



***Candida auris:* Recognition, Resistance, and Epidemiological Challenges**

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Disclosure

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Learning Objectives:



At the completion of this activity, the participant will be able to:

- Recognize clinical and health care exposure patterns that should raise suspicion for *C. auris* colonization, infection, or transmission risk in medically complex patients.
- Explain how major antifungal resistance mechanisms in *C. auris*, affect treatment strategy.

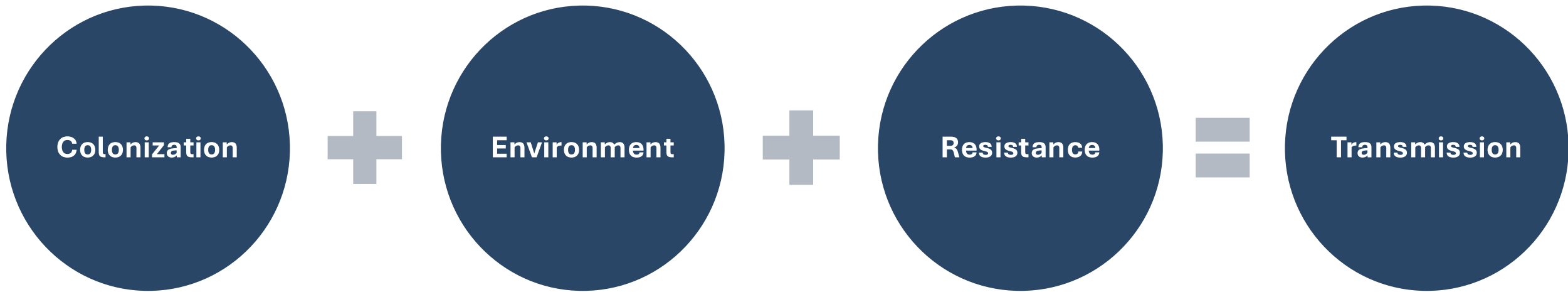
Why are we still paying attention to *C. auris*?



- Increasing health care transmission
- Limited antifungal treatment options
- Causes invasive, life-threatening infection
- Emerging antifungal resistance
- Increasing national burden

***C. auris* is not just an emerging pathogen — it is an increasingly consequential one.**

***C. auris* succeeds when 3 things overlap**



Colonization + Environment + Resistance = Sustained Transmission



Audience Poll

How many here today have:

Managed at least one
case of *C. auris*

Discovered *C. auris*
history during patient
transfer

Worried more about
spread than
treatment

***C. auris* is often recognized after it has already become clinically and epidemiologically important.**



***C. auris* risk factors and colonization**

Risk factors for acquisition



Health care exposure	Antimicrobial use	Patient factors	Environmental factors
• Long hospital stays • Invasive devices • Open wounds • Health care in areas of advanced spread or endemicity	• Empiric antimicrobial use without de-escalation • Prolonged or frequent antimicrobial use	• Severe or critical illness • Immunocompromised • Chronic conditions • Age extremes	• Colonization pressure • Inadequate infection control practices • Contaminated environment and/ or equipment • Colonization

While individual risk factors (devices, antimicrobials, co-morbidities) remain critical, **geography and facility prevalence magnify those risks.**

Colonization



Skin colonization

Major source of spread

Persistence

Can be prolonged,
even after treatment

Biofilm support

Helps survival

Host interaction

May support continued
carriage

The skin is not just a surface. It is a reservoir.



Audience Poll

When should *C. auris* trigger concern?

