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INTRODUCTION

The pharmaceutical industry plays a vital role in the world's economy, as well as in ensuring the welfare of its citizens. In the United States, this industry constitutes a large and important part of the economy. In 2002, health care expenditure in the United States reached $1.6 trillion, accounting for fifteen percent of total GNP.[1] This percentage is also growing over time—it was seven percent in 1970.[2] An important component of the health care industry is the pharmaceutical industry—in 2002, its size was estimated at $193 billion.[3] While the pharmaceutical industry is driven by innovation, it spends more money on marketing than on research and development.[4] For example, this industry spends more than any other U.S. industry on its sales force ($7 billion annually) and on media advertising ($2.8 billion annually).[5]

Pharmaceutical companies typically direct their marketing efforts toward physicians and, as of late, directly to patients (consumers). The marketing efforts directed at physicians comprise personal selling through sales representatives

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1. *What's Driving Health Care Costs and the Uninsured: Hearing Before the Senate Comm. on Health, Educ., Labor & Pensions*, 108th Cong. 38 (2004) (statement of Douglas Holtz-Eakin, Director, Cong. Budget Office).

2. *Id.*

3. PHARM. RESEARCH & MFRS. OF AM. (PHRMA), PHARMACEUTICAL INDUSTRY PROFILE 2004 44 (2004), http://www.phrma.org/publications/publications//2004-03-31.937.pdf.

4. FAMILIES USA FOUND., OFF THE CHARTS: PAY, PROFITS AND SPENDING BY DRUG COMPANIES 3 (2001), http://www.familiesusa.org/site/DocServer/offthecharts.pdf?docID=823.

5. DICK R. WITTINK, ANALYSIS OF ROI FOR PHARMACEUTICAL PROMOTION (ARPP) (2002), http://www.rxpromoroi.org/arpp/media/arpp_handout_0927.pdf.

(detailing);[6] sampling (provision of drugs at no cost); physician meetings and events; and advertisements in medical journals.[7] Since 1997, a change in the legal environment that allowed direct-to-consumer advertising (DTCA) has resulted in a 350% increase in expenditures for such advertising between 1996 and 2001.[8] However, the biggest chunk of marketing expenditure is directed toward detailing.[9] Historically, detailing has been the pharmaceutical industry's primary promotional instrument.[10] Our aim in this Article is to provide an integrative review of the academic research on the effect and role of detailing. We highlight the main findings that arise from the medical, legal, economics, and marketing literature. Finally, we propose an explanation of the pervasiveness of detailing over a drug's life. We conclude by proposing how an increase in the efficiency and effectiveness of this expenditure can benefit firms, physicians, and patients.

As noted above, we attempt to provide an integrative review of the literature on detailing. As a result, we need to provide organizational criteria in order to deal with the large number of studies on the subject. We use two such criteria to organize this review: the outcome variable and the nature of the data collected by the researcher. The outcome variable is the variable that is affected by detailing, which can range from "softer" variables, such as physician attitudes, to "harder" variables, such as drug sales. The nature of data collected can be survey data or actual behavioral (market) data. While we believe that these two criteria are important, we also describe the extant literature using all relevant criteria in the form of tables in the Appendix.[11] We first examine physician attitudes toward

6. For an excellent overview of the evolution of modern detailing in the United States, see Jeremy E. Greene, *Attention To 'Details': Etiquette and the Pharmaceutical Salesman in Postwar America*, 34 SOC. STUD. SCI. 271 (2004).

7. STEPHEN P. BRADLEY & JAMES WEBER, THE PHARMACEUTICAL INDUSTRY: CHALLENGES IN THE NEW CENTURY 7 (Harvard Bus. Sch., Working Paper No. 9-703-489, 2004).

8. *Id.*

9. WITTINK, *supra* note 5, at 6-7.

10. BRADLEY & WEBER, *supra* note 7, at 8-9.

11. There have been other such integrative articles. *See, e.g.*, Dale B. Christensen & Patricia J. Bush, *Drug Prescribing: Patterns, Problems and Proposals*, 15a SOC. SCI. & MED. 343 (1981); Richard J. Plumridge, *A Review of Factors Influencing Drug Prescribing* (pt. 1), 13 AUSTL. J. HOSP. PHARMACY 16 (1983). But not all include detailing as an independent variable, *see, e.g.*, Dennis W. Raisch, *A Model of Methods for Influencing Prescribing* (pts. 1 & 2), 24 DICP, ANNALS PHARMACOTHERAPY 417, 537 (1990), even the ones that do not differentiate between detailing as a general source of information, detailing's function in new product introductions, and its influence on physician prescribing, *see, e.g.*, James R. Williams & Paul J. Hensel, *Changes in Physicians' Sources of Pharmaceutical Information: A Review and Analysis*, 11 J. HEALTH CARE MARKETING 46 (1991). Most other literature reviews cover a very broad set of variables that affect physician prescribing. *See, e.g.*, T.S. Caudill & Nicole Lurie, *The Influence of Pharmaceutical Industry Advertising on Physician Prescribing*, 22 J. DRUG ISSUES 331 (1992); Elina Hemminki, *Review of*

detailing using studies from the medical literature. As the purported reason for the existence of detailing is that it provides information to physicians, we then examine whether the medical community indeed perceives it as such and if these perceptions have changed over time. We then look at whether detailing affects stated and actual prescription behavior. Finally, we examine the role of detailing over the life cycle of a drug with a special emphasis on its effects in the early, awareness-building stage. We conclude by integrating the main findings into a coherent explanation of the role of detailing.

