Global Academic Journal of Economics and Business

Available online at https://www.gajrc.com
DOI: https://doi.org/10.36348/gajeb.2026.v08i04.020

OPEN ACCESS

ISSN: 2706-9001 (P)
ISSN: 2707-2584 (O)

Original Research Article

Optimizing Internal Medicine Care Pathways for Chronic Diseases Management under Saudi Vision 2030

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Article History
Received: 26.05.2026
Accepted: 20.07.2026
Published: 22.07.2026

Abstract: Chronic diseases have become a central workload for internal medicine services in Saudi Arabia, where diabetes, hypertension, cardiovascular disease, chronic kidney disease, obesity, chronic respiratory disease and fatty liver disease frequently coexist in the same patient. Conventional clinic structures still tend to manage each diagnosis through separate appointments, separate targets and delayed specialist referral, which increases therapeutic inertia, patient burden and avoidable admissions. This review proposes a Saudi Vision 2030-aligned internal medicine care pathway for chronic disease management that integrates early risk detection, multimorbidity assessment, shared care planning, protocolized escalation, patient education, digital follow-up and outcomes governance. A narrative review method was applied to evidence published from 2020 to 2025, including Saudi health transformation literature, international clinical guidelines, chronic disease implementation frameworks and recent Saudi studies on noncommunicable disease burden. The proposed pathway places internal medicine as a coordination hub between primary care and organ-based specialties. It recommends risk-based screening, medication optimization, multidisciplinary review, digital monitoring, patient-reported outcomes and value-based key performance indicators. The review concludes that pathway redesign can support the Health Sector Transformation Program by improving continuity, standardizing chronic disease care, reducing duplication and strengthening prevention before complications occur.

Keywords: Internal Medicine, Chronic Disease Management, Saudi Vision 2030, Care Pathways, Multimorbidity, Diabetes, Hypertension, Digital Health, Value-Based Healthcare.

INTRODUCTION

Internal medicine is positioned at the point where chronic disease complexity becomes visible. A patient may enter the clinic for uncontrolled diabetes, but the same visit often reveals obesity, hypertension, dyslipidemia, early kidney disease, breathlessness, sleep disturbance, depression, polypharmacy and weak adherence. In such circumstances, single-disease care is inadequate because it treats the chart rather than the person. Saudi Arabia's Health Sector Transformation Program has emphasized access, prevention, digital transformation and quality improvement as major routes toward Vision 2030 [2, 3]. These priorities create an opportunity to redesign chronic disease management from episodic consultations into structured pathways that make risk visible, reduce fragmentation and support long-term self-management.

The chronic disease challenge in Saudi Arabia is intensified by demographic change, urban lifestyles, high cardiometabolic risk and growing demand on hospital services. National and regional studies identify diabetes, cardiovascular disease, kidney disease and obesity as major contributors to morbidity, mortality and cost [4-7]. The attached Saudi cardiorenal metabolic disease review illustrates how interrelated conditions share mechanisms and should be managed through integrated, patient-centered pathways rather than by isolated specialties [1]. For internal medicine, this means building a practical operating model that can identify high-risk adults, coordinate therapeutic decisions, use specialist input efficiently and monitor outcomes after the patient leaves the clinic.

This review develops an optimized pathway for chronic disease management under Saudi Vision 2030. It does not propose a new disease guideline; instead, it translates guideline evidence into a service design for internal medicine settings. The focus is on common long-term conditions managed by internists: diabetes, hypertension, cardiovascular risk, chronic kidney disease, chronic respiratory disease, obesity, metabolic liver disease and multimorbidity. The pathway is intended for hospitals, polyclinics and integrated care networks that need a consistent, measurable and digitally supported model.

Aim and Objectives of the Study

The aim of this review is to propose an internal medicine care pathway that improves chronic disease management in Saudi Arabia by aligning evidence-based clinical practice with Vision 2030 health transformation priorities. The specific objectives are to synthesize recent evidence on chronic disease integration; identify barriers that prevent seamless internal medicine care; design a pathway from risk stratification to follow-up; define multidisciplinary and digital enablers; and recommend measurable indicators for implementation. A further objective is to support research and policy discussion by presenting a model that can be adapted to local hospital capacity, workforce availability and patient population risk.

METHODS

A narrative review methodology was selected because the topic concerns pathway design, implementation and context-sensitive service improvement rather than a single intervention effect. The method was informed by the structure of the attached Springer review, which combines literature review, regional evidence, expert-oriented recommendations and implementation logic for Saudi Arabia [1]. Literature published between 2020 and 2025 was prioritized. Sources included official Saudi Vision 2030 and Ministry of Health transformation materials, WHO noncommunicable disease packages, diabetes, kidney, hypertension and respiratory guidelines, and recent peer-reviewed Saudi studies on chronic disease burden.

Search concepts included internal medicine pathways, chronic disease management, multimorbidity, Saudi Vision 2030, Health Sector Transformation Program, diabetes, hypertension, chronic kidney disease, cardiovascular risk, chronic respiratory disease, obesity, digital health, patient-centered care and value-based healthcare. Evidence was organized by relevance to five pathway domains: risk detection, clinical coordination, treatment optimization, patient engagement and outcome measurement. Preference was given to systematic reviews, guidelines, national reports and Saudi data. Because no new patient data were collected, ethical approval was not required. The synthesis generated pathway components and practical recommendations rather than pooled effect estimates.