Single case

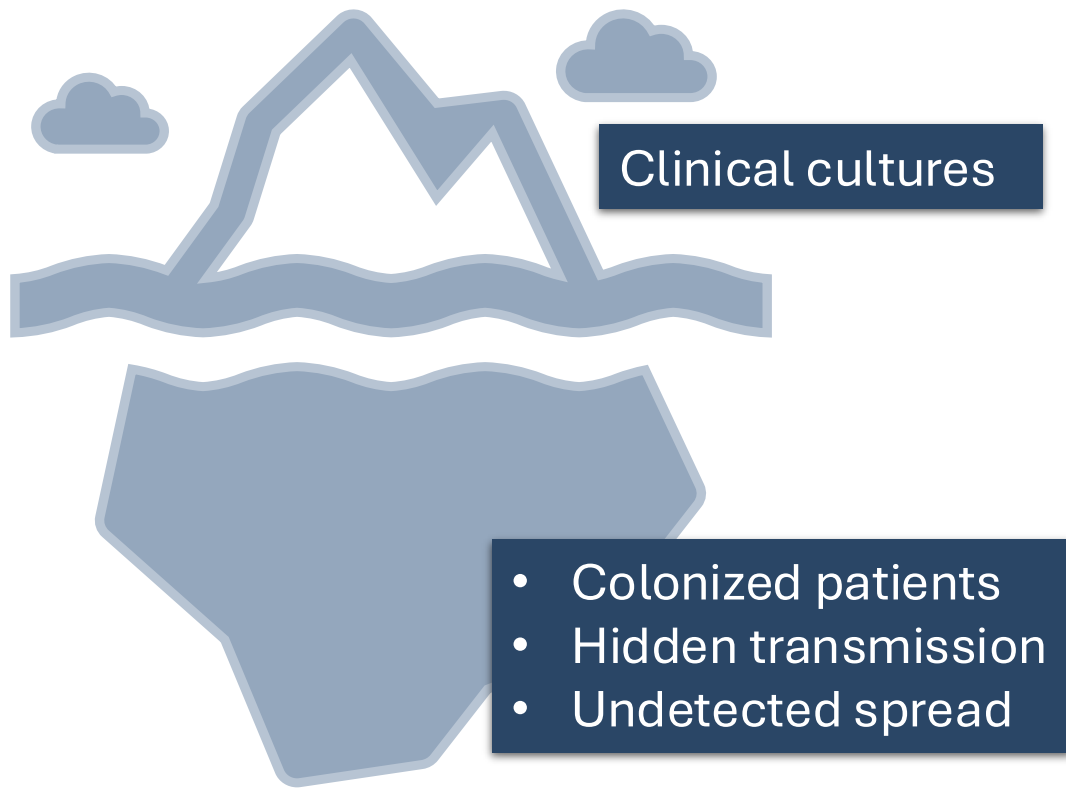
Epidemiologic
overlap

Known
exposure
history

Additional
colonization
detected

Ask not only “Do we have a case?” but “What else are we missing?”

Consider the entire iceberg



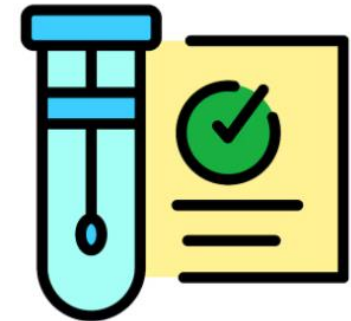
- Clinical cases underestimate spread
- Colonization screening reveals hidden transmission
- Screening informs the containment strategy

If you only focus on infection, you will underestimate transmission.

Colonization screening for *C. auris*



- Importance of Screening (**Why**)
 - Early identification of colonization
 - Implementation of early IPC core actions
- **Who** gets screened?
 - Local Epidemiology
 - Epidemiologic Linkages
 - Patient Risk Factors

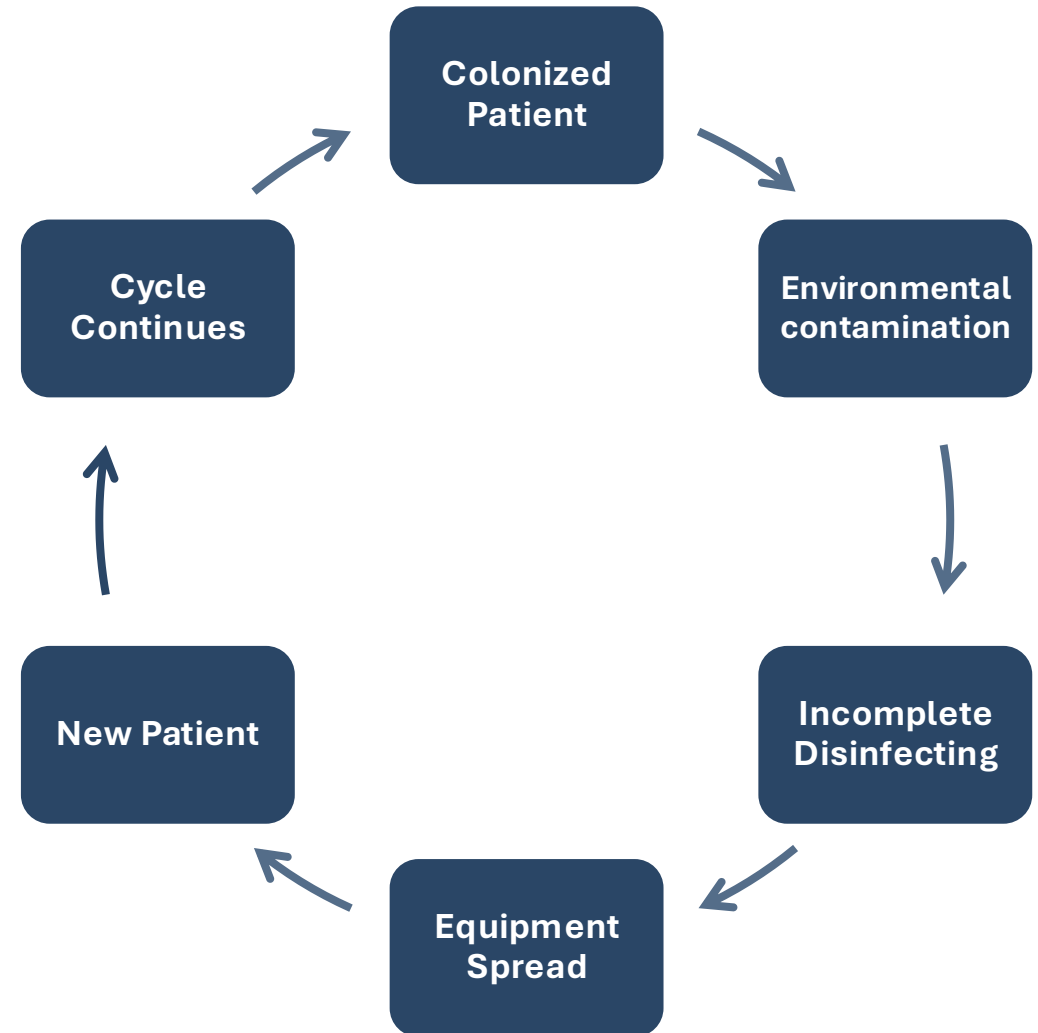


***C. auris* colonization screening helps identify hidden spread.**

Environmental persistence



- Survives weeks–months on surfaces
- Resistant to common disinfectants
- Forms biofilms
- Contaminates shared equipment
- Rapid recontamination of high-touch surfaces
- Heavy skin shedding



