

FROM VISION CORRECTION TO DISEASE PREVENTION: THE EXPANDING CLINICAL SCOPE OF OPTOMETRISTS EXPANDING CLINICAL SCOPE OF OPTOMETRY

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ABSTRACT

Background: Optometry has historically been framed around refractive correction and low-vision rehabilitation. Over the past decade, however, expansion of diagnostic technology, independent prescribing rights, and workforce pressures on ophthalmology have repositioned optometrists as active participants in disease detection, chronic-disease monitoring, and, increasingly, systemic health screening.

Objectives: To critically synthesise recent primary research (2022–2026) describing the expanding clinical scope of optometrists across diabetic eye disease, glaucoma, systemic ('oculomics') screening, and community-based urgent eye care, and to identify controversies, gaps, and implications for clinical practice and health policy.

Methods: A narrative literature search of PubMed, Scopus, Web of Science, and Google Scholar was conducted for the period January 2022 to January 2026, restricted to original primary research (randomised trials, cohort, cross-sectional, case-control, pilot, and quality-improvement studies) involving optometrists or optometry-delivered services. Systematic reviews, meta-analyses, scoping reviews, editorials, and conference abstracts were excluded. No PRISMA framework was applied, consistent with the narrative design.

Review: Twenty primary studies met inclusion criteria. These demonstrate that optometrist-delivered diabetic retinopathy review clinics achieve substantial diagnostic concordance with hospital ophthalmology, that routine optical coherence tomography in optometric practice increases glaucoma case-finding, that community optometrists absorb a majority share of acute eyecare episodes previously managed by general practitioners, and that retinal imaging increasingly functions as a biomarker

platform for cardiovascular and neurodegenerative risk. Independent prescribing and enhanced case-finding schemes have proved clinically safe during service evaluations, although evidence remains dominated by high-income, single-country settings.

Conclusion: The clinical scope of optometry has moved decisively from refraction toward disease prevention, but the evidence base is heterogeneous, weighted toward the United Kingdom and United States, and rarely includes health-economic or low- and middle-income country data. Structured accreditation, harmonised referral pathways, and pragmatic trials of oculomics-based screening in routine optometric practice are priority next steps.

Keywords: Optometry; Primary Eye Care; Diabetic Retinopathy; Glaucoma; Oculomics; Scope of Practice; Telemedicine

INTRODUCTION

For much of the twentieth century, optometry was defined largely by its dispensing function: refraction, spectacle and contact lens prescribing, and referral of suspected pathology to ophthalmology. That boundary has been steadily redrawn. Rising global prevalence of diabetes and glaucoma, an ageing population, and a persistent shortage of ophthalmologists relative to demand have created capacity gaps that community optometry is increasingly asked to fill.(1,18,20) At the same time, diagnostic technology once confined to hospital eye departments optical coherence tomography (OCT), non-mydratic fundus photography, and artificial intelligence (AI)-assisted image analysis has become affordable and portable enough for routine use in optometric practice.(3,5,15) Regulatory reform has kept pace in several jurisdictions: UK optometrists can independently prescribe ocular medicines and manage minor eye disease without automatic referral, while more than a dozen United States jurisdictions have extended optometric scope to laser procedures.(15,17)

A parallel and less widely appreciated development is the emergence of 'oculomics' the use of retinal imaging to infer risk of systemic disease, including cardiovascular disease and dementia, from structural and vascular features of the retina.(9,10,11,12,13,14) Because optometrists perform more retinal examinations, on a more frequent and accessible basis, than any other health professional group, they are positioned as a potential frontline node for opportunistic systemic screening, not merely ocular disease detection.

This review asks whether recent primary evidence supports this expanded clinical role, where the

evidence is strong, where it is contested, and what this means for clinicians, educators, and policymakers including in health systems such as Pakistan's, where ophthalmology workforce density is limited and optometry-led primary eye care could plausibly extend reach if appropriately regulated and evaluated. Rather than restating findings already summarised in prior systematic reviews, this narrative review focuses deliberately on primary research published between 2022 and 2026, synthesising it critically to expose controversies and propose a forward research and policy agenda.