Burden and Rationale for Pathway Optimization

Chronic disease management requires an integrated view because the same determinants recur across conditions. Physical inactivity, unhealthy diet, obesity, tobacco exposure, poor sleep, social stress and medication nonadherence influence diabetes, hypertension, cardiovascular disease, chronic kidney disease and chronic respiratory disease. WHO PEN and HEARTS materials emphasize protocolized primary care, risk-based cardiovascular prevention and feasible service packages for NCDs [8, 9]. In Saudi Arabia, the transformation agenda adds a further policy driver: care should move from late complication management toward prevention, patient activation, digital access and sustainable service delivery [2, 3].

The internal medicine pathway is important because internists often receive patients after primary care treatment has failed, before organ failure is advanced, or when multiple specialists are involved but no one owns the complete plan. Without a shared pathway, patients experience repeated testing, inconsistent advice, unclear medication changes and delayed escalation. Therapeutic inertia becomes common when clinicians are uncertain whether to intensify treatment, wait for another specialty, or focus on adherence. A structured pathway can reduce this ambiguity by defining who is screened, which tests are mandatory, when medicines are optimized, when referrals occur and how follow-up is tracked.

Saudi data show why this redesign is urgent. Diabetes and prediabetes affect a large adult

population, cardiovascular disease remains a leading cause of death, and kidney and respiratory complications add avoidable hospital demand [4-10]. The issue is not simply prevalence; it is clustering. Many patients have two or more chronic diseases, making disease-specific clinic schedules inefficient. Pathway optimization should therefore be designed around multimorbidity, risk tiers and patient goals. Internal medicine can coordinate these elements while preserving the value of specialist expertise for complex or unstable cases.

Core Pathway Design

The proposed pathway begins with systematic risk stratification. Every adult seen in internal medicine should have an updated chronic disease profile that includes blood pressure, body mass index, smoking status, HbA1c or fasting glucose, lipid profile, creatinine-based estimated glomerular filtration rate, urinary albumin-creatinine ratio, medication list, vaccination status and symptom screening relevant to respiratory, cardiovascular and mental health risk. Patients with obesity, family history, prior gestational diabetes, established cardiovascular disease, chronic kidney disease or recurrent admissions should be classified as high priority. This step transforms the first visit from a complaint-based encounter into a prevention opportunity.

The second step is creation of a single shared care plan. The plan should list the patient's main problems, agreed targets, red-flag symptoms, medication changes, lifestyle goals, referral triggers and follow-up date. It should also identify treatment burden, because a technically correct plan may fail when the patient cannot manage appointments, cost, transport, side effects or complex dosing. Shared decision-making is especially important in multimorbidity, where strict guideline targets may conflict with frailty, hypoglycemia risk, renal impairment or quality-of-life priorities [11].

The third step is protocolized treatment optimization. Diabetes management should follow current standards that consider cardiovascular and kidney risk rather than glucose alone [12]. Hypertension care should use confirmed measurement, lifestyle treatment, combination therapy when indicated and assessment of target-organ damage [13]. CKD management should include albuminuria, blood pressure control, renin-angiotensin system blockade when indicated, nephroprotective agents and timely referral based on eGFR decline or high-risk categories [14]. Chronic respiratory disease should include spirometry confirmation, inhaler technique review, vaccination, exacerbation history and pulmonary rehabilitation referral where available [15].

The fourth step is multidisciplinary escalation. Not every patient needs multiple specialists, but every pathway should define when escalation is mandatory. Cardiology referral is appropriate for heart failure symptoms, suspected ischemia, complex arrhythmia or uncontrolled risk after standard therapy. Nephrology referral is needed for advanced CKD, rapid decline, significant albuminuria or resistant hypertension. Endocrinology support may be required for difficult diabetes, obesity pharmacotherapy, recurrent hypoglycemia or endocrine secondary causes. Pulmonology referral is needed for severe obstruction, frequent exacerbations, oxygen assessment or diagnostic uncertainty. Hepatology referral is appropriate for high fibrosis risk, persistent liver enzyme elevation or suspected advanced metabolic liver disease.

Digital and Patient-Centered Enablers

Digital health should not be treated as a separate project; it should be embedded inside the pathway. Electronic records can flag missing risk tests, overdue HbA1c, abnormal eGFR trends, uncontrolled blood pressure, medication duplication and missed appointments. Patient portals and mobile reminders can support home blood pressure logs, glucose uploads, medication adherence and education. Telemedicine can be used for stable follow-up, medication tolerance checks and lifestyle coaching, while face-to-face review should be preserved for diagnostic uncertainty, deterioration and complex examination needs.