Shared equipment can connect patients who never shared a room.

***C. auris* outbreak
prevention and
containment**

***C. auris* infection prevention and containment strategy**

Prevention

- Have a facility *C. auris* plan
- Maintain a robust IPC program
- Stay informed about burden
- Screen high-risk patients on admit



Containment

- Communication
- Contact precautions
- Use effective disinfectant
- Environmental and equipment cleaning and disinfecting
- Screening potentially exposed patients
- Hand hygiene compliance
- Auditing of front-line infection control practices

Robust auditing with in-the-moment feedback assists with containment.

Outbreak opportunity points



Delayed recognition

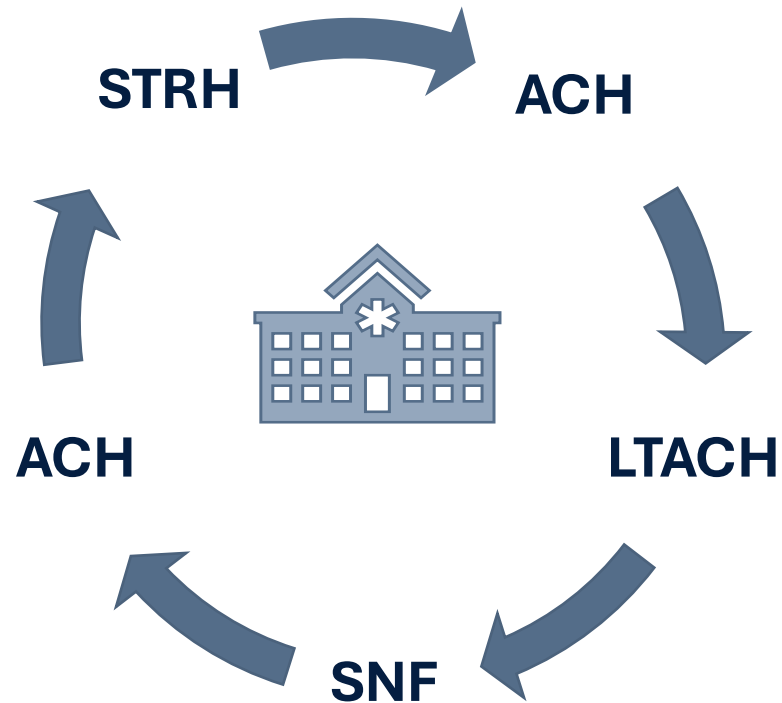
Communication gaps

Missed screening

Workflow gaps

The first positive is often not the first transmission event.

