Bibliometric analysis of top 100 systematic reviews and meta-analysis in ophthalmology literature

Análise bibliométrica das 100 principais revisões sistemáticas e metanálises da literatura oftalmológica

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KEYWORDS:

Bibliometric analysis; Systematic review; Meta-analysis; Ophthalmology.

ABSTRACT

Vision impairment affects more than 2.2 billion people worldwide, underscoring the need for evidence-based guidance in ophthalmology. This bibliometric analysis mapped the 100 most-cited systematic reviews and meta-analyses in the field to identify highest-impact evidence and how research priorities have evolved. Records were retrieved from the Web of Science Core Collection (15 Jan 2025) and ranked by total citations; bibliometric indicators and visualizations were generated with Bibliometrix (R) and VOSviewer. The 100 articles (1992-2023) accrued over 42.000 citations, with output peaking in 2015-2016. Ten journals, led by *Ophthalmology* (37 papers), hosted 86% of the studies, while 25 countries, 365 institutions and 658 authors contributed. The United States (26 articles) and United Kingdom (22) dominated volume, yet Australia and Singapore produced exclusively multi-country publications, highlighting reliance on global collaboration. The National University of Singapore, University of Melbourne and Johns Hopkins University were the most productive institutions, and Wong T-Y was the leading author (13 papers, >10 000 citations). Keyword and timeline analyses showed a shift from glaucoma-centric topics to population eye-health metrics and therapeutic evidence from randomized trials. Overall, high-impact ophthalmic evidence is increasingly generated through international networks and concentrated in a few specialist journals, guiding future efforts toward collaborative rigorous research.

PALAVRAS-CHAVE:

Análise bibliométrica; Revisão sistemática; Meta-análise; Oftalmologia.

RESUMO

A deficiência visual afeta mais de 2,2 bilhões de pessoas em todo o mundo, o que reforça a necessidade de diretrizes baseadas em evidências na oftalmologia. Esta análise bibliométrica mapeou as 100 revisões sistemáticas e meta-análises mais citadas na área para identificar as evidências de maior impacto e como as prioridades de pesquisa evoluíram. Os registros foram obtidos da Web of Science Core Collection (15 de janeiro de 2025) e classificados pelo total de citações; os indicadores bibliométricos e as visualizações foram gerados com o Bibliometrix (R) e o VOSviewer. Os 100 artigos (1992-2023) acumularam mais de 42.000 citações, com pico de produção em 2015-2016. Dez periódicos, liderados pela *Ophthalmology* (37 artigos), publicaram 86% dos estudos, com contribuições de 25 países, 365 instituições e 658 autores. Os Estados Unidos (26 artigos) e o Reino Unido (22) dominaram o volume, enquanto a Austrália e Singapura produziram exclusivamente publicações multinacionais, destacando a dependência da colaboração global. A Universidade Nacional de Singapura, a Universidade de Melbourne e a Universidade Johns Hopkins foram as instituições mais produtivas, e Wong T-Y foi o autor principal (13 artigos, >10.000 citações). As análises de palavras-chave e cronologia mostraram uma mudança de foco de tópicos centrados no glaucoma para métricas de saúde ocular populacional e evidências terapêuticas de ensaios randomizados. De modo geral, evidências oftalmológicas de alto impacto são cada vez mais geradas por meio de redes internacionais e concentradas em alguns periódicos especializados, orientando os esforços futuros para pesquisas colaborativas rigorosas.

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INTRODUCTION

The 2019 *World Report on Vision* by the World Health Organization states that vision impairment affects over 2.2 billion people worldwide, with more than 1 billion cases either preventable or untreated, highlighting the importance of ophthalmology for public health. Higher prevalence rates include myopia, affecting 2.6 billion individuals, presbyopia with 1.8 billion, glaucoma at 76 million, and diabetic retinopathy at 146 million. The same report estimates that preventing vision loss in 11.9 million cases (e.g. glaucoma, diabetic retinopathy, trachoma) could have saved $32.1 billion in healthcare costs[1].

In this scenario, evidence-based medicine is a powerful tool to prevent eye disease and guide clinical practice toward the most effective, safe, and cost-effective treatments[2-4]. Sacket et al. explain that evidence-based medicine combines individual clinical experience with the best available scientific evidence to guide patient care decisions, valuing physician judgment while respecting patient preferences, and using different types of studies[5]. Systematic reviews and meta-analyses, recognized as level 1 evidence, are at the top of the evidence hierarchy. By integrating qualitative and quantitative data from comparable studies, they provide robust conclusions supported by larger patient samples and enrich the existing literature, increasingly cited in guidelines and clinical practice[4].

Bibliometric analysis is a valuable tool for evaluating the quality, quantity, and impact of scientific publications which helps clinicians and researchers identify key publications[6]. In recent years, bibliometric studies in ophthalmology have increased focusing on various sub-topics, such as myopia, cataracts, glaucoma, dry eye, and pediatric ophthalmology[7-20].

This bibliometric analysis is the first to focus on the top 100 systematic reviews and meta-analyses in ophthalmology to provide an overview of global research in the field. Key findings include trends in annual scientific production, institutional contributions, journal output, and leading universities and authors in the field. By examining these parameters, we hope to help consolidate the existing literature, facilitate the dissemination of high-quality evidence to ophthalmologists. provide valuable insights into research, guide future studies, and encourage international collaborations.

METHODS

Data sources and search strategy

The Web Of Science Core Collection (WOSCC) Collection database was accessed on 15 January 2025, with no time of restriction. To minimize bias, articles were identified by two independent researchers (R.D.F.R and B.G.) searching in WOSCC to identify the top 100 cited articles in the area, and any differences were compared and obtained by consensus. The search strategy used to search in title, abstract, author keywords, and keywords plus fields were "systematic review" OR "Systematic reviews" OR "meta-analysis" OR "meta-analyses" in the TOPIC (title, abstract, author, keywords, and keywords plus). Later, the articles were refined by the "ophthalmology" category.

Data collection and bibliometric analysis

A global analysis of articles published in journals was conducted, ranking them in descending order based on their total citation counts. Key information, such as article titles, authors, publication year, country of origin, primary institution, publishing journal, and journal impact factor, was recorded. The H-index was used to evaluate the local impact of the authors, while journal impact factors (IF) were sourced from the SCImago Journal Rank (SJR). Bibliometric indices and visualizations were generated using VOSviewer software (v1.6.20) and the Bibliometrix package in R.[21,22] Bibliometrix was employed to examine quantitative bibliometric metrics, including annual publication trends, top authors, countries, journals, and the most frequently cited articles. Meanwhile, VOSviewer enabled co-occurrence analyses to investigate Keywords Plus, institutional partnerships, and co-authorship networks. These tools were chosen for their advanced features in literature mapping and their ability to provide detailed insights into emerging research trends and key focus areas. Bibliometrix was employed to examine quantitative bibliometric metrics, including annual publication trends, top authors, countries, journals, and the most frequently cited articles. Meanwhile, VOSviewer enabled co-occurrence analyses to investigate Keywords Plus, institutional partnerships, and co-authorship networks. These tools were chosen for their advanced features in literature mapping and their ability to provide detailed insights into emerging research trends and key focus areas.

RESULTS

Analysis of annual publications

The temporal distribution of the 100 most cited systematic reviews and meta-analyses in ophthalmology is presented in Figure 1. The oldest article in this collection was published in 1992, and since then, a general trend of increasing high-impact publications per year has been observed. Between 1992 and 2000, the number of highly cited articles was low (frequently none or only one per year). From 2001 onward, a more consistent increase began, although with year-to-year fluctuations. This growth intensified during the 2010s, culminating in notable productivity peaks in 2015 and 2016. In 2016, the most productive year, 15 articles from the ranking were published, followed by about 8 articles in 2014. After 2016, the annual number of top 100 publications declined. These findings indicate that the mid-2010s concentrated many of the most influential systematic reviews/meta-analyses, possibly reflecting growing interest in evidence-based medicine in ophthalmology during that period.

Most cited articles and co-authorship

Table 1 compiles the 100 most cited articles, including title, DOI, first author, total citations, publishing journal, and journal impact factor. Among these, the most cited article was published in 2014 in the journal *Ophthalmology*, with approximately 3.707 citations (about 337 citations per year since publication). The second most cited article was published in 2016 also in *Opthalmology*, accumulating around 2.851 citations (approximately 316 per year). The third, published in 2011 in the *British Journal of Ophthalmology*, received about 2.348 citations in total (around 167 annually on average). These impressive figures highlight the high relevance and impact that certain systematic reviews/meta-analyses have achieved in ophthalmology.

Regarding authorship, strong international collaboration was observed among the highest-impact studies. Approximately 45% of these 100 articles involved co-authors from multiple countries, demonstrating the multicentric nature of the most cited research. Conversely, about 55% of the papers had all authors affiliated with the same country. In other words, nearly half of the most cited studies resulted from international collaborations. This underscores the importance of global research networks in ophthalmology: multinational teams have significantly contributed to the field's most influential work.

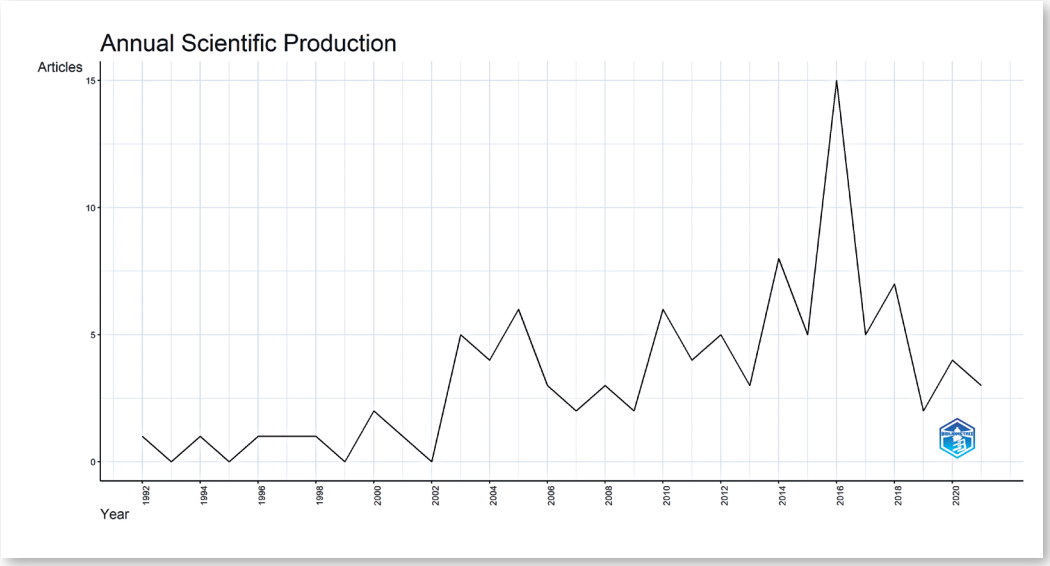

Figure 1. Annual scientific production on top 100 most cited articles in ophthalmology.

Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/j.ophtha.2014.05.013	OPHTHALMOLOGY	4.55	CHENG, CY (CORRESPONDING AUTHOR), NATL UNIV HLTH SYST, DEPT OPHTHALMOL, 1E KENT RIDGE RD, NUHS TOWER BLOCK LEVEL 7, SINGAPORE 119228, SINGAPORE	3707	GLOBAL PREVALENCE OF GLAUCOMA AND PROJECTIONS OF GLAUCOMA BURDEN THROUGH 2040: A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1016/j.ophtha.2016.01.006	OPHTHALMOLOGY	4.55	NAIDOO, KS (CORRESPONDING AUTHOR), UNIV NEW S WALES, BRIEN HOLDEN VIS INST, GATE 14 BARKER ST, RUPERT MYERS BLDG,4TH FLOOR, KENSINGTON, NSW 2052, AUSTRALIA	2851	GLOBAL PREVALENCE OF MYOPIA AND HIGH MYOPIA AND TEMPORAL TRENDS FROM 2000 THROUGH 2050
10.1136/bjophthalmol-2011-300539	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	PASCOLINI, D (CORRESPONDING AUTHOR), WORLD HLTH ORG, CHRON DIS \& HLTH PROMOT DEPT, 20 AVE APPIA, CH-1211 GENEVA 27, SWITZERLAND	2348	GLOBAL ESTIMATES OF VISUAL IMPAIRMENT: 2010
10.1001/archopht.122.4.564	ARCHIVES OF OPHTHALMOLOGY	2.28	FRIEDMAN, DS (CORRESPONDING AUTHOR), JOHNS HOPKINS UNIV, WILMER EYE INST, DANA CTR PREVENT OPHTHALMOL, WILMER 120,600 N WOLFE ST, BALTIMORE, MD 21287 USA	1966	PREVALENCE OF AGE-RELATED MACULAR DEGENERATION IN THE UNITED STATES
10.1016/j.jtos.2017.05.003	OCULAR SURFACE	1.82	STAPLETON, F (CORRESPONDING AUTHOR), UNSW SYDNEY, SCH OPTOMETRY \& VIS SCI, SYDNEY, NSW, AUSTRALIA	1585	TFOS DEWS II EPIDEMIOLOGY REPORT
10.1001/archopht.122.4.532	ARCHIVES OF OPHTHALMOLOGY	2.28	FRIEDMAN, DS (CORRESPONDING AUTHOR), JOHNS HOPKINS UNIV HOSP, WILMER EYE INST, 600 N WOLFE ST, BALTIMORE, MD 21287 USA	1076	PREVALENCE OF OPEN-ANGLE GLAUCOMA AMONG ADULTS IN THE UNITED STATES