Patient education is a clinical intervention, not an accessory. The pathway should include short structured education at diagnosis, after medication changes and during annual review. Patients should understand the connection between conditions: uncontrolled diabetes accelerates kidney and cardiovascular disease; obesity worsens blood pressure, sleep and liver risk; smoking damages cardiovascular and respiratory systems; and missed medication doses can lead to silent deterioration. Education should be culturally appropriate, available in Arabic and other commonly used patient languages, and reinforced through family engagement when the patient agrees.

Behavioral support is essential because chronic disease outcomes are determined largely outside the clinic. Internal medicine teams should use motivational interviewing, realistic goals and follow-up calls rather than one-time advice. A useful plan converts broad instructions into specific actions: walking minutes per week, salt reduction steps, inhaler demonstration, home monitoring schedule, medication timing and signs requiring urgent care. This approach is consistent with Vision 2030's

prevention orientation and helps shift patients from passive recipients of care to active partners.

Proposed Clinical Workflow

At entry, patients are categorized into three pathway levels. Level 1 includes stable patients with one controlled chronic condition and low complication risk; they can be followed through primary care with periodic internal medicine review. Level 2 includes patients with two or more conditions, suboptimal control, early kidney or cardiovascular risk, recurrent medication changes or adherence barriers; these patients need an internal medicine-led shared care plan and digital follow-up. Level 3 includes unstable or high-risk patients with uncontrolled diabetes, resistant hypertension, advanced CKD, heart failure symptoms, frequent COPD or asthma exacerbations, suspected advanced liver disease or repeated admissions; they require multidisciplinary review and defined escalation.

The annual review is the pathway's anchor. It should include clinical examination, laboratory review, medication reconciliation, vaccination status, complication screening, lifestyle assessment, mental health screening and patient priorities. Between annual reviews, shorter contacts should focus on target gaps and safety. For example, a patient with diabetes, hypertension and albuminuria should not wait a year for action if blood pressure remains uncontrolled or eGFR is declining. The pathway should define rapid follow-up windows after medication initiation, hospital discharge or abnormal results.

Medication reconciliation deserves special attention. Patients with multimorbidity are at risk of duplication, contraindications, adverse events and poor adherence. Internal medicine clinics should maintain a high-risk medication review process for insulin, anticoagulants, diuretics, steroids, inhalers, opioids and nephrotoxic agents. Pharmacist involvement can improve dose adjustment, side-effect counseling, affordability review and deprescribing. Deprescribing is not undertreatment; it is a safety function when medicines no longer align with renal function, frailty, life expectancy or patient goals.

Implementation under Saudi Vision 2030

Implementation should proceed in phases rather than as a single large reform. Phase one should map existing clinic flow, identify high-volume chronic disease groups and agree minimum data sets. Phase two should introduce standardized templates, risk tiering, referral rules and patient education materials. Phase three should connect dashboards with quality indicators and multidisciplinary meetings. Phase four should evaluate outcomes, cost, patient experience and staff workload. This staged approach allows each hospital cluster or clinic network to adapt the pathway without losing the core design.

Workforce redesign is critical. The pathway cannot depend only on consultant physicians. Nurses can manage screening, education, vaccination checks and home monitoring review. Pharmacists can lead medication reconciliation and adherence support. Dietitians can deliver structured nutrition counseling for diabetes, obesity, hypertension and fatty liver disease. Respiratory therapists can support inhaler technique and pulmonary rehabilitation. Care coordinators can track referrals, missed appointments and post-discharge follow-up. Internists remain responsible for clinical integration, prioritization and escalation.

Value-based healthcare requires measurement that reflects outcomes, not only activity. Counting clinic visits is less useful than measuring blood pressure control, HbA1c improvement, kidney function preservation, exacerbation reduction, admission avoidance, medication safety, patient confidence and timely referrals. Dashboards should stratify indicators by risk level, region, age, sex and facility type to reveal inequity. This is aligned with the national shift toward quality, efficiency and patient-centered care [2, 3].

Barriers and Mitigation Strategies

Barriers are expected. Patients may resist lifestyle change, fear new medicines, lack transport or misunderstand silent risk. Clinicians may face time pressure, incomplete records, limited access to allied health or uncertainty about referral thresholds. Systems may struggle with interoperability, fragmented appointment scheduling, medication availability and uneven digital literacy. These barriers should be addressed directly through simplified education, standing orders, team-based visits, shared templates, formulary planning and multilingual digital support.

A common risk is overcomplication. Pathways fail when they become long checklists that clinicians cannot use during a busy clinic. The solution is to separate mandatory actions from optional details. The mandatory core should include risk tier, shared plan, key tests, medication reconciliation, referral triggers and follow-up date. More detailed disease modules can sit behind the core. Another risk is creating dashboards without accountability. Data should be reviewed in monthly quality meetings where teams identify bottlenecks and agree corrective actions.

Equity should be considered from the beginning. Chronic disease outcomes differ according to income, literacy, employment, family support and access to transport. Non-Saudi residents, shift workers and patients in remote areas may need flexible appointment timing, telehealth review and community-based testing. The pathway should therefore avoid assuming that all patients can attend frequent specialist appointments. Digital care should expand access, but alternatives must remain available for people without smartphones or stable internet.

