# A Year in Infection Prevention; The High-Risk Immunocompromised Host (ASID HICSIG)

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# Disclosures


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# *Who is the high-risk immunocompromised host?*

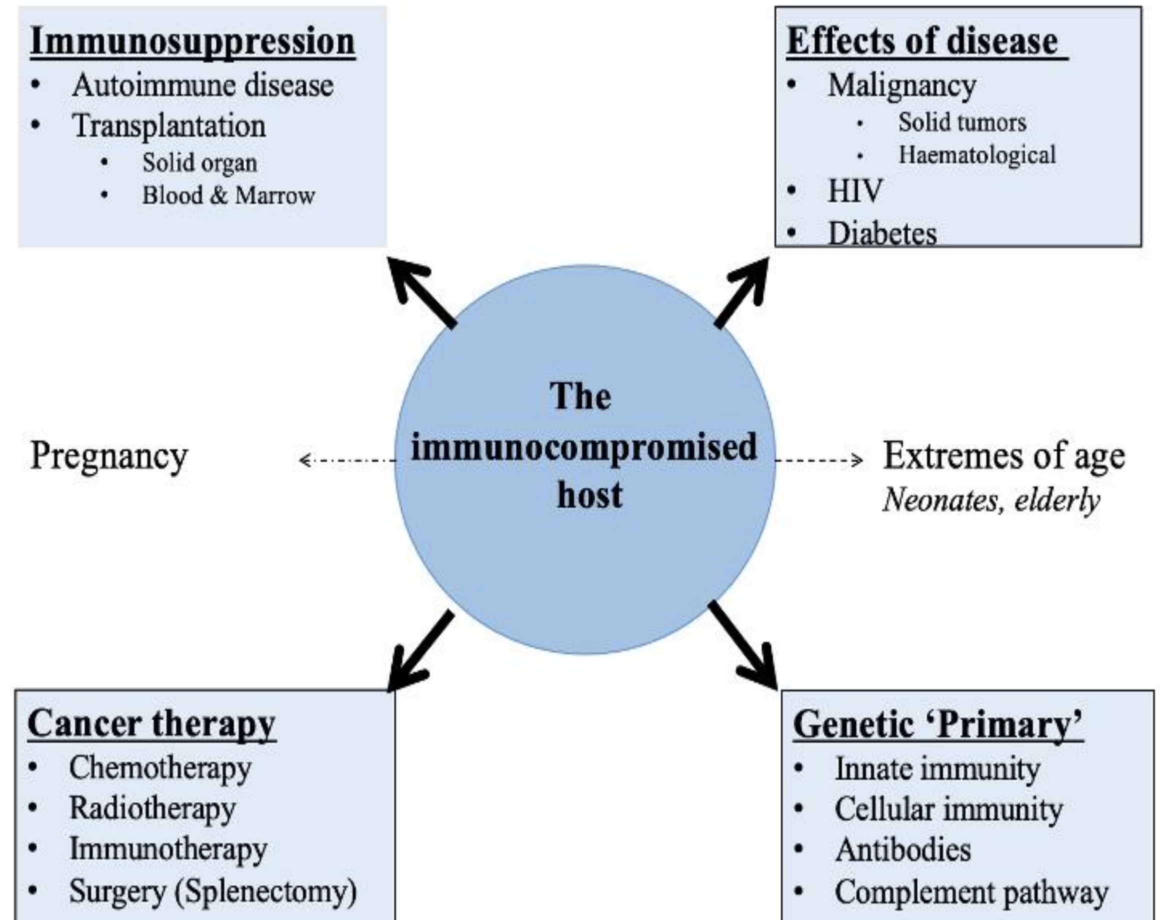
# The high-risk immunocompromised host

- **Impaired** innate/adaptive **immunity →** risk **OI + HAIs → morbidity, mortality, healthcare expenditure**

- The Australasian high-risk **ICH** pop **(cancer/transplant)** = expanding, vulnerable

- Improved **Dx capacity,** transplant **opportunity**, **survivorship,** broader use novel **immune suppressants**

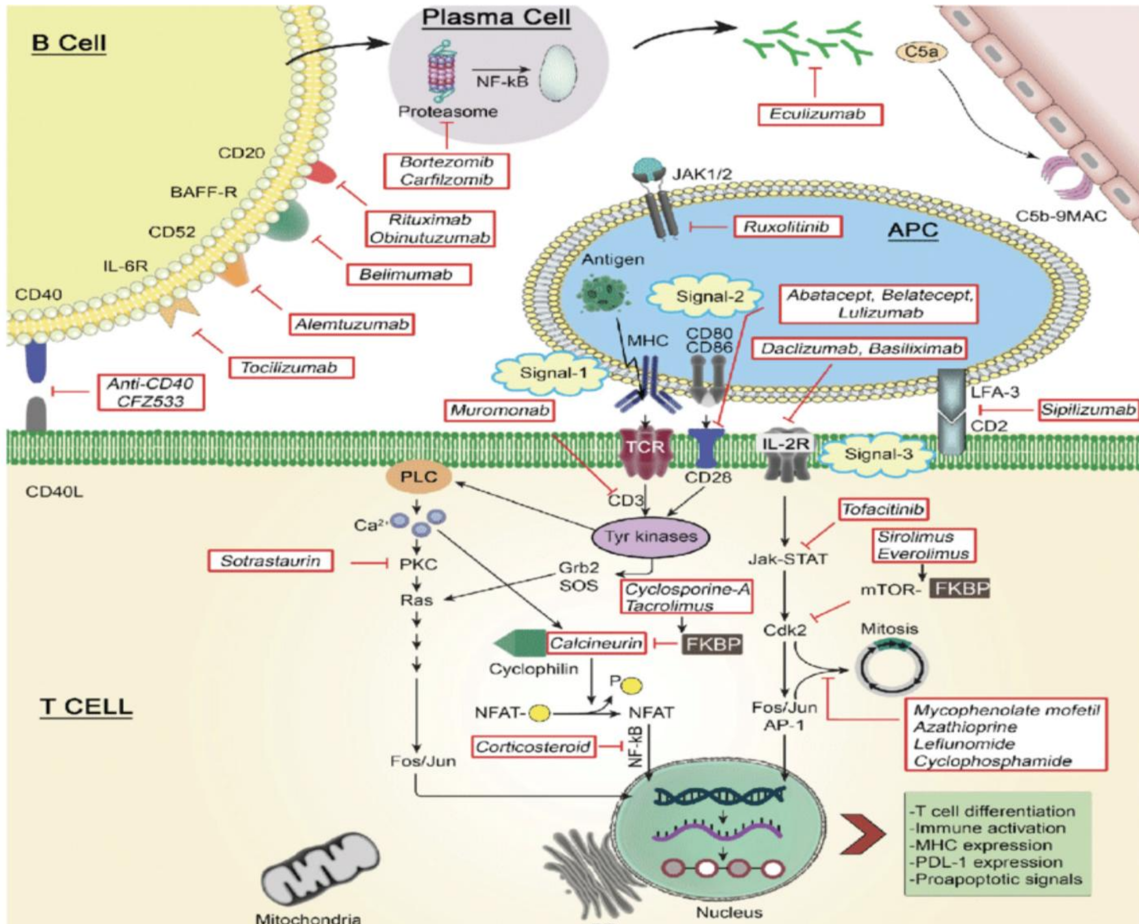
= **Infectious risks** evolve/ **amplify**