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1001/jamaophthalmol.2015.4776	JAMA OPHTHALMOLOGY	2.28	THURET, G (CORRESPONDING AUTHOR), UNIV ST ETIENNE, FAC MED, LAB BIOL INGN \& IMAGERIE GREFFE CORNEE, EA 2521, 10 RUE MARANDIERE, F-42055 ST ETIENNE 2, FRANCE	1046	GLOBAL SURVEY OF CORNEAL TRANSPLANTATION AND EYE BANKING
10.1016/S0039-6257(00)00110-7	SURVEY OF OPHTHALMOLOGY	2.05	GLASGOW CALEDONIAN UNIV, DEPT VIS SCI, COWCADDENS RD, GLASGOW G4 0BA, LANARK, SCOTLAND	1045	HUMAN CORNEAL THICKNESS AND ITS IMPACT ON INTRAOCULAR PRESSURE MEASURES: A REVIEW AND META-ANALYSIS APPROACH
10.1016/j.ophtha.2021.04.027	OPHTHALMOLOGY	4.55	CHENG, CY (CORRESPONDING AUTHOR), SINGAPORE EYE RES INST, 20 COLL RD, DISCOVERY TOWER LEVEL 6, SINGAPORE 169856, SINGAPORE	913	GLOBAL PREVALENCE OF DIABETIC RETINOPATHY AND PROJECTION OF BURDEN THROUGH 2045 <I>SYSTEMATIC REVIEW AND META</I>-<I>ANALYSIS</I>
10.1016/j.ophtha.2011.01.040	OPHTHALMOLOGY	4.55	SINGH, AD (CORRESPONDING AUTHOR), CLEVELAND CLIN, COLE EYE INST, DEPT OPHTHALM ONCOL, 9500 EUCLID AVE, CLEVELAND, OH 44195 USA	889	UVEAL MELANOMA: TRENDS IN INCIDENCE, TREATMENT, AND SURVIVAL
10.1016/j.ajo.2006.11.060	AMERICAN JOURNAL OF OPHTHALMOLOGY	4.10	SCHAUMBERG, DA (CORRESPONDING AUTHOR), BRIGHAM \& WOMENS HOSP, DIV PREVENT MED, 900 COMMONWEALTH AVE E, BOSTON, MA 02215 USA	643	IMPACT OF DRY EYE SYNDROME ON VISION-RELATED QUALITY OF LIFE
10.1186/1471-2415-10-31	BMC OPHTHALMOLOGY	1.70	CHAKRAVARTHY, U (CORRESPONDING AUTHOR), QUEENS UNIV BELFAST, CTR VIS SCI, BELFAST, ANTRIM, NORTH IRELAND	566	CLINICAL RISK FACTORS FOR AGE-RELATED MACULAR DEGENERATION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/j.ophtha.2015.11.010	OPHTHALMOLOGY	4.55	QU, J (CORRESPONDING AUTHOR), WENZHOU MED UNIV, HOSP EYE, 270 WEST XUEYUAN RD, WENZHOU 325027, ZHEJIANG, PEOPLES R CHINA	497	EFFICACY COMPARISON OF 16 INTERVENTIONS FOR MYOPIA CONTROL IN CHILDREN <I>A NETWORK META</I>-<I>ANALYSIS</I>
10.1016/j.ajo.2013.08.010	AMERICAN JOURNAL OF OPHTHALMOLOGY	4.10	WONG, TY (CORRESPONDING AUTHOR), NATL UNIV SINGAPORE, SINGAPORE NATL EYE CTR, SINGAPORE EYE RES INST, 11 3RD HOSP AVE, SINGAPORE 168751, SINGAPORE	496	EPIDEMIOLOGY AND DISEASE BURDEN OF PATHOLOGIC MYOPIA AND MYOPIC CHOROIDAL NEOVASCULARIZATION: AN EVIDENCE-BASED SYSTEMATIC REVIEW
10.1016/j.ophtha.2007.03.008	OPHTHALMOLOGY	4.55	SLEDGE, I (CORRESPONDING AUTHOR), UNITED BIOSOURCE CORP, 101 STN LANDING, MEDFORD, MA 02155 USA	456	THE NATURAL HISTORY AND PROGNOSIS OF NEOVASCULAR AGE-RELATED MACULAR DEGENERATION
10.1016/j.ophtha.2011.03.012	OPHTHALMOLOGY	4.55	JANSONIUS, NM (CORRESPONDING AUTHOR), UNIV GRONINGEN, DEPT OPHTHALMOL, UNIV MED CTR GRONINGEN, POB 30-001, NL-9700 RB GRONINGEN, NETHERLANDS	437	MYOPIA AS A RISK FACTOR FOR OPEN-ANGLE GLAUCOMA: A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1167/iovs.05-1504	INVESTIGATIVE OPHTHALMOLOGY \& VISUAL SCIENCE	1.37	TOMLINSON, A (CORRESPONDING AUTHOR), GLASGOW CALEDONIAN UNIV, DEPT VIS SCI, COWCADDENS RD, GLASGOW G4 0BA, LANARK, SCOTLAND	436	TEAR FILM OSMOLARITY: DETERMINATION OF A REFERENT FOR DRY EYE DIAGNOSIS
10.1001/archopht.123.5.613	ARCHIVES OF OPHTHALMOLOGY	2.28	JOHNS HOPKINS UNIV, WILMER OPHTHALMOL INST, 727 MAUMENEE BLDG,600 N WOLFE ST, BALTIMORE, MD 21287 USA	408	ACUTE ENDOPHTHALMITIS FOLLOWING CATARACT SURGERY - A SYSTEMATIC REVIEW OF THE LITERATURE
10.1038/sj.eye.6701978	EYE	1.27	BOLTON HOSP, NHS TRUST, BOLTON EYE UNIT, MINERVA RD, BOLTON BL4 0JR, ENGLAND	401	SMOKING AND AGE-RELATED MACULAR DEGENERATION: A REVIEW OF ASSOCIATION

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DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/j.ophtha.2013.05.025	OPHTHALMOLOGY	4.55	BOURNE, RRA (CORRESPONDING AUTHOR), ANGLIA RUSKIN UNIV, VIS \& EYE RES UNIT, EAST RD, CAMBRIDGE CB1 1PT, ENGLAND	397	GLOBAL PREVALENCE OF VISION IMPAIRMENT AND BLINDNESS <I>MAGNITUDE AND TEMPORAL TRENDS</ I>, <I>1990</I>- <I>2010</I>
10.1016/j.preteyeres.2015.12.001	PROGRESS IN RETINAL AND EYE RESEARCH	5.83	OHNO-MATSUI, K (CORRESPONDING AUTHOR), TOKYO MED \& DENT UNIV, DEPT OPHTHALMOL \& VISUAL SCI, BUNKYO KU, 1-5-45 YUSHIMA, TOKYO 1138510, JAPAN	371	UPDATES OF PATHOLOGIC MYOPIA
10.1016/S0161-6420(03)00078-2	OPHTHALMOLOGY	4.55	THOMAS JEFFERSON UNIV, WILLS EYE HOSP, ONCOL SERV, 900 WALNUT ST, PHILADELPHIA, PA 19107 USA	371	INCIDENCE OF UVEAL MELANOMA IN THE UNITED STATES: 1973-1997
10.1167/iovs.61.4.49	INVESTIGATIVE OPHTHALMOLOGY \& VISUAL SCIENCE	1.37	KLAVER, CCW (CORRESPONDING AUTHOR), ERASMUS MC, ROOM NA 2808, POB 2040, NL-3000 CA ROTTERDAM, NETHERLANDS	361	THE COMPLICATIONS OF MYOPIA: A REVIEW AND META-ANALYSIS
10.1016/j.ophtha.2009.10.007	OPHTHALMOLOGY	4.55	WONG, TY (CORRESPONDING AUTHOR), NATL UNIV SINGAPORE, SINGAPORE NATL EYE CTR, SINGAPORE EYE RES INST, YONG LOO LIN SCH MED, 11 3RD HOSP AVE, SINGAPORE 168751, SINGAPORE	355	THE PREVALENCE OF AGE-RELATED MACULAR DEGENERATION IN ASIANS <I>A SYSTEMATIC REVIEW AND META</I>- <I>ANALYSIS</I>
10.1136/bjophthalmol-2015-307724	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	RUDNICKA, AR (CORRESPONDING AUTHOR), ST GEORGES UNIV LONDON, POPULAT HLTH RES INST, CRANMER TERRACE, LONDON SW17 0RE, ENGLAND	354	GLOBAL VARIATIONS AND TIME TRENDS IN THE PREVALENCE OF CHILDHOOD MYOPIA, A SYSTEMATIC REVIEW AND QUANTITATIVE META-ANALYSIS: IMPLICATIONS FOR AETIOLOGY AND EARLY PREVENTION
10.1016/S0161-6420(98)97023-3	OPHTHALMOLOGY	4.55	SCHAUMBERG, DA (CORRESPONDING AUTHOR), DIV PREVENT MED, 900 COMMONWESLTH AVE E, BOSTON, MA 02215 USA	353	A SYSTEMATIC OVERVIEW OF THE INCIDENCE OF POSTERIOR CAPSULE OPACIFICATION

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1111/aos.13403	ACTA OPHTHALMOLOGICA	1.39	HE, XG (CORRESPONDING AUTHOR), SHANGHAI EYE HOSP, SHANGHAI EYE DIS PREVENT \& TREATMENT CTR, DEPT PREVENTAT OPHTHALMOL, 380 KANGDING RD, SHANGHAI 200040, PEOPLES R CHINA	351	TIME SPENT IN OUTDOOR ACTIVITIES IN RELATION TO MYOPIA PREVENTION AND CONTROL: A META-ANALYSIS AND SYSTEMATIC REVIEW
10.1016/j.ophtha.2013.09.048	OPHTHALMOLOGY	4.55	VAN GELDER, RN (CORRESPONDING AUTHOR), UNIV WASHINGTON, SCH MED, DEPT OPHTHALMOL, CAMPUS BOX 359608,325 9TH AVE, SEATTLE, WA 98104 USA	351	EXPERT PANEL RECOMMENDATIONS FOR THE USE OF ANTI-TUMOR NECROSIS FACTOR BIOLOGIC AGENTS IN PATIENTS WITH OCULAR INFLAMMATORY DISORDERS
10.1167/iovs.06-0299	INVESTIGATIVE OPHTHALMOLOGY \& VISUAL SCIENCE	1.37	RUDNICKA, AR (CORRESPONDING AUTHOR), UNIV LONDON ST GEORGES HOSP, SCH MED, DIV COMMUNITY HLTH SCI, CRANMER TERRACE, LONDON SW17 0RE, ENGLAND	350	VARIATIONS IN PRIMARY OPEN-ANGLE GLAUCOMA PREVALENCE BY AGE, GENDER, AND RACE: A BAYESIAN META-ANALYSIS
10.1016/j.ophtha.2005.01.042	OPHTHALMOLOGY	4.55	MAASTRICHT UNIV HOSP, DEPT OPHTHALMOL, POB 5800, NL-6202 AZ MAASTRICHT, NETHERLANDS	349	INTRAOCULAR PRESSURE-LOWERING EFFECTS OF ALL COMMONLY USED GLAUCOMA DRUGS - A META-ANALYSIS OF RANDOMIZED CLINICAL TRIALS
10.1016/j.ophtha.2017.05.035	OPHTHALMOLOGY	4.55	KLAVER, CCW (CORRESPONDING AUTHOR), ERASMUS MC, DEPT OPHTHALMOL, POB 2040, NL-3000 CA ROTTERDAM, NETHERLANDS	341	PREVALENCE OF AGE-RELATED MACULAR DEGENERATION IN EUROPE
10.1016/j.ophtha.2017.12.011	OPHTHALMOLOGY	4.55	CHIOU, ST (CORRESPONDING AUTHOR), NATL YANG MING UNIV, SCH MED, INST PUBL HLTH, TAIPEI, TAIWAN	336	MYOPIA PREVENTION AND OUTDOOR LIGHT INTENSITY IN A SCHOOL-BASED CLUSTER RANDOMIZED TRIAL

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.3129/i08-001	CANADIAN JOURNAL OF OPHTHALMOLOGY-JOURNAL CANADIEN D OPHTALMOLOGIE	0.57	JUTAI, JW (CORRESPONDING AUTHOR), REHABIL \& GERIAT CARE RES CTR, LAWSON HLTH RES INST, PARKWOOD HOSP B-3002 A 801 COMMISSIONERS RD E, LONDON, ON N6C 5J1, CANADA	332	AGE-RELATED MACULAR DEGENERATION AND LOW-VISION REHABILITATION: A SYSTEMATIC REVIEW
10.1136/bjophthalmol-2015-307223	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	RUDNICKA, AR (CORRESPONDING AUTHOR), UNIV LONDON, POPULAT HLTH RES INST, CRANMER TERRACE, LONDON SW17 0RE, ENGLAND	327	GLOBAL VARIATIONS AND TIME TRENDS IN THE PREVALENCE OF PRIMARY OPEN ANGLE GLAUCOMA (POAG): A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1001/archopht.1994.01090140115033	ARCHIVES OF OPHTHALMOLOGY	2.28	JOHNS HOPKINS HLTH INST, WILMER INST, DANA CTR, BALTIMORE, MD USA	326	SYNTHESIS OF THE LITERATURE ON VISUAL-ACUITY AND COMPLICATIONS FOLLOWING CATARACT-EXTRACTION WITH INTRAOCULAR-LENS IMPLANTATION
10.1136/bjo.2009.157727	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	MITRY, D (CORRESPONDING AUTHOR), PRINCESS ALEXANDRA EYE PAVIL, EDINBURGH EH3 9HA, MIDLOTHIAN, SCOTLAND	324	THE EPIDEMIOLOGY OF RHEGMATOGENOUS RETINAL DETACHMENT: GEOGRAPHICAL VARIATION AND CLINICAL ASSOCIATIONS
10.1016/j.ophtha.2010.01.058	OPHTHALMOLOGY	4.55	WONG, TY (CORRESPONDING AUTHOR), UNIV MELBOURNE, CTR EYE RES AUSTRALIA, 32 GISBORNE ST, MELBOURNE, VIC 3002, AUSTRALIA	324	NATURAL HISTORY OF BRANCH RETINAL VEIN OCCLUSION: AN EVIDENCE-BASED SYSTEMATIC REVIEW

