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**Postdoctoral Fellowship**

**Department of Medicine, Division of Clinical Pharmacology**

**Faculty of Medicine and Health Sciences, Stellenbosch University**

**Scope of Research**

This 2-year postdoctoral research fellowship at Stellenbosch University supports research aimed at optimising antimicrobial therapy for neonatal bacterial infections. It forms part of a collaborative initiative between the Division of Clinical Pharmacology and the Department of Paediatrics and Child Health.

The neonatal period is the most vulnerable stage of life, with severe bacterial infections remaining a leading—and largely preventable—cause of neonatal mortality. A major contributor to poor clinical outcomes is the substantial pharmacokinetic (PK) variability observed in neonates, which may result in subtherapeutic antimicrobial exposure. While therapeutic drug monitoring (TDM) can help guide treatment, its utility is limited by inconsistent interpretation, a lack of target concentration guidance, and insufficient integration of pharmacokinetic/pharmacodynamic (PK/PD) principles into routine care.

Model-informed precision dosing (MIPD) presents a powerful alternative. By combining population PK/PD models with individual patient data—such as measured drug concentrations and clinical characteristics—MIPD enables personalised dosing recommendations using Bayesian forecasting methods.

The successful candidate will work closely with both clinical and pharmacometric teams to evaluate and support the implementation of MIPD for antimicrobials in neonates at Tygerberg Hospital. This work will include:

Identifying key antimicrobials relevant to neonatal sepsis.

* Conducting a systematic literature review to identify published PK/PD models with appropriate data quality, empirical covariate structures, and populations that include neonates and infants.
* Prioritising models that have been validated in African populations.
* Using selected models to develop an online dosing calculator designed to provide optimised empiric dosing recommendations for neonatal and infant sepsis.
* Integrating validated models into a web-based application that generates personalised dosing based on user-inputted patient characteristics.

The fellowship will run for two years, contingent on satisfactory progress. It is valued at R220,000 per annum (tax-free), with the possibility of additional financial supplementation.

**The postdoctoral researcher will be expected to:**

* Lead the development and refinement of MIPD protocols for neonatal antimicrobial therapy at Tygerberg Hospital.
* Collaborate with neonatology, infectious disease, and pharmacometric teams to implement and assess MIPD in clinical settings.
* Contribute to the development, selection, and validation of population PK/PD models for key antimicrobials.
* Support the development of a user-friendly web-based MIPD tool for clinicians.
* Prepare and submit ethics, hospital, and regulatory applications as required.
* Draft, coordinate, and publish high-quality research outputs on neonatal dosing and precision pharmacotherapy.

**Requirements:**

* PhD in Clinical Pharmacology, Pharmacology, or a related field (e.g., Biomedical Sciences), obtained within the past 5 years
* Demonstrated experience in population PK/PD modelling and/or MIPD
* Proficiency in—or commitment to learning—pharmacometric software tools such as NONMEM, Monolix, NlmixR, or MATLAB
* Familiarity with therapeutic drug monitoring and its clinical application in antimicrobial therapy
* Interest in paediatric pharmacology and infectious diseases
* Strong ability to work independently and collaboratively in interdisciplinary research environments
* Excellent analytical skills and proficiency in scientific writing and communication in English
* Strong interpersonal and organisational skills
* Open-mindedness, intellectual curiosity, and a commitment to translating quantitative science into clinical benefit

**Commencement of duties:** 01 August 2025, or as soon as possible thereafter.

**Closing date:** 01 July 2025. Send a letter of application, accompanied by a comprehensive curriculum vitae, including list of publications and the names and contact details of at least two referees, to ericdecloedt@sun.ac.za. Please note that communication will only be sent to shortlisted candidates.

**Enquiries:** Prof Eric Decloedt, ericdecloedt@sun.ac.za