C. auris often spreads during transition in care

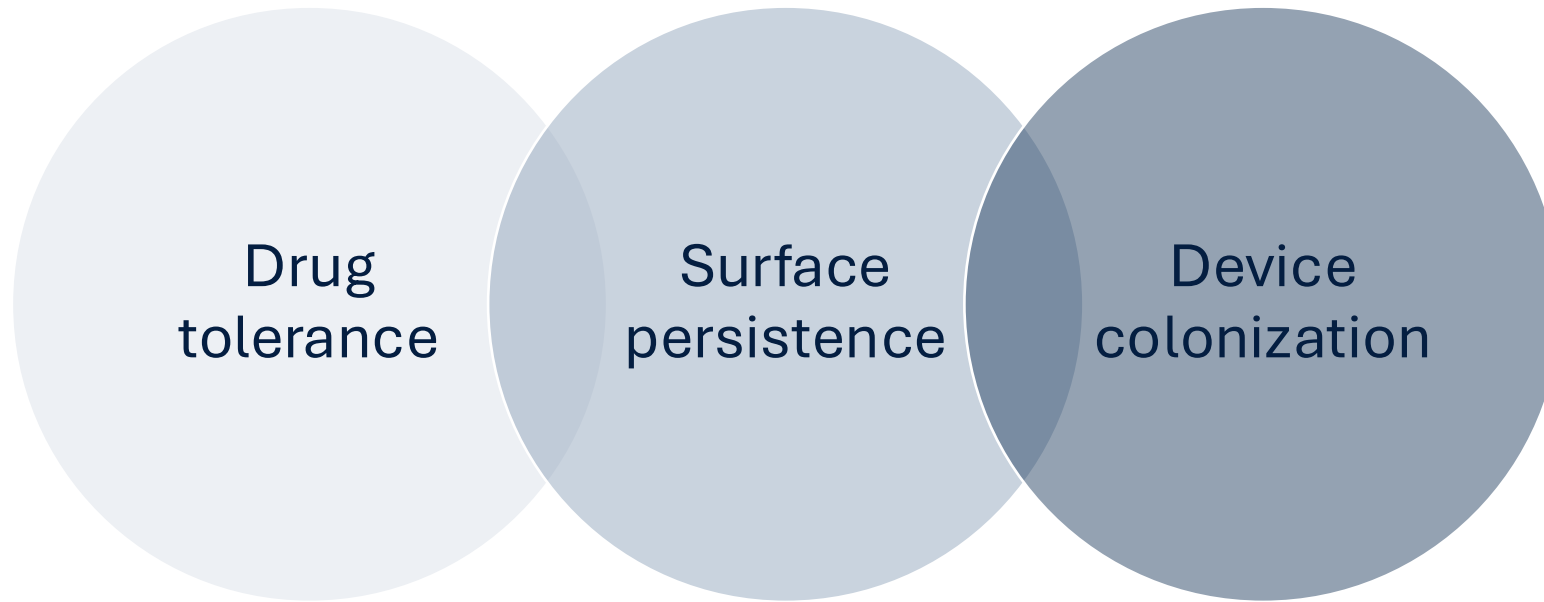


Legend
ACH = Acute care hospital
LTACH = Long-term acute care hospital
SNF = Skilled nursing facility
STRH = Short-term Rehabilitation hospital

- Include *C. auris* status in interfacility transfer communication
- Notify receiving facilities and transport teams
- Ensure IP handoff (IP should notify unit, EVS, leadership)
- Maintain precautions across transitions

One poorly communicated transfer can undo weeks worth of containment effort.

Biofilm: persistence + resistance together



- Biofilm supports persistence and tolerance
- Environmental survival can prolong outbreak risk

Biofilm is a structured survival state that increases persistence and drug tolerance.