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DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1038/sj.eye.6701476	EYE	1.27	UNIV COLL SWANSEA, SCH CLIN, SWANSEA SINGLETON PK, SWANSEA SA2 8PP, W GLAM, WALES	324	EPIDEMIOLOGY OF DIABETIC RETINOPATHY AND MACULAR OEDEMA: A SYSTEMATIC REVIEW
Not applicable	INVESTIGATIVE OPHTHALMOLOGY \& VISUAL SCIENCE	1.37	JOHNS HOPKINS UNIV, SCH MED, WILMER INST, DANA CTR PREVENT OPHTHALMOL, BALTIMORE, MD	321	MODELS OF OPEN-ANGLE GLAUCOMA PREVALENCE AND INCIDENCE IN THE UNITED STATES
10.1016/j.ophtha.2012.04.020	OPHTHALMOLOGY	4.55	SHERWIN, JC (CORRESPONDING AUTHOR), UNIV CAMBRIDGE, INST PUBL HLTH, DEPT PUBL HLTH \& PRIMARY CARE, FORVIE SITE, ROBINSON WAY, CAMBRIDGE CB2 0SR, ENGLAND	310	THE ASSOCIATION BETWEEN TIME SPENT OUTDOORS AND MYOPIA IN CHILDREN AND ADOLESCENTS <I>A SYSTEMATIC REVIEW AND META</I>-<I>ANALYSIS</I>
10.1097/IAE.0b013e31820a67e4	RETINA-THE JOURNAL OF RETINAL AND VITREOUS DISEASES	1.01	MCCANNEL, CA (CORRESPONDING AUTHOR), UNIV CALIF LOS ANGELES, JULES STEIN EYE INST, DAVID GEFFEN SCH MED, 100 STEIN PLAZA, LOS ANGELES, CA 90095 USA	310	META-ANALYSIS OF ENDOPHTHALMITIS AFTER INTRAVITREAL INJECTION OF ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR AGENTS' CAUSATIVE ORGANISMS AND POSSIBLE PREVENTION STRATEGIES
10.1016/j.ophtha.2018.04.013	OPHTHALMOLOGY	4.55	FRICKE, TR (CORRESPONDING AUTHOR), UNIV NEW SOUTH WALES, BRIEN HOLDEN VIS INST, GATE 14 BARKER ST,4TH FLOOR RUPERT MYERS BLDG, KENSINGTON, NSW 2052, AUSTRALIA	305	GLOBAL PREVALENCE OF PRESBYOPIA AND VISION IMPAIRMENT FROM UNCORRECTED PRESBYOPIA <I>SYSTEMATIC REVIEW, META-ANALYSIS, AND MODELLING</I>

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/j.ophtha.2015.03.018	OPHTHALMOLOGY	4.55	HAMMOND, CJ (CORRESPONDING AUTHOR), KINGS COLL LONDON, ST THOMAS HOSP, DEPT OPHTHALMOL, 3RD FLOOR, BLOCK D, SOUTH WING, LONDON SE1 7EH, ENGLAND	303	INCREASING PREVALENCE OF MYOPIA IN EUROPE AND THE IMPACT OF EDUCATION
10.1016/j.visres.2009.02.010	VISION RESEARCH	0.62	LEVI, DM (CORRESPONDING AUTHOR), UNIV CALIF BERKELEY, SCH OPTOMETRY, BERKELEY, CA 94720 USA	290	PERCEPTUAL LEARNING AS A POTENTIAL TREATMENT FOR AMBLYOPIA: A MINI-REVIEW
10.1001/archopht.1992.01080140101036	ARCHIVES OF OPHTHALMOLOGY	2.28	JOHNS HOPKINS UNIV HOSP, WILMER OPHTHALMOL INST, BALTIMORE, MD 21205	286	A REVIEW OF MORTALITY FROM CHOROIDAL MELANOMA .2. A METAANALYSIS OF 5-YEAR MORTALITY-RATES FOLLOWING ENUCLEATION, 1966 THROUGH 1988
10.1097/ICO.0000000000002150	CORNEA	0.95	KHABAZKHOOB, M (CORRESPONDING AUTHOR), SHAHID BEHESHTI UNIV MED SCI, SCH NURSING \& MIDWIFERY, DEPT MED SURG NURSING, TEHRAN 1968653111, IRAN	279	THE PREVALENCE AND RISK FACTORS FOR KERATOCONUS: A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1016/j.ophtha.2004.10.042	OPHTHALMOLOGY	4.55	UNIV MANNHEIM, AUGENKLIN, THEODOR KUTZER UFER 1-3, D-68167 MANNHEIM, GERMANY	266	INTRAOCULAR PRESSURE ELEVATION AFTER INTRAVITREAL TRIAMCINOLONE ACETONIDE INJECTION

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/j.ophtha.2011.09.027	OPHTHALMOLOGY	4.55	OWEN, CG (CORRESPONDING AUTHOR), ST GEORGES UNIV LONDON, DIV POPULAT HLTH SCI \& EDUC, CRANMER TERRACE, LONDON SW17 ORE, ENGLAND	252	AGE AND GENDER VARIATIONS IN AGE-RELATED MACULAR DEGENERATION PREVALENCE IN POPULATIONS OF EUROPEAN ANCESTRY: A META-ANALYSIS
10.1016/j.preteyeres.2014.09.001	PROGRESS IN RETINAL AND EYE RESEARCH	5.83	ZEITZ, C (CORRESPONDING AUTHOR), INST VIS, DEPT GENET, 17 RUE MOREAU, F-75012 PARIS, FRANCE	248	CONGENITAL STATIONARY NIGHT BLINDNESS: AN ANALYSIS AND UPDATE OF GENOTYPE-PHENOTYPE CORRELATIONS AND PATHOGENIC MECHANISMS
10.1016/j.ophtha.2015.10.002	OPHTHALMOLOGY	4.55	KESSEL, L (CORRESPONDING AUTHOR), RIGSHOSP GLOSTRUP, DEPT OPHTHALMOL, NORDRE RINGVEJ 57, DK-2600 GLOSTRUP, DENMARK	242	TORIC INTRAOCULAR LENSES IN THE CORRECTION OF ASTIGMATISM DURING CATARACT SURGERY <I>A SYSTEMATIC REVIEW AND META</I>-<I>ANALYSIS</I>
10.1136/bjophthalmol-2013-304033	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	BOURNE, RRA (CORRESPONDING AUTHOR), ANGLIA RUSKIN UNIV, POSTGRAD MED INST, VIS \& EYE RES UNIT, EAST RD, CAMBRIDGE CB1 1PT, ENGLAND	241	PREVALENCE AND CAUSES OF VISION LOSS IN HIGH-INCOME COUNTRIES AND IN EASTERN AND CENTRAL EUROPE: 1990-2010
10.1016/S0002-9394(00)00358-5	AMERICAN JOURNAL OF OPHTHALMOLOGY	4.10	KUHN, F (CORRESPONDING AUTHOR), POB 55687, BIRMINGHAM, AL 35255 USA	240	INTERNAL LIMITING MEMBRANE REMOVAL IN THE MANAGEMENT OF FULL-THICKNESS MACULAR HOLES
10.1136/bjophthalmol-2011-301109	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	OWEN, CG (CORRESPONDING AUTHOR), ST GEORGES UNIV LONDON, DIV POPULAT HLTH SCI \& EDUC, LONDON SW17 0RE, ENGLAND	239	THE ESTIMATED PREVALENCE AND INCIDENCE OF LATE STAGE AGE RELATED MACULAR DEGENERATION IN THE UK

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/j.ophtha.2018.08.009	OPHTHALMOLOGY	4.55	CHEUNG, CY (CORRESPONDING AUTHOR), HONG KONG EYE HOSP, CUHK EYE CTR, KOWLOON, 147K ARGYLE ST, HONG KONG, PEOPLES R CHINA	238	SPECTRAL-DOMAIN OCT MEASUREMENTS IN ALZHEIMER'S DISEASE <I>A SYSTEMATIC REVIEW AND META</I>-<I>ANALYSIS</I>
10.1016/j.ophtha.2008.12.037	OPHTHALMOLOGY	4.55	SOLOMON, KD (CORRESPONDING AUTHOR), MED UNIV S CAROLINA, STORM EYE INST, MAGILL RES CTR VIS CORRECT, 167 ASHLEY AVE, CHARLESTON, SC 29425 USA	233	LASIK WORLD LITERATURE REVIEW <I>QUALITY OF LIFE AND PATIENT SATISFACTION</I>
10.1136/bjophthalmol-2017-311258	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	BOURNE, RRA (CORRESPONDING AUTHOR), ANGLIA RUSKIN UNIV, SCH MED, VISI \& EYE RES UNIT, CAMBRIDGE CB1 1PT, ENGLAND	231	PREVALENCE AND CAUSES OF VISION LOSS IN HIGH-INCOME COUNTRIES AND IN EASTERN AND CENTRAL EUROPE IN 2015: MAGNITUDE, TEMPORAL TRENDS AND PROJECTIONS
10.1016/j.survophthal.2004.10.006	SURVEY OF OPHTHALMOLOGY	2.05	HONG, CH (CORRESPONDING AUTHOR), TULANE UNIV, SCH MED, DEPT OPHTHALMOL, NEW ORLEANS, LA 70118 USA	225	GLAUCOMA DRAINAGE DEVICES: A SYSTEMATIC LITERATURE REVIEW AND CURRENT CONTROVERSIES
10.1001/archophthalmol.2011.179	ARCHIVES OF OPHTHALMOLOGY	2.28	HOLMES, JM (CORRESPONDING AUTHOR), JAEB CTR HLTH RES, 15310 AMBERLY DR, STE 350, TAMPA, FL 33647 USA	224	EFFECT OF AGE ON RESPONSE TO AMBLYOPIA TREATMENT IN CHILDREN

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/S0161-6420(02)01563-4	OPHTHALMOLOGY	4.55	MOORFIELDS EYE HOSP, CITY RD, LONDON EC1V 2PD, ENGLAND	220	INDOCYANINE GREEN ANGIOGRAPHY IN CHORIOREFINAL DISEASES: INDICATIONS AND INTERPRETATION - AN EVIDENCE-BASED UPDATE
10.1097/01.opx.0000175009.08626.65	OPTOMETRY AND VISION SCIENCE	0.63	UNIV ALABAMA BIRMINGHAM, CTR RES APPL GERONTOL, DEPT BIOSTAT, 1530 3RD AVE S, HOLLEY MEARS BLDG, BIRMINGHAM, AL 35294 USA	219	CUMULATIVE META-ANALYSIS OF THE RELATIONSHIP BETWEEN USEFUL FIELD OF VIEW AND DRIVING PERFORMANCE IN OLDER ADULTS: CURRENT AND FUTURE IMPLICATIONS
10.1016/j.ophtha.2015.09.005	OPHTHALMOLOGY	4.55	LI, TJ (CORRESPONDING AUTHOR), JOHNS HOPKINS BLOOMBERG SCH PUBL HLTH, CTR CLIN TRIALS \& EVIDENCE SYNTH, DEPT EPIDEMIOL, 615 N WOLFE ST, ROOM E6011, BALTIMORE, MD 21205 USA	213	COMPARATIVE EFFECTIVENESS OF FIRST-LINE MEDICATIONS FOR PRIMARY OPEN-ANGLE GLAUCOMA <I>A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS</I>
10.1136/bjophthalmol-2017-311266	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	NAIDOO, KS (CORRESPONDING AUTHOR), UNIV NEW SOUTH WALES, BRIEN HOLDEN VIS INST, KENSINGTON, NSW 2052, AUSTRALIA	212	GLOBAL PREVALENCE OF VISUAL IMPAIRMENT ASSOCIATED WITH MYOPIC MACULAR DEGENERATION AND TEMPORAL TRENDS FROM 2000 THROUGH 2050: SYSTEMATIC REVIEW, META-ANALYSIS AND MODELLING
10.1016/j.ophtha.2014.07.051	OPHTHALMOLOGY	4.55	KIM, MH (CORRESPONDING AUTHOR), SAEVIT EYE HOSP, 1065 JUNGANG RO, GOYANG 418817, GYEONGGI DO, SOUTH KOREA	212	DIABETES, FASTING GLUCOSE, AND THE RISK OF GLAUCOMA A META-ANALYSIS

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1016/S0161-6420(03)00722-X	OPHTHALMOLOGY	4.55	LEYLAND, M (CORRESPONDING AUTHOR), ROYAL BERKSHIRE HOSP, EYE DEPT, LONDON RD, READING RG1 5AN, BERKS, ENGLAND	212	MULTIFOCAL VERSUS MONOFOCAL INTRAOCULAR LENSES IN CATARACT SURGERY
10.1016/j.ophtha.2010.01.039	OPHTHALMOLOGY	4.55	CURSIEFEN, C (CORRESPONDING AUTHOR), UNIV ERLANGEN NURNBERG, DEPT OPHTHALMOL, SCHWABACHANLAGE 6, D-91054 ERLANGEN, GERMANY	206	CORNEAL NEOVASCULARIZATION AS A RISK FACTOR FOR GRAFT FAILURE AND REJECTION AFTER KERATOPLASTY <I>AN EVIDENCE-BASED META-ANALYSIS</I>
10.1001/archopht.126.6.826	ARCHIVES OF OPHTHALMOLOGY	2.28	WONG, TY (CORRESPONDING AUTHOR), UNIV MELBOURNE, CTR EYE RES AUSTRALIA, 32 GISBORNE ST, MELBOURNE, VIC 3002, AUSTRALIA	205	DIETARY Ω-3 FATTY ACID AND FISH INTAKE IN THE PRIMARY PREVENTION OF AGE-RELATED MACULAR DEGENERATION -: A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1136/bjophthalmol-2019-314422	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	FINGER, RP (CORRESPONDING AUTHOR), UNIV BONN, DEPT OPHTHALMOL, D-53127 BONN, GERMANY	202	PREVALENCE AND INCIDENCE OF AGE-RELATED MACULAR DEGENERATION IN EUROPE: A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1111/j.1475-1313.2004.00187.x	OPHTHALMIC AND PHYSIOLOGICAL OPTICS	0.97	DE BOER, MR (CORRESPONDING AUTHOR), VRIJE UNIV AMSTERDAM, MED CTR, DEPT OPHTHALMOL, 4A83 POB 7057, NL-1007 MB AMSTERDAM, NETHERLANDS	202	PSYCHOMETRIC PROPERTIES OF VISION-RELATED QUALITY OF LIFE QUESTIONNAIRES: A SYSTEMATIC REVIEW
10.1186/s12886-017-0612-2	BMC OPHTHALMOLOGY	0.72	TEWELDEMEDHIN, M (CORRESPONDING AUTHOR), AKSUM UNIV, DEPT MED LAB SCI, COLL HLTH SCI, AKSUM, TIGRAY, ETHIOPIA	199	BACTERIAL PROFILE OF OCULAR INFECTIONS: A SYSTEMATIC REVIEW