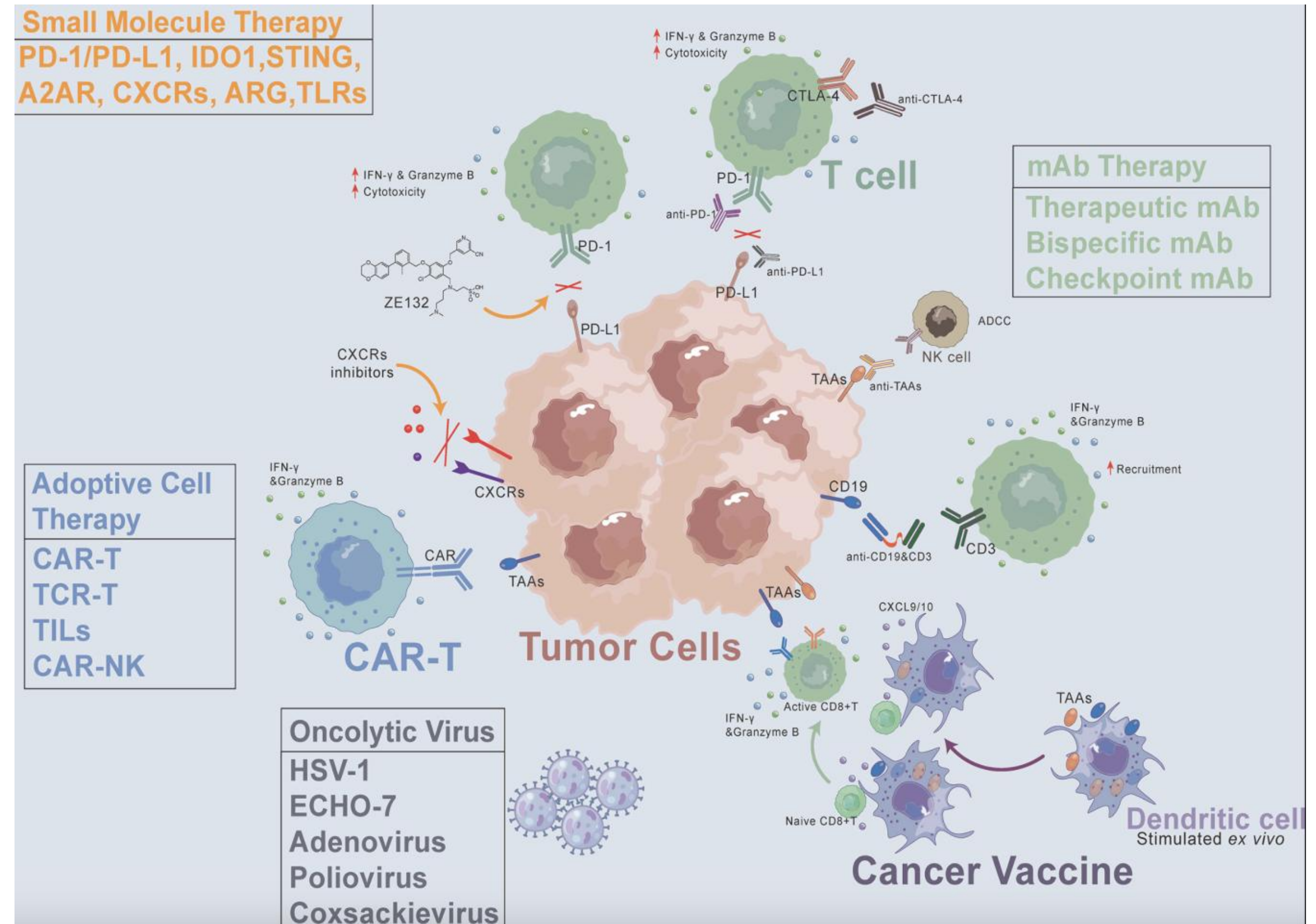

*Garg P, Gilroy N. Infection Prevention in the Immunocompromised and Oncology Setting. Shaban, R. Z et al. (Eds.) (2024). Healthcare-associated infections in Australia: Principles and Practice of Infection Prevention and Control. (1st ed.) Elsevier. Diagram – N Gilroy.*

# Immunosuppressive revolution

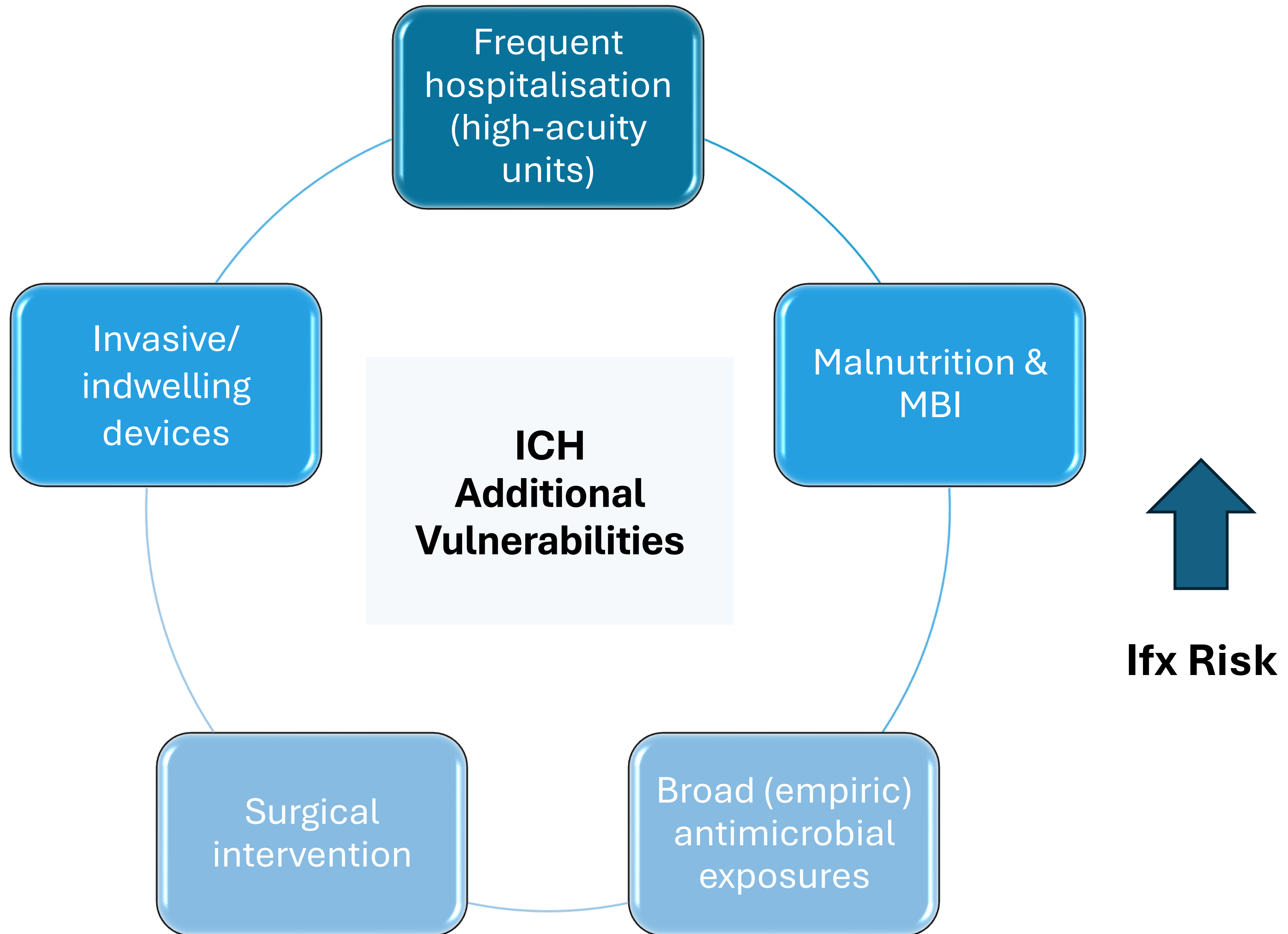
**Novel immune suppressive therapies;** T/B/APC signalling
**Transformed cancer, transplant landscape → ++ infectious opportunists**