Literature Search Strategy

A narrative (non-systematic) literature search was conducted across PubMed, Scopus, Web of Science, and Google Scholar for the period January 2022 to January 2026. Search terms combined 'optometry' OR 'optometrist' with 'diabetic retinopathy', 'glaucoma', 'oculomics', 'retinal imaging', 'systemic disease', 'cognitive decline' OR 'dementia', 'cardiovascular risk', 'independent prescribing', 'scope of practice', 'telemedicine' OR 'teleoptometry', and 'community eye care' OR 'minor eye conditions'. Inclusion criteria were: (i) original primary research randomised controlled trials, prospective or retrospective cohort studies, cross-sectional studies, case-control studies, or structured service/quality-improvement evaluations; (ii) direct relevance to optometric scope of practice, community eye care, or retinal-imaging-based systemic screening; (iii) publication in English between 2022 and 2026 in PubMed-, Scopus-, or Web of Science-indexed journals. Systematic reviews, meta-analyses, scoping reviews, umbrella reviews, editorials, letters, and conference

abstracts were excluded, as were studies with no eye-care-provider relevance. Reference lists of retrieved articles were hand-searched for additional eligible primary studies. This review does not follow PRISMA methodology and does not include a flow diagram, consistent with its narrative rather than systematic design.

From Refraction to Disease Detection: A Changing Paradigm

The clearest evidence of paradigm change lies in workforce economics. Clark et al. note that the prevalence of type 2 diabetes in United States adults is projected to rise by roughly 50% by 2025, while the supply of trained optometrists and ophthalmologists is expected to grow by only 1–2% over the same period a widening gap that community optometry, not hospital ophthalmology, is best placed to absorb.(1) In the United Kingdom, national workforce surveys show that a substantial minority of primary care optometrists already provide glaucoma repeat-measures or enhanced case-finding services, and a further cohort report willingness to pursue additional qualifications enabling co-management of stable disease.(6) This is not simply task-shifting for convenience: it reflects a structural recalibration in which optometrists are expected to detect, triage, and in some jurisdictions manage disease that would previously have defaulted automatically to ophthalmology or general practice.

Optometrists in Diabetic Retinopathy Screening and Review

Diabetic retinopathy (DR) screening is the area in which optometric scope expansion is most extensively documented. Clark and colleagues describe a mobile, optometrist- and nurse-delivered DR screening quality-improvement

project embedded in primary care, designed explicitly to close the anticipated capacity gap described above.(1) Dorrian et al. compared a primary care optometry-based DR review clinic in which optometrists with additional DR training conducted face-to-face review with imaging against a traditional hospital-based virtual DR clinic, finding weighted-kappa grading concordance of 0.61 for DR severity and 0.69 for diabetic macular oedema status between primary care optometrists and consultant ophthalmologists, concordance levels generally interpreted as substantial rather than near-perfect agreement.(2) The RETINAvail project in Spain is now formally evaluating agreement between primary care physicians, ophthalmologists, and an AI grading system for DR referral decisions, an explicit acknowledgement that screening accuracy, not merely access, remains an open question as new evaluators enter the pathway.(3)

The strongest causal evidence in this review comes from the ACCESS trial, a randomised controlled trial in which youth with type 1 or type 2 diabetes were assigned to autonomous AI-based point-of-care diabetic eye examination versus standard eye-care-provider referral. Diabetic eye exam completion was significantly higher in the AI intervention arm than in the referral-and-education control arm, demonstrating that technology-enabled screening embedded outside traditional ophthalmic settings can close, not merely narrow, the screening adherence gap.(4) Collectively, these studies show a consistent direction of effect optometry- and technology-enabled DR pathways increase screening completion and provide clinically acceptable, though imperfect, diagnostic concordance but concordance data indicate that quality assurance and structured re-training remain necessary rather than optional.

