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# Chronic Disease Management in Primary Care: Evaluating Hypertension and Diabetes Treatment Outcomes in Kenya's Public Health Facilities

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## Abstract

What is the level of hypertension and diabetes control of Kenyan public facilities once a patient has been taken under care? This article is a synthesis of household surveys of Kenya, clinical cohorts, trials and patient reports. It can differentiate changes between patients with follow-up measures and results on all who initiate treatment. In a big hypertension programme, blood pressure control was measured in 48.6 of patients at an estimated time of one year, but there was only 12% retention after twelve months. In Webuye District Hospital, the mean glycated haemoglobin decreased in entry, as 10.2% went to 8.4% in patients who stayed on treatment after eighteen months. These findings indicate that there can be clinical improvement though both estimates do not characterize all patients using Kenyan public facilities. Integration of chronic care with an existing service platform in western Kenya raised the ratio of new patients with no evident evidence of better blood pressure or glucose results. The reason why diagnosis is not always followed by long-term control has to do with medicine availability, the price of recurrent visits, and access to monitoring. In the article, it is suggested that counties should consider clinical control and retention, measure coverage and patient costs, and apply them to the point of care breakage.

**Key words:** *hypertension, type 2 diabetes, primary health care, Kenya, blood pressure control, glycated haemoglobin*

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## Introduction

A patient who comes to the clinic to be treated with hypertension and does not show up again on the clinic register is a problem to both the clinician and county health manager. The clinician is not aware of whether or not the patient is under treatment, has or requires an urgent review. A report of satisfactory blood pressure control among the returning patients may still be provided to the manager. The same issue can be seen in diabetes where the patients attend regularly but are not able to get a glycated haemoglobin (HbA1c) test. In both cases, the result given is about people whom the service can quantify. In order to evaluate the effectiveness of the state primary care in Kenya, the knowledge of missing people is important.

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The extent of the problem is established through national survey data prior to patients visiting a facility. The age-standardised hypertension prevalence was 24.5 in the 2015 Kenya STEPwise survey of adults aged 18-69 years. Only 15.6% of the participants who were categorized as having hypertension were aware of it. Among the aware, 26.9% received treatment; among the treated, 51.7% controlled their blood pressure (Mohamed, Mutua, et al., 2018). The last percentage will sound positive when read on its own. Its denominator does not include individuals who were not diagnosed or treated. These historical estimates characterize the population which is surveyed and gives a starting point; they do not quantify the current performance of a county clinic.

An independent survey analysis of the same survey estimated prevalence of age-standardised diabetes of 2.4% and of prediabetes of 3.1% (Mohamed, Mwangi, et al., 2018). The measurement problem with diabetes care is different than hypertension care. During a consultation, staff can measure the blood pressure with the help of the necessary equipment. The clinician must have an HbA1C level or another appropriate result that must be interpreted in context to evaluate longer-term glycaemia. A clinic that fails to consistently acquire these measurements has little evidence regarding the effectiveness of its prescriptions. The number of people treated with diabetes will not solve that uncertainty.

The publicly based system has dispensaries and health centres providing the first-contact care, sub-county hospitals, where referrals are received and hospitals offering more specialised services. A patient can be utilizing more than one of these facilities in a year. Practically, a diagnosis confirmation institution can be different than the location where a patient receives medications or consults in case of symptom alteration. A survey of national facilities identified variability in preparedness based on the level of care and condition, which has practical importance to the location of follow-up (Ammoun et al., 2022). Comparisons of counties must therefore take into consideration service level, referral duties and the patients that access each facility.

This article deals with three questions. What Kenyan research informs us about blood pressure and glycaemic outcomes with the initiation of treatment? What impacts the interpretation of those outcomes are retention, access to medicines, household costs and the accessibility of tests? What would your indicators be to inform county teams about where to intervene? It is in terms of adult outpatient, specifically hypertension and type 2 diabetes. The interpretation of public facility evidence is combined with evidence provided by partner-supported programmes and referral clinics, and each of the settings is identified. The aim is to find out what an evident enhancement should entail to the people that a given service to the people is taking care of over a period of time.

## Literature review

### From resources to outcomes

Donabedian (1988) made a difference between the resources that care is given and what health professionals do with them and what then happens to patients. The difference is especially valuable in the case of chronic disease. One of the resources is a working blood pressure monitor. Valid measurement is a process of care to be taken and recorded. A patient outcome is sustained blood pressure reduction. It is important to record all three as they all lead to varied responses. In one facility, it could be a replacement of a failed monitor; in another facility, it could be about whether there is a person who reviews a high result and sets up the next contact. The identification of both cases as poor control blurs the distinction.