Clinical Practice Recommendations

Recommendation 1: Internal medicine clinics should adopt a multimorbidity-first chronic disease pathway rather than separate disease-only review. Recommendation 2: Every patient should have an updated risk tier based on cardiometabolic, renal, respiratory and medication-safety indicators. Recommendation 3: A single shared care plan should be documented after each comprehensive review and should include patient goals, treatment targets, red flags and follow-up actions. Recommendation 4: Clinical decision support should flag missing tests, uncontrolled risk factors, unsafe medicines and delayed referrals.

Recommendation 5: Multidisciplinary support should be embedded through pharmacists, nurses, dietitians, respiratory therapists and care coordinators. Recommendation 6: Specialist referrals should follow agreed escalation thresholds so that complex patients are prioritized and stable patients remain close to primary care. Recommendation 7: Digital follow-up should be used for monitoring, education and adherence, but not as a substitute for examination when deterioration or diagnostic uncertainty exists. Recommendation 8: Outcome dashboards should include clinical, safety, experience and utilization indicators. Recommendation 9: Implementation should be phased and evaluated locally before scale-up. Recommendation 10: Saudi research registries should track chronic disease clusters, pathway adherence and long-term outcomes.

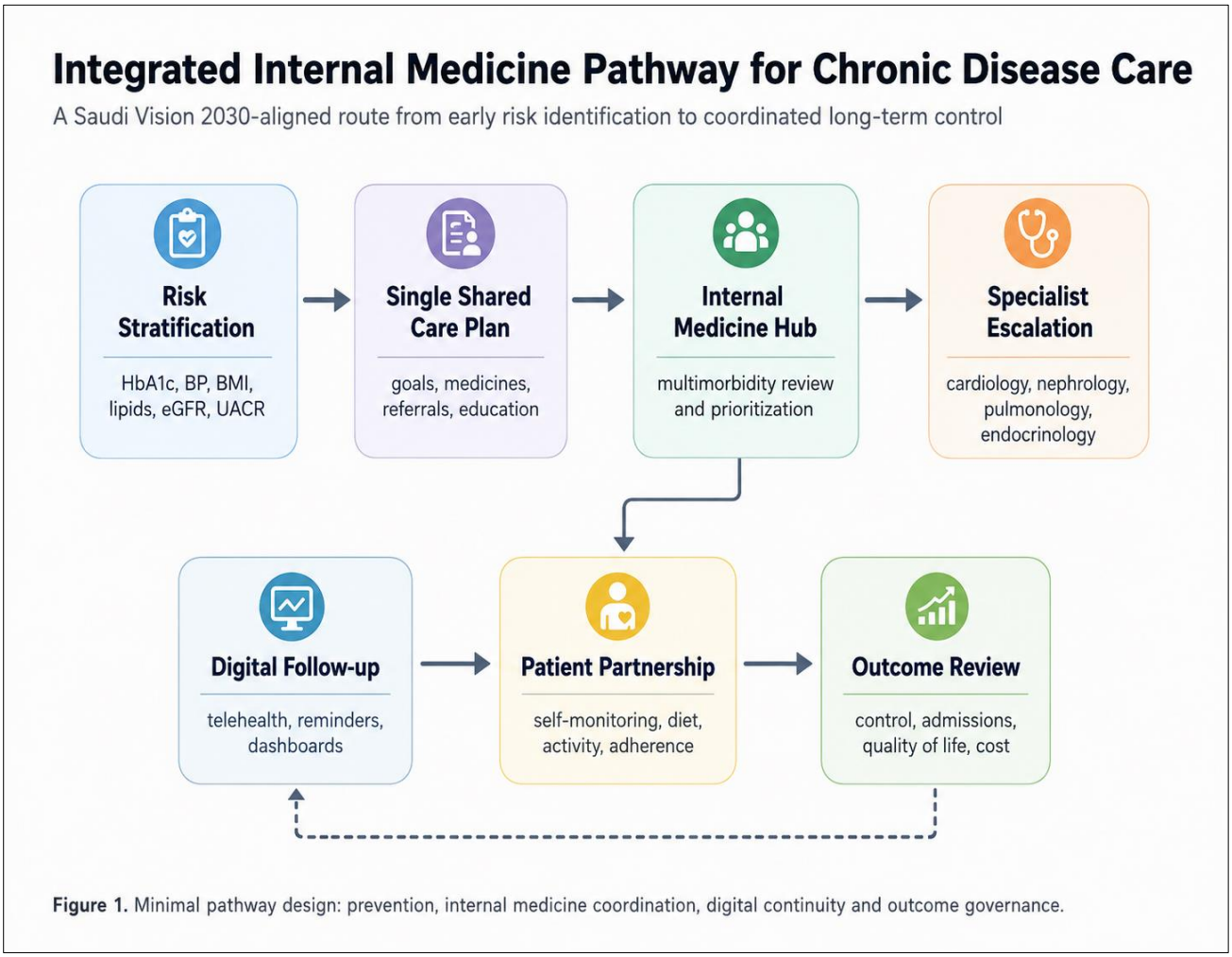

Figure 1: Integrated internal medicine pathway map for chronic disease management

