IMMUNOSENESCENCE AND INFLUENZA

It is well established that older adults are at a greater risk of severe influenza, with hospitalisations, ICU usage and mortality increasing with age.[1]

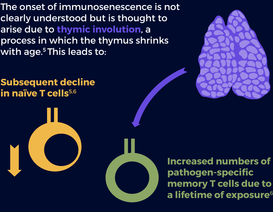
This increased susceptibility may be due in part to immunosenescence.[1]

WHAT IS IMMUNOSENESCENCE?

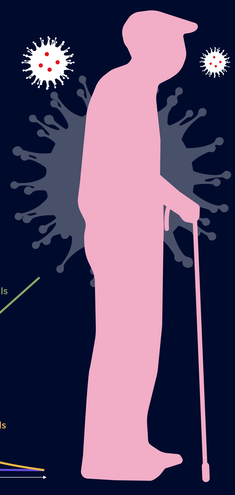
Immunosenescence is the age-related decline in ability to mount novel immune responses.[2,3]

Hallmarks of immunosenescence include defects in innate immunity (dendritic cells, macrophages and NK cells) and adaptive immunity (T cells and B cells)[4]

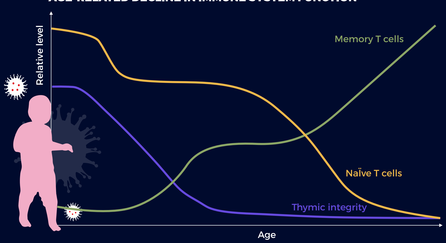
The onset of immunosenescence is not clearly understood but is thought to arise due to **thymic involution**, a process in which the thymus shrinks with age.[5] This leads to:



These contribute to the waning of immune responses to new pathogens (such as a new influenza virus) with age

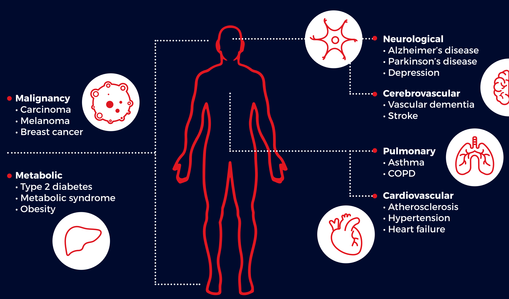


AGE-RELATED DECLINE IN IMMUNE SYSTEM FUNCTION[5-7]



In addition to immunosenescence, several chronic conditions are associated with age, and the likelihood of manifesting several of these comorbidities increases as we age.[8-11]

Age-related chronic conditions include:[8-11]



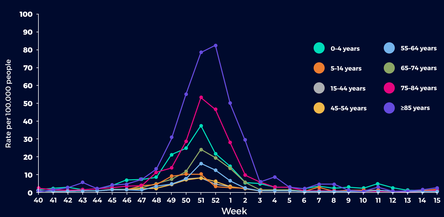
WHAT DOES IMMUNOSENESCENCE MEAN FOR INFLUENZA INFECTION?

The immune decline observed in immunosenescence predisposes individuals to more frequent and severe infections, as well as increasing the risk of complications.[5,12]

HOSPITALISATIONS

In the case of influenza, the peak rate of hospitalisation was greatest in adults aged 75–84 and ≥85 years in the 2022/23 season.[13]

RATE OF INFLUENZA HOSPITAL ADMISSIONS BY AGE GROUP, 2022/23[†13]

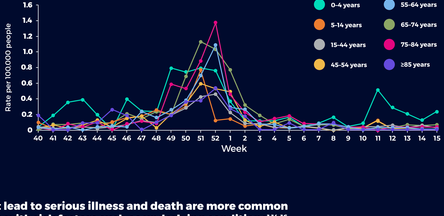


ICU ADMISSIONS

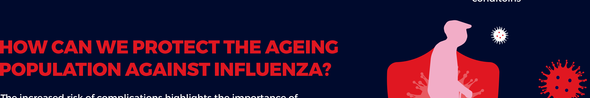
Similarly, peak ICU or HDU admissions were also generally higher in older adults, with highest rates observed in people aged 75–84, 65–74 and 55–64 years in the 2022/23 season.[13]

Trends were marginally higher in 2022/23 than previous seasons for both hospitalisations and ICU/HDU admissions.[13]

RATE OF INFLUENZA ICU/HDU ADMISSIONS BY AGE GROUP 2022/23[†13]



Complications of influenza that lead to serious illness and death are more common beyond middle age and in those with risk factors such as underlying conditions[†14-16]



HOW CAN WE PROTECT THE AGEING POPULATION AGAINST INFLUENZA?

The increased risk of complications highlights the importance of vaccinating older adults against influenza. Influenza vaccines help to prevent transmission and hospitalisations across all age groups.[16,17]

The JCVI recommends the use of enhanced vaccines in older adults aged ≥65 years, for their favourable immunogenicity, efficacy and effectiveness compared with standard vaccines in this age group.[17]

Immunosenescence in the older population leads to increased susceptibility to infection and severity of disease, often leading to hospitalisations, complications and death.[5,12] Vaccination of older adults aged ≥65 years is important to help prevent severe disease and alleviate the burden of influenza on individuals and healthcare systems.

†Based on SARI Watch sentinel surveillance in England during the 2022/23 season.
COPD, chronic obstructive pulmonary disease; HDU, high-dependency unit; ICU, intensive care unit; JCVI, Joint Committee on Vaccination and Immunisation; NK, natural killer.

1. Langer J, et al. *Adv Ther*. 2023;40:1601-27. 2. Targonski PV, et al. *Vaccine*. 2007;25:3066-9. 3. Lee KA, et al. *Front Aging*. 2022;3:900028. 4. Santoro A, et al. *Ageing Res Rev*. 2021;71:101422. 5. Palmer S, et al. *Proc Natl Acad Sci U S A*. 2018;115(8):1883-8. 6. Jones E, et al. *J Theor Biol*. 2021;510:110475. 7. Abedin S, et al. *Exp Gerontol*. 2005;40:537-48. 8. Barbé-Tuana F, et al. *Semin Immunopathol*. 2020;42(5):545-557. 9. Li T, et al. *Cell Death Dis*. 2020;11(10):932. 10. Cho W-K, et al. *Yonsei Med J*. 2019;60(5):407-415. 11. Soma T, Nagata M. Biomolecules 2022;12(10):1546. 12. Dugan HL, et al. *Cell Immunol*. 2020;348:103998. 13. UKHSA. Surveillance of influenza and other seasonal respiratory viruses in the UK, winter 2022 to 2023. Available at: https://www.gov.uk/government/statistics/annual-flu-reports/surveillance-of-influenza-and-other-seasonal-respiratory-viruses-in-the-uk-winter-2022-to-2023#emerging-respiratory-viruses. Accessed December 2023. 14. Frasca D, Blomberg BB. *Curr Opin Immunol*. 2014;29:112-8. 15. Kim DK, et al. *Influenza Other Respir Viruses*. 2022;16(4):632-4. 16. UKHSA. Influenza: the green book, chapter 19. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1107978/Influenza-green-book-chapter19-16September22.pdf. Accessed December 2023. 17. JCVI. Advice on influenza vaccines for 2023/24. Available at: https://www.gov.uk/government/groups/joint-committee-on-vaccination-and-immunisation#influenza-vaccines-jcvi-advice. Accessed December 2023.

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