The cardiovascular risk assessment and diabetes management are included in primary health care as part of the World Health Organization package of essential noncommunicable disease interventions (World Health Organization [WHO], 2020). This strategy provides the facilities with an incentive to make services centred on the person. A patient who takes an antihypertensive medication and a glucose-lowering medication must be provided with a consistent follow-up regimen, despite the fact that the two prescriptions are written by different clinics. A typical appointment may save on traveling, but its worth will be determined on what can

be actually accomplished on the day. In case the laboratory is not available or that one of the medicines is out of stock, the seemingly positive result of a combined visit can be passed on to the patient as another trip.

Careful interpretation of clinical targets is also required. WHO (2021) discusses pharmacological therapy and follow-up of non-pregnant adults who have hypertension and whose diagnosis is appropriate. A blood pressure level of less than 140/90 mmHg is commonly used in research programmes to compare groups. In the case of diabetes, the HbA1c target should be less than 7% in most non-pregnant adults, depending on the circumstances and risk of hypoglycaemia (American Diabetes Association Professional Practice Committee for Diabetes, 2026). A standard reporting threshold is comparable and the clinical record may maintain a personal goal and justification. Otherwise, a service may seem to be doing better by trying to achieve a numerical goal in a person whose goal is inappropriate.

## What different measures reveal

The proportion of patients who achieve a target is answered by a fall in average blood pressure. When a patient initially has quite high pressure, he/she can get very much better and still be above the level. A different patient who starts near to the threshold might shift to uncontrolled to controlled with a slight shift. A facility which gets complicated referrals will hence be expected to appear different as compared to a dispensary after stable patients. Information that cannot be presented by a raw control percentage is the baseline severity, elapsed time and the number of patients measured. The BIGPIC trial of western Kenya explains why the baseline and comparator are important to interpret changes in systolic pressure (Vedanthan et al., 2021).

The measure of glucose is equally important. HbA1c provides a longer term measure of glycaemia than a random or fasting glucose level. Mood and time in relation to meals influence the interpretation of a glucose result. It is reasonable that measurements that are available to a service can be used by that service, although a report ought to identify measurements made. The evaluation of the Primary Health Integrated Care Project on Chronic Conditions (PIC4C) made a differentiation between fasting and random plasma glucose and applied specific thresholds when defining diabetes control (Mugo et al., 2024). Such a rate cannot be used instead of an HbA1c control rate. The indicator can change due to a change in the availability of a test in the same clinic without necessarily changing health.

The patients are interested in longer-term outcomes: will they be able to continue working, prevent severe hypoglycaemia, sustain vision or kidney functionality, spend less time at the hospital. Evidence of Kenyan county hospitals demonstrates why glucose is not the only thing to be given attention. Kimando et al. (2017) reported in their study that only 20.3% of the ambulatory patients with type 2 diabetes were able to achieve the study targets of glycaemia, blood pressure and low-density lipoprotein cholesterol at the same time. This is information regarding a given outpatient population. It further poses a key question to primary care: when a glucose finding is acceptable, has the team managed the other risks that the person has? One successful measurement may be in the presence of a large number of unmet care needs.

## Continuity and the work patients undertake

Largely between visits, a treatment plan is followed. Patients need to spend money on transportation and medications, get food that fits their situation, retain information and choose when a symptom should prompt a follow-up. In a survey of 301 individuals with hypertension or diabetes in western Kenya, respondents rated costs and health monitoring and fatigue caused by self-management as among the more taxing parts of care (Koros et al., 2023). The research involved the measurement of experience instead of clinical control changes. It is valuable because it can determine the activities that can complicate a medically sound plan to follow especially by the patient with more than one chronic condition.

The difference between initiation and persistence of treatment can be seen in Kenyan cohorts of outpatients. Werner et al. (2015) trailed clinic records of two informal settlements in Nairobi. Out of 726 who attended

at least once, 27% did so just once. Just 3.4% attended monthly throughout the 34-month programme. The latter was a strict definition of regular attendance; it is not the same as skipping one scheduled visit but to suspend the treatment forever. However, just clinical figures of repeat attenders would be leaving much to be desired in the story. A return interval must be interpreted relative to the treatment provided, the scheduled appointment and whether the patient received care elsewhere or not.