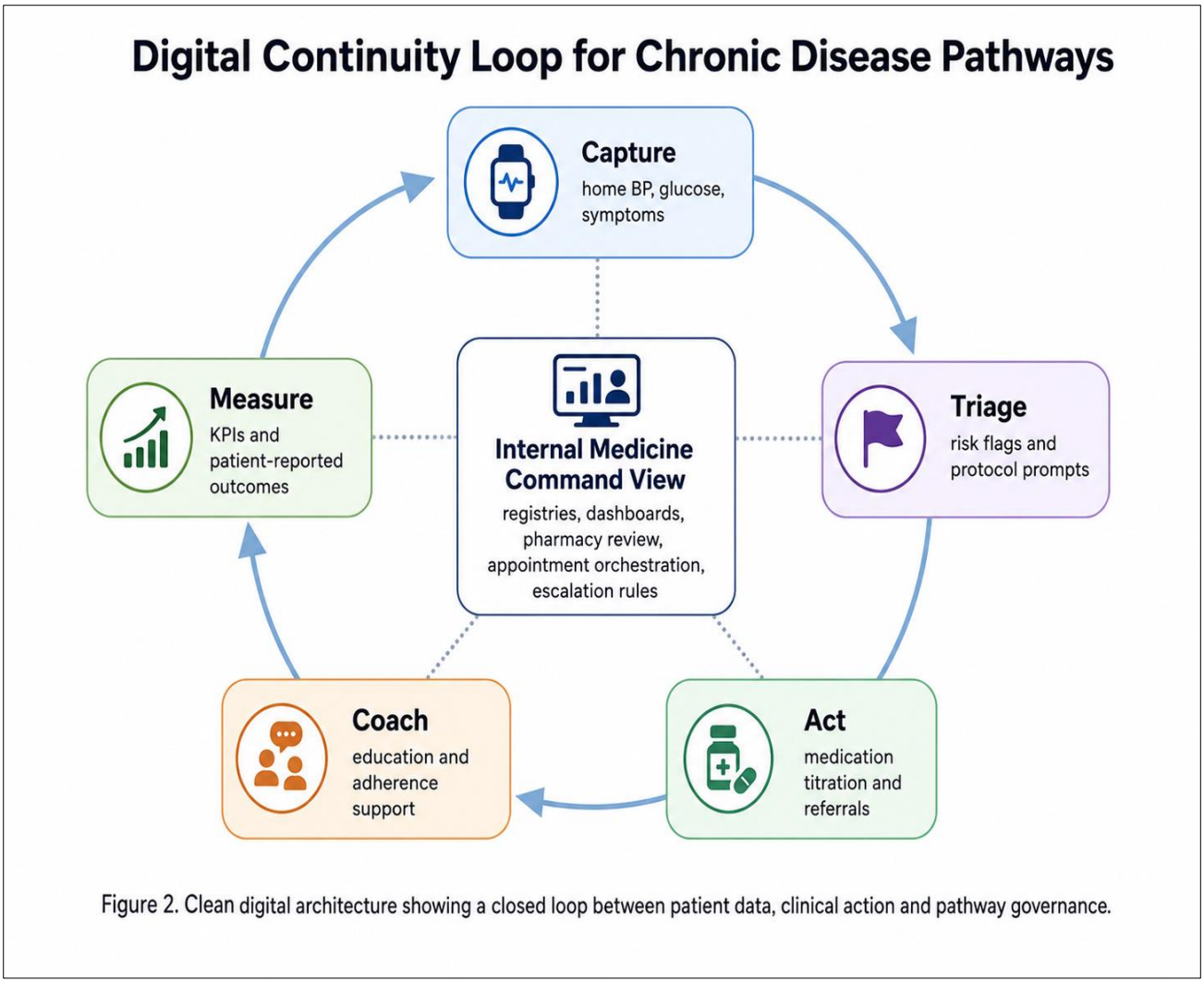

Figure 2: Digital continuity loop connecting patient-generated data, clinical triage, action and outcome governance

Table 1: Internal medicine chronic disease pathway components and operational triggers

Pathway component	Target patients	Core actions	Escalation trigger
Risk identification	Adults with chronic disease or risk factors	BP, BMI, HbA1c/glucose, lipids, eGFR, UACR, smoking and symptoms	New abnormal result or missing annual screen
Shared care plan	Patients with one or more uncontrolled conditions	Targets, medication plan, lifestyle goals, education and follow-up date	Unclear ownership or multiple competing plans
Medication optimization	Patients on complex or high-risk medicines	Reconciliation, adherence review, dose adjustment, deprescribing and safety checks	Hypoglycemia, renal decline, duplication or adverse effects
Specialist coordination	High-risk multimorbidity or diagnostic uncertainty	Defined referrals to cardiology, nephrology, endocrinology, pulmonology or hepatology	Rapid deterioration, repeated admissions or guideline threshold met
Digital follow-up	Stable or moderate-risk patients needing continuity	Telehealth, reminders, home monitoring and dashboard tracking	Missed follow-up, uncontrolled readings or red-flag symptoms