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1167/iovs.62.5.3	INVESTIGATIVE OPHTHALMOLOGY \& VISUAL SCIENCE	1.37	MORGAN, IG (CORRESPONDING AUTHOR), AUSTRALIAN NATL UNIV, RES SCH BIOL, CANBERRA, ACT, AUSTRALIA	195	IMI RISK FACTORS FOR MYOPIA
10.1001/jamaophthalmol.2013.5059	JAMA OPHTHALMOLOGY	2.28	RULLI, E (CORRESPONDING AUTHOR), IRCCS, IST RIC FARMACOL MARIO NEGRI, CLIN RES LAB, VIA LA MASA 19, MILAN, ITALY	195	EFFICACY AND SAFETY OF TRABECULECTOMY VS NONPENETRATING SURGICAL PROCEDURES A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1016/j.survophthal.2014.06.002	SURVEY OF OPHTHALMOLOGY	2.05	JACKSON, TL (CORRESPONDING AUTHOR), KINGS COLL LONDON, KINGS COLL HOSP LONDON, DEPT OPHTHALMOL, LONDON SE5 9RS, ENGLAND	194	SYSTEMATIC REVIEW OF 342 CASES OF ENDOGENOUS BACTERIAL ENDOPHTHALMITIS
10.1016/S0161-6420(03)00077-0	OPHTHALMOLOGY	4.55	THOMAS JEFFERSON UNIV, WILLS EYE HOSP, ONCOL SERV, 900 WALNUT ST, PHILADELPHIA, PA 19107 USA	190	SURVIVAL RATES WITH UVEAL MELANOMA IN THE UNITED STATES: 1973-1997
10.1038/eye.2016.156	EYE	1.27	SHEELADEVI, S (CORRESPONDING AUTHOR), CITY UNIV LONDON, SCH HLTH SCI, DIV OPTOMETRY \& VISUAL SCI, CTR PUBL HLTH RES, LONDON EC1V 0HB, ENGLAND	184	GLOBAL PREVALENCE OF CHILDHOOD CATARACT: A SYSTEMATIC REVIEW
10.1016/S0161-6420(01)00775-8	OPHTHALMOLOGY	4.55	EDWARD S HARKNESS EYE INST, 635 W 165TH ST, NEW YORK, NY 10032 USA	184	EVIDENCE-BASED RECOMMENDATIONS FOR THE DIAGNOSIS AND TREATMENT OF NEOVASCULAR GLAUCOMA
10.1038/s41433-020-0806-3	EYE	1.27	KHABAZKHOOB, M (CORRESPONDING AUTHOR), SHAHID BEHESHTI UNIV MED SCI, SCH NURSING \& MIDWIFERY, DEPT MED SURG NURSING, TEHRAN, IRAN	181	GLOBAL AND REGIONAL PREVALENCE OF AGE-RELATED CATARACT: A COMPREHENSIVE SYSTEMATIC REVIEW AND META-ANALYSIS

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1001/jamaophthalmol.2017.1091	JAMA OPHTHALMOLOGY	2.28	LIU, LQ (CORRESPONDING AUTHOR), SICHUAN UNIV, DEPT OPHTHALMOL, WEST CHINA HOSP, GUOXUE XIANG 37, CHENGDU 610041, PEOPLES R CHINA	180	EFFICACY AND ADVERSE EFFECTS OF ATROPINE IN CHILDHOOD MYOPIA A META-ANALYSIS
10.1097/OPX.0000000000000516	OPTOMETRY AND VISION SCIENCE	0.63	SAW, SM (CORRESPONDING AUTHOR), SINGAPORE EYE RES INST, 16 MED DR,MD 3, SINGAPORE 117597, SINGAPORE	177	THE AGE-SPECIFIC PREVALENCE OF MYOPIA IN ASIA: A META-ANALYSIS
10.4103/ijo.IJO_297_21	INDIAN JOURNAL OF OPHTHALMOLOGY	0.63	HONAVAR, SG (CORRESPONDING AUTHOR), CTR SIGHT, RD 2, BANJARA HILLS, HYDERABAD, TELANGANA, INDIA	175	COVID-19 AND EYE: A REVIEW OF OPHTHALMIC MANIFESTATIONS OF COVID-19
10.1016/j.ophtha.2017.11.017	OPHTHALMOLOGY	4.55	DICK, AD (CORRESPONDING AUTHOR), UNIV BRISTOL, BRISTOL EYE HOSP, SCH CLIN SCI, LOWER MAUDLIN ST, BRISTOL BS1 2LX, AVON, ENGLAND	172	GUIDANCE ON NONCORTICOSTEROID SYSTEMIC IMMUNOMODULATORY THERAPY IN NONINFECTIOUS UVEITIS <I>FUNDAMENTALS OF CARE FOR UVEITIS</I> (<I>FOCUS</I>) <I>INITIATIVE</I>
10.1016/j.survophthal.2011.06.006	SURVEY OF OPHTHALMOLOGY	2.05	MARGRAIN, TH (CORRESPONDING AUTHOR), CARDIFF UNIV, SCH OPTOMETRY \& VIS SCI, MAINDY RD, CARDIFF CF24 4LU, S GLAM, WALES	170	HOW EFFECTIVE IS LOW VISION SERVICE PROVISION? A SYSTEMATIC REVIEW
10.1001/archopht.124.1.54	ARCHIVES OF OPHTHALMOLOGY	2.28	OTTAWA HOSP, 375 LISGAR ST,206, OTTAWA, ON K2P 0E3, CANADA	170	THE ASSOCIATION BETWEEN HOST SUSCEPTIBILITY FACTORS AND UVEAL MELANOMA - A META-ANALYSIS
10.1155/2014/724780	JOURNAL OF OPHTHALMOLOGY	1.80	KOLAR, P (CORRESPONDING AUTHOR), MASARYK UNIV BRNO, UNIV EYE CLIN, JIHLAVSKA 20, BRNO 62500, CZECH REPUBLIC	168	RISK FACTORS FOR CENTRAL AND BRANCH RETINAL VEIN OCCLUSION: A META-ANALYSIS OF PUBLISHED CLINICAL DATA

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1001/jamaophthalmol.2015.4070	JAMA OPHTHALMOLOGY	2.28	AVERY, RL (CORRESPONDING AUTHOR), CALIF RETINA CONSULTANTS & RES FDN, 525 E MICHELTORENA, STE A, SANTA BARBARA, CA 93103 USA	165	SYSTEMIC SAFETY OF PROLONGED MONTHLY ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR THERAPY FOR DIABETIC MACULAR EDEMA A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1016/S0039-6257(96)82015-7	SURVEY OF OPHTHALMOLOGY	2.05	JOHNS HOPKINS UNIV, WILMER INST, BALTIMORE, MD 21287 USA	165	SUCCESS OF MONOVISION IN PRESBYOPES: REVIEW OF THE LITERATURE AND POTENTIAL APPLICATIONS TO REFRACTIVE SURGERY
10.1016/j.ophtha.2017.12.005	OPHTHALMOLOGY	4.55	OHNO-MATSUI, K (CORRESPONDING AUTHOR), TOKYO MED \& DENT UNIV, DEPT OPHTHALMOL \& VISUAL SCI, BUNKYO KU, 1-5-45 YUSHIMA, TOKYO 1138510, JAPAN	163	PROGRESSION OF MYOPIC MACULOPATHY DURING 18-YEAR FOLLOW-UP
10.1136/bjo.87.3.312	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	ST GEORGE HOSP, SCH MED, DEPT PUBL HLTH SCI, CRANMER TERRACE, LONDON SW17 0RE, ENGLAND	162	HOW BIG IS THE BURDEN OF VISUAL LOSS CAUSED BY AGE RELATED MACULAR DEGENERATION IN THE UNITED KINGDOM?
10.1097/IAE.0000000000000937	RETINA-THE JOURNAL OF RETINAL AND VITREOUS DISEASES	1.01	SCHWARTZ, SD (CORRESPONDING AUTHOR), UNIV CALIF LOS ANGELES, DAVID GEFFEN SCH MED, STEIN EYE INST, RETINA DIV, LOS ANGELES, CA 90095 USA	161	ULTRA-WIDEFIELD FUNDUS IMAGING A REVIEW OF CLINICAL APPLICATIONS AND FUTURE TRENDS
10.1136/bjophthalmol-2012-302281	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	WANG, L (CORRESPONDING AUTHOR), CHINA MED UNIV, SCH PUBL HLTH, 92 BEIER RD, SHENYANG 110001, LIAONING, PEOPLES R CHINA	159	IS SUNLIGHT EXPOSURE A RISK FACTOR FOR AGE-RELATED MACULAR DEGENERATION? A SYSTEMATIC REVIEW AND META-ANALYSIS

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.3928/23258160-20140306-08	OPHTHALMIC SURGERY LASERS \& IMAGING RETINA	0.49	SCOTT, IU (CORRESPONDING AUTHOR), PENN STATE COLL MED, DEPT OPHTHALMOL, 500 UNIV DR, HU19, HERSHEY, PA 17033 USA	157	META-ANALYSIS OF INFECTIOUS ENDOPHTHALMITIS AFTER INTRAVITREAL INJECTION OF ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR AGENTS
10.1136/bjophthalmol-2014-306102	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	CHENG, CY (CORRESPONDING AUTHOR), 20 COLL RD,LEVEL 6, DISCOVERY TOWER, SINGAPORE 169856, SINGAPORE	153	GLAUCOMA IN ASIA: REGIONAL PREVALENCE VARIATIONS AND FUTURE PROJECTIONS
10.1016/j.ophtha.2019.02.029	OPHTHALMOLOGY	4.55	FERDI, AC (CORRESPONDING AUTHOR), SAVE SIGHT INST, 8 MACQUARIE ST, SYDNEY, NSW 2000, AUSTRALIA	151	KERATOCONUS NATURAL PROGRESSION <I>A SYSTEMATIC REVIEW AND META-ANALYSIS OF 11 529 EYES</I>
10.1097/ICL.0000000000000499	EYE \& CONTACT LENS-SCIENCE AND CLINICAL PRACTICE	0.74	COOPER, J (CORRESPONDING AUTHOR), SUNY COLL OPTOMETRY, 539 PK AVE, NEW YORK, NY 10036 USA	151	A REVIEW OF CURRENT CONCEPTS OF THE ETIOLOGY AND TREATMENT OF MYOPIA
10.1016/j.ophtha.2006.12.013	OPHTHALMOLOGY	4.55	CARTER, MJ (CORRESPONDING AUTHOR), STRATEG SOLUT INC, 1143 SALSBURY AVE, CODY, WY 82414 USA	145	GLOBAL COST-EFFECTIVENESS OF CATARACT SURGERY
10.1097/IAE.0000000000000837	RETINA-THE JOURNAL OF RETINAL AND VITREOUS DISEASES	1.01	ZHANG, JJ (CORRESPONDING AUTHOR), SICHUAN UNIV, WEST CHINA HOSP, DEPT OPHTHALMOL, CHENGDU 610041, PEOPLES R CHINA	144	RISK FACTORS FOR CENTRAL SEROUS CHORIORETINOPATHY A SYSTEMATIC REVIEW AND META-ANALYSIS
10.1136/bjo.2009.168062	BRITISH JOURNAL OF OPHTHALMOLOGY	1.80	CHANTADA, GL (CORRESPONDING AUTHOR), HOSP JP GARRAHAN, HEMATOONCOL DEPT, COMBATE POZOS 1881, C1245 AAL, BUENOS AIRES, DF, ARGENTINA	144	SURVIVAL OF RETINOBLASTOMA IN LESS-DEVELOPED COUNTRIES IMPACT OF SOCIOECONOMIC AND HEALTH-RELATED INDICATORS

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Table 1. 100 Most Cited Articles

DOI	Publishing Journal	Journal Impact Factor	First Author	Citations	Title
10.1097/OPX.0000000000000796	OPTOMETRY AND VISION SCIENCE	0.63	NAIDOO, KS (CORRESPONDING AUTHOR), AFRICAN VIS RES INST, 172 UMBILO RD, ZA-4000 DURBAN, SOUTH AFRICA	142	GLOBAL VISION IMPAIRMENT AND BLINDNESS DUE TO UNCORRECTED REFRACTIVE ERROR, 1990-2010
10.1016/j.survophthal.2014.06.006	SURVEY OF OPHTHALMOLOGY	2.05	WONG, MOM (CORRESPONDING AUTHOR), HONG KONG EYE HOSP, 147K ARGYLE ST, HONG KONG, HONG KONG, PEOPLES R CHINA	141	SYSTEMATIC REVIEW AND META-ANALYSIS ON THE EFFICACY OF SELECTIVE LASER TRABECULOPLASTY IN OPEN-ANGLE GLAUCOMA
10.3928/1081597X-20151111-06	JOURNAL OF REFRACTIVE SURGERY	2.90	ZHOU, JB (CORRESPONDING AUTHOR), SHANGHAI JIAO TONG UNIV, SCH MED, DEPT OPHTHALMOL, SHANGHAI PEOPLES HOSP 9, 639 ZHIZAOJU RD, SHANGHAI 200011, PEOPLES R CHINA	140	CLINICAL OUTCOMES OF SMILE AND FS-LASIK USED TO TREAT MYOPIA: A META-ANALYSIS
10.1016/j.ophtha.2013.10.020	OPHTHALMOLOGY	4.55	LOIS, N (CORRESPONDING AUTHOR), QUEENS UNIV BELFAST, CTR VIS \& VASC SCI, BELFAST, ANTRIM, NORTH IRELAND	140	VITRECTOMY WITH INTERNAL LIMITING MEMBRANE PEELING VERSUS NO PEELING FOR IDIOPATHIC FULL-THICKNESS MACULAR HOLE

Annual citations

Figure 2 shows the trend of average annual citations for the top 100 articles—that is, the number of citations received per year on average since publication. This metric assesses impact adjusted for time, identifying which publications maintain continued high relevance. Between 1992 and 1998, annual average citations remained low (generally below 10 per year). From 1999, a gradual increase in this index is observed, with fluctuations but an overall upward trajectory. Pronounced peaks are seen in 2004, 2012, 2014 and 2017, years in which articles with exceptionally high citation rates were published. The highest peak of average annual citations occurs around 2021. In summary, this temporal impact analysis suggests that while older classic works continue to be cited, many of the most influential articles have emerged in recent years and are achieving high annual citation rates, reflecting current topics of great interest in ophthalmology.