Antifungal resistance mechanisms

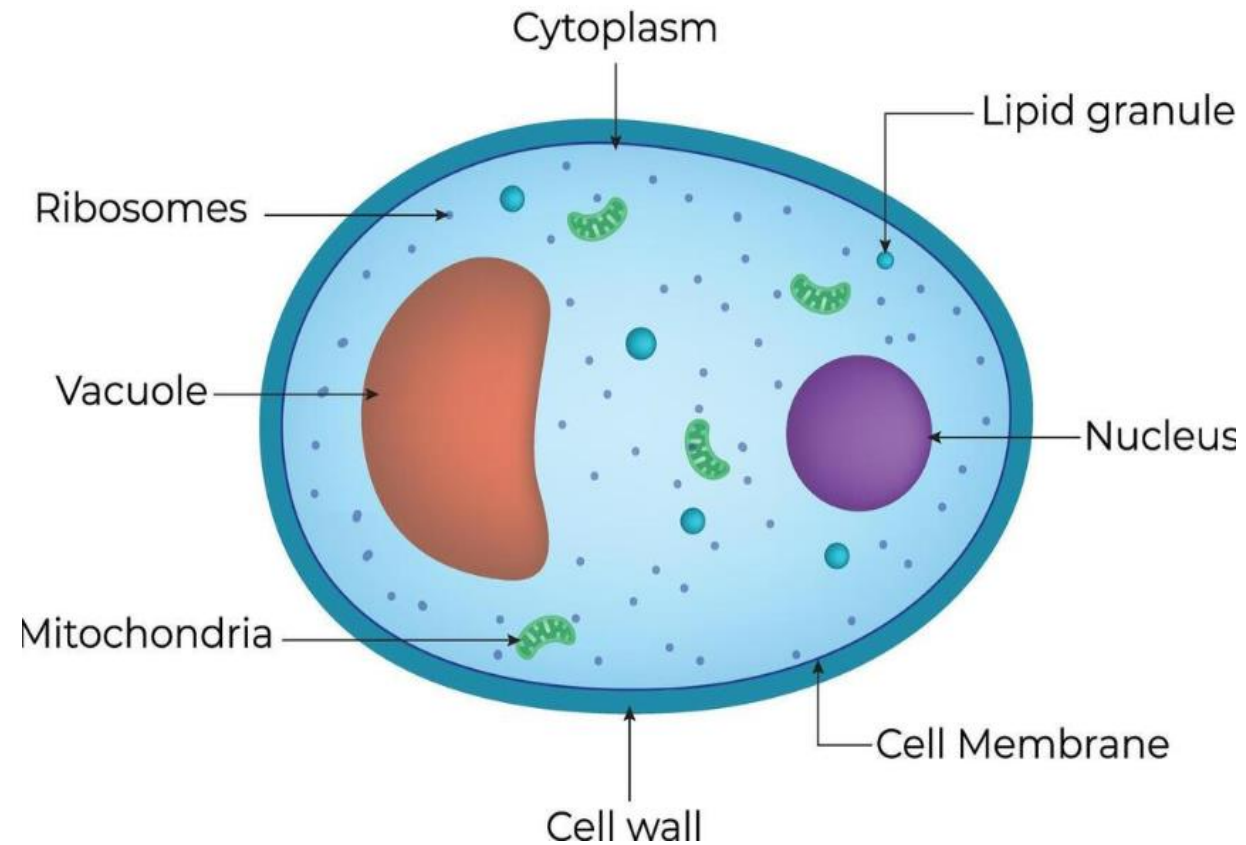
Antifungals



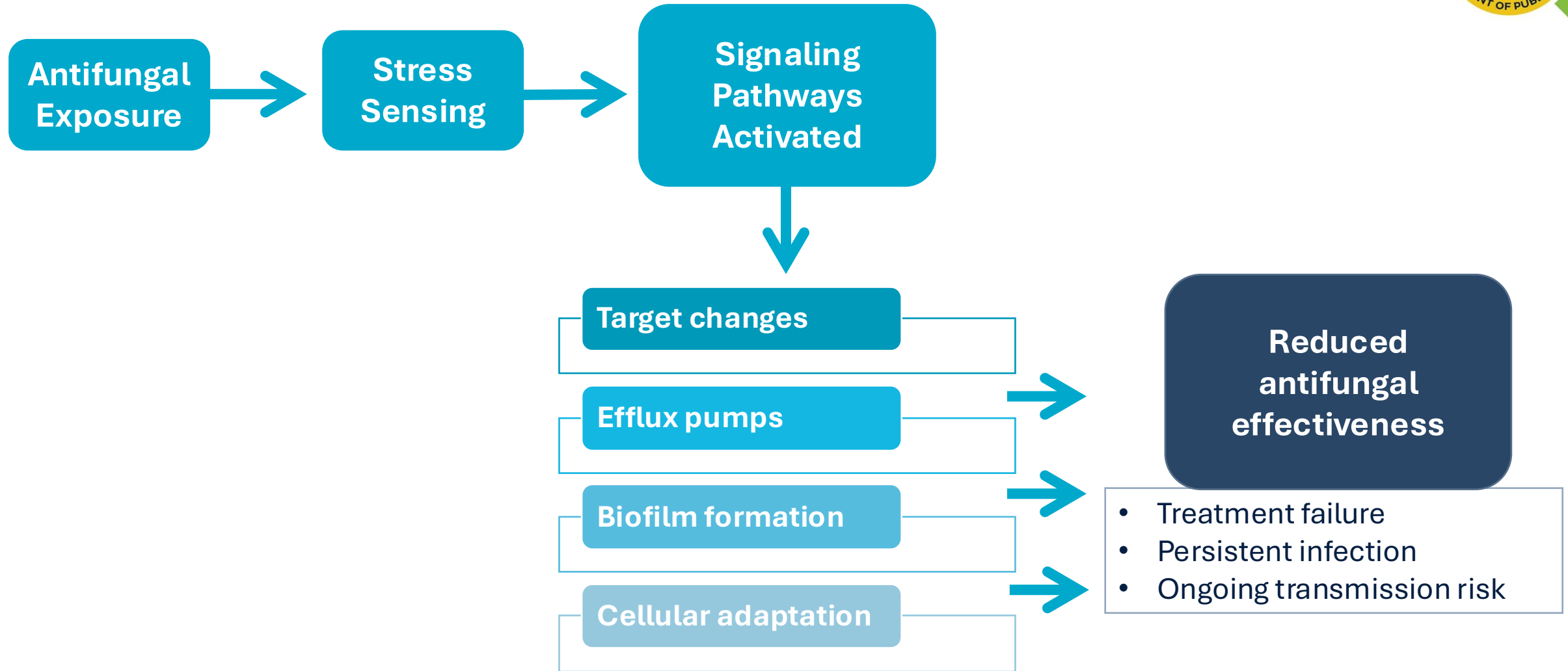
Drug Class	Clinical Role	Resistance Concern
Azoles	Often familiar / oral step-down context	Very common resistance
Echinocandins	First-line for invasive infection	Most concerning when lost
Polyenes (AmB)	Alternative / salvage role	Variable resistance
Flucytosine	Limited adjunctive role	Resistance can emerge

The therapeutic toolbox is already small. Resistance narrows it further.

