



# Transfers between health facilities of people living with diabetes attending primary health care services in South Africa

Jasantha Odayar

*University of Cape Town, Cape Town, South Africa*

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*Co-authors: Jody Rusch, Joel A. Dave, Diederick J Van Der Westhuizen, Elton Mukonda, Maia Lesosky, Landon Myer*

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# Background

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- The prevalence of diabetes is increasing rapidly in low- and middle-income countries (LMIC) including South Africa
- Levels of retention in care and glycaemic control among those on treatment are low
- Chronic conditions including diabetes require long-term and continuous care to reduce morbidity and mortality
- To maintain long-term care, people may require access to care at multiple health care facilities
- The process of transferring between facilities could interrupt the continuum of care

# Background

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- Transfers include
  - Up-referrals (from lower to higher levels of care)
  - Down-referrals (from higher to lower levels of care)
  - Lateral transfers (between facilities at the same level of care e.g. between primary health care [PHC] facilities)
- Among people living with HIV, transfers between PHC facilities occur frequently and are associated with disengagement and viraemia
- Among people living with diabetes (PLD), data on transfers are limited overall and particularly for transfers between PHC facilities

# Aims

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- In PLD in the WCP of South Africa, we aimed to:
  - Quantify transfers between PHC facilities
  - Assess the association between transfers between PHC facilities and HbA1c outcomes



# Methods

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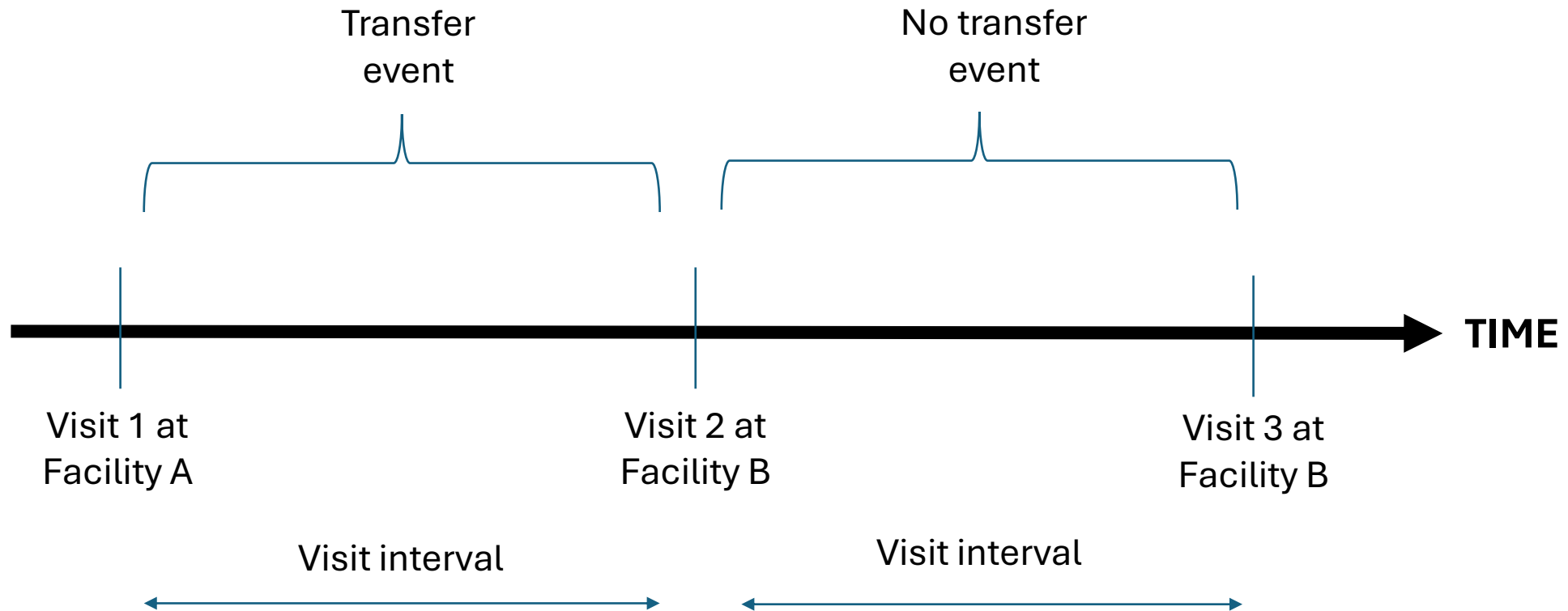
- Retrospective cohort study
- Data source: National Health Laboratory Service (NHLS)
  - All HbA1c tests conducted in the WCP from January 2016 to March 2020 obtained from the NHLS
  - Data included biological sex and age, test facility and date and result of each HbA1c test