Table 2: Suggested value-based indicators for pathway implementation

Indicator domain	Example KPI	Data source	Review frequency
Clinical control	HbA1c, BP, LDL-C, eGFR slope, exacerbation rate	EHR, laboratory and pharmacy records	Monthly dashboard; quarterly governance
Safety	High-risk medication reconciliation, hypoglycemia, AKI alerts	EHR alerts, pharmacist notes, incident reports	Monthly
Continuity	Follow-up after discharge, referral completion, missed appointments	Scheduling system and care coordinator log	Monthly
Patient engagement	Education completion, home monitoring uploads, patient confidence score	Portal, nurse checklist, patient-reported outcome tool	Quarterly
Efficiency	Avoidable admissions, duplicate tests, pathway adherence	Claims, EHR, quality unit data	Quarterly to semiannual

DISCUSSION

The proposed model reframes internal medicine as the organizing center for chronic disease complexity. This is different from simply adding more specialist appointments. It asks the internist to integrate risk, prioritize problems, reduce treatment burden and coordinate the next best action. The approach is consistent with the attached Saudi CRMD review, which argues for holistic management of interconnected metabolic, cardiovascular, renal and hepatic conditions [1]. It also aligns with global NCD frameworks that favor primary care strengthening, standardized protocols and risk-based prevention [8, 9].

A pathway approach may improve outcomes through several mechanisms. First, it reduces missed opportunities by making screening routine. Second, it reduces therapeutic inertia through agreed escalation rules. Third, it improves adherence by simplifying plans and involving patients in decisions. Fourth, it improves safety through medication reconciliation. Fifth, it supports system learning by turning outcomes into dashboard metrics. These mechanisms are especially relevant in Saudi Arabia, where Vision 2030 seeks to modernize access, quality and prevention across the health sector [2, 3].

The model has limitations. It is based on narrative synthesis rather than trial testing, and implementation effects will differ by facility resources. Some clinics may lack pharmacists, dietitians or digital infrastructure. The pathway also requires leadership support; otherwise, templates may be created but not used. Future studies should test the model prospectively, comparing pathway-based internal medicine care with usual care on control rates, hospitalization, patient experience, clinician workload and cost. Saudi cluster-level pilots would provide valuable evidence for national adaptation.

Implementation Governance and Research Agenda

Strong governance is required to convert the proposed pathway from a document into routine practice. Each facility should appoint a pathway owner, ideally an internal medicine consultant with support from nursing, pharmacy, quality and information technology leads. The pathway owner should convene a monthly review meeting that examines dashboard results, difficult cases, referral delays, medication safety alerts and patient feedback. This meeting should not be punitive. Its purpose is to identify variation, remove barriers and make small improvements that clinicians can see in their daily work. Governance should also define the minimum service standard for every clinic, including risk tiering, documented care plans, annual complication screening, medication reconciliation and follow up after abnormal results. When the standard is clear, new staff can be trained quickly and patients receive a more consistent experience across different sites.

Clinical governance should be paired with data governance. Chronic disease information is often scattered across laboratory systems, pharmacy records, hospital discharge summaries and separate specialty notes. A pathway dashboard will be reliable only if data definitions are agreed before measurement begins. For example, blood pressure control should specify whether the last clinic reading, an average home reading or an ambulatory measurement is used. Diabetes indicators should define whether the most recent HbA1c is acceptable or whether the patient is overdue. Kidney indicators should separate stable low eGFR from rapid decline, because these conditions require different responses. Data quality checks should be built into the workflow so that missing tests trigger action rather than passive reporting. Privacy and confidentiality must also be protected, particularly when remote monitoring and patient portals are used.

The pathway should include a practical research agenda. Saudi healthcare clusters can

evaluate which components produce the largest benefit in different populations. Possible pilot studies include pharmacist led medication review for uncontrolled diabetes and hypertension, nurse led home blood pressure monitoring after treatment intensification, telehealth follow up after hospital discharge, and internal medicine led multidisciplinary review for patients with repeated admissions. Outcomes should include not only clinical control but also attendance, patient confidence, adverse events, clinician workload and cost. Mixed methods research would be valuable because pathway success depends on patient behaviour, staff acceptance and organizational readiness as much as on guideline adherence. Registry data can then support risk prediction tools that are specific to Saudi populations rather than imported without validation.

Cultural adaptation is also necessary. Dietary advice should reflect local food patterns, family meals, Ramadan fasting, hospitality customs and the availability of healthy options. Physical activity plans should consider climate, gender preferences, safe walking spaces and workplace schedules. Medication plans should account for fasting, travel, shift work and affordability. Education should avoid blame and instead explain chronic disease as a long term condition that can be controlled through shared effort. Family involvement can be powerful when the patient agrees, especially for older adults or patients with low health literacy. At the same time, privacy and autonomy must be respected. A culturally aware pathway can improve trust, which is essential for long term adherence.

Sustainability depends on making the pathway useful for clinicians. Templates should save time by bringing risk data into one view, not increase typing. Referral rules should reduce uncertainty, not remove clinical judgement. Dashboards should highlight a small number of meaningful indicators rather than overwhelm teams with dozens of measures. Training should use real cases from the clinic, showing how a shared plan changes decisions for patients with multiple diseases. Leadership should protect time for multidisciplinary review and recognize pathway work as quality care, not administrative burden. When clinicians see that the pathway prevents missed results, improves communication and reduces avoidable crises, adoption becomes more likely.

