

# The Role of Pharmacists in Antifungal TDM

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# Disclaimer

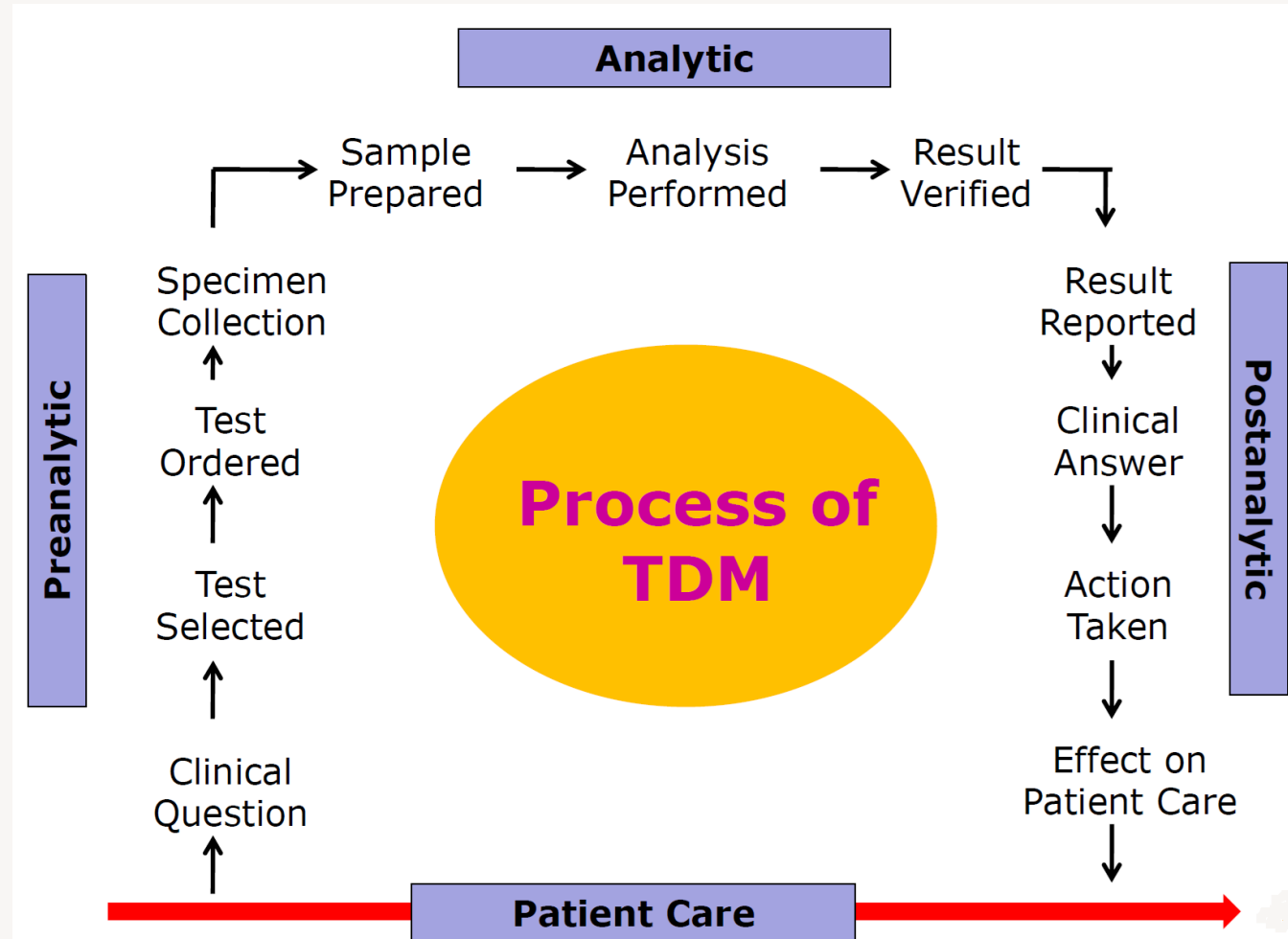
- No financial disclosure
- No conflict of interests