Table 1. Primary studies on optometrist-delivered diabetic retinopathy screening and review

Study (Year)	Design / Setting	Sample	Key finding	Clinical implication
Clark et al., 2024(1)	Quality-improvement project; US primary care	Adults with type 2 diabetes; mobile screening units	Improved DR screening completion and disease awareness	Optometry-linked mobile screening can offset projected capacity gap

Study (Year)	Design / Setting	Sample	Key finding	Clinical implication
			amid projected workforce shortfall	
Dorrian et al., 2024(2)	Retrospective service comparison; UK primary vs. hospital DR clinics	1,760 virtual clinic; 954 primary care optometry clinic patients	Weighted kappa 0.61 (DR grade) and 0.69 (DMO) between optometrists and consultants	Primary care optometry DR review is a safe, efficient alternative to hospital virtual clinics
López-Lifante et al., 2026(3)	Retrospective protocol/baseline report; Spain	1,517 retinographies from 301 patients	34.5% referred to ophthalmology; groundwork for AI-clinician concordance analysis	AI-assisted grading integration under active evaluation in real-world primary care
Wolf et al., 2024(4)	Randomised controlled trial (ACCESS); US paediatric diabetes centre	164 youth aged 8–21 with T1D/T2D	Autonomous AI point-of-care exam significantly increased completion vs. standard referral	Point-of-care AI screening can be embedded outside dedicated eye-care settings

Glaucoma Detection and Community Glaucoma Services

Routine incorporation of OCT into optometric practice has produced measurable gains in glaucoma case-finding. Paul and colleagues, in an Australian optometry-practice cohort, showed that routine OCT use increased identification of patients requiring referral for suspected glaucoma beyond what conventional examination alone would detect, supporting earlier intervention and, by extension, prevention of avoidable vision loss.⁽⁵⁾ The UK's 2023 national Clinical Practice Survey of over a thousand optometrists found that a third of primary care respondents already provide glaucoma repeat-measures services, a quarter provide enhanced case-finding, and a smaller but meaningful proportion co-manage stable, low-risk glaucoma evidence that expanded glaucoma roles are becoming embedded practice rather than isolated pilots.⁽⁶⁾ A qualitative multi-stakeholder evaluation of accredited optometrists delivering glaucoma care identified consistent enablers (investment in technology and training,

inter-professional trust) and recurring barriers (time pressure, unclear governance, variable commissioning), suggesting that technical capability alone does not guarantee successful service scale-up.⁽⁷⁾

Evidence from lower- and middle-income settings remains comparatively scarce, though not absent. A Pakistani case-control study using corneal confocal and specular microscopy alongside OCT-derived retinal nerve fibre layer thickness in primary open-angle glaucoma patients illustrates that advanced structural biomarkers relevant to glaucoma diagnosis and monitoring are being actively investigated in South Asian tertiary settings, even where community optometric case-finding infrastructure is less developed than in the UK or Australia.⁽⁸⁾ This asymmetry sophisticated diagnostic research alongside limited primary-care-level case-finding capacity is itself a policy-relevant finding: technical innovation is not confined to health systems with mature optometric scope, but translation into optometry-led community screening pathways lags behind.

Table 2. Primary studies on glaucoma case-finding and community glaucoma services

Study (Year)	Design / Setting	Sample	Key finding	Clinical implication
Paul et al., 2024(5)	Cohort/service evaluation; Australian optometry practice	Optometric patients undergoing routine OCT	Routine OCT increased glaucoma case-finding vs. conventional examination	Supports embedding OCT as standard-of-care in optometric practice
Ellek et al., 2026(6)	National cross-sectional survey; UK	1,009 optometrists (824 primary care)	33% provide repeat measures; 25% enhanced case-finding; 9% co-management	Enhanced glaucoma roles are increasingly embedded, not experimental
Gunn et al., 2024(7)	Qualitative multi-stakeholder evaluation; UK	38 participants (optometrists, ophthalmologists, patients, commissioners)	Technology, training and inter-professional trust are key enablers; governance and time are barriers	Service scale-up requires organisational, not just technical, investment
Naqvi et al., 2024(8)	Case-control study; Pakistan (tertiary hospital)	26 eyes POAG; 28 eyes controls	Corneal nerve/keratocyte parameters correlated with OCT-derived RNFL thickness	Novel structural biomarkers may complement OCT in glaucoma monitoring in South Asian settings