Parlakpinar H et al. Transplantation and immunosuppression: a review of novel transplant-related immunosuppressant drugs. Immunopharmacol Immunotoxicol. 2021 Dec;43(6):651-665. doi: 10.1080/08923973.2021.1966033. Epub 2021 Aug 20. PMID: 34415233




Liu C et al. Clinical cancer immunotherapy: Current progress and prospects. Front Immunol. 2022 Oct 11;13:961805. doi: 10.3389/fimmu.2022.961805. PMID: 36304470.

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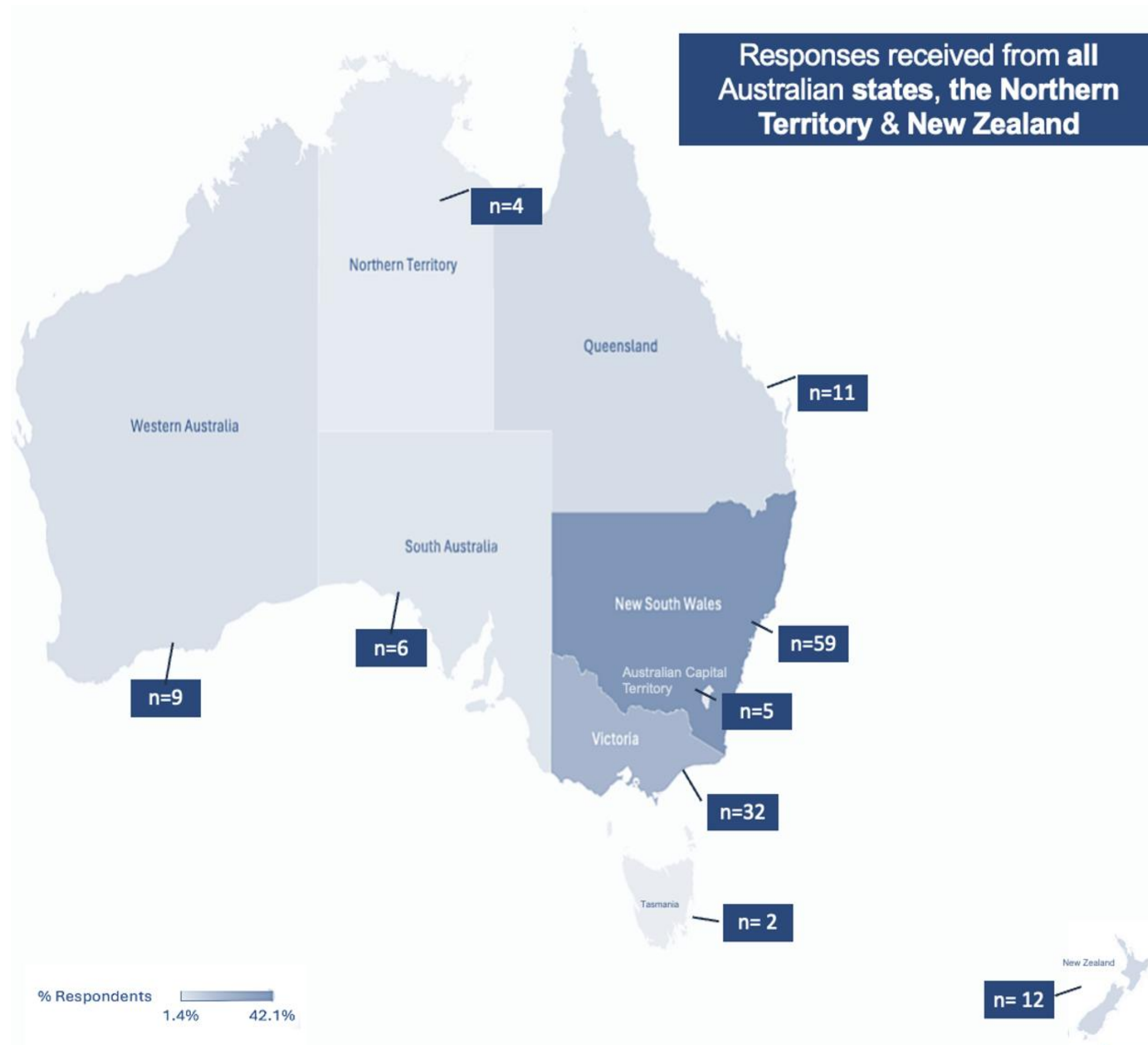
# IPC/Surveillance Practice in cancer & transplant - varied




- ***NCIC INTERACT Study*** *(Garg et al. AJIC 2025)*
- First survey **IPC/ surveillance in** care of **high-risk ICH** Australasia
- **140 HCW respondents**
- Variability – availability **ICH-ID services, IPC resourcing, PPE**, specialised rooms, MDRO, **surveillance** OIs/HAIs, **consumer** engagement