### Evidence for different ways of organising care

Care can be more accessible through community health workers, shared clinical responsibilities and group appointments. A meta-analysis of task sharing in the low- and middle-income nations revealed an overall decrease in systolic blood pressure, with significant variation across studies and professional groups (Anand et al., 2019). This advocates the idea of team-based care in Kenya, but does not dictate what type of tasks a specific cadres shall do. The local decision is based on training, supervision, referral access and the possibility to escalate abnormal findings. Giving a measurement task is easier than making sure that a patient requiring clinical attention gets it.

One western Kenyan pilot integrated group care with an income-generation strategy and quantified the association of those who screened positive with an initial session (Pastakia et al., 2017). It contributed by demonstrating that the screening-to-group visit pathway could be made to run under programme conditions. In a later randomised trial, the more challenging question of whether group medical visits or microfinance was better than an established chronic care service in terms of blood pressure was posed (Vedanthan et al., 2021). That development exemplifies a problem that is recurring in the literature. To prove the feasibility, to provide an additional clinical benefit, and to demonstrate affordability on county scale, other evidence is needed.

## Methodology

### Review design and scope

A systematic literature review was employed to unite the studies which respond to varying sections of the same service question. This design allows making comparisons between clinical cohorts, facility audits, household surveys, patient interviews and trials without considering their endpoints to be the same (Snyder, 2019). Publicly available research was used in the review; no recruitment was used, no identifiable patient files or new facility measurements were reviewed. The reported result was the unit of interpretation in its original context. Where a publication reported a programme which acted at multiple levels of the facility, the findings were programme-level unless they were reported by facility type.

Narrowed searches involved adding Kenya and county or programme names to hypertension, diabetes, primary care, blood pressure control, HbA1c, retention, medicines, costs and facility readiness. Search results were found in PubMed-indexed reports, open-access journal articles, records of publishers and institutional records and documents. References and links to publications were used to trace related studies. Corpus contained evidence that is accessible by November 2026, and older studies with distinct national baselines or clinical follow-up. To be eligible, one needed to make a contribution to at least one of the review questions. The definitions of concepts and interpretation of outputs were based on methodological literature and international guidelines, but not estimating the performance of treatment in Kenya.

Kenyan studies that are able to establish a population, care setting and observable outcome were given priority. Documents of the public hospitals were kept wherein outpatient diabetics care or a referral routeway was detailed in the primary care. Urban outreach and nongovernmental clinics were also considered as comparators and were identified as such. Purchase site studies, money, training and service preparedness studies added to the explanation of any gap in treatment; they were not included as a measure of clinical efficacy. Intervention or geographic network Reports based on the same survey were read together. A

number of papers on a single programme can explain the mechanism without independent replication of the effects of the programme.

### Comparison and interpretation

Each major clinical estimation was analyzed based on the underlying population, setting, design, baseline or comparator, follow-up window, measurement and denominator. The difference in percentage points was maintained separately of relative change, and the difference in blood pressure was maintained separately in mmHg. As an example, the comparison of groups visits with usual care has the difference between groups as its primary estimate and its confidence interval. The change in the improvement within the group only was the one that was introduced by the intervention and could have been provided in the usual care. In the case of observational cohorts, special care was taken over the patients who measured later at the time point.

Results were tabulated based on the course of care: access to treatment, the continuity of access, clinical control and patient outcomes documented. The result might still be unknown due to the movement or transfer, death, inability to pay, failure to take any test or discontinued attendance. Those individuals who were not measured were not given a clinical status in the review. No composite national control estimate was obtained: the studied available had variations in the ownership of the facilities, the selection of patients, thresholds, follow-up and treatment support. The search was purposive and not based on independent duplicate screening and could be biased in favor of better documented programmes. These constraints limit the scope of the results especially in counties where few data were published.

## Findings

### Hypertension improves among patients reached for follow-up

A large Kenyan hypertension programme provides the clearest evidence of an unbridgeed gap between the initiation of treatment and sustained observation. Mbau et al. (2022) studied data collected in routine in 2015-18 and comprised 663,028 screening interactions and 66,981 individuals who initiated treatment. Only 12% of patients were retained after 12 months. Among those on treatment and evaluated at 10.5-13.5 months after enrolment, 48.6% had their blood pressure under control. The former count is of encounters, which can be repeated; the latter percentage is of a significantly smaller clinical population. The programme showed great screening capacity, but was able to record the eventual status of only a small proportion of patients.

