

# Trends in Type of Original Psoriasis Publications by Decade, 1960 to 2010

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## ABSTRACT

**Context:** Research investigating psoriasis has spanned decades, and as our understanding of the disease has evolved, the focus of publications has changed.

**Objective:** We sought to characterize the trends in original psoriasis-related research from 1960 to 2010 chronologically by decade.

**Methods:** A literature review was performed using the keyword *psoriasis* in the MEDLINE database. All original psoriasis-related articles published at the beginning of each decade were searched and categorized by study type and topic.

**Main Outcome Measure:** Number of articles per topic.

**Results:** A total of 869 original psoriasis-related articles were found. The number of publications increased 18 fold over 5 decades. The immunology and pathogenesis of psoriasis was the most frequently researched topic (36%), and retrospective studies were the most common study type (37%). Recent highly published topics included biologic therapy, genetics, and psoriasis-associated cardiovascular disease.

**Conclusion:** Original psoriasis-related publications have grown substantially since 1960. Basic science research into the immunology and pathogenesis has been and continues to be the mainstay of psoriasis research. Recent research trends suggest the focus has expanded to topics such as psoriasis-associated cardiovascular disease, genetics, and biologic therapy.

## INTRODUCTION

Psoriasis is a chronic inflammatory skin condition affecting 2% of the population, and it can be physically and psychologically debilitating.<sup>1</sup> Although psoriasis was first described in 1841, it was the 1960s that first saw a surge in psoriasis-related research. Initial studies focused on the keratinocyte, and nonmalignant proliferation and reduced differentiation were found to be hallmarks of psoriasis.<sup>2</sup>

Since then, considerable achievements have changed the way psoriasis is viewed. Advances in technology have allowed researchers to gain an understanding of the molecular mechanisms driving the disease. Breakthroughs in biologic therapy have revolutionized the way psoriasis is managed. Recent research suggests that patients with psoriasis have a systemic inflammatory state, putting them at increased risk of cardiovascular complications, including metabolic syndrome, peripheral vascular

disease, stroke, myocardial infarction, and cardiac death.<sup>3,4</sup> Some articles suggest that tumor necrosis factor inhibitors may decrease the risk of stroke and myocardial infarction in patients with psoriasis.<sup>5,6</sup>

As understanding of the disease has continued to evolve over five decades, research interests have expanded. Our goal is to identify these new components to gain a better understanding of the current landscape and future direction of psoriasis-related research. On the basis of recent study findings, we hypothesized that there would be a higher proportion of recent publications investigating psoriasis-associated cardiovascular disease and biologic therapy. To our knowledge, no study has systematically examined research trends in this field. We sought to accomplish this through a literature review, wherein all original psoriasis-related articles published at the beginning of each decade, starting in 1960, were categorized by study type and topic.

## METHODS

To evaluate trends in psoriasis research, we extracted articles from the MEDLINE database using the keyword *psoriasis* for the calendar years of 1960, 1970, 1980, 1990, 2000, and 2010. We excluded articles that were not original research, were not available in English, or were not primarily focused on psoriasis. Systematic reviews, meta-analyses, case reports, literature reviews, and editorials were excluded.

Articles that met inclusion criteria were classified by study type as follows: clinical trial, basic science, retrospective, and cross-sectional. The clinical trials topic included randomized trials and prospective nonrandomized trials. Basic science studies were defined as studies that required specialized or extensive laboratory testing outside a clinical trial or animal models. Retrospective studies included observational studies. Cross-sectional studies were generally time-independent, questionnaire-based studies.

These articles were then linked by their subject matter to 1 of 13 topics: topical therapy, oral therapy, phototherapy, biologics, other therapy, genetics, immunology and pathogenesis of psoriasis, cardiovascular comorbidities, other comorbidities, infection, cancer, quality of life, and epidemiology and cost. These topics were thought to capture the variety of broad research topics that have been covered in psoriasis research. Therapy-based topics such as topical therapy encompassed studies that evaluated any aspect of the treatment, including but not limited to cost, efficacy, side effects, and pharmacology. Genetics articles focused on the hereditary nature of the disease. Immunology and pathogenesis of

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psoriasis was a broad heading that covered the mechanisms and manifestations of the disease. Publications dealing with cardiovascular comorbidities, infection, or cancer looked at the association between psoriasis and each of these entities. Studies of other comorbidities investigated the association between psoriasis and other diseases. Quality of life included studies that investigated the impact psoriasis has on the patient's well-being and emotional state. Epidemiology and cost consisted of studies that analyzed the pattern of disease or the financial impact. If an article's subject matter covered multiple topics, the article was categorized into the topic that fit best.

