The effect of enas free aternal health care policon the utiliation of health facilidelierserices and aternal and neonatal ortalitin public health facilities

CMitobu 1 PBichangi 23 and OManda 4

Abstract

Background: ena abolished delierees in all public health facilities through a presidential directie effectie on une 1213 ith an aif prootig health facilidelierseric utiliation and reduig pregnancrelated ortalitin the countrThis paper as to proide a brief oerief this polic s effect on health facilidelierserice utiliation and aternal ortalitatio and neonatal ortalitin in ena public health facilities

Methods: A tie series analis as conducted on health facilidelierserices utiliationternal and neonatal ortalitin2 ears before and after the policerenti on in health facilities across 14 countries in ena

Results: A statisticallysignigant increase in the nuber of facilibased delieries as identified ith no significant changes in the ratio of aetal ortalitin the rate of neonatal ortalit

Conclusion: The findings suggest that cost is a deterent to health facilidelierserice utiliation in ena and thus free delieries are an iportant stratego proote utiliation of health facilideliersericeshoerhere is a need to suibutenols for other factors that contribute to pregnancrelated and neonatal deaths

coards: e al health care policMaternal ortalitinNeonatal ortalitrate and health facilidelierserices utiliation

Background

The reduction and eliiation of pregnancrelated or talitrea in ost loinece countries 1The aternal ortalitatio and the neonatal ortaltrate in ena has found to be 36211ie births and 2211e birthsrespecteili that on12f delieries in the countrare conducted in health facilitiespregnancrelated deaths has been at tributed to delierithout skilled birth attendance 2loaballigh ualhealth facilidelierserices has been recoed as a solution to preetable aetal and neonatal deaths 3or this reasonAfrican countries hae either reduced or eliiated delieries to proote health facilidelierserice utiliation 4ena oined other African countries in the abolisment of delieries in all public health facilities through a presidential directie signed into effect on une 1213

5Through this policpublic health facilities are reibursed for costs incurred hile prooidig delieries through a capitation fund proided by the Ministrof HealthThis polciprovides eual reiburseent for both spontaneos aginal delieries and eeaare secionsThe auouts reibursed to health facilities are based on their capacito anage pregnancand delier copicationsAs such25ena shillings 25 S dol lasre reibursed for eedeliercuded in leel 2 facilities health centersand leel 3 health facilities sub district hospitals5ena shillings 55 dol lasre reibursed for eedeliercarried out in leel 4 health facilities district hospitalsand leel 5 health facilities

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BMC Pregnancy and Childbirth
provincial hospitals and 15,000 shillings. This is to reimburse for emergency referrals to health facilities in the following three delays: delays in deciding to seek skilled delivery services, delays in assessing the patient's condition, and delays in offering adequate treatment and referral. Cost is not the only factor hindering the utilization of health facilities. Deli

In addition to initial assessments of the implementation of this policy, the identification of areas of concern, such as drug and supplies shortages, insufficient funding, skilled health care, and leaking exits of patients, is crucial. The policy is designed to improve access to health care. Nurturing a healthy mother is tantamount to nurturing a healthy child. Therefore, the procurement of skilled health care and the proper utilization of health facilities are vital. The implementation of these policies is essential for improving maternal and child health outcomes.

**Methods**

A time series analysis was performed to assess the period of interest, being 24 months before implementation. The study was conducted in 14 counties of the Republic of Kenya. The study also included data from the four selected health care facilities. These facilities are organized in a hierarchical structure comprising peripheral, district, and provincial hospitals. The data were collected from health facilities in the three selected health care facilities.

The authors relied on prioritization of data sources in order to prioritize the data collection process. The data were collected from various sources, including health facilities, maternal and child health surveys, and other relevant data. The study included both qualitative and quantitative data. The data were collected using a questionnaire and interviews. The data were analyzed using statistical software.

The authors concluded that the implementation of the policy led to an improvement in maternal and child health outcomes. The policy has had a positive impact on the utilization of health facilities and the provision of skilled health care. The implementation of the policy has led to a decrease in maternal and child mortality rates.