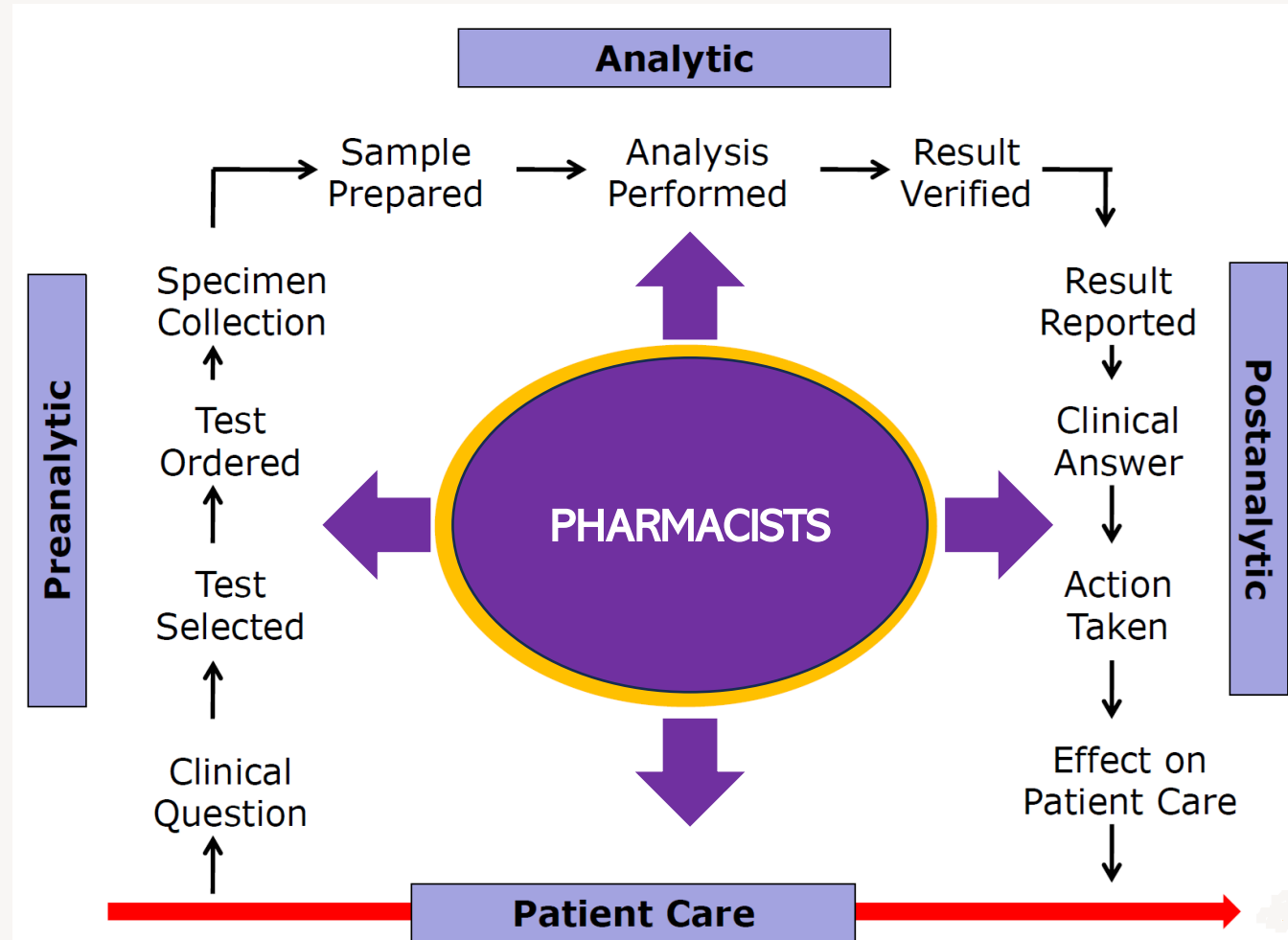
# Learning Objectives



# Recall the Process of TDM



# Pharmacists are the Heart of TDM



# Why Pharmacists?

- Drug Experts!
  - Pharmacokinetics (PK)
  - Pharmacodynamics (PD)
  - Pharmacogenomics (PG)
  - Effect of drug formulations on PK
  - Effect of drug interactions on PK/PD
  - Other factors influencing PK/PD
  - Effect of assay interferences on results
- Advocates for medication safety, precision medicine/personalised therapy



