

## Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our [Editorial Policies](#) and the [Editorial Policy Checklist](#).

Please do not complete any field with "not applicable" or n/a. Refer to the help text for what text to use if an item is not relevant to your study. For final submission: please carefully check your responses for accuracy; you will not be able to make changes later.

### Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a Confirmed

The exact sample size ( $n$ ) for each experimental group/condition, given as a discrete number and unit of measurement

A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly

The statistical test(s) used AND whether they are one- or two-sided  
*Only common tests should be described solely by name; describe more complex techniques in the Methods section.*

A description of all covariates tested

A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons

A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)

For null hypothesis testing, the test statistic (e.g.  $F$ ,  $t$ ,  $r$ ) with confidence intervals, effect sizes, degrees of freedom and  $P$  value noted  
*Give  $P$  values as exact values whenever suitable.*

For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings

For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes

Estimates of effect sizes (e.g. Cohen's  $d$ , Pearson's  $r$ ), indicating how they were calculated

*Our web collection on [statistics for biologists](#) contains articles on many of the points above.*

### Software and code

Policy information about [availability of computer code](#)

Data collection

The code for the CDSS application used by CHWs for data collection and service delivery can be found at: <https://github.com/clinepi-usb/cht-combacal>. Access to the test environment of the CDSS application is available from the corresponding author upon reasonable request.

Data analysis

Data management was done using Stata IC 16.0 and data analysis using R version 4.3.3.

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [guidelines for submitting code & software](#) for further information.

### Data

Policy information about [availability of data](#)

All manuscripts must include a [data availability statement](#). This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

A de-identified key dataset for reproducing the primary and secondary endpoints is available at <https://doi.org/10.5281/zenodo.15674324>. The trial was registered with ClinicalTrials.gov (NCT05684055), where a full protocol and statistical analysis plan are available. A study protocol manuscript has been published previously. Requests for access to more detailed data may be made to the corresponding author by submitting a proposal, which will be reviewed by the trial consortium.

## Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

### Reporting on sex and gender

Only sex was reported. In a pre-specified analysis the interaction of sex with the intervention effect was assessed..

### Reporting on race, ethnicity, or other socially relevant groupings

Race, ethnicity, or other socially relevant groupings were not collected in this study.

### Population characteristics

Consenting adults with uncontrolled hypertension living in one of the study villages were included

### Recruitment

Participants for this trial were recruited among ComBaCal cohort participants after home-based eligibility screening including blood pressure measurements.

### Ethics oversight

The study was approved by the National Health Research and Ethics Committee (NH-REC) of Lesotho (ID 102-2022). Additionally, the Ethikkommission Nordwest- und Zentralschweiz (EKNZ) in Switzerland provided a statement confirming the trial meets all ethical requirements for a Swiss research project (ID AO\_2022\_00074).

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

Life sciences

Behavioural & social sciences

Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see [nature.com/documents/nr-reporting-summary-flat.pdf](https://nature.com/documents/nr-reporting-summary-flat.pdf)

## Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

### Sample size

The sample size was calculated assuming an individual randomization inflated by a design effect that accounts for variation at cluster level. Assumptions: hypertension prevalence: 18%, cluster size: 100 adults, BP control rate in control group: 35%; control rate in intervention group: 52.5%, intra-cluster correlation: 0.015, type 1 error of 0.025, power: 80%. 304 participants minimally required (38 clusters); decided to recruit across all 103 ComBaCal cohort clusters due to operational reasons and uncertainties of some estimates.

### Data exclusions

Participants who became pregnant during follow-up were excluded from the primary analysis

### Replication

Not applicable

### Randomization

Half of the ComBaCal cohort villages were randomly allocated 1:1 to intervention and control groups by a statistician not involved in the study. Randomization was stratified by district (Mokhotlong versus Butha-Buthe) and access to health facilities (easy versus difficult).

### Blinding

Participants were blinded to the allocation, meaning that participants in the control villages were not aware of the intervention being implemented in other villages. CHWs who enrolled participants, provided the intervention and collected endpoint data were not blinded

## Behavioural & social sciences study design

All studies must disclose on these points even when the disclosure is negative.

### Study description

### Research sample

### Sampling strategy

### Data collection

### Timing

### Data exclusions

### Non-participation

### Randomization

# Ecological, evolutionary & environmental sciences study design

All studies must disclose on these points even when the disclosure is negative.