Analysis of journals

Table 2 presents the 10 leading journals responsible for the highest number of articles among the top 100 cited. In total, 23 different journals published these 100 papers; however, only 10 of them accounted for 86 articles, showing that high-impact production is highly concentrated within a select group of journals.

The journal *Ophthalmology* stands out as the main outlet, publishing 37 of the 100 most cited articles, representing 37% of all works in this ranking. Next, the *British Journal of Ophthalmology* published 13 articles from the top 100, and *Archives of Ophthalmology* contributed 8 articles. Notably, the *Archives of Ophthalmology* ceased publication under this name in 2013 and was rebranded as *JAMA Ophthalmology*, which continues to publish under the same editorial lineage.

The remaining journals in the top 10—Survey of *Ophthalmology, Investigative Ophthalmology & Visual Science (IOVS), Eye, JAMA Ophthalmology,*

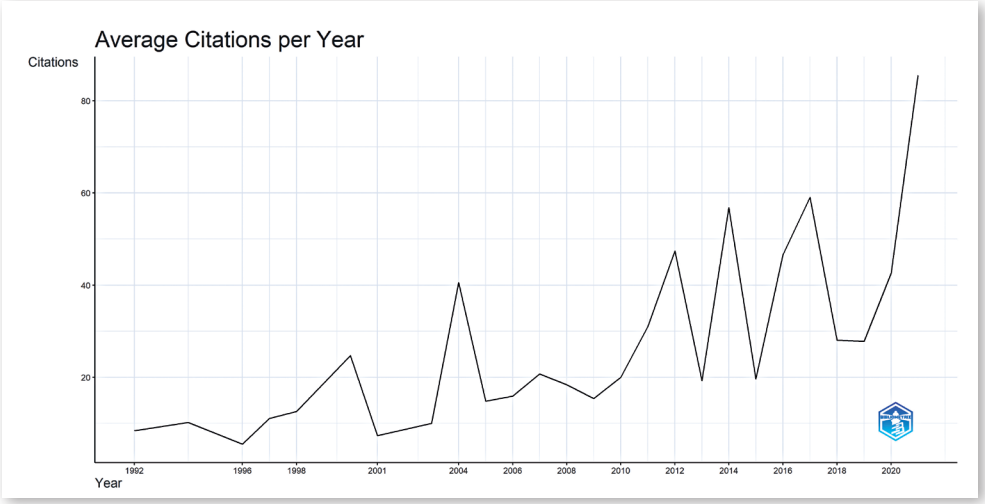

Figure 2. Mean citations per year on the top 100 most cited articles in ophthalmology.

Table 2. List of the 10 journals with the highest number of publications among the 100 most cited articles in Ophthalmology

Journals	Articles
Ophthalmology	37
Br J Ophthalmol[1]	13
Arch Ophthalmol[2]	8
Surv Ophthalmol[3]	6
Invest Ophthalmol Vis Sci[4]	5
Sci	4
Eye	4
JAMA Ophthalmol[5]	3
Am J Ophthalmol[6]	3
Optom Vis Sci[7]	

[1]British Journal of Ophthalmology; [2]Archives of Ophthalmology; [3]Survey of Ophthalmology; [4]Investigative Ophthalmology & Visual Science; [5]JAMA Ophthalmology; [6]American Journal of Ophthalmology; [7]Optometry and Vision Science;

American Journal of Ophthalmology, and Optometry and Vision Science, published between 3 and 6 articles each.

In addition to the raw article count, it is relevant to examine how these journals' output evolved over time. Figure 3 illustrates the cumulative production of articles (among the top 100) by five key journals from 1992 to 2020: *Ophthalmology, Archives of Ophthalmology, IOVS, British Journal of Ophthalmology, and Survey of Ophthalmology. Ophthalmology* (blue line) consistently led contributions over recent decades, with a marked increase in cumulative articles especially after 2005. By 2018, *Ophthalmology* surpassed 30 articles published among the top 100, evidencing its central role in disseminating the most influential research. *Archives of Ophthalmology* (red line) saw a notable rise from the mid-2000s, and the *British Journal* (yellow line) shows a slight increase in the late 2010s. This analysis reinforces that *Ophthalmology* not only published the greatest number of influential works but also consolidated its dominance over time. While the other leading journals are important, their roles have been more modest and gradual. These patterns highlight the importance of specific journals as preferred vehicles for high-impact systematic reviews/meta-analyses in ophthalmology, possibly due to the broad reach and credibility these outlets offer.

Analysis of the universities

The 100 evaluated articles involve authors affiliated with a total of 365 institutions (universities, hospitals, or research centers). Table 3 lists the 10 institutions with the highest presence among high-impact works, measured by the number of top 100 articles in which each institution was represented by at least one author. Institutions from Asia, Oceania, and North America dominate this ranking. The National University of Singapore (NUS) leads the list, participating in 19 of the top 100 most cited articles, followed closely by the University of Melbourne (Australia) with 18 articles and Johns Hopkins University (United States of America - USA) with 17. Harvard University (USA) and the Singapore Eye Research Institute (SERI) each contributed 10 articles. Other notable institutions include the University of

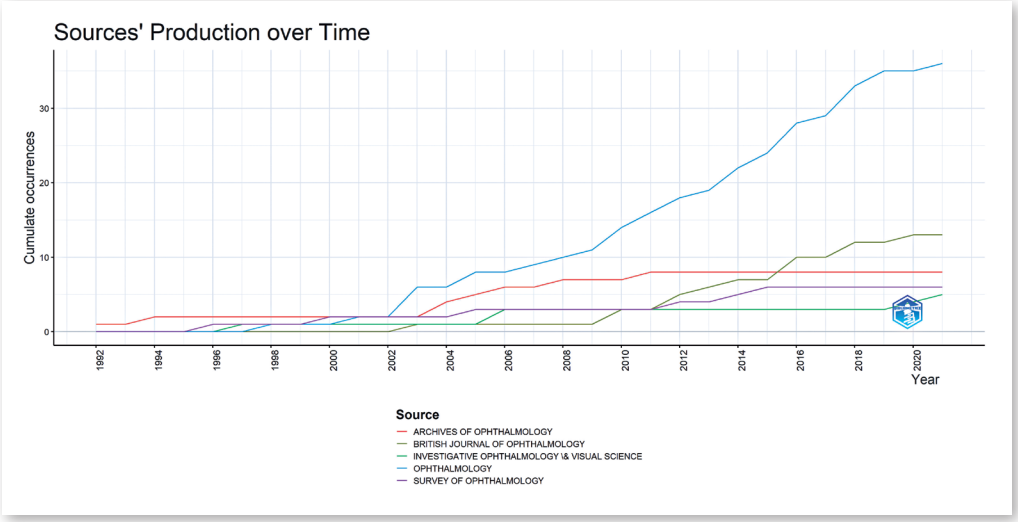

Figure 3. Cumulative journals output.

Table 3. List of Top 10 institutions with the highest presence among high-impact works

Affiliation	Articles
National University of Singapore	19
University of Melbourne	18
Johns Hopkins University	17
Harvard University	10
Singapore Eye Research Institute	10
University of Sydney	9
Moorfields Eye Hospital	8
Queen's University Belfast	8
Anglia Ruskin University	7
Brien Holden Vision Institute	7

Sydney (Australia) with 9 articles, Moorfields Eye Hospital/Institute of Ophthalmology (UK) with 8, Queen's University Belfast (UK) also with 8, and both Anglia Ruskin University (UK) and Brien Holden Vision Institute (Australia) with 7 articles each.

These data show that a few academic centers concentrate much of the influential production: notably, institutions from Singapore, Australia, the UK, and of the USA. The strong presence of NUS and SERI reflects the prominent contribution of researchers from Singapore, especially led by ophthalmologist Tien-Yin Wong (the most productive author—see below). Similarly, the University of Melbourne and the University of Sydney demonstrate Australia's central role in high-impact collaborative research, while Johns Hopkins and Harvard stand out as the main North American hubs. UK institutions such as Moorfields and Queen's Belfast also appear prominently.

Figure 4 shows the temporal evolution of the leading institutions' output from 1992 to 2021. Harvard University (red line) presented continuous and growing contributions, with an increase in articles starting in the mid-2000s, reaching a peak of about 10 accumulated articles by 2007, then it practically stalls. Johns Hopkins University (golden - yellow line) shows an increasing growth since 2003, reaching around 16 accumulated articles by 2018. The trajectory of the National University of Singapore (green line) and Singapore Eye Research Institute (blue line) displayed sharp growth from 2013/2014, reflecting Singapore's rapid rise in global ophthalmology, leading the global high-impact contributions. The University of Melbourne (purple line) had a slower start with few articles in the 1990s and 2000s but shows acceleration from 2007, increasing its high-impact publication count near the end of the 2010s.

Overall, these trends highlight the dynamics among leading institutions: traditional North American universities (Harvard, Johns Hopkins) lost its dominant presence , while Asia-Pacific institutions (Singapore, Australia) gained prominence mainly over the past decade, evidencing the globalization of ophthalmological research and the emergence of new centers of excellence beyond the traditional USA-Europe axis.

Figure 5 illustrates the co-authorship network among the top publishing institutions (with at least five top-cited articles). Each node represents an institution, while the thickness of the connecting lines denotes the strength of collaboration, measured by co-authorship frequency in the top 100 articles.

The National University of Singapore and Johns Hopkins University appear as central hubs, maintaining strong bilateral collaborations with institutions from both Asia and Oceania. Notably, the University of Sydney and Singapore Eye Research Institute also show dense connectivity, underscoring their strategic roles in international research partnerships. The visualization suggests three main clusters: one centered around Singaporean institutions (in red), another around Australian collaborators (in green), and a smaller but cohesive UK cluster around Moorfields Eye Hospital (in blue). These clusters not only reflect geographic proximity but also longstanding collaborative ties in ophthalmologic research. In addition to temporal trends, institutional collaboration patterns offer insights into the cooperative structure of high-impact

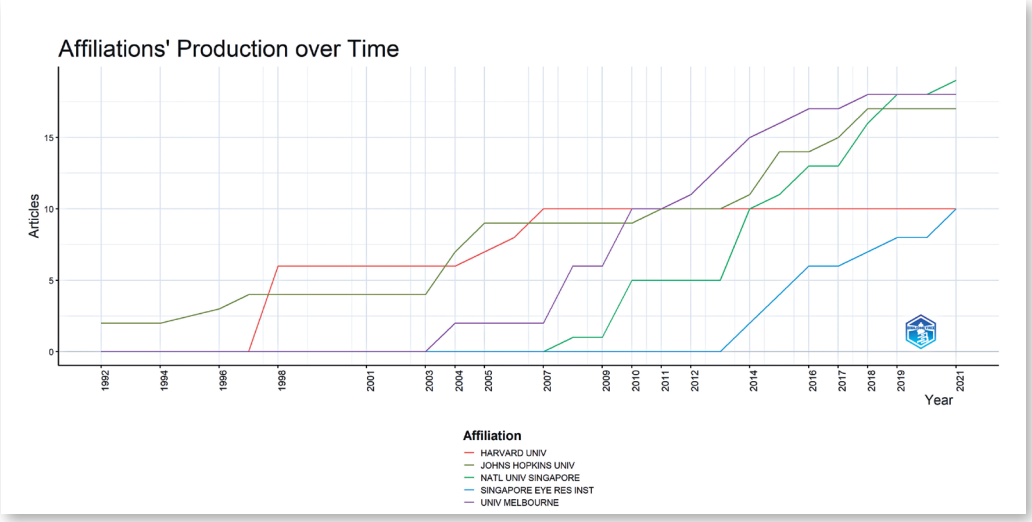

Figure 4. Evaluation of affiliations productions over time.

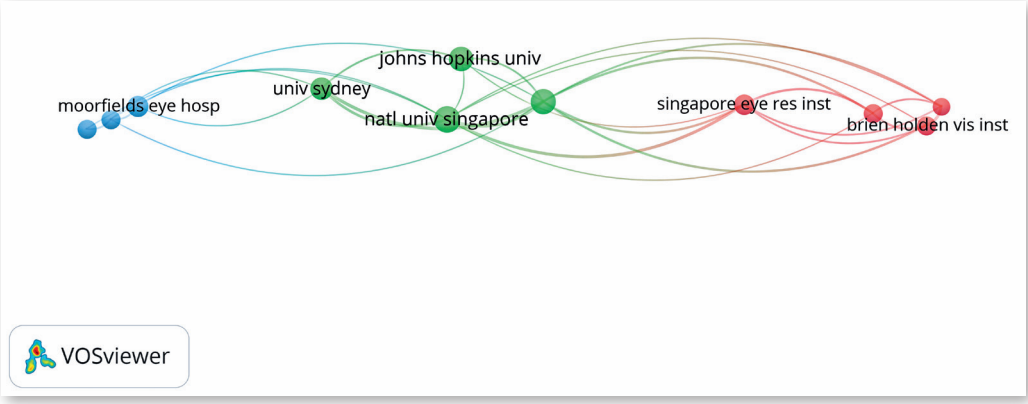

Figure 5. Co-authorship network among the top 10 institutions (≥5 publications) contributing to the 100 most cited articles.

research.