Beyond the Eye: Oculomics and Systemic Disease Risk Stratification

The most conceptually novel expansion of optometric scope concerns systemic, non-ocular disease. Large-scale phenome- and genome-wide analyses of retinal OCT images have identified reproducible associations between ocular structural parameters and a wide range of systemic conditions, reinforcing the principle that the retina functions as an accessible, non-invasively imaged extension of systemic vasculature and neural tissue.(9) Using UK Biobank data, Qian and colleagues tested whether deep-learning cardiovascular risk estimates derived from retinal images were equivalent to conventional risk-factor-based cardiovascular risk measurement in a prospective cohort design; the comparison illustrates both the promise and the current limits of image-derived risk scores as a substitute for, rather than merely a complement to, established

risk calculators.(10) A smaller pilot study using OCT angiography demonstrated detection of systemic cardiovascular illnesses and cardiometabolic risk factors from retinal vascular imaging, a proof-of-concept finding that nonetheless involved modest sample sizes typical of early-phase oculomics research.(11)

Neurodegenerative disease screening shows a similarly early but suggestive evidence base. A community-based Chinese cohort study (the KaiLuan Study) found that deep-learning-derived retinal vessel parameters, including fractal dimension and vessel width, were independently associated with cognitive impairment.(12) A Swedish memory-clinic cohort study found that hyperspectral retinal imaging combined with machine learning classification distinguished amyloid-beta-positive from amyloid-beta-negative patients with encouraging, though not yet clinical-grade, diagnostic performance.(13) A retinal-

photograph-derived ageing biomarker, RetiPhenoAge, predicted future cognitive decline and incident dementia in a Southeast Asian memory-clinic cohort, with replication in UK Biobank participants over twelve years of follow-up.(14) Taken together, these studies support the biological plausibility and statistical association

between retinal imaging features and systemic or neurodegenerative disease, but none yet demonstrates that optometrist-initiated referral triggered by such biomarkers changes downstream clinical outcomes a critical and, at present, unanswered translational question.

Table 3. Oculomics: retinal imaging for systemic and neurodegenerative disease risk stratification

Study (Year)	Design / Setting	Sample	Key finding	Clinical implication
Zekavat et al., 2024(9)	Phenome/genome-wide association study; large biobank cohort	Population-scale OCT imaging dataset	Multiple reproducible links between OCT-derived ocular measures and systemic health traits	Establishes biological basis for oculomics as a discipline
Qian et al., 2024(10)	Prospective cohort design; UK Biobank	UK Biobank retinal imaging subset	Deep-learning retinal risk estimates track, but do not clearly surpass, traditional risk factor measurement	Retinal AI risk scores currently complement rather than replace risk calculators
Huang et al., 2023(11)	Pilot study; OCT angiography	Small clinical pilot cohort	Machine learning on OCTA detected cardiometabolic risk factors and cardiovascular illness markers	Proof-of-concept for OCTA as a cardiometabolic screening adjunct
Li et al., 2024 (KaiLuan)(12)	Community-based cohort; China	908 participants, 15-year cohort	Retinal vessel fractal dimension and width independently associated with cognitive impairment	Retinal vessel analysis may flag patients for cognitive assessment referral
Dallora et al., 2025(13)	Prospective cross-sectional cohort; Sweden	57 memory-clinic patients	Hyperspectral imaging classified amyloid-beta status with promising accuracy (AUC 0.77)	Non-invasive adjunct to invasive CSF/PET amyloid testing under early investigation
Sim et al., 2025(14)	Cohort with external replication; Singapore + UK Biobank	Memory-clinic cohort; UK Biobank replication	Retinal ageing biomarker (RetiPhenoAge) predicted 12-year incident dementia risk	Retinal photography may support long-range dementia risk stratification