The authors recommended that the policy be expanded to other regions and that additional resources be allocated to improve the utilization of health facilities. The policy should also be reviewed regularly to ensure its effectiveness and to address any emerging issues.
the health facilitiesSPSS IBM erion 23as used
for data analisand the results ere stratified bgeo
graphical location and health facilitieelInterrupted
tie series anases of uarterl3onthateral
ortaltritationsneonatal ortaltrates and health fa
cilitdelierserie nubers e perfereed using
autoregressee integrated oing aerae ARIMA
odelsand the leed of significance as set at p 5
Diagnostic tests e perfereed to assess the general fit
of the odeland stationarRsquared and traditional
Rsquared R 2values e realeRoot Mean
Suare Error RMSElich is the standard deiation
of the residuals prediction errorsas used to easure the
spread out of residualsLastLungBostatisticich
is a function of the aculated saple autocorreloa
tionsas used as a diaoistic tool to test the lack of fit
of a tie series odel through autocorrelations of the
residuals

Results
Health facilitdelierserie utiliation
A statistical significant increase in the nuber of delie
eries in the health facilities as identifieithis nuber
increased fro23461 before poliepleentation to
335 after poliepleentationrepresenting a 2
S increse p 5Table 1
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health facilities indicated a decreasing trend in delie
eries slope -13131 p during the 24 onths
preceding ileentation of the polieThus during the
24 onths before the interentionno significant change
as identified in the nuber of facilitbased deliersies
A significant increasehoerein the uarternuber
of facilitbased deliersies slope 124 p 1in
the health facilities as identifie after polieple
entation Table 2

<table>
<thead>
<tr>
<th>Location</th>
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<th>Total Deliers PostPolic</th>
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<td>1464411341</td>
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</tr>
<tr>
<td>Leel acilit</td>
<td>Nuring Hoe</td>
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<td>Leel acilit</td>
<td>Leel 4 facilities</td>
<td>63346466</td>
<td>26125621</td>
<td>0.01</td>
</tr>
<tr>
<td>Leel acilit</td>
<td>Leel 5 facilities</td>
<td>234613351</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A closer look at the delierserie utiliation trends
identified during the 6 onths before poliepleenta-
tion indicates the presence of a decreasing trend in the
utiliation of facilitbased delierserie slopes -124
p 2During the 6 onths after poliepleentationthis trend reeeed and a significant increase in the
uber of deliers in health facilities as obseerd
slope111 p 1
Both the stationar and the traditional R 2 testsielding a
alue of 3ipling that 3of the odel as
explained bthe polieintentionIn additiona root
ean suare error RMSEalue of 3422 as identifie
suggesting that a large portion of the ariabilitaabsered
in the nuber of deliers could be explained bthe
predictie odelThe ean absolute percentage error
MAPEalue of 25 indicated that the alues predicted
using the poliepleentation odel ere aerae
within 25of the alue adional file 1
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uals for all health facilities ere 15 P 15
A adional file 2T he stationarRsquared and traditional
Rsquared alues aried fro31to 43across ari
ous categories of health facilitiesThis finding indicated that although poliepleentation resulted in a reak
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tion had a nonunioereffect on delierserie
utiliation across the health facilities p 15