# Multiple Roles of Pharmacists in TDM



**Administrator/Leader**



**Educator**



**Coordinator**



**Researcher**



**Analyst**



**Auditor**



**Communicator**



**Collaborator**

# Design Evidence-Based Guidelines and Protocols

- To guide empiric dosage regimens (pre-emptive dose modification) based on specific patient characteristics (demographics, interacting drugs)
- To recommend appropriate and **cost-conscious** TDM
- To guide dose adjustments when TDM results are available





# Recommend and Schedule Appropriate TDM

- Ensure TDM is requested with appropriate indication
- Ensure appropriate timing of drug administration and sample collection
- Select appropriate sampling method (collection of blood vs other biological fluids)



# Monitor and Adjust

- Monitor and adjust dosing regimens based on pharmacologic responses, TDM results, clinical signs and symptoms, changes in pharmacokinetics, other biochemical variables



# Evaluate Unusual Responses

- Detect and interpret unusual TDM results or responses
- Evaluate for possible pharmacokinetic and pharmacologic explanations to unusual results



# Communicate with Healthcare Providers and Patients regarding TDM

- Provide correct instructions to ensure TDM is done appropriately
- Report and document TDM results and dose adjustment recommendations
- Communicate and document patient-specific drug therapy information to physicians, nurses, other healthcare providers, and patients





# Educate

- Counsel patients on TDM (indication, procedure, cost, expectation)
- Teach pharmacists, physicians, nurses, microbiologists, laboratory staff and other healthcare providers on pharmacokinetic principles and the appropriate indications of TDM, including **cost-effective use of TDM**



# Promote Quality Assurance

- Develop quality assurance programs that collect and monitor adequate data to show improved patient outcomes and economic benefits resulting from TDM
- Continued justification and support for TDM services



# Collaborate

- Promote collaborative relationships with other individuals and departments involved in TDM to encourage development and appropriate use of pharmacokinetic principles in pharmaceutical care
- Collaborate for research and quality improvement projects



# Promote Research and Quality Improvement

- Design and conduct research to expand clinical knowledge and application of TDM





# Apply Technology

- Develop and apply computer programs and point-of-care information systems to enhance the accuracy and sophistication of pharmacokinetic modelling and applications to pharmaceutical care
- May consider use of Model-Informed Precision Dosing



# Provide Consultation

- Pharmacists with more specialised knowledge can serve as expert consultants to other pharmacists and healthcare providers



# How do we overcome these common barriers?

- Lack of knowledge/exposure
- Lack of administration support
- Lack of facilities that can perform antifungal TDM
- Difficulty in coordinating logistics for blood sampling
- Long turn-around time
- High cost of TDM





# The Singapore General Hospital Experience in Azole TDM



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Neuroscience Institute



Singapore National  
Eye Centre



SingHealth  
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# The Role of Pharmacists in Azole TDM @ SGH

- Initiated research on azole TDM
- Developed and validated azole TDM assays
- Collaborated with physicians and biochemistry lab (even external clinicians) for large scale clinical implementation
- Developed dosing guidelines and TDM protocols
- Provide advice on empiric azole dosing regimens, how to perform azole TDM (timing of samples), how to interpret results and how to dose adjust

# The Role of Pharmacists in Azole TDM @ SGH

➤ J Glob Antimicrob Resist. 2020 Jun;21:427-433. doi: 10.1016/j.jgar.2019.12.004. Epub 2019 Dec 14.