→ ***Standardisation – reduce risk/ benchmark***

# Dilemmas in Infection Prevention - ICH

**Vulnerable pop > broader range of pathogens/ risks**

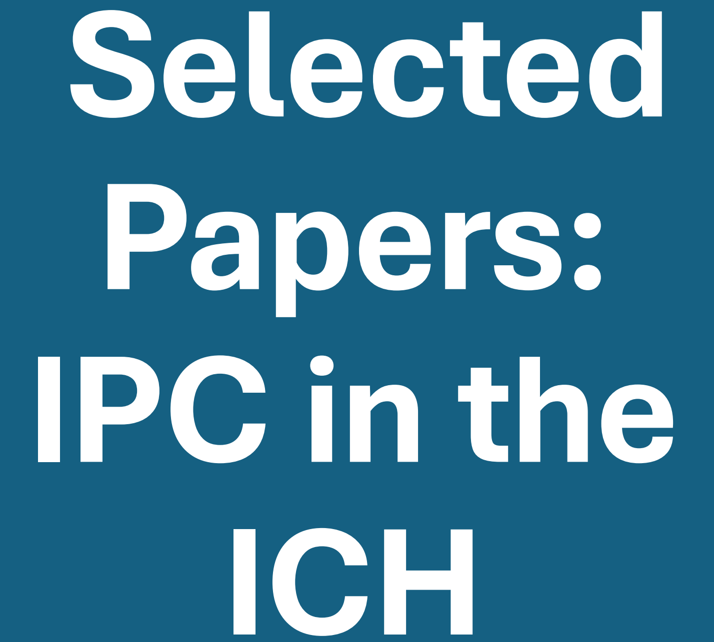
- **Expanding, ageing**
- **Dynamic IPC measures →**
  Dx, depth immunosuppression, timing Tx/ transplant

**Additional Need:**

- **Research equity –** excluded clinical trials
- **Next pandemic → *disproportionately impact*** *ICH* (COVID-19)

*Commission for Hospital Hygiene and Infection Prevention (KRINKO). Infection prevention requirements for the medical care of immunosuppressed patients: recommendations of the Commission for Hospital Hygiene and Infection Prevention (KRINKO) at the Robert Koch Institute. GMS Hyg Infect Control. 2022 Apr 13;17:Doc07. doi: 10.3205/dgkh000410.*

# How do we bridge the research gap?




*(No particular order, subjective)*

1

**_Does mask-wearing reduce the risk of respiratory viral infection for high-risk patients?_**

## Consistent FFP2-masking as part of reducing viral respiratory infections on medical wards for allogeneic hematopoietic stem cell transplantation

*Richardson et al. Holtick (2024) Nature Scientific Reports*

- **Allo-HSCT pts >susceptible to Ifx**
- RVIs = + complications (LRTI/ pulmonary GvHD/ secondary OI)
- **Routine mask-wearing uncommon** < COVID-19
- **Aim:** Compare incidence/ outcomes of **RVIs in adult allo-HSCT** 2018-2020 (pre) & 2020-2022 (post) FFP-2 mask eras
- **Methods:** Single centre, retrospective observational study (University of Cologne Hospital, Germany)

**Methods: 300 consecutive** patients transplant → engraftment

(150 pre/150 post) - **matched** age/sex/malignancy/stem-cell source

*Ward: pre/post restricted entry, clothes change*

*1 asymptomatic visitor/day. All single rooms (PPV capacity)*

Post – **FFP2 mandated** for staff, patients (group areas), visitors

**Results: 58% acute leukaemia**, median age 55

*Excluding RVIs Dx at admission:*

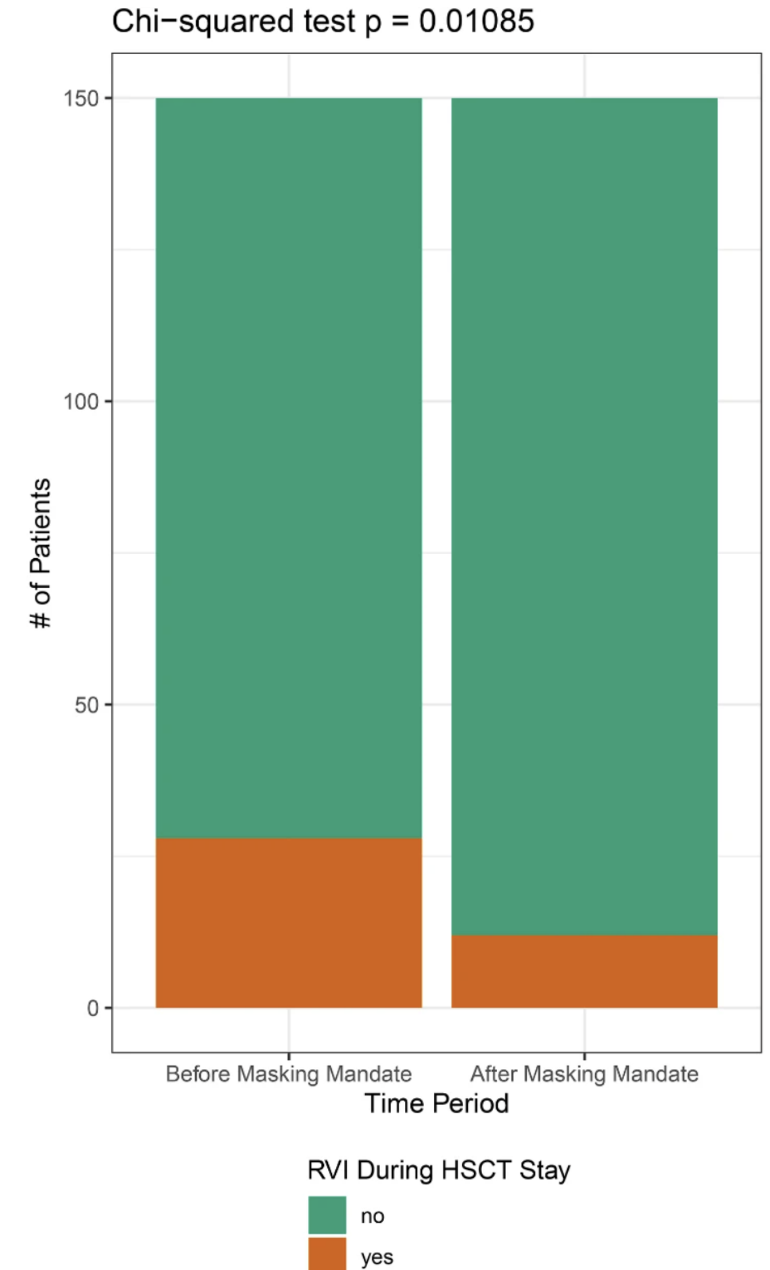
- 31 RVIs prior (multiple RVIs), 3 post (all rhinovirus)
- **RVI Incidence 20.7% → 2%**
- Median **duration stay post-transplant 26 → 23.5 days**

No difference 30-day overall/ hospital survival

- ~ large numbers
- **Well matched** population & seasons
- Lower RVIs → **less CT scans/ BALs**

*However*

- **Single site**
- **?Impact other measures** (hand hygiene/ social distancing), reduced **community RVIs**
- Difficult to interpret **outcome measures LoS/ crude mortality** in high-risk allo-HSCT
- \+ **well resourced IPC setting** baseline (?generalisability)
- **Acceptability/ tolerability/ fit** of FFP2 masking (?)