Yeast cell diagram

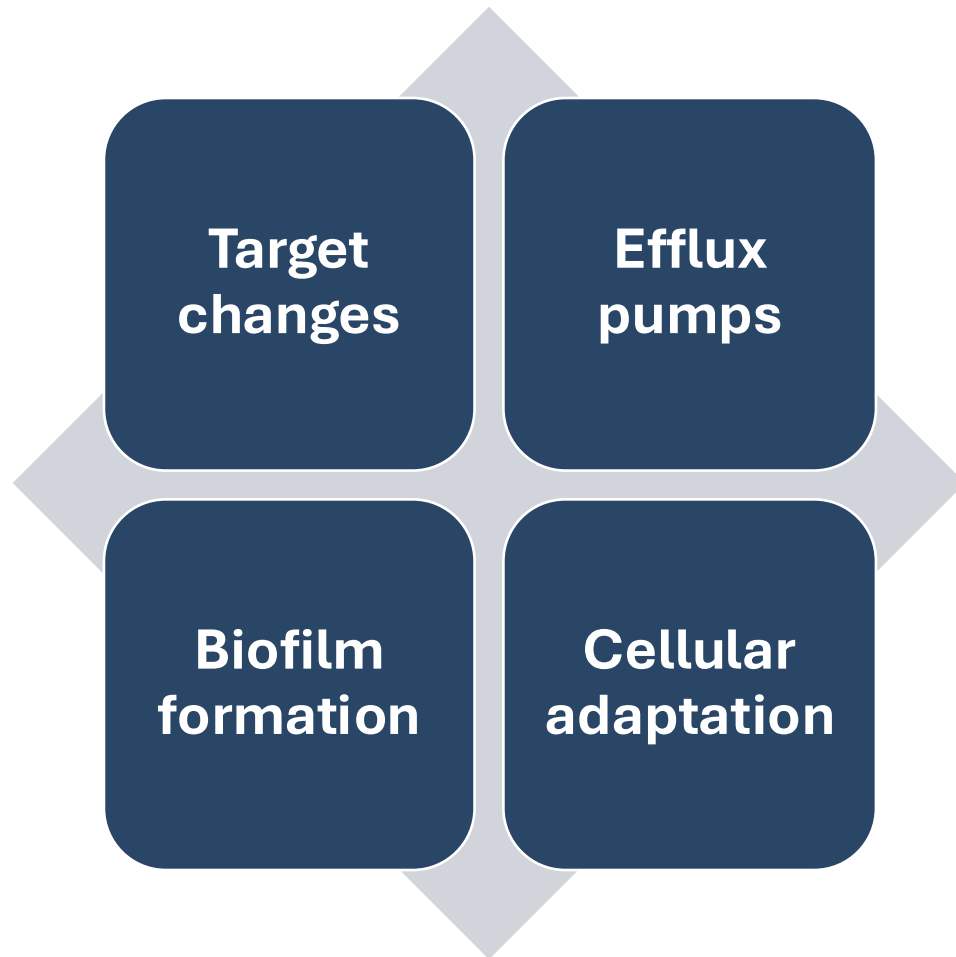


Adaptive response system



***C. auris* does not just resist drugs, it adapts to them.**

Antifungal resistance mechanisms



Clinical meaning

- Reduced antifungal effectiveness
- Resistance may emerge during therapy
- Susceptibility cannot be assumed

Resistance in *C. auris* can be layered, adaptive, and clinically frustrating.