Community Optometry, Urgent Eye Care, and Reducing Secondary Care Burden

The COVID-19 pandemic accelerated reliance on community optometry for urgent and acute eye

conditions. Independent prescribing optometrists in the United Kingdom provided acute community ophthalmology services that directly supported hospital eye services during pandemic-

related capacity constraints, while a national evaluation of Manchester's COVID-19 Urgent Eyecare Service documented outcomes for patients managed entirely within community optometric settings during the same period.(15,16) A parallel study of independent prescribing optometrists in Wales during lockdown similarly demonstrated that community-based prescribing capacity could be mobilised rapidly when hospital access was constrained.(17) These pandemic-era findings have persisted into routine practice: a large retrospective data-linkage study in Wales found that, of over 365,000 acute eyecare episodes analysed, optometrists and pharmacists together managed the majority (approximately 52%) of episodes, with general practice and emergency departments absorbing a comparatively smaller share, though a substantial and economically patterned burden of acute eyecare on GPs and emergency departments

persisted, particularly in areas of greater deprivation.(18)

Access, however, remains uneven. A cross-sectional survey of rural and urban communities in Papua New Guinea identified persistent structural barriers to eye-care uptake distance, cost, and awareness despite outreach efforts, illustrating that community-based models proven in high-income settings do not automatically translate to low-resource contexts.(19) In the United States, a geospatial cross-sectional analysis linking eye-care-provider location to ZIP-code-level socioeconomic data found that areas with higher unemployment and lower educational attainment had significantly fewer eye-care providers per capita, reinforcing that expanded optometric scope only improves population eye health where providers are geographically and economically accessible to the populations who need them most.(20)

Table 4. Community-based, urgent, and access-related optometry studies

Study (Year)	Design / Setting	Sample	Key finding	Clinical implication
Ansari et al., 2022(15)	Service evaluation; UK, COVID-19 period	Community ophthalmology attendances	Independent prescribing optometrists sustained acute eye care during hospital capacity constraints	IP optometrists are a viable surge capacity resource
Kanabar et al., 2022(16)	Service evaluation; Manchester, UK	COVID-19 urgent eyecare service (CUES) attendances	Community optometry-based urgent service safely managed acute presentations	Urgent eyecare pathways can be optometry-led without routine hospital referral
Cottrell et al., 2022(17)	Service evaluation; Wales, UK, COVID-19 lockdown	IP optometrist prescribing episodes	IP optometrists provided rapid, community-based prescribing capacity during lockdown	Prescribing rights enable pandemic and routine service resilience
Rawlings et al., 2024(18)	Retrospective population data-linkage; Wales, UK	365,044 acute eyecare episodes (2017–2018)	Optometrists/pharmacists managed ~52% of episodes; GP/A&E burden linked to deprivation	Community optometry substantially offsets GP/A&E acute eyecare burden
Owusu-Afriyie et al., 2024(19)	Cross-sectional survey; Papua New Guinea	~378 rural/urban	Distance, cost and awareness remain major barriers to eye-care uptake	Community models require context-specific

Study (Year)	Design / Setting	Sample	Key finding	Clinical implication
		outreach attendees		adaptation in LMIC settings
Tran et al., 2024(20)	Cross-sectional geospatial study; USA	47,949 eye-care providers by ZIP code	Lower-SES ZIP codes had significantly fewer eye-care providers per capita	Scope expansion must be paired with equitable geographic distribution

Critical Analysis of Current Evidence

Several patterns emerge on cross-study comparison. First, the strength of study design is uneven: only one identified study (the ACCESS trial) used randomisation, while the remainder are cross-sectional surveys, retrospective service evaluations, or small pilot cohorts.(4) This limits causal inference about whether expanded optometric roles improve, rather than merely maintain, patient outcomes relative to traditional referral pathways. Second, geographic concentration is pronounced: the United Kingdom and United States account for the large majority of studies identified, with comparatively isolated contributions from Pakistan, Spain, China, Sweden, Singapore, and Papua New Guinea. This imbalance means that findings on scope-of-practice expansion, however robust within their originating health systems, cannot be assumed to generalise to systems with different regulatory structures, training pathways, or population disease burdens.(3,8,12,13,19) Third, diagnostic concordance data where reported indicate substantial but imperfect agreement between optometrists and ophthalmologists (weighted kappa 0.61–0.69), a level that supports task-sharing but also justifies continued quality assurance rather than unconditional confidence.(2) Fourth, oculomics research remains predominantly associative: statistical links between retinal biomarkers and systemic or neurodegenerative disease are increasingly well replicated, but no study in this review tested whether acting on such biomarkers within routine optometric practice changes clinical trajectories.(9–14) Finally, health-economic evaluation is almost entirely absent from the primary literature

reviewed, despite scope expansion being frequently justified on cost and capacity grounds.