It has been shown that in the rightly supported case, lower level facilities can provide effective follow-up. In Empower Health programme, 16,970 out of 65,517 patients who had blood pressure records at six months and twelve months were reported to have hypertension with eligibility to last a year or more. Control of less than 140/90 mmHg improved by 37 to 56 percent at baseline and twelve months in that measured group. The percentage of patients under control increased by 32 to 63 among the measured group of patients in dispensaries and health centres (Medtronic LABS, 2025). This programme report presents some exceptionally candid evidence regarding lower level facilities. Its estimates extend to individuals with repeated measurements and a discrepancy between hospitals could be due to baseline pressure, referral patterns and patient selection.

The BIGPIC trial offers more robust comparison of alternative models of delivery. In 24 clusters, the participants were distributed to usual programme care, microfinance, group medical visits or both additions (2,890). After a year, mean systolic pressure had decreased by 11.4 mmHg of usual care and 16.4 mmHg of combined intervention. The adjusted difference for the combined arm relative to usual care was −3.9 mmHg; the multiplicity-adjusted 98.3% confidence interval ranged from −8.5 to 0.7 mmHg (Vedanthan et al., 2021). The data permit a potentially beneficial extra advantage, but there is no difference in the interval. They fail to prove that microfinance is a key to successful hypertension treatment.

The comparator is specifically relevant to a county that is making a decision on the place to invest. The standard care in BIGPIC was a multicomponent, established programme. The inclusion of group visits in that service tackles a different choice of providing reliable blood pressure measurement and medicines to a facility that does not have them. Chay et al. (2024) then used a model based on the trial to estimate costs and disability-adjusted life years. Their approximations back a budget debate regarding other delivery models. They cannot be interpreted as experimented stroke or mortality decreases in the participants of the trial. The annual cost of staff time, supervision, travel and any functions previously financed by partners are also required by a county wishing to replicate.

## Diabetes control can improve without reaching target

The Webuye District Hospital diabetes clinic offers a good longitudinal comparison of rural outpatient care. Out of 524 patients that were enrolled within the assessment period, the average baseline HbA1c was 10.2%. The mean of patients staying in care at eight months was 8.4% across the patients who stayed in care at eighteen months (Pastakia et al., 2018). The variation of 1.8 percentage points is positive to indicate that there is improvement in the observed population, but the final mean remains above the general population expectation of many adults. Since the subsequent measurement involved sustained attendance and testing, it does not prove a 1.8-point decrease in each individual that is enrolled. These two means cannot be able to recover an individual level target attainment rate.

An alternative image develops when HbA1c is taken on a single occasion among clinic attenders. Mwavua et al. (2016) evaluated 200 individuals with type 2 diabetes (120 Kenyatta National Hospital and 80 Thika District Hospital). Only one out of seven met the definition of good glycaemic control of the study. The corresponding estimates were 18.3% and 15% and there was no statistically definite difference between sites. Thika patients however expressed higher affordability and satisfaction; these dimensions of quality which cannot be reflected in an HbA1C comparison. These were outpatients in hospitals. The findings provide a rationale to explore upstream management and referrals, but are unable to characterize diabetes control at pharmacies around Kenya.

Three primary care clinics operated by Médecins Sans Frontières served hypertension and diabetes or both people in Kibera. The glycaemic target of the programme was attained among only 20% of patients with diabetes. Two-thirds of hypertensive patients without diabetes achieved their blood pressure target at twenty-four months, versus 28% of patients with diabetes achieving theirs (Sobry et al., 2014). These numbers relate to externally run programme and study targets. They report about the difficulty of dealing with concurrent conditions in an informal settlement. They fail to determine that it is the difference caused by diabetes itself and that the same rates would be applicable to government facilities serving the area.

The data on the public referral pathway assists in understanding the reasons why durable diabetes outcomes are especially hard to determine. Among the nine facilities surveyed within the county of Murang’a, at levels three through five, researchers found that there were gaps in HbA1c and renal testing and regular evaluation of complications (Morales Ortiz et al., 2022). In cases where a patient has to go to seek a test, the outcome might never get to the clinician who modifies treatment. One effective service measure is then the percentage of requested tests to which a result was sent to the treating facility and to which a documented review was made. A different thing is to buy a laboratory test and do that clinical loop.