Percentages for topic type were calculated by dividing the number of articles by the total number of articles that year. Percentage increase from decade to decade was calculated by dividing the number of articles in a given decade by the number of articles in the comparative decade then subtracting 1 and converting to a percent.

**RESULTS**  
**Original Psoriasis Research**

Our search yielded 869 original psoriasis-related publications (Table 1). There was a linear increase in the number of original articles from 1960 to 1980, with 7 times more articles published in 1980 than in 1960. Although the years 1990

and 2000 experienced a modest increase in publications, 2010 saw a 101% rise compared with the previous decade.

**Trends in Study Topic**

Immunology and pathogenesis of psoriasis was the most-researched topic, totaling 300 articles and comprising 35% of the total research found, followed by studies in topical therapy (n = 102, 12%) and phototherapy (n = 102, 12%; see Table 1). The least-researched topics overall were cancer (n = 8, 1%), infection (n = 10, 1%), and other comorbidities (n = 23, 3%).

Immunology and pathogenesis of psoriasis comprised 47%, 40%, and 26%

**Table 1. Original psoriasis articles by study type and topic**

Decade	Study type	Topical	Oral	Photo	Biologics	Other	Genetics	IP	CV	OCM	Infection	Cancer	QOL	EC	Total
1960	Clinical trial	2	3	1	0	0	0	1	0	0	0	0	0	0	7
	Basic science	0	0	0	0	2	0	6	0	0	0	0	0	0	8
	Retrospective	0	0	0	0	0	0	2	0	0	0	1	1	0	4
	Cross-sectional	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Subtotal	2	3	1	0	2	0	9	0	0	0	1	1	0	19
1970	Clinical trial	11	10	1	0	0	0	0	0	0	0	0	0	0	22
	Basic science	3	4	0	0	0	4	26	0	0	0	0	0	0	37
	Retrospective	5	1	1	0	0	0	5	2	0	1	0	1	0	16
	Cross-sectional	1	1	0	0	0	0	0	0	0	0	0	0	0	2
	Subtotal	20	16	2	0	0	4	31	2	0	1	0	1	0	77
1980	Clinical trial	3	6	12	0	1	0	0	0	0	0	0	0	0	22
	Basic science	1	1	15	0	0	1	44	0	0	0	0	0	0	62
	Retrospective	4	4	15	0	1	6	10	3	4	0	0	0	1	48
	Cross-sectional	0	0	0	0	0	0	0	0	0	0	0	2	0	2
	Subtotal	8	11	42	0	2	7	54	3	4	0	0	2	1	134
1990	Clinical trial	19	6	6	2	5	0	0	0	0	0	0	0	0	38
	Basic science	7	5	3	0	1	2	39	0	0	0	0	0	0	57
	Retrospective	4	3	4	0	0	2	14	0	3	0	2	0	1	33
	Cross-sectional	0	0	0	0	0	0	0	0	0	0	0	1	3	4
	Subtotal	30	14	13	2	6	4	53	0	3	0	2	1	4	132
2000	Clinical trial	14	4	12	4	7	0	0	0	0	0	0	0	0	41
	Basic science	5	0	1	1	1	7	46	0	2	1	1	0	0	65
	Retrospective	4	3	1	1	1	9	19	0	5	2	1	0	7	53
	Cross-sectional	0	0	0	0	0	0	0	0	0	0	0	9	0	9
	Subtotal	23	7	14	6	9	16	65	0	7	3	2	9	7	168
2010	Clinical trial	15	7	14	30	4	0	0	0	0	0	0	0	0	70
	Basic science	3	1	4	0	1	4	58	0	0	0	0	0	0	71
	Retrospective	1	2	12	26	8	24	30	25	9	6	3	2	15	163
	Cross-sectional	0	0	0	0	0	0	0	0	0	0	0	21	14	35
	Subtotal	19	10	30	56	13	28	88	25	9	6	3	23	29	339
Total		102	61	102	64	32	59	300	30	23	10	8	37	41	869

CV = cardiovascular comorbidities; EC = epidemiology and cost; IP = immunology and pathogenesis of psoriasis; OCM = other comorbidities; oral = oral therapy; other = other comorbidities; photo = phototherapy; QOL = quality of life; topical = topical therapy.