# Inclusion Criteria

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- Individuals with an HbA1c in 2016–2017 were included in the analysis if:
  - $\geq 18$  years of age at first included HbA1c
  - $\geq 2$  HbA1cs in the study period
  - $\geq 1$  HbA1c at a PHC facility
- Maximum duration of follow-up was 27 months

# Definitions



- Disengaged at end of visit interval if duration between visits  $>14$  months
- Engaged at end of visit interval if duration between visits  $\leq 14$  months

# Analysis

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- Transfer incidence rates were calculated
- Generalised estimating equations with poisson regression were used to assess predictors of transfers between PHC facilities
- Mixed effects logistic regression was used to assess the association between transfers between PHC facilities and a post-transfer HbA1c  $\geq 8\%$



# Results

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- Cohort characteristics at first HbA1C
  - 102,813 individuals with 208,030 person-years of follow-up
  - 68,090 (66%) female
  - Median age at first HbA1c: 56 (IQR 48–64) years
  - Median number of visits: 2 (IQR 2 – 3)
  - Median value of first HbA1c test: 8.4% (IQR 6.7–10.6)

# Transfer events

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- Among 102,813 participants, 23,227 (23%) had  $\geq 1$  transfer of any type
- 6996/23,277 (30%) individuals who transferred had  $\geq 1$  transfer between PHC facilities
- Including repeat transfers per individual, there were 29,994 total transfers
- 7884/29,994 (26%) transfers were between PHC facilities

# Results

## Predictors of transfers

<b>Characteristic</b>	<b>aIRR</b>	<b>95% CI</b>
Male vs female	1.01	0.96 – 1.06
Age at first HbA1c (years)	0.998	0.996 – 1.000
First HbA1c $\geq 8\%$	1.17	1.11 – 1.22
At least one HbA1c in a rural district	1.14	1.09 – 1.19
At least one hospital visit	0.39	0.36 – 0.42

aIRR, adjusted incidence rate ratio; CI, confidence interval

# Results

The association between transfers between PHC facilities and an HbA1c  $\geq 8\%$  post-transfer

	aOR	95% CI
Transfer between PHC facilities	1.20	1.05 – 1.37
Age (years)	0.890	0.887 – 0.893
Male vs female	0.42	0.37 – 0.47
At least one hospital visit	0.88	0.78 – 1.00
Preceding HbA1c in a rural district	2.29	2.05 – 2.56
Disengagement in the visit interval	1.10	1.02 – 1.18

aOR, adjusted odds ratio; CI, confidence interval

# Results

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- Stratification by disengagement status:
  - Including only transfers between PHC facilities with disengagement, the relationship between transfers and an HbA1c $\geq$ 8% persisted (aOR 1.12, 95% CI 1.03 – 1.21)
  - Including only transfers between PHC facilities without a disengagement, the effect estimate was reduced and was no longer statistically significant (aOR 1.09, 95% CI 0.94 – 1.27)

# Discussion

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- Transfers involving PHCs occur frequently and are associated with a raised HbA1c post-transfer
- Possible reasons for worsening glycaemic control post-transfer include:
  - Disruption of continuity of care
  - Disengagement from care among people who transfer

# Future research

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- Qualitative work among patients and providers to understand
  - Reasons for transfers between PHC facilities
  - Transfer processes
  - Possible reasons for increased HbA1c values in PLD who transfer
- Research in different settings