Training should be modular and repeated, because pathway skills are practical skills. A short induction module can explain the pathway logic, risk tiers, documentation rules and referral thresholds. A second module can focus on medication safety, including renal dose adjustment, hypoglycemia prevention, inhaler technique and high risk combinations. A third module can teach communication skills such as motivational interviewing, shared decision making and explaining risk without fear based language. Simulation cases are useful for patients with diabetes and kidney disease, resistant hypertension, recurrent breathlessness, or multiple admissions. Training should include reception and scheduling teams because access problems often begin before the clinician sees the patient.

The pathway should also define disease modules that sit inside the wider multimorbidity framework. The diabetes module should connect glycemic control with cardiovascular and kidney protection. The hypertension module should emphasize confirmed measurement, home monitoring and target organ assessment. The kidney module should highlight albuminuria, eGFR trends and avoidance of nephrotoxic medicines. The respiratory module should require spirometry confirmation, inhaler technique review and exacerbation prevention. The obesity and fatty liver module should address weight, nutrition, physical activity, metabolic risk and fibrosis screening. These modules allow standardization while still keeping the patient rather than the disease at the center.

Post discharge care is a high value entry point for the pathway. Many chronic disease admissions occur after gradual deterioration that could have been recognized earlier, and many readmissions occur when medication changes are not understood after discharge. Internal medicine clinics should receive an electronic alert after admission for heart failure, acute kidney injury, hyperglycemia, hypertensive emergency, asthma or COPD exacerbation, stroke, myocardial infarction or medication related harm. A follow up contact within seven to fourteen days can reconcile medicines, check symptoms, arrange tests and confirm that specialist plans are understood. This step links hospital care back to prevention.

Quality improvement cycles should be simple. Teams can select one indicator, understand the baseline, test a small change for four weeks, review the result and then scale the change if it works. Examples include increasing UACR testing in diabetes, reducing missed post discharge appointments, improving inhaler technique documentation, or shortening nephrology referral delays for high risk CKD. Small cycles create momentum and help staff see progress. The pathway should therefore be treated as a learning system rather than a fixed manual.

Financial planning should be included from the start. Pathways can fail when recommended tests, medicines or allied health visits are not affordable or available. A realistic model should map formularies, insurance rules, public sector access, appointment capacity and community resources. Cost effective actions such as blood pressure control, smoking cessation, vaccination, kidney screening and medication reconciliation should be protected because they prevent expensive complications. For higher cost therapies, eligibility criteria should be transparent and based on risk, expected benefit and equity. Value based evaluation can then show whether early investment reduces emergency visits, dialysis progression, cardiovascular events and long hospital stays.

Finally, patient reported measures should be part of the pathway. Chronic disease control is not only a laboratory target. Patients need to understand their plan, trust their team, manage medicines, attend follow up and maintain daily function. Short patient questions can ask whether the care plan is clear, whether medicines are manageable, whether symptoms limit work or family life, and whether the patient knows whom to contact when readings worsen. These measures help internal medicine teams detect barriers that are invisible in laboratory data. They also support the Vision 2030 goal of care that is responsive, humane and focused on quality of life.

Risk communication should be standardized but compassionate. Many patients hear separate warnings about sugar, pressure, cholesterol and weight, yet they may not understand how these risks interact. A pathway based conversation can explain that the purpose of treatment is to protect the heart, kidneys, brain, lungs and daily independence. Visual risk charts, medicine schedules and written action plans can reduce confusion. Clinicians should check understanding through teach back rather than assuming that consent means comprehension.

Local Adaptation Note

Local leaders should review progress often, share lessons across clusters, protect patient time, support staff learning, and keep the pathway focused on safer care, better control, earlier action, and fewer preventable complications. Local leaders should review progress often, share lessons across clusters, protect patient time, support staff learning, and keep the pathway focused on safer care, better control, earlier action, and fewer preventable complications. Local leaders should review progress often, share lessons across clusters, protect patient time, support staff learning, and keep the pathway focused on safer care, better control, earlier action.

CONCLUSION

Optimizing internal medicine care pathways for chronic disease management is a practical route toward Saudi Vision 2030 health goals. The proposed pathway integrates early detection, shared care planning, protocolized treatment, multidisciplinary escalation, digital follow-up, patient education and value-based measurement. It responds to the reality that chronic diseases commonly cluster in the same patient and require coordinated action rather than fragmented appointments. By positioning internal medicine as a hub for multimorbidity management, Saudi healthcare organizations can improve continuity, reduce avoidable complications and support prevention before disease reaches advanced stages. The next step is local pilot implementation with rigorous measurement and refinement.