Table 2. Percentage of total research stratified by topic and decade					
Research topics	1960	1990	2010	Change, 1960 to 1990	Change, 1990 to 2010
Immunology and pathogenesis	47	40	26	+ 488	+ 66
Biologic therapy	0	1	17	NA	+ 2700
Phototherapy	5	10	9	+ 1200	+ 130
Genetics	0	3	8	NA	+ 600
Epidemiology and cost	0	3	8	NA	+ 625
Cardiovascular	0	0	7	0%	NA
Quality of life	5	1	7	0%	+ 2400
Topical therapy	11	23	5	+ 1400	- 37
Other therapy	11	4	4	+ 200	+ 116
Oral therapy	16	11	3	+ 366	- 29
Other comorbidities	0	2	3	NA	+ 200
Infections	0	0	2	NA	NA
Cancer	5	2	1	+ 100	+ 50

NA = not applicable.

of total psoriasis articles in 1960, 1990, and 2010, respectively (Table 2). Publications in immunology and pathogenesis of psoriasis initially grew quickly, rising 488% from 1960 to 1990, and continued to grow steadily, with 66% more articles published in 2010 than in 1990.

Research into phototherapy rose steeply in 1980 (Figure 1), comprising 31% of the articles published that year, 14 times more than the number of articles published in 1960 and 1970 combined. However, interest in phototherapy waned in the following decades, comprising only

9.8%, 8.3%, and 8.8% of total articles published in 1990, 2000, and 2010, respectively.

Some topics have experienced decreased publication. Oral therapy and topical therapy were the second and third most researched topics in 1960, respectively, but were only the eighth and ninth in 2010 (Figure 1). The subjects made up 16% (oral) and 11% (topical) of total articles in 1960 but totaled just 3% and 5% in 2010. This represents a 29% and 37% decrease in the number of articles from 1990.

Biologic therapy publications, however, increased dramatically in recent decades (Figure 1). There were 56 articles (17%) published in 2010, a 7-fold rise in the number of publications compared to 1990 through 2000, when only 8 were published.

Similarly, published research in cardiovascular comorbidities, which was not found in 1960 or 1990, grew tremendously in 2010, comprising 7% of total research (Figure 1). The total number of articles in 2010 (25) was more than what was published for all the previous years combined (5). Research into epidemiology and cost, quality of life, and genetics also experienced a remarkable growth in publications in 2010, with 625%, 2400%, and 600% increases, respectively, over 1990.

**Trends in Study Type**

Retrospective studies were the most common study type, with 317 original articles (37%), followed by basic science studies (35%) and clinical trials (23%; Table 1). Immunology and pathogenesis of psoriasis was the most common retrospective study topic, with a 25% share. In addition, immunology and pathogenesis of psoriasis accounted for 73% of total basic science research. The most common clinical trials were in topical therapy (32%), followed by

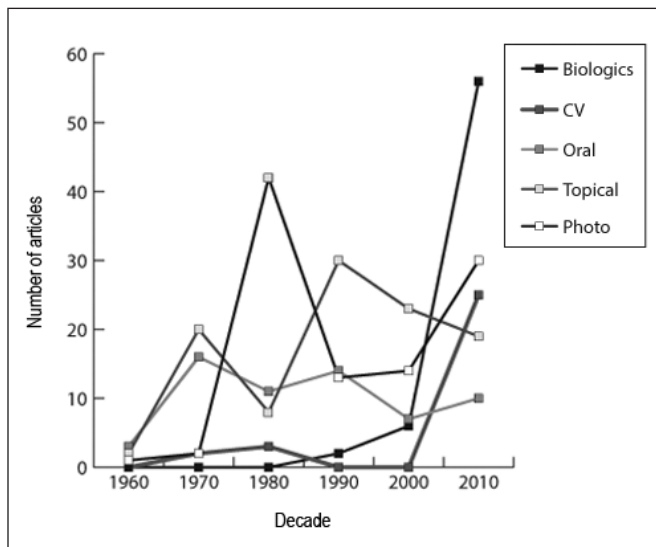


Figure 1. Number of articles by topic and decade.

CV = cardiovascular comorbidities; oral = oral therapy; photo = phototherapy; topical = topical therapy.