Analysis of trends topics

The analysis of trending topics over time (shown in Figure 6) reveals changes in the most frequent research themes among the high-impact articles. The figure presents a timeline of relevant keywords, where the position and color of the terms approximately indicate the period they were in vogue, while the size reflects frequency of occurrence (number of articles in which they appear). Some topics gained prominence in earlier periods, while others emerged more recently. For example, the term "intraocular pressure" appears predominantly around the mid-2000s (circa 2005–2007), then loses prominence in the following years, likely reflecting great interest in glaucoma and intraocular pressure control in foundational work from that era, followed by relative decline as new focuses emerged. In contrast, terms such as "population," "visual impairment," "blindness," "risk factors," and "open-angle glaucoma" consistently appear starting around 2014 and remain prevalent in later years. This indicates a sustained emphasis on epidemiological and public health themes in ophthalmology, such as population-based studies of visual impairment and blindness, identification of risk factors, and specific conditions like open-angle glaucoma.

Furthermore, terms like "prevalence" and "maculopathy" (especially associated with age-related macular degeneration) appear regularly during the central portion of the timeline, suggesting continued focus on prevalence studies of ocular diseases and their visual consequences. In more recent years (approximately 2016–2020), new topics emerge such as "choroidal neovascularization" (typical of exudative macular degeneration), "refractive error" (including myopia), and "randomized clinical trial."

The appearance of terms related to randomized clinical trials (RCTs) suggests that several recent high-impact meta-analyses focused on evidence from RCTs, likely involving new therapies or interventions in ophthalmology (e.g., anti-VEGF studies for choroidal neovascularization or interventions for refractive error correction).

In summary, thematic evolution reflects a shift from classic pathophysiological factors (e.g., intraocular pressure in glaucoma) to a broader population health approach (blindness, risk factors, prevalence), and more recently, toward therapeutic and methodological advances (new interventions evaluated through RCTs). This trend analysis

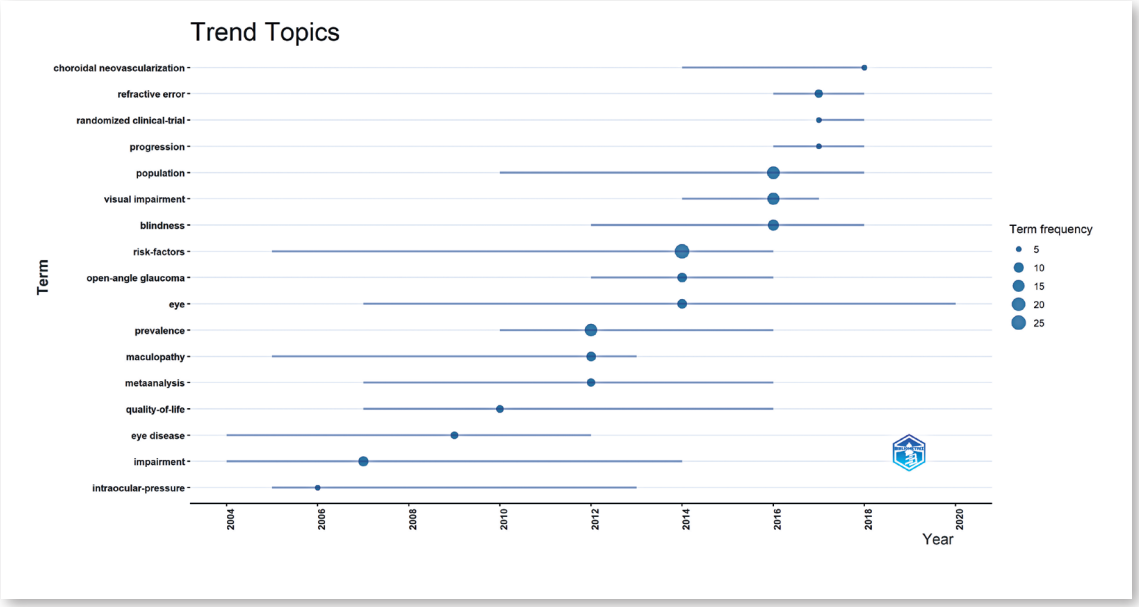

Figure 6. Temporal visualization of trending topics.

confirms that highly influential ophthalmological research has adapted to emerging challenges in the field, incorporating increasingly important themes such as global blindness, retinal neovascular diseases, and evidence-based medicine via rigorous clinical trials.

Analysis of authors

A total of 658 authors contributed to the 100 most cited articles in ophthalmology. Table 4 highlights the 10 most productive authors, along with their total citations and the year of their first publication in the dataset. High-impact ophthalmological research is, in part, driven by a group of prolific and influential authors.

The most productive author is Wong Tien-Yin (Wong TY), with 13 articles among the top 100. His works have amassed a total of 10,428 citations, remarkably surpassing other authors and emphasizing his leading international role in ophthalmic research, particularly in ocular epidemiology and global vision health. Wong's high-impact publications began in 2008, and since then, he has established himself as the top contributor in both quantity and citation impact. The second most productive author is Jonas Jost B. (Jonas JB), with 8 top 100 articles (2,708 citations), whose first contribution in the dataset dates back to 2005. He is recognized for global studies on prevalence and risk factors for eye diseases. Next is Paul Mitchell (Mitchell P), with 7 highly cited articles (5,316 citations) since 2004, focusing on epidemiological studies, particularly regarding retinal diseases and ocular risk factors.

Other authors with multiple high-impact publications include Cathy Owen (Owen CG), Serge Resnikoff (Resnikoff S), and Angela Rudnicka (Rudnicka AR), each with 6 articles. Resnikoff, for instance, has 4,148 citations (since 2013), reflecting his influence in global blindness and vision health research. Owen and Rudnicka (since 2003) each have 1,684 citations, working primarily on genetic associations and ocular epidemiology in the UK. David S. Friedman (Friedman DS) contributed 5 articles (3,698 citations, first in 2004), focused mainly on glaucoma and global eye health. Four-article contributors include Cheng Ching-Yu (Cheng CY), Paul J. Foster (Foster PJ), and Konrad Pesudovs (Pesudovs K). Notably, Cheng CY's 4 papers have gathered 4,950 citations, indicating that his publications (mainly on ocular genetics and population-based studies in Singapore) are among the most cited in the dataset. Foster (since 2012) and Pesudovs (since 2013) collected 1,281 and 1,011 citations, respectively, contributing to fields such as glaucoma (Foster) and visual quality of life (Pesudovs).

In terms of impact within the dataset (i.e., local citations—how often these articles cite each other), Wong TY also leads with 19 local citations. He is followed by Paul Mitchell (13) and Serge Resnikoff (11). Other authors, though not leading in total output, stand out in local influence: Paul Foster, Timothy R. Fricke, Brien A. Holden, Monica M. Jong, Thanemozhi J. Naduvilath, and Kovin Naidoo each received 8 local citations, indicating that their works are frequently referenced by other top-cited articles (all are associated with global research on refractive errors and avoidable blindness).

These local citation data (summarized in Figure 7) suggest interconnectivity among the top 100 articles: authors such as Wong, Mitchell, and Resnikoff produce foundational studies that serve as conceptual or methodological bases for others, forming a highly referenced literature core. In summary, the author analysis reveals both the key scientific leaders in ophthalmology, whose research volume and global impact are extraordinary, and the network of mutual influence among these high-impact studies, reinforcing the cumulative and collaborative nature of scientific advancement in the field.

Table 4. Top 10 productive authors

Author	Total of citations	Number of publications	Year of Publication Start
Wong TY	10428	13	2008
Jonas JB	2708	8	2005
Mitchell P	5316	7	2004
Owen CG	1684	6	2003
Resnikoff S	4148	6	2013
Rudnicka AR	1684	6	2003
Friedman DS	3698	5	2004
Cheng CY	4950	4	2014
Foster PJ	1281	4	2012
Pesudovs K	1011	4	2013

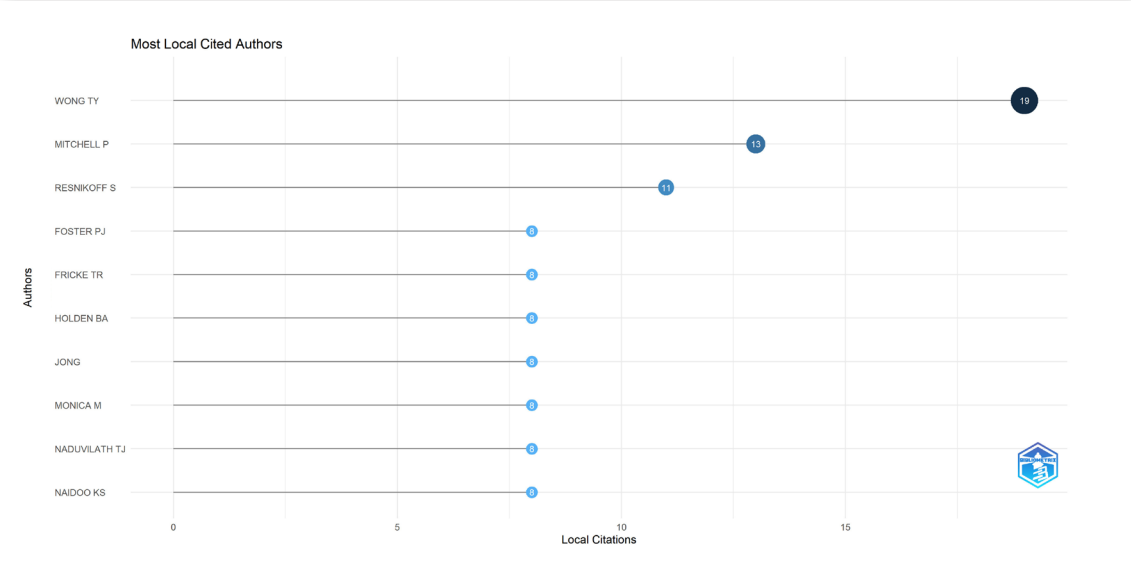

Figure 7. Top 10 most local cited authors.

Analysis of keywords

These offer a thematic overview of the articles content. To identify the most common topics, a co-occurrence analysis was conducted using terms that appeared in at least 5 articles. A total of 23 keywords met this threshold. Figure 8 graphically displays the co-occurrence network of these 23 terms, nodes represent the keywords, and links indicate joint appearances in the same article (stronger links indicate higher co-occurrence).

The most frequent terms summarize the primary thematic focuses of the top-cited articles. Broadly, they cluster into three areas: ocular epidemiology, prevalent eye diseases, and methods/interventions. In the ocular epidemiology and global vision health cluster, prominent keywords include "blindness," "visual impairment," "prevalence," "population," and "risk factors." These reflect a strong emphasis on disease burden and population-level studies among top-cited works, many of which explore prevalence, risk factors, and visual loss impacts across populations.

In the disease-specific cluster, key terms relate to prevalent ocular conditions: "glaucoma" (often linked with "open-angle glaucoma" and "intraocular pressure"), indicating a focus on glaucoma research and associated risk factors; retinal pathologies like "maculopathy" and "choroidal neovascularization," are keywords or trending topics suggesting focus on age-related macular degeneration and neovascular complications (Figures 6 and 8).

In the methodology/intervention cluster, terms such as "meta-analysis," "randomized clinical trial (Figure 8). The presence of "randomized clinical trial" supports the finding that many high-impact reviews/meta-analyses relied on compiling RCT evidence, emphasizing the role of rigorous evaluation of ophthalmic interventions.

In summary, keyword analysis reinforces previous section findings: the most influential ophthalmology articles in recent years focus on major public health challenges (e.g., global blindness, glaucoma, retinal disease) and clinical intervention assessments. The keywords plus analysis provides a thematic summary of the high-impact research landscape.

Analysis of the countries

Country of origin (based on corresponding author affiliation) reveals the global distribution of high-impact ophthalmic research, while also highlighting disparities among nations. Among the 100 articles, 25 different countries are represented, emphasizing the multinational nature of highly cited ophthalmology research. Table 5 presents the 10 most represented countries, along with their respective collaboration profiles.

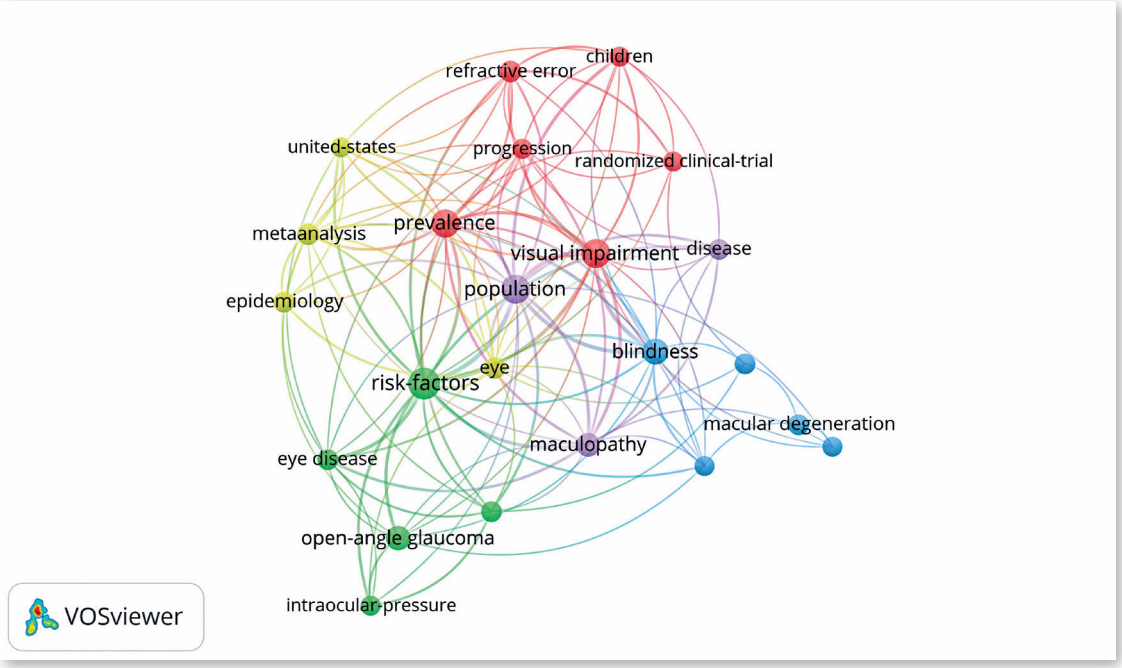

Figure 8. Visual Analysis of Keywords Plus Co-occurrence.