## Integration increases entry into care more reliably than clinical control

PIC4C is a most useful test of what occurs when screening, diagnosis and continuing treatment are embedded in an already existing partnership between the public sector. Mugo et al. (2024) examined 13,046 hypertension and 7,267 diabetes patient records in Busia and Trans Nzoia in 2017-2021. The implementation was linked with increased likelihood that monthly attendees were new patients: adjusted odds ratios were 1.57 in the case of hypertension and 1.31 in the case of diabetes. The primary models exhibited minimal

systolic pressure and fasting glucose increases, and sensitivity analyses did not indicate any difference in both results. The assessment facilitates better access to care. It provides not much ground to argue that there is either better control or damage due to integration.

The evaluation has two characteristics which are important to interpret. To begin with, the discovery of untreated patients alters the clinic make-up. The average glucose may increase as more individuals with high baseline levels become patients, although current patients may continue to improve. Second, the implementation coincided with the COVID-19 pandemic, which makes it difficult to attribute changes in attendance and case mix. These are just possible reasons but not proved causes of the observed estimates. A more rigorous county check would follow newly admitted patients over the same period, separate and keep calendar dates of service disruptions of already established patients. Such design would assist in differentiating the expansion of access and modifications in the quality of continuous treatment.

Patient accounts determine what aspects of integration made a viable difference. Naanyu et al. (2024) interviewed 43 people receiving PIC4C services, with 37 participating at both rounds. Community screening and care that were free and brought near to homes assisted individuals to seek a diagnosis or get into treatment. The challenges in funding of the follow-up care and lack of consistency in the availability of medicines were obstacles post-enrolment. The explanations explain the seeming discrepancy between enhanced recruitment and indecisive clinical results. Access to the first visit can be achieved via a campaign whereas the following year of treatment remains subject to recurrent household spending and a local pharmacy operating.

## Medicine access and household costs shape continuity

The diagnosis at a public system does not always imply the patient will receive treatment at the system. In a household study of 445 individuals living within eight counties and prescribed antihypertensive medicines, 67.5% had a diagnosis at a public hospital, with the most common location of purchase being a retail pharmacy (33.6) (Syed et al., 2018). The place of purchase does not indicate that there was a stockout of a given facility on a given day. It does indicate why a list of prescriptions that are filled in the public hospitals provide partial information concerning access. Inquiring whether a patient got the entire prescription, its origin and cost may clarify an otherwise confusing gap in treatment.

This is supported by supply-side studies. Eight counties were surveyed of health facilities and retail outlets where disparities among sectors were found in the availability and prices of medicines to treat noncommunicable diseases (Ashigbie et al., 2020). A Kenyan cluster-randomised trial showed no significant difference in providing a portfolio of cheaper medicines and improving the availability of medicine in the homes of patients (Rockers et al., 2019). These results relate to availability, rather than physiological control. They are all implying that procurement prices do not give a complete picture about success. There must be ordering, delivery and dispensing of a product in sufficient quantity and the product must be available when the patient requires a refill.

Evidence of seven public facilities in Seme, Kisumu County, provided recently, demonstrates where a supply intervention is likely to be stuck. All seven had developed annual plans and budgets, but none had the complete programme planning, budgeting and a special noncommunicable disease budget line evaluated by the investigators. Six reported common stockouts of medicine, and managers indicated delays in getting permission to spend money (Amollo et al., 2026). This is a small local study that cannot measure national shortages. It provides a clear question to county managers to research when inventory becomes low: who has the money and the power to replenish it and how long does that process last?

The economic strain is particularly apparent with both conditions needing treatment. Surveying 719 adults in Busia and Trans Nzoia, the yearly costs were estimated at KES 13,149 per patient with both conditions, KES 8,408 per patient with diabetes only, and KES 7,458 per patient with hypertension only (Kishindo et

al., 2023). These are estimates of study period with reported use and not with current prices. They provide a tangible rationale to plan appointments and refills. A clinic is able to distribute cheap pills and yet charge unnecessary cost when monitoring, laboratory review and collection involve different trip or day out of work.

### The team and the measurement system influence recorded outcomes

Kenyan research identifies two contributions of community-based care. Community health workers in a cluster trial with customized communication and smartphone-based support demonstrated better linkage in comparison with some comparison conditions, with no evidence of an extra systolic reduction in blood pressure (Vedanthan et al., 2019). Repeated medication delivery in a western Kenyan medication delivery programme was correlated with increased self-reported adherence and a greater reduction in blood pressure (Tran et al., 2022). In the second study, there was no random assignment of receipt of deliveries. The patients that the workers can reach over and over again might also vary in other aspects. The outcomes support the idea to test locally modified delivery plans and monitor clinical outcomes and delivery success.