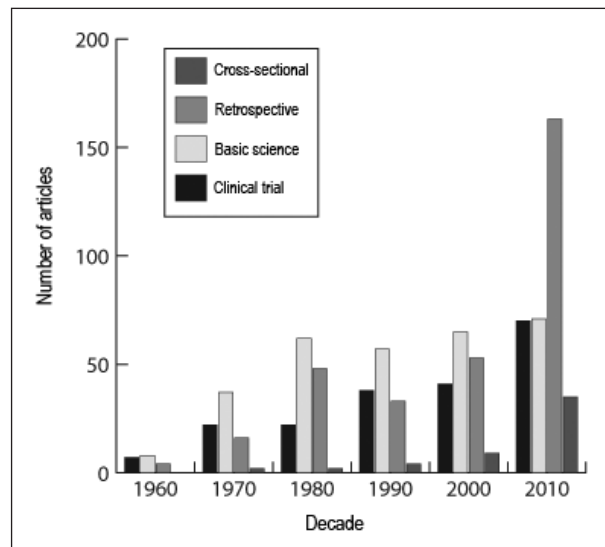


Figure 2. Number of articles by study type and decade.

phototherapy (23%). Quality of life studies made up most of the cross-sectional studies (63%), followed by epidemiology and cost (33%).

Basic science studies were the most published in early decades, comprising 38% to 48% of original studies until 2000 (Figure 2). In 2010, basic science studies comprised only 21% of total research but still produced more articles ( $n = 71$ ) than in 2000 ( $n = 65$ ). The number of retrospective studies varied throughout the years but in 2010 experienced a strong rise, with more than 100 more original articles than in year 2000. The number of clinical trials and cross-sectional studies rose steadily through the years, with almost 2-fold and 4-fold increases in the number of articles in 2010 vs 2000. This rise in cross-sectional studies corresponded to the rise in articles related to quality of life, which were almost exclusively time dependent and questionnaire based.

## DISCUSSION

For decades, investigators have endeavored to identify the cause of psoriasis and discover better treatments for this condition. This has brought about remarkable discoveries that have altered the way dermatologists view and treat psoriasis. The aim of this retrospective study was to capture the trends in psoriasis research by categorizing original psoriasis-related articles published at the beginning of each decade, starting in 1960.

We found that original psoriasis-related publications grew steadily since 1960 and have experienced a surge in the last decade. These results are encouraging and reflect a robust and thriving research interest in psoriasis. This is likely a result of multiple factors, including increased availability of funding, growing interest from pharmaceutical companies, advancements in technology used in research, an increased number of dermatology and skin biology journals, an increased number of physicians and scientists engaged in research, and an expansion in the type of available treatments.<sup>7</sup>

Our study also demonstrates that research interests have drastically shifted from decade to decade. Although basic

science publications in immunology and pathogenesis continue to be the mainstay of psoriasis research, focus on other research topics has evolved. Research in the 1960s and 1970s focused on the available treatments of the disease at the time: topical and oral therapy, which included immunosuppressant agents such as methotrexate.<sup>8</sup> Attention shifted to phototherapy in 1980, which corresponded with the discovery of photochemotherapy (psoralen-ultraviolet A) in the mid-1970s.<sup>9</sup> In 1990, research in phototherapy had dissipated, instead replaced by renewed interest in topical and oral therapy. In particular, studies evaluating cyclosporine and systemic retinoids were frequent.<sup>10-12</sup>

Since 2000, there has been a marked change in the direction of psoriasis research. The emergence of tumor necrosis factor inhibitor therapy for psoriasis occurred during this period, sparking a series of clinical trials that showed remarkable clinical outcomes and changed the way dermatologists manage psoriasis.<sup>13-15</sup> Furthermore, with advancements in DNA technology, publications that analyzed the genetics of psoriasis grew quickly. Last, although the association of psoriasis with cardiovascular disease had been speculated on for some time, the topic received increased attention in recent years.<sup>16</sup> Large clinical trials revealed an increased risk of myocardial infarction and stroke in patients with psoriasis.<sup>17,18</sup>

We predict that these high-impact topics will continue to be frequently published in contemporary literature.

We acknowledge certain limitations to the study. We limited our study to the number of articles and did not assess the impact of the articles themselves. Further studies involving citation analysis could be useful. In addition, we drew conclusions about research performed during a decade on the basis of one year of research at the beginning of that decade. The year may not have been representative of that decade because of sampling error. We were limited by our university's subscriptions to peer-reviewed journals, and some articles may not have been accessible. If an article's topic could be categorized under multiple topics, the reviewer chose the best-fit topic. Therefore,

our conclusions might have varied if we had categorized these articles differently. Furthermore, the topics and study types were subjectively chosen, thought to best represent broad topics in psoriasis research. Results might have varied if different topics were chosen.

## CONCLUSION

The diversity of publications topics in psoriasis research continues to grow at a rapid pace, and recent discoveries have paved the way for future research. Although research topics have changed over the decades, the goal has remained to better understand the disease and its treatment for the benefit of the patient. ❖

## Disclosure Statement

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