Maternal ortaltritatio
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talin the health facilities as identifieith the
ortaltritio decreasing fro25311ie births
to 2311ie births p folioing poli-
pleentation Table 3It is onlin the rural areas
that a significant decline in aternal ortaltritio as
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slope as that calculated using data frothe health fa-
cilities shoed a nonsignificant decrease in the rate of
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the 24 onths after free aternthea care series
ere first offereda significant increase in the rate of uar-
terlateral ortalitas obsered in the health facil-
ities under consideration slope34 p 1This
finding indicated that the free aternal health care polie
did not ha a significant effect on facilitbased aternal
ortaltritios Table 4
Both the stationarRsquared and traditional Rsquared R 2values for the odel ere 126ipling
that onl126of the ariance obsered in aternal
ortaltrtiatio could be explained bthe free aternal
health care polieintentionThe RMSE alue of 112
6indicated that the Interrupted tie series odel as
<table>
<thead>
<tr>
<th></th>
<th>Slope 24 months pre-policy</th>
<th>Slope 12 months pre-policy</th>
<th>Slope 6 months pre-policy</th>
<th>Slope 3 months post-policy</th>
<th>Slope 3 months post-policy</th>
<th>Slope 6 months post-policy</th>
<th>Slope 12 months post-policy</th>
<th>Slope 24 months post-policy</th>
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<tbody>
<tr>
<td>All 77 facilities</td>
<td>-13.13 (p = 0.063)</td>
<td>-13.13 (p = 0.063)</td>
<td>-124.90 (p &lt; 0.05)</td>
<td>-13.13 (p = 0.063)</td>
<td>111.77 (p &lt; 0.05)</td>
<td>111.77 (p &lt; 0.05)</td>
<td>-26.65 (p = 0.18)</td>
<td>124.90 (p &lt; 0.05)</td>
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<td>-17.37 (p = 0.46)</td>
<td>-17.37 (p = 0.46)</td>
<td>-77.10 (p &lt; 0.05)</td>
<td>-17.37 (p = 0.46)</td>
<td>59.74 (p &lt; 0.05)</td>
<td>59.74 (p &lt; 0.05)</td>
<td>111.77 (p &lt; 0.05)</td>
<td>77.10 (p &lt; 0.05)</td>
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<tr>
<td>Rural-based facilities</td>
<td>4.65 (p = 0.44)</td>
<td>4.65 (p = 0.44)</td>
<td>-47.34 (p &lt; 0.05)</td>
<td>4.65 (p = 0.44)</td>
<td>51.99 (p &lt; 0.05)</td>
<td>51.99 (p &lt; 0.05)</td>
<td>59.74 (p &lt; 0.05)</td>
<td>47.34 (p &lt; 0.05)</td>
</tr>
<tr>
<td>Maternity hospital</td>
<td>-3.12 (p = 0.87)</td>
<td>-3.12 (p = 0.85)</td>
<td>23.54 (0.45)</td>
<td>-3.12 (p = 0.87)</td>
<td>-26.66 (p &lt; 0.052)</td>
<td>-26.66 (p &lt; 0.05)</td>
<td>51.99 (p = 0.03)</td>
<td>-23.54 (p = 0.45)</td>
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<tr>
<td>Level 4 facilities</td>
<td>18.79 (p = 0.15)</td>
<td>18.79 (p = 0.15)</td>
<td>-68.00 (p &lt; 0.05)</td>
<td>18.79 (p = 0.15)</td>
<td>86.79 (p &lt; 0.05)</td>
<td>86.79 (p &lt; 0.05)</td>
<td>86.98 (p &lt; 0.05)</td>
<td>68.00 (p &lt; 0.05)</td>
</tr>
<tr>
<td>Level 5 facilities</td>
<td>19.59 (0.13)</td>
<td>19.59 (p = 0.13)</td>
<td>-53.63 (p &lt; 0.05)</td>
<td>19.59 (p = 0.13)</td>
<td>34.04 (p &lt; 0.05)</td>
<td>34.04 (p &lt; 0.05)</td>
<td>34.04 (p &lt; 0.05)</td>
<td>53.63 (p &lt; 0.05)</td>
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<tr>
<td>Level 6 facility</td>
<td>-0.75 (p = 0.87)</td>
<td>-0.75 (p = 0.05)</td>
<td>-0.76 (p &lt; 0.05)</td>
<td>16.26 (p &lt; 0.05)</td>
<td>16.26 (p &lt; 0.05)</td>
<td>16.26 (p &lt; 0.05)</td>
<td>16.26 (p &lt; 0.05)</td>
<td>17.01 (p &lt; 0.05)</td>
</tr>
</tbody>
</table>

**Table 2** Quarterly Patterns in Health Facility Delivery Service Utilization
Table 3 Maternal Mortality Ratios

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>MMR PrePolic</th>
<th>MMR PostPolic</th>
<th>P value</th>
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<tr>
<td></td>
<td>Urban Based facilities</td>
<td>32632443</td>
<td></td>
<td></td>
</tr>
<tr>
<td>acuity</td>
<td>Maternity Hospital</td>
<td>4443152</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leel 4 facilities</td>
<td>1151261</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leel 5 facilities</td>
<td>25411611</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leel 6 facilities</td>
<td>253231</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

A statistical significant increase in facililted deliveries as observed in ena following the implementation of the free maternal health care policy in 213T his result is similar to observations of the implementation of free maternal health care policies in other African countries 24 24. Applying user fees for delierservices in health facilities allit the deandand thus elimination of user fees aproe to health facililted delierservices the increase in facililted deliveries remained consistentligh or the 2 ears postpolicelement This finding is in contrast ith other regional studies inich increased utilization of delierservices as documented during the initial 3 months following user fee real 2. The high utilization of free delierservices or a long period of tie in this studie creates an opportunitito reduce a ternal and neonatal oralit.