A mixed-methods evaluation in the Kisumu County determined holes in the organisational capacity of facilities and staff support in managing hypertension and diabetes (Ouma et al., 2025). Another evaluation of training of 24 workers at ten facilities conducted later found that the average knowledge score of workers increased to 8.17 right after the training, compared to pre-training score of 6.46. The initial increase in observed practice scores followed by a decrease by the three-month assessment (Ouma et al., 2026). In both studies, no outcome of a change in HbA1c or blood pressure in patients was measured. This difference is important to supervision: it is fair to document that employees have studied the content as they analyze independently whether the personnel can use it when the equipment or supplies are not present.

The denominator ends up being both a service and statistical decision. An example of a clinic is considered where 100 adults began hypertension treatment one year ago. Control among the measured patients would be 60 in case 60 had an effective measurement in the review window and 36 of them met the reporting threshold. The original cohort has a documented control of 36%. Unknown clinical status in the other 40 patients; to make a biological claim that would be unjustified we would have to assign all of them to the uncontrolled group. Making the two percentages and the missing number known to the county informs the county on whether to concentrate on the review of treatment, reconnecting the patients or both. These figures depict a calculation and not a Kenyan facility observation.

A county team ought to inquire of their patients (before comparing two facilities) whether they were given equal chances to be counted. A health centre which measures people with unstable disease regularly might report poorer control than that which measures only those people who can afford to visit a laboratory. On the other hand, a dispensary which sends patients with the most complicated cases can seem to perform better than the hospital receiving them. A small sample of both ways referrals should be reviewed to determine whether patients got to the next service or not, as well as the receiving facility received a result or not. It is a feasible test of what a ranking means prior to it making an impact on staffing or supply decisions.

## Conclusion and recommendations

Kenyan experience demonstrates that patients are able to obtain significant blood pressure improvements and enhance glycaemic control during outpatient care, even services provided near their home. Documented outcomes often pertain to a subsample who reappeared and was measurable. Intermediate clinical measures changes in specific programmes have the most powerful evidence. It has low sustainability in control among all patients who start treatment, preventing complications and between counties. A report which indicates that screening has been successful and follow-up is not complete thus defines a service which has already performed one crucial task and still requires completing the other.

The first one is to visualize continuity. Reporting windows should be agreed upon by county teams and groups of newly enrolled patients should be tracked to six and twelve months. Facilities are to report the number enrolled, due, assessed, controlled and transferred, known deaths and unresolved absences. Where feasible a checked transfer must be checked with the receiving facility. The initial number of cohorts should not be hidden but kept in view to comprehend the alterations made on the denominator. Patients with both conditions can have one linked record to identify whether a blood pressure reading and the scheduled glucose assessment were conducted on the same care pathway.

The second priority is to ensure that follow-up is possible. Clinical review and gathering of medicine should be planned together by the facility managers where the clinically appropriate and inquire about travel costs and out-of-pocket costs and provide patients with an option of people to call in case of a missed appointment. Pharmacists in the county should examine the days that the necessary medicines are out of stock and the rate of prescription refills. Laboratory coordinators are to observe the frequency of result of a requested diabetes test that is available at the next clinical review. Measures determine certain roles and enable corrective action prior to a quarterly control rate modification. Expansion of an intervention should only be considered by a county once it has explored the biggest gap in the area.

Third, the clinical governance must connect results and decisions. A review of records sample can determine whether high readings were confirmed in a proper way, treatment was reviewed and barriers were discussed and referral was completed in case it was necessary. Safety concerns, particularly hypoglycaemia and individual goals documentation should also be sought in the review. Patient response might show whether advice was comprehensible and a planned refill was affordable. A combination of reviewing records and a short patient history can be used to differentiate between a missed clinical opportunity and a treatment decision that was wise but improperly documented. It also does not attribute an interruption to patient behaviour in the event of unavailability of the prescribed medicine.

Further studies must involve similar cohorts in dispensaries, health centres and their referral hospitals, with a conscious effort to include counties that may not have good research relationships. It must record baseline severity, patient expenses, accessibility to testing, causes of transfer and experience of individuals who disengage. Extended follow-up and connection with hospital data would enable the assessment of hospital admissions, significant complications and survival. To the decision makers in the county, the test of improvement is more modest and more practical, can a larger proportion of those who start treatment get it regularly, do their progress safely and receive feedback when their results justify a change?

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