

Journal Citation Studies. VI. *Journal of Clinical Investigation*. How Much 'Clinical' and How Much 'Investigation'?

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About a year ago we analyzed citation data for the *Journal of Experimental Medicine*. Despite the generality of its title, citation analysis showed it to be heavily immunological.¹ As a result, it did not appear to be a journal that should be high on the priority list of a small clinical or hospital library. The title of the *Journal of Clinical Investigation (JCI)* likewise suggests that it should be a serious candidate for such a library, particularly as an interface between basic research and clinical practice. Does citation analysis give any indication that this suggestion is valid? I think it does. The journals which *JCI* cites (Table 1) reflect its close proximity to the basic research front. And, the journals that cite it heavily (Table 2) reflect its impact on practice.

Among the thousands of scientific and medical journals published, *Journal of Clinical Investigation* ranked 21st in total citations in a sample we took during the last quarter of 1969.² This seems rather remarkable considering the competition. On the other hand in terms of impact, it ranked 97th. In other words, the 'average' article it published in 1967 and 1968 was cited about 3.5 times in 1969. This is no small accomplishment when compared to other journals in the same study which are closely related to it. For example, the *Journal of Laboratory & Clinical Medicine* ranked 266th by impact.

The tables which follow provide some idea of the editorial slant of *JCI*.

For example, the *Journal of Clinical Endocrinology and Metabolism* shows up high in both tables, while *Endocrinology* and *Diabetes* are also heavily cited by *JCI*.

CC® readers will note that every journal in these two lists has long been covered in CC. This is a confirmation of Garfield's Law of Concentration.³ In applying this concept to biomedicine it simply means that most general and specialty journals share a common core of journals which they cite. If you feel that *JCI* is central to your interests then the journals listed below should be high on your shopping list. This is certainly a simpler method than scanning an unevaluated list of 2500 journals covered by *Index Medicus*.

Perhaps the most surprising observation is that *Journal of the American Medical Association (JAMA)* does not appear in either list. In fact it was cited only 28 times by *JCI* in 1969. *JAMA*, in turn, cited *JCI* only 68 times. In contrast, the *New England Journal of Medicine* was cited 5 times as often as *JAMA* and in turn cited *JCI* 7 times as often. As a test of fact vs. opinion, ask one of your colleagues to guess which of the two journals would be most similar to *JCI*? If the answer is obvious to clinical investigators, let me assure them that it is not so obvious to either medical librarians or most other physicians. Similar comments might be made about *British Medical Journal* and *Lancet*. The latter journal is prominent

Table 1 †
Journal of Clinical Investigation
 cited

the following journals in 1969.

Rank	Times cited	Journal title abbreviation
*1.	1244	J. Clin. Invest. (1244)
*2.	544	J. Biol. Chem. (168)
*3.	368	Amer. J. Physiology (556)
*4.	260	J. Clin. Endocrinol. Metab. (296)
5.	244	Nature
*6.	204	J. Lab. Clin. Med (188)
7.	196	Science
*8.	172	Biochim. Biophys. Acta (356)
*9.	168	Proc. Soc. Exp. Biol. Med. (360)
*10.	164	Biochem. J. (112)
*11.	160	Lancet (272)
12.	152	Endocrinology
*13.	144	Diabetes (188)
*14.	136	New Engl. J. Med (476)
15.	116	J. Lipid Res.
16.	112	Clin. Res.
*17.	100	Ann. New York Acad Sci. (308)
*18.	100	Blood (96)
19.	96	J. Exp. Med.
*20.	92	J. Appl. Physiology (200)
*21.	84	Am. J. Med. (392)
22.	84	Fed. Proc.
*23.	84	J. Physiology (London) (136)
*24.	80	Circulation Res. (100)
25.	76	Analyt. Biochem.
*26.	76	Circulation (284)
*27.	76	Clin. Science (568)
28.	68	J. Pharmacol. Exp. Ther.
29.	64	Acta Physiol. Scand.
30.	64	Cancer Res.
*31.	60	Ann. Internal Med. (212)
*32.	60	Metabolism (188)
33.	56	Arch. Biochem. Biophys.
34.	56	Biochemistry
*35.	56	Gastroenterology (120)
*36.	56	Thromb. Diath. Haemorrh. (116)
37.	52	Rec. Progr. Hormone Res.
38.	48	J. Amer. Chem. Soc.
*39.	48	Proc. Nat. Acad. Sci. USA (100)
*40.	40	Acta Endocrinologica (132)
*41.	40	Clin. Chim. Acta (140)
*42.	40	Klin. Wschr. (248)
*43.	40	Pflugers Arch. (148)
44.	36	Amer. Heart J.
*45.	36	Amer. J. Obst. Gynecol. (168)
46.	36	Biochem. Pharmacol.
47.	36	Physiol. Rev.
*48.	36	Scand. J. Clin. Lab. Invest. (128)
49.	36	Steroids
50.	32	Atherosclerosis
	6428	Total of first 50
	10336	in 512 other publications
	16764	Total

*For purposes of comparison, journals common to the two lists are asterisked, and show after their title abbreviations the citation count from the other list.

†The source of the data on which these lists are based, and the methodology of their manipulation, have been explained previously (see reference 2).

