

# Mathematical Modeling and Analysis of Lipodystrophy Syndrome in HIV-1 Patients

M. Chapwanya<sup>1</sup>, N. Hussaini<sup>1</sup>, T. Moto<sup>2</sup>, C. Mumba<sup>1</sup>, C. Munongi<sup>3</sup>

<sup>1</sup> Department of Mathematics & Applied Mathematics, University of Pretoria, Pretoria 0002, South Africa

<sup>2</sup> School of Health Systems and Public Health, University of Pretoria, South Africa

<sup>3</sup> Department of Mathematical Sciences, University of South Africa, Pretoria, South Africa

m.chapwanya@up.ac.za, nafu.hussaini@up.ac.za, tpmoto@gmail.com, chibalemumba@yahoo.com, munongic@gmail.com

*Lipodystrophy, HIV treatment, non-standard finite difference, sensitivity analysis.*

In this paper a new non linear deterministic model for the transmission dynamics of Lipodystrophy in HIV patients will be derived. A numerical scheme for the model has been designed and compared with some standard numerical methods. Furthermore, a sensitivity analysis on the parameters is presented.

## References

- [1] Andrew Carr and David A Cooper. Adverse effects of antiretroviral therapy. *The Lancet*, 356(9239):1423–1430, 2000.
- [2] Andrew Carr. Hiv lipodystrophy: risk factors, pathogenesis, diagnosis and management. *Aids*, 17:S141–S148, 2003.
- [3] Andrew Carr, HIV Lipodystrophy Case Definition Study Group, et al. An objective case definition of lipodystrophy in hiv-infected adults: a case-control study. *The Lancet*, 361(9359):726–735, 2003.
- [4] Andrew Carr, Katherine Samaras, Samantha Burton, Matthew Law, Judith Freund, Donald J Chisholm, and David A Cooper. A syndrome of peripheral lipodystrophy, hyperlipidaemia and insulin resistance in patients receiving hiv protease inhibitors. *Aids*, 12(7):F51–F58, 1998.