## The utility of voriconazole therapeutic drug monitoring in a multi-racial cohort in Southeast Asia

Peijun Yvonne Zhou<sup>1</sup>, Tze Peng Lim<sup>1</sup>, Si Lin Sarah Tang<sup>1</sup>, Yixin Liew<sup>1</sup>, Sy Grace Nathalie Chua<sup>1</sup>,  
Li Ling Cheryl Lim<sup>1</sup>, Hui Ling Winnie Lee<sup>1</sup>, Si Xuan Tan<sup>1</sup>, Oi Fah Lai<sup>2</sup>, Thuan Tong Tan<sup>3</sup>,  
Gee Chuan Wong<sup>4</sup>, Lay Hoon Andrea Kwa<sup>5</sup>



# The Role of Pharmacists in Azole TDM @ SGH

➤ [J Infect.](#) 2021 Jun;82(6):e18-e21. doi: 10.1016/j.jinf.2021.03.021. Epub 2021 Mar 29.

## Therapeutic drug monitoring is necessary for patients receiving posaconazole tablet

Peijun Yvonne Zhou<sup>1</sup>, Tze Peng Lim<sup>1</sup>, Si Lin Sarah Tang<sup>1</sup>, Jia Le Lim<sup>1</sup>, Yixin Liew<sup>1</sup>,  
Nathalie Grace Chua<sup>1</sup>, Li Ling Cheryl Lim<sup>1</sup>, Hui Ling Winnie Lee<sup>1</sup>, Oi Fah Lai<sup>1</sup>, Thuan Tong Tan<sup>1</sup>,  
Gee Chuan Wong<sup>1</sup>, Lay Hoon Andrea Kwa<sup>2</sup>

Affiliations + expand

PMID: 33794263 DOI: [10.1016/j.jinf.2021.03.021](#)

# The Role of Pharmacists in Azole TDM @ SGH

 Learning Corner



## Voriconazole TDM

Wondering how to conduct voriconazole TDM?

Click on the PDF below for some educational materials and guidance!

Alternatively, approach any of the ASU pharmacists for advice.



# The Role of Pharmacists in Azole TDM @ SGH

Comment > [Int J Antimicrob Agents. 2023 May;61\(5\):106748.](#)

doi: 10.1016/j.ijantimicag.2023.106748. Epub 2023 Feb 8.

## Isavuconazole dosing in Asian patients with invasive mould infections: is there a role for therapeutic drug monitoring?

Yvonne Fu Zi Chan<sup>1</sup>, Yvonne Peijun Zhou<sup>2</sup>, Ban Hock Tan<sup>3</sup>, Candice Yuen Yue Chan<sup>3</sup>, Benjamin Pei Zhi Chong<sup>3</sup>, Yii Ean Teh<sup>3</sup>, Gee Chuan Wong<sup>4</sup>, Andrea Lay Hoon Kwa<sup>2</sup>, Tze Peng Lim<sup>2</sup>, Kelvin Kau Kiat Goh<sup>2</sup>, Farah Iffah Binte Zulkifli<sup>2</sup>, Jasmine Shimin Chung<sup>3</sup>

# Antimicrobial TDM Observership Programme in SGH



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# Programme Objectives

Equip participants with the knowledge and skills necessary for the development and implementation of antimicrobial therapeutic drug monitoring (TDM) services in their practice setting

Target audience: physicians, pharmacists

Antimicrobials: vancomycin, aminoglycosides (gentamicin, amikacin), beta-lactams, fluoroquinolones, fosfomycin, tigecycline, polymyxin and azoles

# Programme Structure

- Facilitated readings
- Case presentation and discussion
- Guided prospective case review of antimicrobial TDM for hands on practice

Duration: 2-4 weeks

## Customisable to suit learning needs

# Teaching Faculty



**A/Prof Andrea Kwa Lay Hoon**

- Assistant Director (Research), Division of Pharmacy, Singapore General Hospital
- Associate Professor, Emerging Infectious Diseases Programme, Duke-NUS Medical School Singapore

**and a team of infectious disease pharmacy specialists** (with extensive experience in antimicrobial stewardship and antimicrobial resistance)

A decorative graphic on the left side of the slide consists of a cluster of hexagons in various colors: light blue, orange, grey, and dark blue. Some hexagons contain images: a person in a meeting, two people working at a desk, a close-up of documents with charts, and a person looking at a whiteboard. Other hexagons are empty or have thin outlines.

# Thank you!

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