# Clinical Impact:

- **?Role** for year-round **masking** reduce transmission **RVIs high-risk wards (allo transplant)**
- Tolerability/ acceptability/cost FFP-2s **(N95s)**
- **?Surgical masking alternative**
- **Environment**

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## Does MRSA screening help rationalise empiric Vancomycin use in the ICH?

## Assessing the Predictive Value of Methicillin-Resistant *Staphylococcus aureus* Nares Colonization Among Transplant Recipients and Patients With Neutropenia

*Shaw et al. Albarillo (2024) Open Forum Infectious Disease*

- ICH pop **+ risk MDROs** (antimicrobial consumption, HCF exposure)
- Vancomycin – empiric management **neutropenic fever**

- **Aim:** Evaluate **role of MRSA nares screening ?antibiotic stewardship tool** in adult ICH population

- **Methods:** Multicentre retrospective cohort (VA hospitals, USA) Jan 2007- 2023
- HSCT, SOT, neutropenia

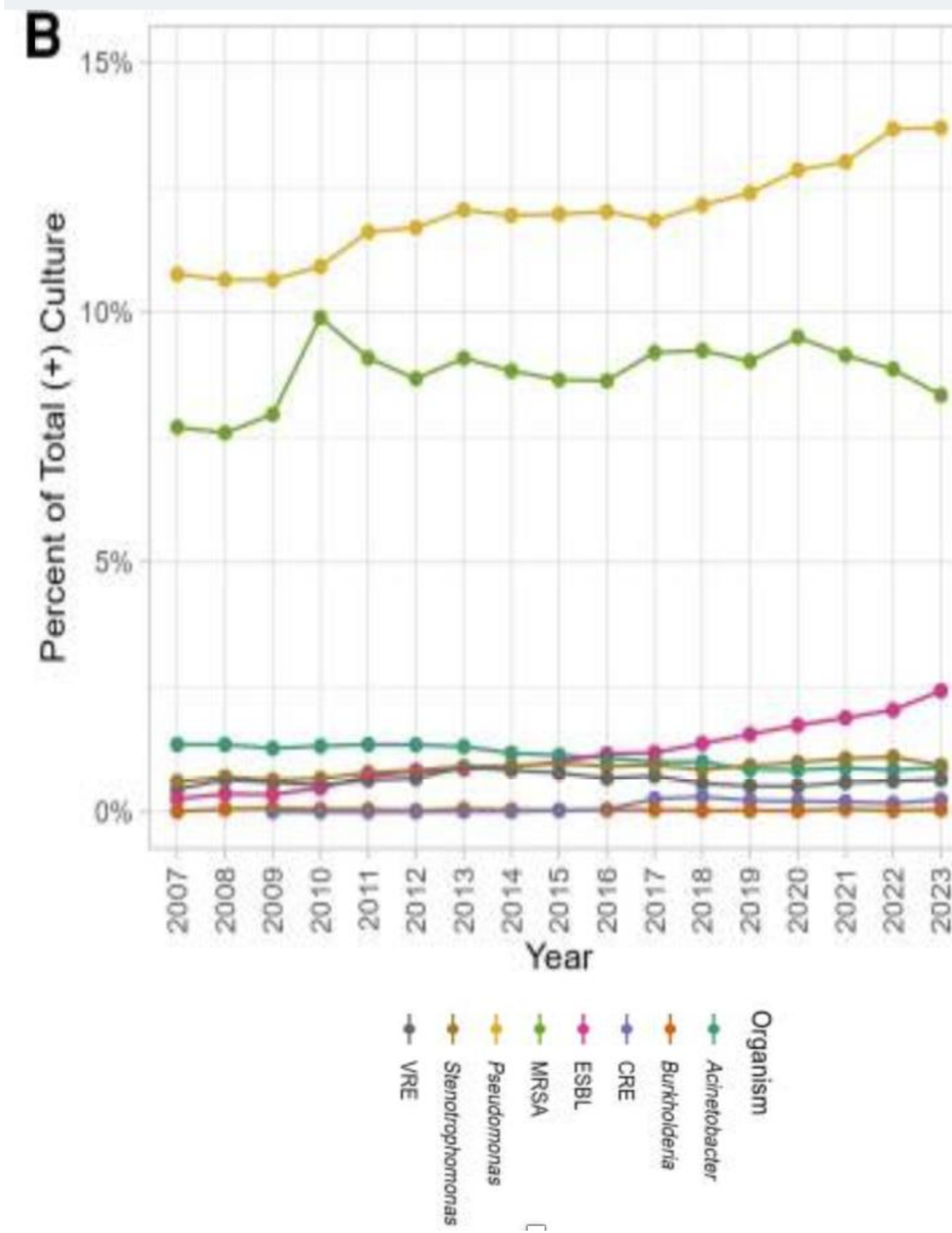
- MRSA colonisation – PCR/ culture
- **+ bacterial culture** within **28 days of MRSA screen** *(multiple anatomical sites)*

**Results:**

- **686,174 pts** screened, 95.5% male

  (Only 2149 neutropenic)

- 8.5% cohort = MRSA Ifx ***(23.1% + MRSA colonised*** *in 28 days prior)*
- **Test - NPV 95.8%** for **MRSA Ifx/28 days**
- **Neg** screen **= supports early rationalisation empiric Vancomycin** in ICH



- **Large cohort, multi-centre/16 years**
- **28 days** (most - 7 days)

*However*

- ++ **older**, **male veterans** ?representativeness
- **Only nares colonisation**
- **Retrospective - multiple tests/pt, swabbing frequency = ?**
- *MRSA Ifx = not clinically defined ?true Ifx*
- No **cost efficacy analysis/ impact early de-escalation →** pts/ prescribing

| Organism | Sensitivity, % | Specificity, % | PPV, % | NPV, % |
|---|---|---|---|---|
| MRSA | 66.6 | 81.6 | 27.8 | 95.8 |

# Clinical Impact:

- **? Role MRSA nares screening** as an **AMS adjunct**
- **High NPV =** ?support **early de-escalation** empiric MRSA coverage in ICH population **where screening <28 days is neg**
- **+ve screen doesn't** seem to **predict for Ifx**
- **Prospective** large-scale studies/**representative** ICH **pop**

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***Do airborne fungal levels correlate to patient rates of invasive mould infection?***

## Multiyear environmental surveillance in a pediatric teaching hospital: association between airborne mold spores and invasive mold infections

Published online by Cambridge University Press: **10 September 2025**

*Phillips et al. Sebert (2025) Infection Control & Hospital Epidemiology*

- **Airborne fungal sampling** performed **- construction/ outbreaks**
- **Utility** routine **airborne fungal sampling** unclear
- **Uncertain incubation** periods – ?categorise HAI