Signaling pathways



Legend

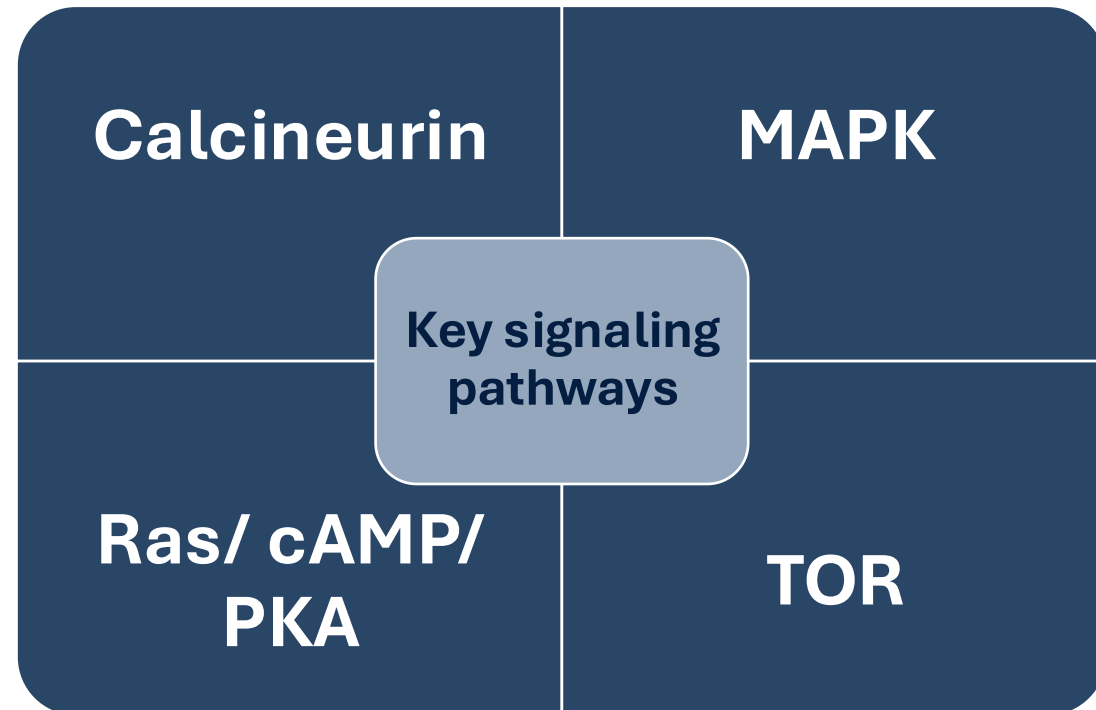
MAPK= Mitogen-activated protein kinase

PKA= Protein kinase A

Ras= Rat sarcoma protein

cAMP= Cyclic adenosine monophosphate

TOR= Target of Rapamycin



***Candida auris* adapts to survive.**

Calcineurin: the fungal survival pathway



Antifungal Stress

- Echinocandin cell wall damage
- Azole membrane stress

Calcium Signal Increases

- Stress activates intracellular calcium signaling

Calcineurin ON

- Central stress-response pathway activated

Survival Responses

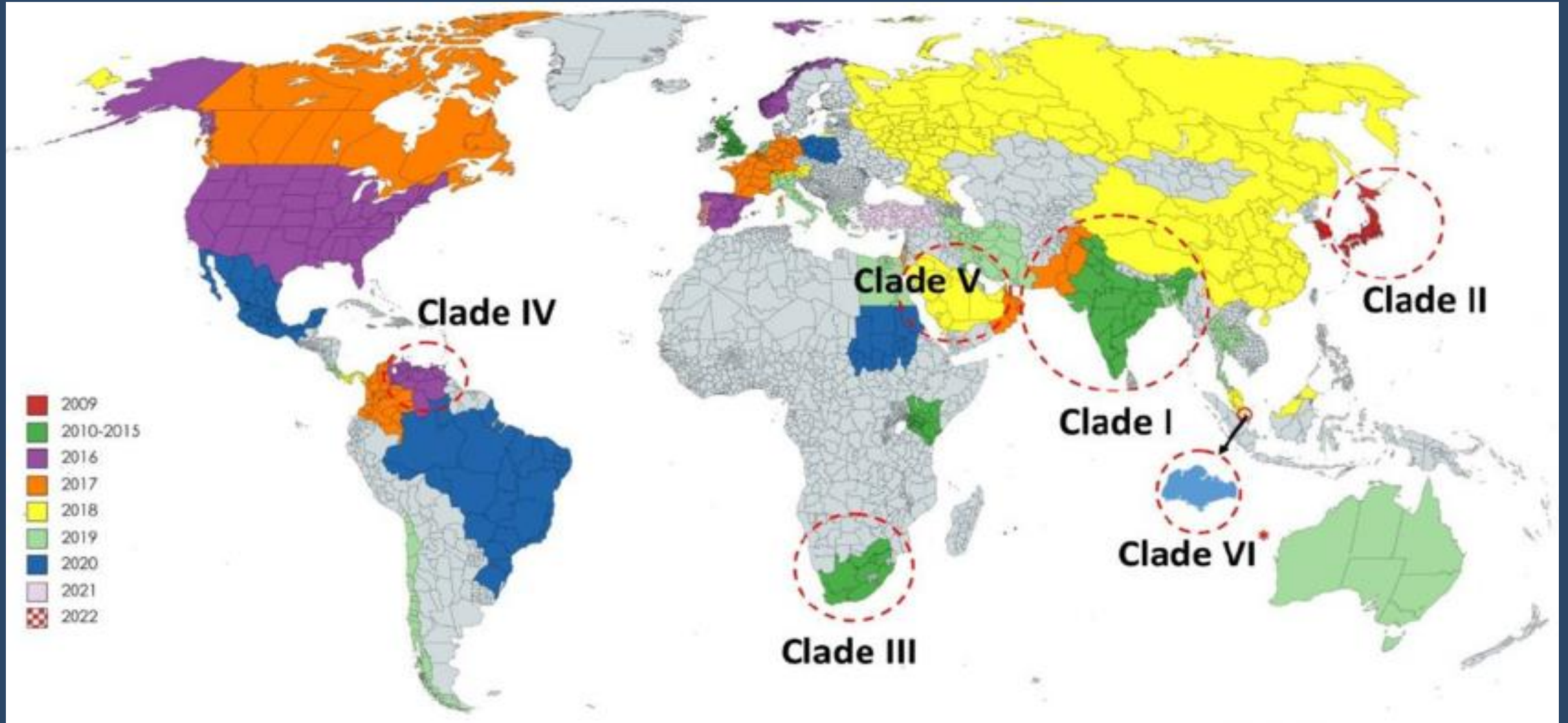
- Cell wall repair
- Membrane stabilization
- Stress gene activation
- Drug tolerance

Persistent Infection Risk

- Slower clearance
- Reduced killing
- Treatment difficulty

Calcineurin enables *C. auris* to sense, adapt, and survive antifungal pressure.

Where in the world is *C. auris*?



C. auris clades



C. auris characteristics by clade		Clade I, S. Asian	Clade II, E. Asian	Clade III, S. African	Clade IV, S. American	Clade V, Iranian
Antifungal susceptibility profile	AZOLES fluconazole	94% R	31% R	96% R	44% R	28.5% R
	POLYENES amphotericin	46% R	0% R	6% R	22% R	0% R
	ECHINOCANDINS micafungin	5.3% R	9.6% R	2.6% R	6.1% R	0% R
Clinical case isolation site		Ear, blood, or other invasive sites	Mainly Ear	Ear, urine, blood, or other invasive sites	Blood or other invasive sites	Nail, skin, ear
Outbreaks		Invasive infections	Ear Infections	Invasive infections	Invasive Infections	Nail, skin, and ear infections

Taxonomy update: Same organism, different name



Candidozyma auris

- Updated taxonomy based on genomic sequencing and molecular phylogenetics

Candida auris

- Clinical and public health name use remains

The name may evolve — the threat remains the same.