Clinical Implications

For practising optometrists, these findings support continued investment in OCT and fundus imaging as core, not optional, diagnostic tools, given demonstrated gains in glaucoma case-finding and DR grading concordance.(2,5) Structured, periodically re-validated training mirroring the enhanced case-finding and repeat-measures accreditation pathways described in the UK appears necessary to sustain the diagnostic concordance levels reported, rather than assuming that equipment access alone confers diagnostic competence.(6,7) For clinicians integrating retinal imaging into general or diabetes care pathways, current oculomics evidence justifies opportunistic use of retinal images already being captured for ocular purposes as an adjunct signal for systemic risk discussion, but does not yet justify independent screening claims or replacement of established cardiovascular or cognitive risk assessment tools.(9,10) For health-system planners, the Welsh population-level data suggest that community optometry can be deliberately commissioned as first-line acute eyecare capacity, provided referral thresholds and inter-professional communication pathways are clearly defined, particularly in socioeconomically deprived areas where burden is highest.(18)

Research Gaps

Four gaps recur across the literature reviewed. First, there is a near-absence of randomised or pragmatic trial evidence testing whether optometrist-initiated referral based on oculomics

biomarkers changes downstream systemic disease outcomes, as opposed to demonstrating statistical association alone.(9-14) Second, cost-effectiveness and health-economic analyses of expanded optometric scope glaucoma co-management, independent prescribing, AI-assisted screening are essentially missing from the primary literature identified, despite capacity and cost being the principal policy justification for expansion.(1,4,6) Third, evidence from low- and middle-income countries, including Pakistan and the wider South Asian region, remains sparse and largely confined to hospital-based diagnostic studies rather than community optometry-led service evaluations, limiting the transferability of UK- and US-derived models to health systems with different optometric training standards and regulatory frameworks.(8,19) Fourth, standardised, validated competency frameworks for expanded roles glaucoma case-finding, independent prescribing, oculomics-informed referral are inconsistently defined across jurisdictions, complicating cross-country comparison of safety and effectiveness data.(6,7,17)

Future Perspectives

Three developments are likely to shape the next phase of optometric scope expansion. First, AI-assisted, point-of-care screening already validated for DR in a randomised paediatric trial is likely to extend to glaucoma and oculomics-based systemic screening, provided algorithm generalisability across ethnicities, camera platforms, and image quality is rigorously tested rather than assumed.(4,5,9) Second, hub-and-spoke teleoptometry models, in which community optometrists capture images that are remotely reviewed by specialists, may offer a pragmatic route to extending oculomics and glaucoma case-finding capacity into rural and low-resource settings, including within Pakistan, where ophthalmology workforce density is limited relative to population need.(3,8,20) Third, prescribing and scope-of-practice reform is likely to continue incrementally, but future policy decisions would benefit substantially from pragmatic, adequately powered trials comparing optometrist-led pathways against traditional referral on both clinical and cost outcomes rather than reliance on service

evaluation and survey data alone, however consistent their direction of effect.(1,6,18)

Conclusion

Primary research published between 2022 and 2026 confirms that optometry has moved substantively beyond refraction toward active disease detection and, increasingly, systemic health screening. Optometrist-delivered diabetic retinopathy review achieves clinically meaningful diagnostic concordance with ophthalmology, routine OCT use measurably increases glaucoma case-finding, and community optometry now absorbs a majority share of acute eyecare episodes in at least one national health system. Oculomics research provides a biologically plausible and statistically robust rationale for using the retina as a window into systemic and neurodegenerative disease, but clinical-outcome evidence for optometrist-initiated oculomics referral remains absent. The evidence base is strongest in the United Kingdom and United States and comparatively thin elsewhere, including in South Asia. Realising the full preventive potential of expanded optometric scope will require pragmatic trials, health-economic evaluation, and deliberate extension of both training frameworks and research effort to lower-resource health systems.

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