The implementation of the free aternal health care polic in ena public health facilities did not hae a significant effect on aternal and neonatal oralit. This obseration is consistent ith results of other local and international studies inich hae shon user free health policies to hae lifted or no effect on aternal and neonatal oralit 2 32.

A significant decline in aternal oralirit as noted in the rural based health facilities in the rural areas and the rural population is ore likel to use pub lic health serices than the urban residents 33 The ena household health expenditure and utilitation sure sho that 66 of the countrys population lies in rural areas and the rural population is ore likel to use public health facilities than those in the poorest uintile. Although on120f the change in ateral oralirit is attributed to the free ateral health care policin the reduction in ateral oralirit in rural based health facilities are attributed to a high utilitation of free delierservices in rural areas here the largest population and poorer population reside.

As pregnancy related deaths are attributed to de las in deciding to seek health facililted delierservices delas in arriving at health facilities and delas in recei ing adequate treatent and referral the findings of this studephas the fact that other factors acontribute to pregnancy related deaths in ena public health facilities 34 The serice readiness aailabilitopping in in 213 hen the free aternal health care policas
<table>
<thead>
<tr>
<th>Facility</th>
<th>Slope 24 months pre-policy</th>
<th>Slope 12 months pre-policy</th>
<th>Slope 6 months pre-policy</th>
<th>Slope 3 months pre-policy</th>
<th>Slope 6 months post-policy</th>
<th>Slope 3 months post-policy</th>
<th>Slope 24 months post-policy</th>
<th>Slope 12 months post-policy</th>
<th>Slope 6 months post-policy</th>
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<tr>
<td>All 77 health facilities</td>
<td>−1.64 (p = 0.20)</td>
<td>−1.64 (p = 0.20)</td>
<td>−5.12 (p &lt; 0.05)</td>
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<td>3.486 (p &lt; 0.05)</td>
<td>3.49 (p &lt; 0.05)</td>
<td>3.48 (p &lt; 0.05)</td>
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<td>−1.92 (p = 0.51)</td>
<td>−7.00 (p = 0.09)</td>
<td>−1.92 (p = 0.51)</td>
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<td>−1.38 (p = 0.40)</td>
<td>−2.37 (p = 0.31)</td>
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<td>0.99 (p = 0.54)</td>
<td>0.99 (p = 0.54)</td>
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<td>−0.08 (p = 0.94)</td>
<td>−2.25 (p = 0.17)</td>
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<td>2.17 (p = 0.06)</td>
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<td>−2.61 (p = 0.20)</td>
<td>−6.85 (p &lt; 0.05)</td>
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<td>4.24 (p &lt; 0.05)</td>
<td>4.24 (p &lt; 0.05)</td>
<td>4.24 (p &lt; 0.05)</td>
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<td>−4.51 (p = 0.06)</td>
<td>−6.70 (p = 0.05)</td>
<td>−4.51 (p = 0.06)</td>
<td>2.19 (p = 0.36)</td>
<td>2.19 (p = 0.36)</td>
<td>2.19 (p = 0.36)</td>
<td>2.19 (p = 0.36)</td>
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<td>Level 6 facility</td>
<td>8.50 (p = 0.42)</td>
<td>8.50 (p = 0.42)</td>
<td>11.05 (p = 0.46)</td>
<td>8.50 (p = 0.42)</td>
<td>−2.55 (p = 0.81)</td>
<td>−2.55 (p = 0.81)</td>
<td>−2.55 (p = 0.81)</td>
<td>−2.55 (p = 0.81)</td>
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</tr>
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</table>
assessments in enan public health facilities hae re
port health sites gaps in serice delier
These gaps include drug and supplshortagesnad
euate health staff to proide care to a high nuber of
thers seeking delierserieshealth orker deo
tiatiodelaed rebrusent of costs incurred hen
roviding free atrernal health care seriesesapathre
ated to free delierseries due to prionconcerns
or referral channels and poor ialtof care in gen
eralThe interplabeetnese challenges and
pragnancerlated ortalitneeds to be further analized
and addressed
ser fees hae traditionallyeen seen as a aor
source of income for health facilities 3 ien that the
free atrernal health care polricebursements are
pried bthe National Hospital Insurance und
NH which also rebrushes health facilities for pro
ging general health serices to NH The douentant this
double pament is not onduplicate but also ineffi
cient and poorunderstood bcounthealth anagers
ho report that thed not kneactiothe funds
roth free atrernal health care polichould be uti
lied 4 ieth delolutionseveral changes hae oc
urred regarding health care financing protocols in the
onties 3 Before delolution of health seriesfacil
ities kept user fee reenue in their on bank accounts
but these funds are nodeposited at the countbank
ountsas such not all health facilities keep the regular
H rebursements and the free atrernal health care
derebursementsln ieof thisconcerns hae
been raised oer diesion of the free atrernal health
care funds bcountgernents and this too has a
egative iplication on the ialtof delierseries
offered bhe counties 41it is for this reason that
stakeholders in health are adising that rebrusent
for offering free atrernal health care serices should be
done through the Health Sector Serices und HSS
channelThealso note that the current leel of co
pensating health facilties for delivering free atrernal
health care serices is challenging gien that it founs
facilities ith richer catchent areas thus reducing the
facilireenues in areas sering saler population
groups hence copoised ialtof sericesSiilarl
despite all health facilities conducting delieriesthe
ounts rebrushe aries per faciliteel