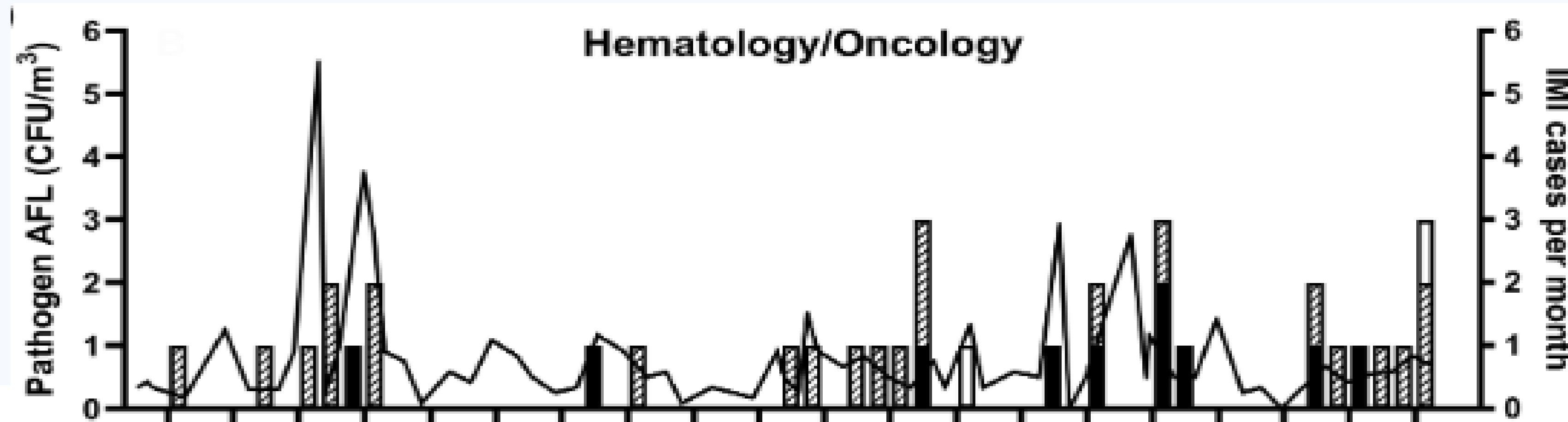
- **Aim:** Association **AFLs & monthly IMI rates**
- **Methods:** Retrospective single-centre study 490-bed tertiary care hospital Texas Nov 18-Oct 23 (*maintenance* June 19-Aug 20)
- Incl. 4 IP haem/onc wards with central HEPA filtration + 1 x PPV HSCT unit

**Methods: Monthly air sampling** – average AFL + fungal MC&S

- **IMI surveillance** (cases→ Hospital vs CO)

**Results:**

- Median total AFL - 2 CFU/$m^3$ *(threshold 0-4)* **no sig association: IMI rates/ facility**
- Monthly AFL values ~ marginally higher construction
- **Haem/onc – >1CFU/$m^3$** average monthly AFL = **1.48x IMI rate**
- ***Aspergillus* spp.** average monthly **AFL >1CFU/$m^3$** = **<u>15.9 x IMI rate</u>**

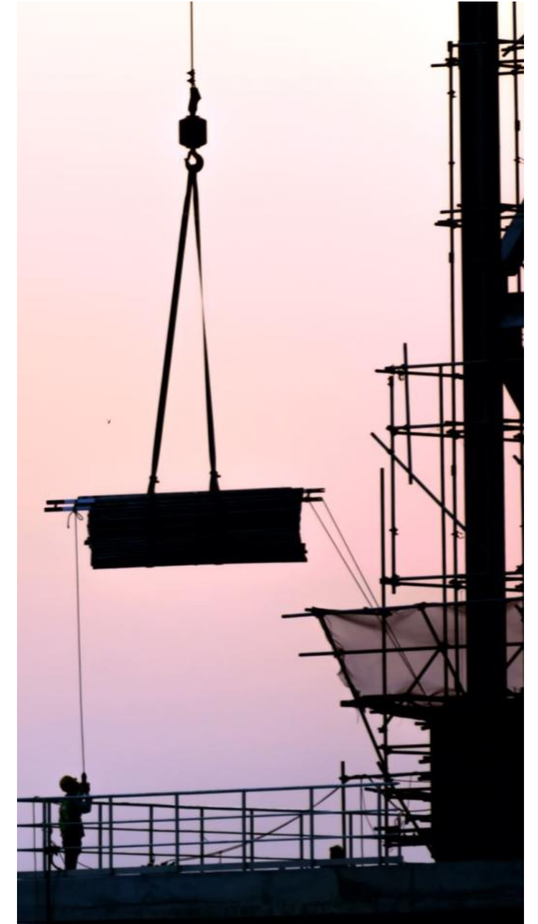



*Line = Pathogen AFL*
*Black bars = Cases of Pr/Pr IMI*

- Systematic process/ 5 yrs
- Sensitivity analysis limited→ **Pr/Pr IMI**

*However there remains a…*

- Lack of **established cut-offs for AFL sampling/** standardised methodology
- Rates of **IMIs unadjusted –*patient level* risks (?impact COVID-19 on fungal Dx)**
- ?True assessment of **construction** on **IMI –** units closed & barricaded