**Where microbiology meets
bedside care**

Every *C. auris* laboratory result should trigger questions



- Infection or colonization?
- Is treatment indicated?
- Do we have susceptibility context?
- Is source control adequate?
- Does this trigger screening or containment?

Not every positive requires treatment — but every positive requires interpretation.

Treatment alone will not stop an outbreak



- Do not treat colonization alone
- Echinocandins are usual first-line therapy
- Reassess persistent infection early
- Source control matters
- No reliable decolonization strategy currently exists

Clinical cure does not necessarily equal containment.

Antifungal Stewardship



Core Elements

1		Leadership commitment
2		Accountability and Expertise
3		Diagnostic stewardship
4		Evidenced-based antifungal use
5		Therapeutic drug monitoring
6		Duration and review of therapy
7		Surveillance and resistance monitoring
8		Education

Interprofessional response



Clinicians

- Recognize risk
- Distinguish infection from colonization
- Pursue source control
- Communicate urgency

Pharmacists

- Protect against reflexive overtreatment
- Interpret susceptibility with infectious disease providers
- Monitor for treatment failure

Infection Prevention

- Coordinate screening
- Implement precautions
- Ensure effective disinfectant use
- Environmental assessment
- Transfer communication

Public Health

- Ensure accurate organism identification
- Enhance facility screening capacity
- Antifungal susceptibility testing
- Consult with facilities during containment
- Broader epidemiologic visibility

Fast, coordinated response beats delayed perfection.

Key Takeaways



- Colonization drives spread.
- Screening reveals hidden reservoirs.
- Environment sustains.
- Resistance is adaptive.
- Delay worsens outcomes.

Questions?



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References



- Arumugam, G., Muthuselvam, M., Lima, P. M. N. D., Rajendran, R., and Junqueira, J. C. (2024). Current Perspectives of Antifungal Therapy: A Special Focus on *Candida auris*. Preprints. <https://doi.org/10.20944/preprints202405.1513.v1>.
- Candida auris | Candida auris (C. auris) | CDC. Centers for Disease Control and Prevention | CDC. (2024). Retrieved April 21, 2026, from https://www.cdc.gov/candida-auris/?CDC_AAref_Val=https://www.cdc.gov/fungal/candida-auris.
- Centers for Disease Control and Prevention. (2024, April 24). Clinical treatment of C. auris infections. <https://www.cdc.gov/candida-auris/hcp/clinical-care/index.html>.
- Centers for Disease Control and Prevention. (2026, February 26). Clinical overview of Candida auris. <https://www.cdc.gov/candida-auris/hcp/clinical-overview/index.html>.
- Chybowska, A.D., Childers, D.S., and Farrer, R.A. (2020). Nine Things Genomics Can Tell Us About Candida auris. Front Genet. 2020 Apr 15;11:351. <https://doi.org/10.3389/fgene.2020.00351>.
- Czajka, K. M., Venkataraman, K., Brabant-Kirwan, D., Santi, S. A., Verschoor, C., Appanna, V. D., Singh, R., Saunders, D. P., and Tharmalingam, S. (2023). Molecular Mechanisms Associated with Antifungal Resistance in Pathogenic Candida Species. Cells, 12(22), 2655. <https://doi.org/10.3390/cells12222655>.

References



- Ganeshkumar, A., Muthuselvam, M., Lima, P.M.N. de, Rajaram, R., and Junqueira, J.C. (2024). Current Perspectives of Antifungal Therapy: A Special Focus on Candida Auris. Journal of Fungi 2024, 10, 408, <https://doi.org/10.3390/jof10060408>.
- Infection Control for Healthcare Providers | Infection Control | CDC. Centers for Disease Control and Prevention | CDC. (2024). Retrieved April 4, 2026, from <https://www.cdc.gov/infection-control/hcp/index.html#hcp>.
- Johnson, M. D., Lewis, R. E., Dodds Ashley, E. S., Ostrosky-Zeichner, L., Zaoutis, T., Thompson, G. R., III, Andes, D. R., Walsh, T. J., Pappas, P. G., Cornely, O. A., Perfect, J. R., and Kontoyiannis, D. P., for the Mycoses Study Group Education and Research Consortium. (2020). Core recommendations for antifungal stewardship: A statement of the Mycoses Study Group Education and Research Consortium. The Journal of Infectious Diseases, 222(Supplement_3), S175–S198. <https://doi.org/10.1093/infdis/jiaa394>.
- Li J, Coste AT, Liechti M, Bachmann D, Sanglard D, and Lamoth F. (2021). Novel ERG11 and TAC1b Mutations Associated with Azole Resistance in Candida auris. Antimicrob Agents Chemother 65:10.1128/aac.02663-20. <https://doi.org/10.1128/aac.02663-20>.
- MDRO Containment Strategy | HAIs | CDC. Centers for Disease Control and Prevention | CDC. (2024). Retrieved April 4, 2026, from <https://www.cdc.gov/healthcare-associated-infections/php/preventing-mdros/mdro-containment-strategy.html>.
- Zhang, W., Cao, X., Liu, C. and Gao, S. (2025) The rising challenge of Candida auris: insights into its transmission, drug resistance, and infection control strategies. Front. Microbiol. 16:1694108. <https://doi.org/10.3389/fmicb.2025.1694108>.