Table 2 †
Journal of Clinical Investigation
 was cited by
 these journals in 1969.

Rank	Times cited	Journal title abbreviation
*1.	1244	J. Clin. Invest. (1244)
*2.	568	Clin. Science (76)
*3.	556	Amer. J. Physiol. (368)
*4.	476	New Engl. J. Med. (136)
*5.	392	Amer. J. Med. (84)
*6.	360	Proc. Soc. Exp. Biol. Med. (168)
*7.	356	Biochim. Biophys. Acta (172)
*8.	308	Ann. New York Acad. Sci. (100)
*9.	296	J. Clin. Endocrinol. Metab. (260)
*10.	284	Circulation (76)
*11.	272	Lancet (160)
*12.	248	Klin. Wschr. (40)
13.	232	Acta Med. Scand.
14.	232	Arch. Internal. Med.
*15.	212	Ann. Internal. Med. (60)
16.	204	Ital. J. Biochem.
*17.	200	J. Appl. Physiology (92)
18.	196	J. Immunology
*19.	188	Diabetes (144)
*20.	188	J. Lab. Clin. Med. (204)
*21.	188	Metabolism (60)
22.	176	Deut. Med. Wschr.
23.	172	Brit. Med. J.
24.	168	Am. J. Digest. Dis.
*25.	168	Amer. J. Obst. Gynecol. (36)
*26.	168	J. Biol. Chem. (544)
27.	160	Amer. J. Clin. Nutrition
*28.	148	Pflugers Arch. (40)
29.	140	Brit. J. Haematol.
*30.	140	Clin. Chim. Acta (40)
31.	136	Amer. J. Med. Sci.
*32.	136	J. Physiology (London) (84)
*33.	132	Acta Endocrinologica (40)
34.	128	Gut
35.	128	Israel J. Med. Sci.
*36.	128	Scand. J. Clin. Lab. Invest. (36)
37.	124	J. Pediatrics
38.	124	Pediatrics
*39.	120	Gastroenterology (56)
40.	116	Amer. Rev. Resp. Dis.
*41.	116	Thromb. Diath. Haemorrh. (56)
42.	112	Ann. Surgery
*43.	112	Biochem. J. (164)
44.	112	Respiration Physiol.
*45.	100	Circulation Res. (80)
46.	100	Danish Med. Bull.
*47.	100	Proc. Nat. Acad. Sci. USA (48)
*48.	96	Blood (100)
49.	96	Med. Clin. North Amer.
50.	92	Beitr. Klin. Tuberk.
	10948	Total of first 50
	8168	in 391 other publications
	19116	Total

*For purposes of comparison, journals common to the two lists are asterisked, and show after their title abbreviations the citation count from the other list.

†The source of the data on which these lists are based, and the methodology of their manipulation, have been explained previously (see reference 2).

on both lists.

There is an interesting "equilibrium" between *JCI* and the rest of the literature. The *JCI* cited 562 different publications (16764 citations) and was cited by 441 (19116 citations). There are 30 journals common to both lists. Most cite *JCI* much more heavily than it cites them. The three exceptions, *Journal of Biological Chemistry*, *Biochemical Journal* and *Journal of Laboratory and Clinical Medicine* require little comment.

Journals that cite *JCI* are much more 'clinically oriented' than those it cites. If one defines as 'clinical' any journal whose title contains the words *clinical*, *medical*, *medicine*, or the name of a medical specialty but not the words *laboratory*, *experimental*, or *research*, the two lists are plainly differentiated.

Thus about 30 'clinical' journals cited *JCI*, while it cites only about 12 similarly defined 'clinical' journals, but in the latter case usually less heavily than they cite *JCI*.

These tables, extracted from ISI's *Journal Citation Reports*,⁴ will be updated in the future. Revised lists may show significant changes with respect to journal rankings, if our sampling method has any flaws in it. I would hope that journal editors would use "profiles" like these lists to gain better insights into their editorial policies.

As a final note, I'd like to mention that the *JCI* has published a number of very highly cited papers. One of them, by V.P. Dole on plasma fatty acids and glucose metabolism,⁵ ranks 17th (2293 citations) among all papers cited during the period 1961-1972.⁶

1. Garfield, E. Journal citation studies. 3. *Journal of Experimental Medicine* compared with *Journal of Immunology*; or, how much of a clinician is the immunologist? *Current Contents*® (CC) No. 23, 7 June 1972, pp. M1-4.
2. -----, Citation analysis as a tool in journal evaluation. *Science* 178:471-79, 1972.
3. -----, The mystery of the transposed journal lists; wherein Bradford's law of scattering is generalized according to Garfield's law of concentration. CC No. 31, 4 August 1971, p. 5-6.

4. -----, The new *ISI Journal Citation Reports* should significantly affect the future course of scientific publication. CC No. 33, 15 August 1973, p. 5-6.
5. Dole, V.P. A relation between non-esterified fatty acids in plasma and the metabolism of glucose. *J. Clin. Invest.* 35: 150-54, 1956.
6. Garfield, E. Selecting the all-time citation classics; here are the fifty most cited papers for 1961-1972. CC No. 2, 9 January 1974, p. 5-8.