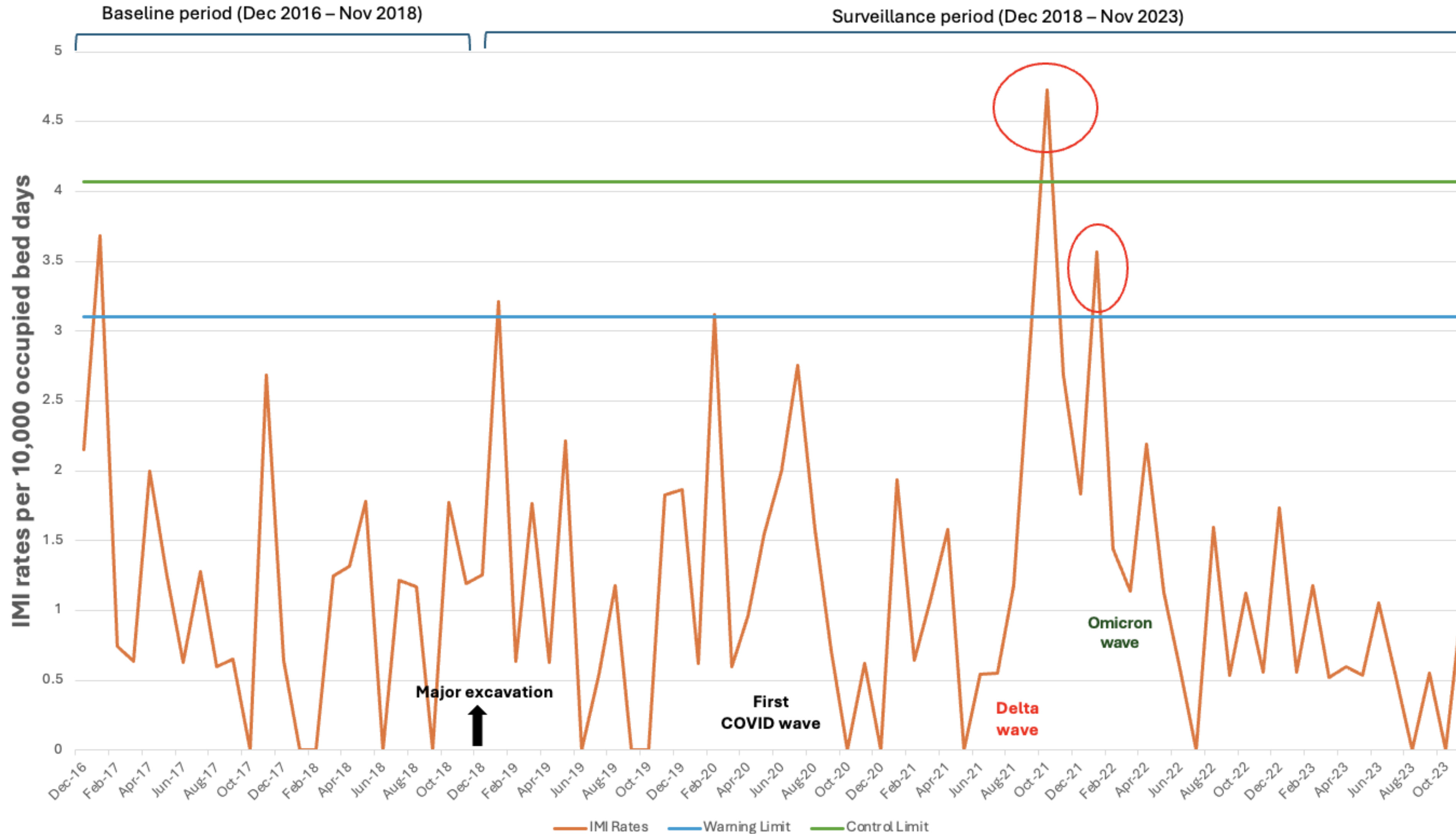


# Clinical Impact:

- **?Preliminary evidence** monitoring AFL & Pr/Pr IMI rates in **Haem/Onc setting**
- Further work **- standardised methodology** for routine **AFL surveillance, threshold values**
- Challenge classification: **HA-IMI vs CO-IMI**

# *Construction*→ IMI rates (Tertiary HCF VIC, Australia)

*Tio S Y et al. Worth (2025 pre-publication)*




Monthly **crude unadjusted rates IMI/ 10,000** occupied **bed days → also no** sig epi association **construction: IMI.**

Oct 21/Jan 22 + IMI rates → **83% COVID-19 - aspergillosis**

*No genomics; case clusters.*
*Did not ?role air sampling (AFP, IPC measures)*

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# Can we apply antimicrobial stewardship measures to antifungal prescribing?

# Assessing the appropriateness of antifungal prescribing: key results from the implementation of a novel audit tool in Australian hospitals

*Khanina A et al. Thursky (2025) Journal of Antimicrobial Chemotherapy*

- **IFIs → morbidity, financial burden (ICH)**
- **Rise AF resistance -** stewardship

- **Aim:** Utilise national antimicrobial prescribing survey (NAPs) to assess quality of systemic AF prescribing /Australian hospitals
- Optimise clinical outcomes, minimise selective pressure & A/Es

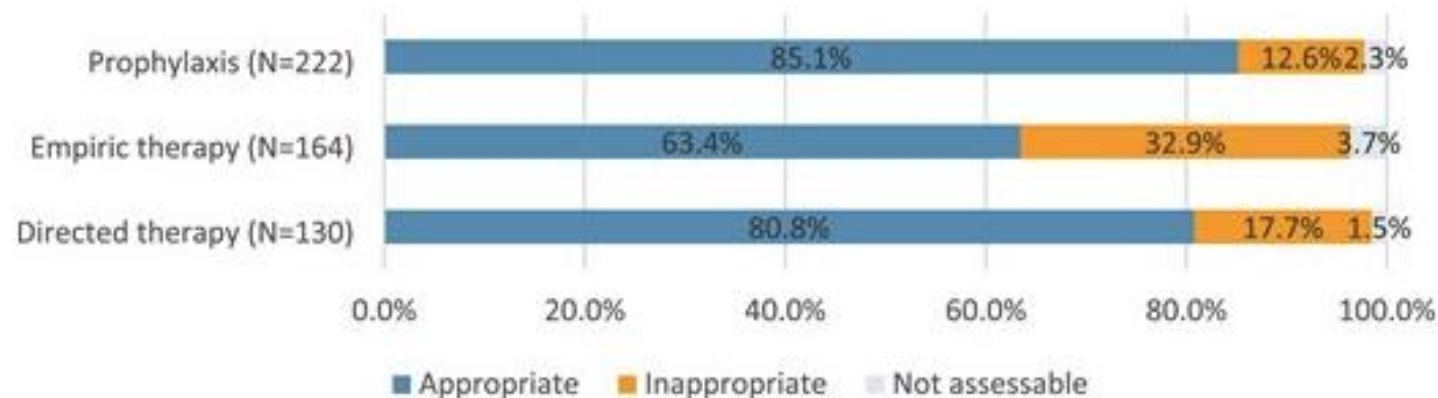
- **Methods:** Retrospective audit all antifungals *(drug/class)*
- **Data;** Oct 22 – June 23

**Results**

- 11 hospitals – 516 prescriptions/ 438 pts (49.5% HM)
- **Overall: 77.1% antifungal Px appropriate**

- **Fluconazole** most prescribed
- + causes inappropriate therapuetic Px Fluconazole – **no AF required (33.3%)**, incorrect **dose/freq** (28.6%), **duration** (18.1%).

**Appropriateness higher** – AF approved via local **AMS process** (88.8%)




Overall appropriateness/course type

- **First audit - evaluate quality of AF Px nationally**
- **International Delphi** → dedicated audit tool
- Fluconazole → QI area (Fluconazole R *Candida* spp.)

*However*

- Metropolitan, public hospital data, ~small no.s (voluntary)
- Complexities benchmarking; absence of guidelines

**Ongoing work establish universally accepted definitions** appropriateness → **enhance international comparison**

# Clinical Impact:

- First-look at **national AF prescribing trends**
- **Embeds AFS** key part of **AMS (ICH) & IPC strategy**
- Helps address ***drivers*** **MDR** (fungal) **organisms**

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## *How can we better support ICH patients/carers in IPC?*

# Patient perspectives on infection prevention and control in cancer care: a survey of knowledge and attitudes among persons with cancer and their next of kin

*Danielson A S et al. Bjørnholt JV (2024) J Hosp Infection*

- **Strengthen IPC** measures in **cancer care**
- Patient perspectives → IPC strategy