Study description

Research sample

Sampling strategy

Data collection

Timing and spatial scale

Data exclusions

Reproducibility

Randomization

Blinding

Did the study involve field work?  Yes  No

## Field work, collection and transport

Field conditions

Location

Access & import/export

Disturbance

## Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

### Materials & experimental systems

n/a	Involved in the study
<input checked="" type="checkbox"/>	Antibodies
<input checked="" type="checkbox"/>	Eukaryotic cell lines
<input checked="" type="checkbox"/>	Palaeontology and archaeology
<input checked="" type="checkbox"/>	Animals and other organisms
<input checked="" type="checkbox"/>	Clinical data
<input checked="" type="checkbox"/>	Dual use research of concern
<input checked="" type="checkbox"/>	Plants

### Methods

n/a	Involved in the study
<input checked="" type="checkbox"/>	ChIP-seq
<input checked="" type="checkbox"/>	Flow cytometry
<input checked="" type="checkbox"/>	MRI-based neuroimaging

## Antibodies

Antibodies used

Validation

## Eukaryotic cell lines

Policy information about [cell lines and Sex and Gender in Research](#)

Cell line source(s)

Authentication

Mycoplasma contamination

Commonly misidentified lines  
(See [ICLAC](#) register)

## Palaeontology and Archaeology

Specimen provenance

Specimen deposition

Dating methods

Tick this box to confirm that the raw and calibrated dates are available in the paper or in Supplementary Information.

Ethics oversight

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Animals and other research organisms

Policy information about [studies involving animals; ARRIVE guidelines](#) recommended for reporting animal research, and [Sex and Gender in Research](#)

Laboratory animals

Wild animals

Reporting on sex

Field-collected samples

Ethics oversight

Note that full information on the approval of the study protocol must also be provided in the manuscript.

## Clinical data

Policy information about [clinical studies](#)

All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration

Clinicaltrials.gov: NCT05684055

Study protocol

Full protocol available on clinicaltrials.gov; published protocol available open access: <https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-024-08226-2>

Data collection

Data were collected by trained CHWs during home visits and entered into a mobile clinical decision support and data collection application.

Outcomes

The primary outcome was blood pressure control rate (<140/90 mmHg) twelve months after enrolment. Secondary endpoints included engagement in care, mean systolic and diastolic blood pressure at six and twelve months. Safety outcomes included deaths, non-fatal serious adverse events and adverse events of special interest, defined as events consistent with complications of hypertension or side-effects to antihypertensive medication.

## Dual use research of concern

Policy information about [dual use research of concern](#)

### Hazards

Could the accidental, deliberate or reckless misuse of agents or technologies generated in the work, or the application of information presented in the manuscript, pose a threat to:

No	Yes
<input type="checkbox"/>	Public health
<input type="checkbox"/>	National security
<input type="checkbox"/>	Crops and/or livestock
<input type="checkbox"/>	Ecosystems
<input type="checkbox"/>	Any other significant area

## Experiments of concern

Does the work involve any of these experiments of concern:

No	Yes
<input type="checkbox"/>	Demonstrate how to render a vaccine ineffective
<input type="checkbox"/>	Confer resistance to therapeutically useful antibiotics or antiviral agents
<input type="checkbox"/>	Enhance the virulence of a pathogen or render a nonpathogen virulent
<input type="checkbox"/>	Increase transmissibility of a pathogen
<input type="checkbox"/>	Alter the host range of a pathogen
<input type="checkbox"/>	Enable evasion of diagnostic/detection modalities
<input type="checkbox"/>	Enable the weaponization of a biological agent or toxin
<input type="checkbox"/>	Any other potentially harmful combination of experiments and agents

## Plants

Seed stocks

Novel plant genotypes

Authentication

## ChIP-seq

### Data deposition

- Confirm that both raw and final processed data have been deposited in a public database such as [GEO](#).
- Confirm that you have deposited or provided access to graph files (e.g. BED files) for the called peaks.

Data access links

May remain private before publication.

Files in database submission

Genome browser session  
(e.g. [UCSC](#))

## Methodology

Replicates

Sequencing depth

Antibodies

Peak calling parameters

Data quality

## Flow Cytometry

### Plots

Confirm that:

- The axis labels state the marker and fluorochrome used (e.g. CD4-FITC).
- The axis scales are clearly visible. Include numbers along axes only for bottom left plot of group (a 'group' is an analysis of identical markers).
- All plots are contour plots with outliers or pseudocolor plots.
- A numerical value for number of cells or percentage (with statistics) is provided.

### Methodology

Sample preparation

Instrument

Software

Cell population abundance

Gating strategy

- Tick this box to confirm that a figure exemplifying the gating strategy is provided in the Supplementary Information.

## Magnetic resonance imaging

### Experimental design

Design type

Design specifications

Behavioral performance measures

Imaging type(s)

Field strength

Sequence & imaging parameters

Area of acquisition

Diffusion MRI

Used

Not used

### Preprocessing

Preprocessing software

Normalization

Normalization template

Noise and artifact removal

Volume censoring

### Statistical modeling & inference

Model type and settings

Effect(s) tested

Specify type of analysis:  Whole brain  ROI-based  Both

Statistic type for inference

(See [Eklund et al. 2016](#))

Correction

## Models & analysis

n/a Involved in the study

- Functional and/or effective connectivity
- Graph analysis
- Multivariate modeling or predictive analysis

Functional and/or effective connectivity

Graph analysis

Multivariate modeling and predictive analysis

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