The United States leads with 26 articles (26%), followed by the United Kingdom with 22 (22%). Together, the US and UK account for nearly half of all top 100 articles, underscoring their historical prominence and leadership in ophthalmology research. Other key contributors include China (9 articles), Australia (8), and Singapore (6).

Netherlands and Germany contributed 5 and 3 articles, respectively, while Canada, France, and Iran each contributed 2. These 10 countries collectively account for 85 of the top-cited studies, reinforcing the idea that a relatively small group of nations concentrates most of the globally influential ophthalmic research.

A particularly relevant aspect revealed in this analysis is the variation in international collaboration, measured through the distinction between SCP (Single-country publications) and MCP (Multiple-countries publications). Countries with lower overall output often show a higher proportion of internationally co-authored articles. For instance, both Australia and Singapore had 100% of their articles as MCPs, indicating that all their high-impact studies were developed through international collaborations, likely via research consortia or multinational epidemiological initiatives. The Netherlands also had a notable share of MCPs (60%), while Canada and France each had 50%. This suggests that researchers from these countries frequently seek international partnerships to enhance their scientific visibility and impact.

In contrast, countries with strong domestic research infrastructure, such as the United States and Germany, tend to have a higher proportion of SCPs, indicating a greater capacity to generate high-impact studies through internal resources. Specifically, the US had 18 of its 26 articles (~69.2%) produced without international collaboration, and Germany had

Table 5. Top 10 most represented countries in corresponding authors

Country	Articles	SCP	MCP
USA	26	18	8
UK	22	12	10
China	9	5	4
Australia	8	0	8
Singapore	6	0	6
Netherlands	5	2	3
Germany	3	2	1
Canada	2	1	1
France	2	1	1
Iran	2	2	0

MCP: Publications from multiple countries; SCP: Publications from a single country

66.7% of its publications authored solely by German researchers. Interestingly, the United Kingdom and China showed a more balanced profile, with about 55% of their output involving MCPs, reflecting both strong national research bases and frequent international engagement. Iran, although contributing only two articles, had both classified as SCPs, suggesting a localized research model.

Figure 9 complements these findings by visually presenting the distribution of SCPs and MCPs among the top contributing countries. It reinforces the central role of high-income nations, especially the US and UK, not only in terms of volume but also in terms of collaboration profiles. While the US dominates in total output, countries like Singapore, Australia, and the Netherlands stand out for their strategic integration into international research networks, evidencing the importance of global cooperation in shaping contemporary ophthalmological science.

DISCUSSION

The present bibliometric analysis provides a comprehensive overview of the top 100 most-cited systematic reviews and meta-analyses in ophthalmology, revealing several important trends across publication outputs, authorship, topics, and collaboration. As the first study to focus specifically on high-impact evidence syntheses in ophthalmology, it extends the scope of prior bibliometric works on subspecialties or general ophthalmic literature[23]. The key findings show a significant rise in influential publications (especially during the mid-2010s), a concentration of these works in a few leading journals, a globalization of research contributions with notable institutional and national leaders, evolving research themes, and an extensive collaborative network underpinning the field. Taken together, these results reflect the current state of ophthalmology research as one driven by evidence-based practice and international teamwork, addressing global eye health challenges.

Trends in publication and citation patterns

The analysis of annual output demonstrates that highly cited systematic reviews and meta-analyses were relatively scarce before the 2000s, followed by a surge in the 2010s. Notably, the mid-2010s saw the greatest productivity. This spike suggests an inflection point when evidence-based ophthalmology gained

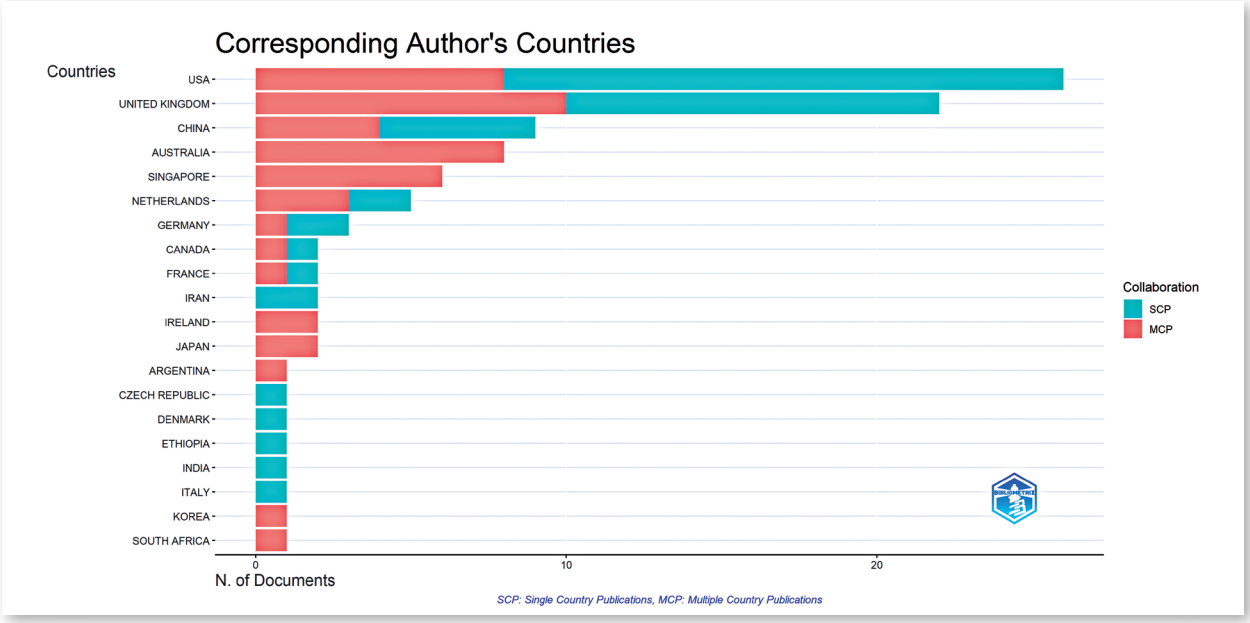

Figure 9. Distribution of corresponding author affiliations among the top contributing countries. Bars indicate the number of documents, separated into SCP (blue) and MCP (red), reflecting domestic versus international collaboration patterns.

substantial momentum, possibly due to growing recognition of the value of systematic reviews in guiding clinical decisions. The timing coincides with broader trends in medicine emphasizing comparative effectiveness research and guideline development.

After 2016, the yearly count of new top-cited papers declined slightly; however, it remained higher than pre-2010 levels (indicating a new plateau of sustained high output).

Citation patterns mirror these publication trends. Earlier seminal reviews (1990s–early 2000s) continue to accrue citations over decades, reflecting their lasting influence. At the same time, many recent articles are achieving very high citation rates shortly after publication, evidenced by peaks in average annual citations around 2013/2014 and especially ~2021. In fact, some reviews published in the late 2010s rapidly amassed hundreds of citations per year, indicating immediate relevance to the field. This dynamic, where classic evidence is continually cited but newly published syntheses quickly become influential underscores a research environment that both honors foundational knowledge and rapidly integrates fresh evidence. It also suggests that ophthalmology, like other disciplines, benefits from the faster dissemination of data in the digital era, where important findings (e.g. global prevalence studies or breakthrough therapy meta-analyses) are quickly recognized and cited by peers. Overall, the temporal analysis reflects an accelerating and cumulative development of the evidence base: ophthalmology entered a phase of exponential growth in high-level evidence production during the 2010s, aligning with an era of heightened evidence-based practice across medicine.

Journal impact and outlet concentration

The dissemination of these top-cited reviews is highly concentrated in a select group of journals. Specialist ophthalmology journals dominate, indicating that authors choose established field-specific outlets to maximize visibility among ophthalmologists. Just 10 journals accounted for 86 of the 100 analyzed papers, while the remaining 14 articles were scattered across 13 other journals. The journal *Ophthalmology* stands out as by far the most common venue, publishing 37% of all top-100 articles. This finding highlights *Ophthalmology* (the flagship journal of the American Academy of Ophthalmology) as a premier platform for influential systematic reviews and meta-analyses. Its broad scope and high impact undoubtedly attract major evidence syntheses, and in turn, those publications garner extensive citations. The next most represented journals were the *British Journal of Ophthalmology* (13 articles) and *Archives of Ophthalmology* (8 articles), followed by other well-regarded outlets such as *Survey of Ophthalmology*, *Investigative Ophthalmology & Visual Science*, *JAMA Ophthalmology*, *American Journal of Ophthalmology*, *Eye*, *Optometry and Vision Science*. Each of these contributed between 3 and 6 of the top-cited works. Notably, nearly all of these journals are vision science or ophthalmology-specific, underlining that influential evidence syntheses in this field typically reside in domain journals rather than general medical journals. Temporal patterns in journal contributions further emphasize *Ophthalmology*'s prominence: its cumulative count of top-100 papers grew steeply after 2005 and surpassed 30 by 2018, far outpacing any other journal. Meanwhile, *Archives of Ophthalmology* and *IOVS* showed slower growth in their share, and other journals exhibited relatively flat trajectories. These patterns suggest that a few elite journals have become the preferred vehicles for high-impact evidence, likely due to their wide readership, credibility, and indexing, factors that enhance citation potential. From a practical standpoint, this concentration means that clinicians and researchers can survey a handful of leading journals to find the most impactful reviews that shape the field.

Institutional and country contributions

The origins of these influential publications span the globe, yet are dominated by certain academic centers and countries, reflecting both historical research powerhouses and emerging contributors. In total, authors from 25 countries and 365 institutions were involved in the top 100 papers, underscoring that impactful ophthalmic research is a multinational enterprise. Institutionally, a small group of universities and research institutes appears disproportionately frequently. The National University of Singapore (NUS) topped the list, with its researchers involved in 19 of

the 100 top-cited studies. Close behind were the University of Melbourne (18 articles) and Johns Hopkins University (17), followed by Harvard University and the Singapore Eye Research Institute (10 each). Other key contributors included the University of Sydney (9 articles), Moorfields Eye Hospital/University College London Institute of Ophthalmology (8), Queen's University Belfast (8), Anglia Ruskin University (7), and the Brien Holden Vision Institute (7). Many of these leading institutions are recognized centers of excellence in ophthalmology and vision science, and their strong showing in this analysis indicates that they consistently produce or collaborate on work that resonates with the global community. It is notable that the top institutions come from multiple regions – Asia (Singapore), Oceania (Australia), North America (USA), and Europe (UK) are all represented. The prominence of Singapore's NUS and SERI reflects that country's investment and leadership in ophthalmic research (indeed, these are closely tied to the productivity of a single influential researcher, Tien-Yin Wong, discussed below). Likewise, Australia's presence via Melbourne, Sydney, and the Brien Holden Vision Institute highlights that nation's focus on eye research (particularly in fields like myopia and global vision impairment). The strong showing of Johns Hopkins and Harvard reaffirms the United States' academic influence, while the inclusion of UK institutions (Moorfields/UCL and Queen's Belfast, plus Anglia Ruskin via collaborative networks) shows the UK's high-impact contributions despite a smaller overall volume compared to the US. These findings echo and update earlier bibliometric observations: historically, the United States produced the majority of top-cited ophthalmic papers (86% in one classic analysis of 1975–2006 publications)[24]. Our results suggest a more internationally distributed landscape in recent years, with Asia-Pacific institutions rising into the top ranks. Indeed, trends over time show that while North American universities maintained a continuous high output from the 1990s onward, Asia-Pacific institutions surged mainly in the last decade. For example, Harvard and Johns Hopkins had steady growth in cumulative top-cited publications from the early 2000s, whereas NUS exhibited a sharp increase only after ~2014, and the University of Melbourne showed acceleration in the late 2010s. This shift signifies the globalization of ophthalmology research, as emerging research hubs outside the traditional US–Europe sphere contribute increasingly to high-level evidence.

At the national level, the United States and United Kingdom are the two leading countries of origin for the top 100 articles, accounting for 26 and 22 articles respectively. Together they contribute nearly half of all papers, underscoring their enduring leadership in ophthalmic science. China ranks next with 9 articles, followed by Australia (8 articles) and Singapore (6). Other countries among the top 10 include the Netherlands (5), Germany (3), Canada (2), France (2), and Iran (2). In total, these ten countries produced 85% of the highly cited reviews, while the remaining 15% came from a long tail of 15 other nations (each with a single paper). The broad participation (25 countries in all) reinforces that influential ophthalmology research is truly international, but the skewed distribution also highlights disparities: a core group of countries drives most of the impactful output. One insight is how collaboration patterns vary by country. We distinguished between publications authored by a single country's researchers (SCP) versus those involving multiple countries (MCP). Interestingly, countries with smaller publication counts tended to have higher collaboration rates. All of Australia's 8 top-cited papers and Singapore's 6 were international collaborations (100% MCP), indicating that these countries achieve impact by partnering globally on every project. The Netherlands also had a high proportion of MCP (60%), and Canada and France each had half of their papers with international co-authors. In contrast, the United States, despite producing the most papers, had the majority of its top articles authored without international collaboration (~69% SCP), and Germany similarly had two of its three articles done domestically. The UK and China fell in between, with around 45% of their top works involving foreign co-authors. These patterns suggest that major research powers like the US (and to some extent China) can often marshal enough internal resources and data to generate high-impact studies independently, whereas researchers in smaller countries frequently join forces across borders to make substantive contributions.