- **Methods:** Survey 13 knowledge statements, 40 attitude items Likert scale

→ Norwegian Cancer Society user panel (incl. NOK) Aug – Sept 23

**Results:**

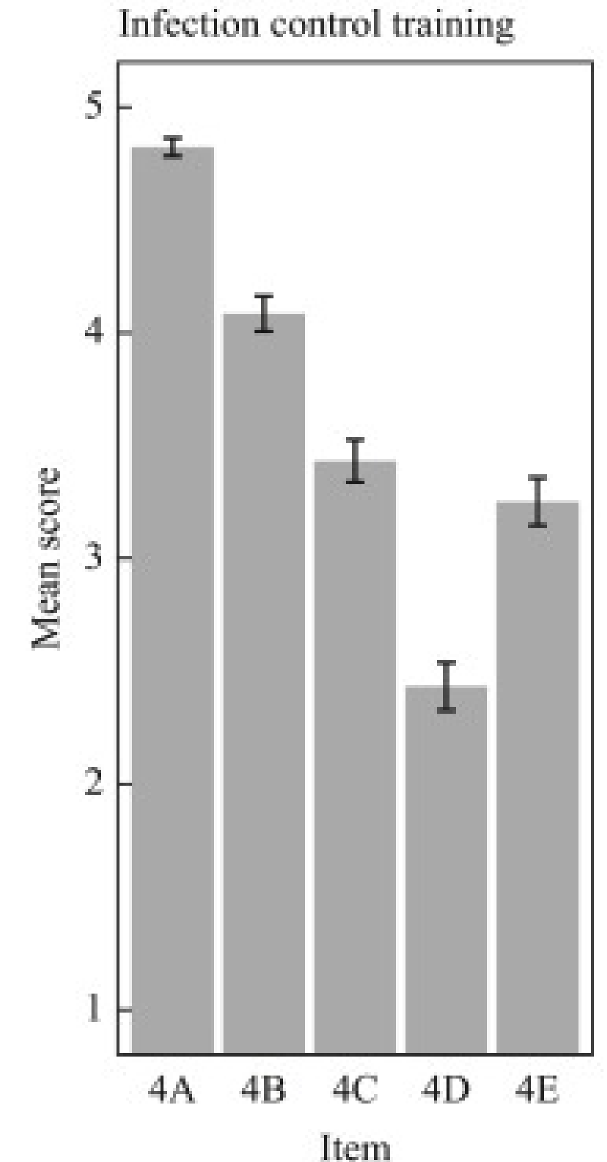
- **551 respondents** (40% response rate), 78% pts, median 59 years

**79.5% mean correct answers -** knowledge statements;

- 99% - Importance ***hand hygiene***
- **41%** hand hygiene - ***prevention Abx resistance***
- Almost half – *unaware that body fluids carry Ifx agents*

Agreement - Attitude statements:

- **52.1% = comfortable reminding caregivers to use hand sanitiser/ PPE**
- **56.4% = I know enough about preventing Ifx**
- **97.6% = Pts susceptible to Ifx should receive education on IPC**



# Clinical Impact:

- **High-level agreement - support IPC strengthening patient-centred** cancer care
- Establishes clear **knowledge gaps**
- Need for ongoing **consumer empowerment – optimising IPC standards**

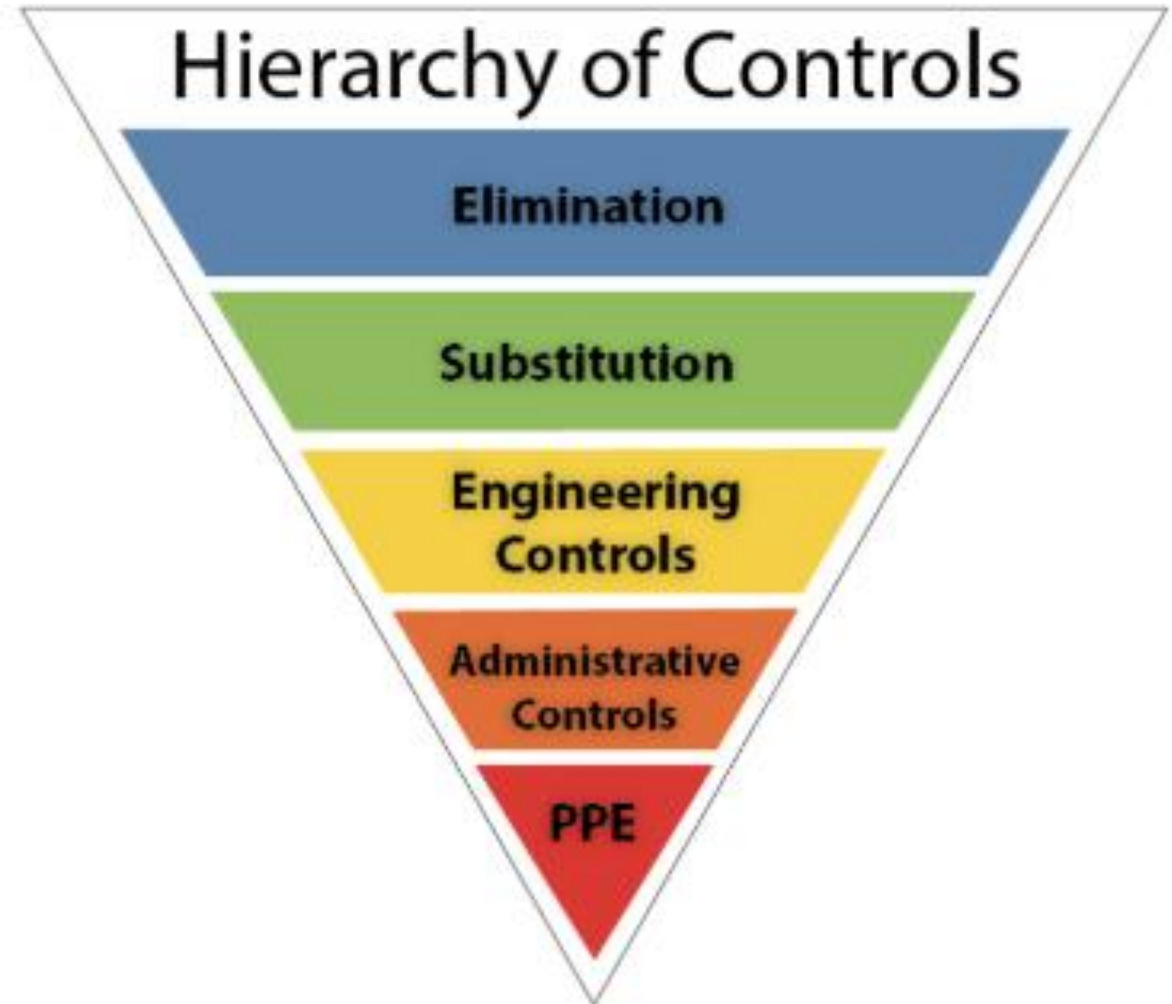
# Reframe: Hierarchy of Controls - ICH

**Basic Principles:**

- Hand hygiene, **PPE**
- Cleaning
- Vaccination
- Isolation/ Engineering controls
- **MDROs**, Surveillance
- Outbreak investigation

**Additional Controls:**

- **Stewardship – AMx**/ Diagnostic
- Prophylaxis
- **Tools ?air sampling**
- Digital/ AI monitoring platforms
- **Consumer & carer engagement**




https://www.cdc.gov/niosh/hierarchy-of-controls/about/index.html

# Acknowledgements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