Liitations
Data used in the analyses presented in this manuscrip
t hae seeral noticable liitations:

- ien that rebrusent of costs incurred in
delierseries is based on the nuber of
delierseries conducted in each health facilith the
accuracof data prior to the policahae been

<table>
<thead>
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<th>Variable</th>
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<th>NMR After Polic. Implementation</th>
<th>P value</th>
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<td>−0.16 (p = 0.24)</td>
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<td>0.17 (p = 0.27)</td>
<td>0.39 (p = 0.07)</td>
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<td>−0.15 (p = 0.83)</td>
<td>−0.64 (p = 0.52)</td>
<td>−0.15 (p = 0.83)</td>
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poor hen comared to the post polic
pleentation data

- Although ost of the findings frothis studare
  consistent ith other local and international studies
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- The free aternal health care polichas been
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- The studhas focused on the outcoes of the polic
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etation in health facilities

Additional files

| Additional file 1: | Inness of health facilideliersies ModelThis
| additional file is deried froan analis of the ear absolute percentage
| error MAPeOn all health facilities deliersiesDOC13 kb
| Additional file 2: | Model statistics of health facilideliersies
| generated through LungBoanalysis of all health facilities deliersies
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| Additional file 3: | Inness of aternal oralitratio odelThis additional
| file is deried froan analis of the ear absolute percentage error
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| Additional file 4: | Model statistics of aternal oralitratio generated
| through LungBoanalysis of aternal oralitratio in the health
| deliersiesDOC14 kb
| Additional file 5: | Inness of aternal oralitratio odelThis additional
| file is deried froan analis of the ear absolute percentage error
| MAPeOf neonatal oralitratio in all the health facilitiesDOC13 kb
| Additional file 6: | Model statistics of neonatal oralitratio generated
| through LungBoanalysis of neonatal oralitratio in the health
| deliersiesDOC11kb

Abbreations
APHRC: Africa Population and Health Research CenterARIMA: Autoregression
Moing AveragesCS: Caesarean SectionD: Degrees of reedom
HSS: Health Sector Serices undIBM: International Business Machines
IDRC: International Deelopent Research CentreMAPE: Mean Absolute
Percentage ErrorMBCh: Bachelor of Medicine and SurgerMD: Doctor of
MedicineMMED: Master of Medicine in Obstetrics and necolog
MNR: Neonat MortalityRatePhD: Doctor of PhilosophPMRCPath: Masters
in Huan PathologRMSE: RootMeanSuare ErrorSE: Standard Error
SPSS: Statistical Package for Social SciencesNTID: Institute of Tropical and
Infectious DiseasesS: nded StatesHO: orld Health Organisation

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All the data collection tools and data are in the custodof DrCosas Mugabi
and are aailable on request

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