and may lead to an increased risk of infection and some diseases.[1]

Adapted from Simon AK *et al.* 2015.[1]

*Schematic representation of immune system function across lifespan, based on an example of immune response to flu. For illustrative purposes only.

Despite public health interventions, infectious diseases continue to pose a burden in Australia, particularly in the younger and older populations[2]

Figure 2: Some infections and diseases that may be of greater risk to younger children and older adults in Australia[3–15]



Younger children

- Varicella (chickenpox)
- Haemophilus influenzae type B (Hib)
- Meningococcal disease
- Rotavirus
- Shigella†
- Coxsackievirus (hand-foot and mouth)

Both

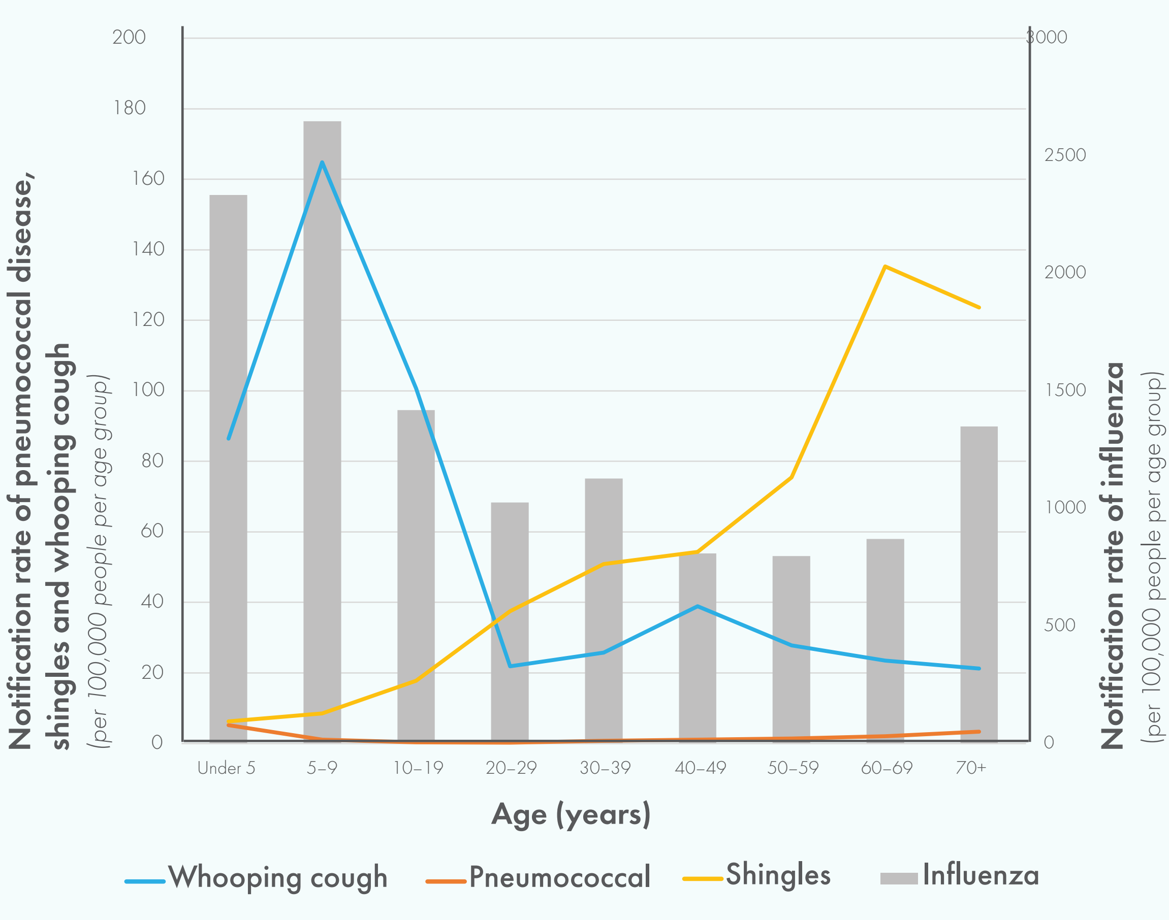
- Influenza (flu)
- Pertussis (whooping cough)
- Pneumococcal disease
- RSV (respiratory syncytial virus)

Older adults

- Herpes Zoster (shingles)
- COVID-19
- MRSA (Methicillin-resistant staphylococcus aureus)‡

†Common bacterial infection which causes diarrhoea in children less than 5 years.
‡Causes skin infections.

Figure 3: Notification rate† of influenza, pneumococcal disease, shingles, and whooping cough by age (Australia, 2019)[2,16]



Adapted from Australian Government Department of Health. National Notifiable Diseases Surveillance System (NNDSS). 2021.[2] and Australian Bureau of Statistics. 2021.[16] © Commonwealth of Australia

†Notification rate refers to the number of reported cases of a notifiable disease (one that must be reported to the Commonwealth's NNDSS) per 100,000 of the population. The above data has been age-adjusted to account for differences in the population size for each age group.

While infectious diseases can cause mild, short-term signs and symptoms, some can also lead to serious, long-term health complications[17]

Examples of mild symptoms and serious complications that can be caused by the flu:[18–22]

Mild symptoms

These signs and symptoms eventually resolve on their own and are usually a result of the body fighting to clear the infection.[18]

- Cough, sore throat
- Congestion
- Fever, chills
- Muscle aches
- Headaches
- Fatigue, weakness

Serious complications§

Individuals with weaker immune systems—such as the very young, older adults, pregnant women, and those with certain medical conditions—are at greater risk of these rare, but serious complications.[18]

- Pneumonia
- Neurological complications
- Heart complications
- Death

§Influenza may also worsen some existing medical conditions such as asthma or heart conditions.[18]

Taking steps to help strengthen and maintain a healthy immune system throughout life may help to reduce the risk of serious infections and promote healthy ageing over the long term[23–29]

Some examples of healthy behaviours that may help promote a healthy immune system:

- Eat a balanced diet
- Get adequate sleep
- Stay active
- Manage stress
- Regular health checks including keeping up to date with immunisations
- Quit smoking and reduce alcohol intake

Protect tomorrow's moments today.

Talk to your doctor about ways to help maintain a healthy immune system and embrace healthy ageing.

1. Simon AK *et al. Proc R Soc B* 2015;282:20143085. **2.** Australian Government Department of Health. National Notifiable Diseases Surveillance System (May 2021). Notifications of a selected disease by age group, sex and year. Available at http://www9.health.gov.au/cda/source/rpt_5_sel.cfmz (accessed 7 May 2021). **3.** Australian Government Department of Health. Australian Immunisation Handbook. Haemophilus influenzae type b (Hib) (September 2019). Available at https://immunisationhandbook.health.gov.au/vaccine-preventable-diseases/haemophilus-influenzae-type-b-hib (accessed 19 May 2021). **4.** Australian Government Department of Health. Australian Immunisation Handbook. Meningococcal disease (September 2019). Available at https://immunisationhandbook.health.gov.au/vaccine-preventable-diseases/meningococcal-disease (accessed 19 May 2021). **5.** Australian Government Department of Health. Australian Immunisation Handbook. Varicella (chickenpox) (April 2019). 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