Key Summary Points

- Saudi internal medicine services increasingly manage multimorbidity rather than isolated disease episodes; therefore, pathway design should prioritize shared risk, treatment burden and prevention of complications.
- The attached Springer review model demonstrates a useful structure for Saudi-focused chronic disease work by combining literature synthesis, regional applicability, multidisciplinary consensus and graded recommendations [1].
- A Vision 2030-aligned pathway should connect primary care, internal medicine, specialist clinics, digital follow-up and patient self-management around a single longitudinal plan.
- The highest-value actions are early screening, protocolized medication optimization, integrated referral rules, patient education, remote monitoring and continuous measurement of clinical and experience outcomes.

REFERENCES

1. Alshaikh A, Alshehri A, Alzubaidi L, et al. Developing a comprehensive approach for managing cardiorenal metabolic diseases in Saudi Arabia: thinking beyond single disease-literature review and multidisciplinary consensus report. Diabetes Therapy. Published online 2025.
2. Vision 2030. Health Sector Transformation Program. Riyadh: Kingdom of Saudi Arabia; 2025.
3. Chowdhury S, Mok D, Leenen L. Transformation of health care and the new model of care in Saudi Arabia: Kingdom's Vision 2030. Journal of Medicine and Life. 2021;14(3):347-354.

4. Alasiri AA, Mohammed V. Healthcare transformation in Saudi Arabia: an overview since the launch of Vision 2030. Health Services Insights. 2022;15:11786329221121214.
5. Hazazi A, Chandramohan S. Noncommunicable diseases and health system responses in Saudi Arabia: focus on policies and strategies. Health Research Policy and Systems. 2022;20:63.
6. AlHarbi M, et al. Burden of illness of type 2 diabetes mellitus in the Kingdom of Saudi Arabia. Journal of Medical Economics. 2024.
7. Aljarid S, et al. Examining factors contributing to mortality in Saudi Arabia. BMC Public Health. 2025;25:1-12.
8. World Health Organization. WHO package of essential noncommunicable disease interventions for primary health care. Geneva: WHO; 2020.
9. World Health Organization. HEARTS-D: Diagnosis and management of type 2 diabetes. Geneva: WHO; 2020.
10. Mohieldein A, et al. Prediabetes in adult Saudis: a systematic review and meta-analysis. BMC Endocrine Disorders. 2025.
11. Skou ST, Mair FS, Fortin M, et al. Multimorbidity. Nature Reviews Disease Primers. 2022;8:48.
12. American Diabetes Association Professional Practice Committee. Standards of Care in Diabetes-2024. Diabetes Care. 2024;47(Suppl 1):S1-S350.
13. Mancia G, Kreutz R, Brunstrom M, et al. 2023 ESH Guidelines for the management of arterial hypertension. Journal of Hypertension. 2023;41(12):1874-2071.
14. Levin A, Ahmed SB, Carrero JJ, et al. Executive summary of the KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney International. 2024;105(4):684-701.
15. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for prevention, diagnosis and management of COPD: 2024 report. GOLD; 2024.
16. Global Initiative for Asthma. Global strategy for asthma management and prevention: 2024 update. GINA; 2024.
17. Marx N, Federici M, Schutt K, et al. 2023 ESC Guidelines for the management of cardiovascular disease in patients with diabetes. European Heart Journal. 2023;44:4043-4140.
18. Ndumele CE, Rangaswami J, Chow SL, et al. Cardiovascular-kidney-metabolic health: a presidential advisory from the American Heart Association. Circulation. 2023;148:1606-1635.
19. Ibrahim M, Ba-Essa EM, Baker J, et al. Cardio-renal-metabolic disease in primary care setting. Diabetes/Metabolism Research and Reviews. 2024;40:e3755.
20. Zhang N, Liu X, Wang L, et al. Lifestyle factors and longitudinal progression of cardio-renal-metabolic multimorbidity: a prospective cohort study. Cardiovascular Diabetology. 2024;23:265.
21. Flood D, Hane J, Dunn M, et al. Integrating hypertension and diabetes management in primary health care. BMC Health Services Research. 2022;22:1-13.
22. Khan T, et al. The HEARTS partner forum-supporting implementation of integrated cardiovascular risk management. Global Heart. 2023;18:1-8.
23. Al-Khattabi GH, et al. A comprehensive systematic scoping review of preventive medicine and public health transformation in Saudi Arabia. BMC Public Health. 2025.
24. Jeraiby MA, et al. Trends in diabetes mellitus prevalence and gender disparities in Saudi Arabia. Scientific Reports. 2025.
25. Alsaidan AA, et al. Cardiovascular disease management and prevention in Saudi Arabia. International Journal of Clinical Practice. 2025.
26. Alharbi SH. Anti-inflammatory role of glucagon-like peptide-1 receptor agonists and clinical implications. Therapeutic Advances in Endocrinology and Metabolism. 2024;15:20420188231222367.
27. Suleiman AK, et al. Transforming healthcare: Saudi Arabia's Vision 2030 healthcare model. Journal of Multidisciplinary Healthcare. 2025.
28. OECD. Health at a Glance 2023: OECD Indicators. Paris: OECD Publishing; 2023.
29. World Health Organization. Noncommunicable diseases country profiles and Saudi Arabia health data. Geneva: WHO; 2022.
30. Saudi Ministry of Health. Healthcare Transformation Strategy and Health Sector Transformation Program guide. Riyadh: MOH; 2021-2025.