Collaboration network analysis further emphasizes this point: the international co-authorship network is anchored by strong links between the US and UK, which form the central axis of collaboration. Both of these countries also serve as frequent partners for Australia, Singapore, and China in multicenter studies, creating a dense network among Anglophone and large-population countries. The UK's collaborations with Australia and Singapore are notable, reflecting Commonwealth ties and shared projects in global vision epidemiology. The prominence of Singapore and Australia as collaborative nodes (despite their lower solo output) demonstrates how integration into global consortia (such as the Vision Loss Expert Group or other worldwide studies) has allowed those nations to have outsized influence on ophthalmic evidence. Overall, the collaborative networks evident in this analysis illustrate that high-impact ophthalmology research is very much a team effort across nations. The field's most influential systematic reviews often result from multicenter, international partnerships, leveraging diverse patient populations and expertise to address questions of global significance.

Leading authors and research collaboration

High-impact contributions in ophthalmology are also driven by a group of prolific authors, whose work often spans institutions and countries. In our analysis, 658 individual authors were involved across the top 100 papers, but a small fraction of these researchers contributed multiple landmark studies. The most productive author is Wong Tien-Yin (Wong TY), who authored or co-authored 13 of the top 100 cited reviews. Wong's publications amassed over 10,000 citations in total – far surpassing any other individual, reflecting his extraordinary impact on the field. This finding is consistent with other bibliometric studies that identified Wong as a leading figure in ophthalmology research[25]. His contributions, primarily in the realm of ocular epidemiology and global vision health, have clearly shaped current knowledge (for instance, he has been instrumental in global prevalence studies of diabetic retinopathy, myopia, and other major eye conditions). The second most prolific author, Jost B. Jonas, has 8 top-cited publications (≈2,700 citations), focusing on global eye disease burden and risk factors. *Paul Mitchell* follows with 7 papers (~5,300 citations), largely in epidemiology of retinal diseases and population eye health. Several other authors appear 5 or more times, including Cathy G. Owen, Angela R. Rudnicka, Serge Resnikoff, and David S. Friedman, each of whom contributed between 5 and 6 high-impact studies. These researchers are known for work in areas such as genetic ophthalmology (Owen, Rudnicka), global blindness and vision impairment (Resnikoff, who spearheaded World Health Organization vision initiatives), and glaucoma and public health (Friedman). It is worth noting that many of these prolific authors often collaborate with one another or appear in multi-author consortium papers, indicating that rather than siloed individual efforts, the most impactful research tends to arise from collaborative teams led by experienced investigators. This is further supported by analysis of citation networks within the top 100 articles: authors like Wong, Mitchell, and Resnikoff not only produce highly cited papers but their work is frequently referenced by other top-cited studies, forming a core literature that underpins subsequent research. In fact, several authors (e.g. Paul Foster, Brien Holden, Kovin Naidoo, who are not at the very top by count still show high "local" citation influence, meaning their studies are heavily cited among this group of 100, underscoring a tightly knit network of knowledge. In summary, the author analysis reveals a cadre of influential ophthalmologists driving evidence synthesis, often through global collaborations. This leadership by a few experts, many of whom head major research institutes or consortia, has helped steer the field's research agenda toward impactful topics.

Keyword and topical trends

The content analysis of keywords illuminates how the focus of high-impact ophthalmic research has evolved over time. By examining frequent Keywords Plus and their co-occurrences, clear thematic clusters emerged that reflect the field's shifting priorities. Broadly, the early-to-mid 2000s in our dataset were characterized by topics like "intraocular pressure," "open-angle glaucoma," and glaucoma-related terms, indicating that glaucoma management (e.g. con-

trolling intraocular pressure) was a prominent concern in influential studies of that era. This aligns with the chronology of major glaucoma trials and the fact that glaucoma was (and remains) a leading cause of irreversible blindness worldwide. As time progresses into the 2010s, there is a noticeable shift toward epidemiological and public health themes: keywords such as "population," "prevalence," "blindness," "visual impairment," and "risk factors" become prevalent starting around 2010 and continue through the late 2010s. This trend corresponds to the surge in large-scale population-based systematic reviews and meta-analyses. For example, global prevalence studies of vision impairment, meta-analyses of risk factors for diseases like diabetic retinopathy, and projections of disease burden (many of which were indeed among the top-cited papers). These works mirror the global health community's increasing focus on quantifying and addressing avoidable blindness and vision loss. Alongside those, the 2010s also saw continued interest in retinal diseases: terms like "maculopathy" and specifically "choroidal neovascularization" (a hallmark of exudative age-related macular degeneration) appear in more recent years, reflecting the impact of new interventions (e.g. anti-VEGF therapies) and the meta-analyses evaluating their outcomes. Additionally, towards the late 2010s, methodological terms such as "randomized clinical trial" gain prominence among the keywords. The presence of "randomized clinical trial" and "meta-analysis" as frequent terms underscores that many of these top-cited papers were not just epidemiological surveys but also syntheses of intervention studies, pooling evidence from RCTs to guide treatment. For instance, several high-impact reviews evaluated the efficacy of treatments (from cataract surgical techniques to pharmacotherapies in retina and glaucoma), thus the emphasis on RCT evidence denotes a maturation of the field toward rigorous, controlled evidence for clinical decision-making. The keyword co-occurrence network confirms that these themes cluster together: one cluster centers on global vision epidemiology ("blindness-visual impairment-prevalence-population"), another around glaucoma ("glaucoma-open angle-intraocular pressure"), and another around retinal disease and therapy ("maculopathy-choroidal neovascularization-vascular endothelial growth factor," etc.). In summary, the topical trends reveal a progression: earlier seminal reviews often tackled pathophysiological or singular clinical issues, whereas more recent influential studies address broader public health questions and therapeutic evaluations. This reflects the field's response to emerging challenges. For example, recognizing the need to combat the worldwide myopia and diabetes epidemics, and leveraging new treatment modalities, all through the lens of evidence synthesis.

Implications for clinical practice

The dominance of systematic reviews and meta-analyses in citation counts attests to their pivotal role in guiding ophthalmic practice and policy. As level-1 evidence, these studies aggregate data from numerous trials or population studies, providing ophthalmologists with comprehensive evidence on which to base clinical decisions. The fact that many of the top-cited articles deal with prevalence and risk factors of major diseases (like age-related macular degeneration, diabetic retinopathy, glaucoma, and myopia) means that they have likely informed screening guidelines, public health targets, and resource allocation. For example, highly cited global prevalence studies of vision impairment and blindness have fed directly into initiatives like the WHO's Vision 2020 and Global Vision Report, helping quantify the scope of intervention needed for diseases such as uncorrected refractive error and cataract. Likewise, influential meta-analyses of treatment outcomes (e.g. comparing anti-VEGF agents for macular degeneration or evaluating intraocular pressure-lowering therapies) have been incorporated into clinical practice guidelines, ensuring that patient management in areas from retina to glaucoma is aligned with the best available evidence. Clinicians frequently rely on these summary analyses for decision support, especially in rapidly evolving areas. The surge in evidence synthesis during the 2010s means that by now, most subspecialties in ophthalmology have a foundation of high-level evidence to consult, whether it is for choosing a surgical technique or estimating a patient's prognosis based on population data. Another practical implication of our findings is the

confirmation that key journals (like *Ophthalmology* or *JAMA Ophthalmology*) serve as one-stop sources for influential reviews; busy practitioners reading those journals are exposed to the critical evidence that can change practice. Moreover, the global and collaborative nature of these top studies ensures that the conclusions are often broadly generalizable. Multi-country meta-analyses and reviews incorporate data from diverse populations and care settings, making their recommendations applicable to a wide range of clinical contexts worldwide. This is particularly important in ophthalmology, where disease burden and treatment response can vary with demographics and healthcare infrastructure. In summary, the trends identified in this bibliometric study reassure that ophthalmic clinical practice is increasingly evidence-based and globally informed. Patients ultimately benefit from this, as therapies and policies shaped by high-quality evidence are more likely to improve outcomes and address public health needs.

Directions for future research

Understanding the patterns in high-impact research also points to future opportunities and gaps that the ophthalmic community should address. First, the leveling off of top-cited output after the mid-2010s might indicate that the field is ready for a next wave of innovation – future systematic reviews may need to tackle emerging topics that have not yet produced many highly cited works. For instance, areas like ocular genomics, artificial intelligence in ophthalmology, gene and cell therapies, and long-term outcomes of new surgical techniques are all burgeoning domains that could benefit from rigorous meta-analytic synthesis. As these technologies and interventions mature, they will generate data ripe for systematic review; ensuring these are conducted and disseminated in top journals will be crucial. Second, the keyword trends suggest that while traditional causes of blindness and common diseases have been well studied, there is room for more evidence on under-studied conditions or regional issues. Conditions such as neglected tropical eye diseases, outcomes in low-resource settings, or pediatric ocular disorders might be under-represented in the current top 100 and deserve attention through collaborative research efforts. Third, the collaboration analysis implies that international partnerships have been key to impactful studies, future research should continue to strengthen global consortia, especially including researchers from currently under-represented countries. With only 25 countries involved in these top studies, many nations with significant blindness burdens (for example, in Africa or parts of Asia) had little representation among the highest-impact evidence. Facilitating research capacity and inclusion of those regions in multi-center studies could both improve the relevance of findings and increase the global impact of the resulting publications. Additionally, our findings echo the results of broader scientometric studies, emphasizing that countries like China are becoming major contributors; going forward, balancing contributions and fostering knowledge exchange between traditional Western centers and emerging Asian, Latin American, and African centers will enrich ophthalmic research. Finally, an important future direction is to maintain and further improve the quality of systematic reviews and meta-analyses. The prominence of these studies means that their rigor (methodology, bias control, reporting standards) is critical. Recent analyses have noted improvements in practices like pre-registration of review protocols and adherence to reporting guidelines in medicine. Ophthalmology should continue this trajectory: encouraging registration (e.g. in PROSPERO) and transparent methods will enhance credibility and ultimately influence. High-quality evidence syntheses not only garner citations but truly change practice; thus, investing effort in the conduct and methodological innovation of reviews (such as living systematic reviews or individual patient data meta-analyses) will pay dividends in the form of impactful, actionable knowledge.

Limitations

This study has limitations that should be considered when interpreting the findings. While citation count remains a widely used metric to assess impact, it may favor older publications that have had more time to accumulate citations, regardless

of methodological quality or real-world relevance. In contrast, recently published reviews of high scientific value may not yet have reached comparable citation levels, potentially leading to their underrepresentation in the analysis.

The use of a single database, the Web of Science Core Collection (WOSCC), although robust and widely adopted in bibliometric research, may still restrict the scope of included articles. Even though WOSCC indexes a large proportion of high-impact journals, relying exclusively on one platform can limit the breadth of the literature retrieved, particularly for interdisciplinary or emerging areas that might be better captured through complementary sources.

It is also important to note that this analysis did not evaluate the methodological rigor, risk of bias, or reporting quality of the included systematic reviews and meta-analyses. Therefore, high citation frequency does not necessarily equate to high scientific validity or adherence to standards such as PRISMA or PROSPERO registration.

Moreover, although international collaboration was explored, the influence of self-citations or citation networks was not assessed, which could potentially inflate the perceived impact of some authors or institutions. Finally, the study focuses on articles published in peer-reviewed journals and indexed in WOSCC, which may inadvertently exclude regionally relevant or gray literature, especially from low-resource settings.

Despite these considerations, the study provides a comprehensive and data-driven overview of high-impact systematic reviews and meta-analyses in ophthalmology, offering useful insights into global research trends, collaborative patterns, and thematic evolution in the field.

In conclusion, this bibliometric study of top-cited systematic reviews and meta-analyses in ophthalmology illuminates the field's evolution and current priorities. We observed a marked growth in influential evidence publications over the past three decades, peaking in the mid-2010s alongside an embrace of evidence-based medicine. A small number of prestigious journals and prolific authors, often working in global collaborations, have driven much of this impact. The leading contributing institutions and countries span multiple continents, indicating a globalizing research landscape where traditional leaders (US/UK) now share the stage with Asia-Pacific and other regions. The thematic analysis shows that ophthalmology research has progressively shifted to address broad public health concerns and to evaluate interventions with rigorous methodology, reflecting the community's commitment to reducing vision loss worldwide. These findings portray a field that is both rooted in high-quality evidence and dynamically responding to new challenges.

By highlighting trends in publication, authorship, and collaboration, our study provides researchers, clinicians, and policymakers with insight into how ophthalmic knowledge is generated and disseminated. Importantly, the results underscore that collaborative, global efforts and adherence to best research practices are key to producing impactful research. Such efforts ultimately translate into better clinical care, guiding prevention strategies, informing treatment guidelines, and improving patient outcomes on a global scale. Future bibliometric updates should continue to monitor these patterns, as they will signal how ophthalmology is adapting to emerging technologies and health issues. As the field moves forward, maintaining a focus on collaborative, high-quality evidence generation will be essential in meeting the vision needs of an aging and growing world population. The present analysis not only catalogues past and present achievements but also lays a foundation for shaping the next generation of ophthalmology research toward areas of greatest impact.

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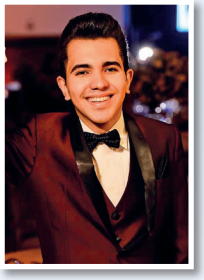

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