Based on our analysis we draw the following major conclusions. First, it seems that physicians have negative (at one extreme) to neutral (at the other) attitudes toward pharmaceutical sales representatives. The variance in this attitude is explained by a variety of factors. Some of the important factors are the quality of informational and educational support provided via detailing, detailer style, and the physician's practicing environment. However, detailing exists and flourishes in spite of this attitude as it provides an inexpensive and convenient source of information. Interestingly, the importance of detailing as a source of information has declined over the past five decades, as it is no longer the most important source of information.

Second, not only is detailing an important source of information, it affects physician prescription behavior in a positive and significant manner. More important, this seems to occur over the length of the drug's life cycle. This is puzzling considering that over a drug's life cycle, most information about the drug is likely to be disseminated early on—a fact confirmed by physician surveys. Thus, detailing's effect should diminish over the life cycle of a drug. There is no obvious explanation for the fact that detailing has a positive and significant effect late in the drug life cycle. Based on our analysis and industry observations, our explanation is that in addition to providing a "reminder effect," constant interaction builds a stock of goodwill between a detailer (or the firm) and the physician, translating into positive physician prescription behavior. This goodwill is not based on purely objective and rational factors but on social and cultural norms. Its character changes from informative to more persuasive in the

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Literature on the Factors Affecting Drug Prescribing, 9 SOC. SCI. & MED. 111 (1975); Russell R. Miller, *Prescribing Habits of Physicians: A Review of Studies on Prescribing of Drugs* (pts. 1-8), 7 DRUG INTELLIGENCE & CLINICAL PHARMACY 492, 557 (1973), 8 DRUG INTELLIGENCE & CLINICAL PHARMACY 81 (1974); J.P. Rovers, *The Doctor's, the Druggist's, and the Detail Rep's Dance: Who Leads, Who Follows*, 37 CAN. FAM. PHYSICIAN 100 (1991); Dennis B. Worthen, *Prescribing Influences: An Overview*, 7 BRIT. J. MED. EDUC. 109 (1973). In other words, reviews concentrating on detailing as a factor influencing physician attitudes and prescribing behavior are relatively rare. Also noteworthy is Joel Lexchin, *Doctors and Detailers: Therapeutic Education or Pharmaceutical Promotion?*, 19 INT'L J. HEALTH SERVS. 663 (1989), which critically discusses doctors, detailers, and their relationships.

later stages of the drug life cycle. The evolution of goodwill in this manner reflects the deepening relationship between the physician and the pharmaceutical sales representative.

Finally, detailing is clearly here to stay. Although physicians claim to tolerate it as a necessary evil, detailing evidently has an impact on prescription behavior via both a subjective and an objective path. From the industry perspective, pharmaceutical firms continue to invest heavily in this mode of promotion—they have more than doubled their 1997 sales force to about 90,000 in 2002.[12] Thus, one possible approach that could be beneficial to all concerned parties—patients, physicians, firms, and policy makers—would be to ensure that this large expenditure on detailing is carried out in the most efficient manner possible. We conclude the Article by providing suggestions on how this could be carried out.

I. REVIEW OF PAST STUDIES

A. Physician Attitudes Toward Detailing

In this Section, we focus our attention on physician attitudes as documented (mostly) in the medical literature. We focus on general attitudes toward detailing and detailers and attitudes toward gifts. We then look at studies that provide an explanation for the formation of these attitudes. (Tables 1a-1c provide a more detailed overview of the studies discussed.)

1. Physician Attitudes Toward Detailers

A series of studies document that physician attitudes toward detailing and pharmaceutical sales representatives are mostly negative. First, Poirier et al. surveyed physicians on their attitudes toward pharmaceutical marketing practices.[13] They found that only 24% of the physicians were satisfied with detailing and 48% were dissatisfied.[14] These skeptical attitudes were confirmed by the finding that only 20% of the physicians believed in the accuracy and objectivity of presented information, while 44% did not.[15] Nevertheless, 56% admitted that representatives could influence formulary decisions if efficacy,

12. *Pushing Pills*, THE ECONOMIST, Feb. 15, 2003, at 61.

13. Therese I. Poirier et al., *Pharmacists' and Physicians' Attitudes Toward Pharmaceutical Marketing Practices*, 51 AM. J. HOSP. PHARMACY 378 (1994).

14. *Id.* at 379.

15. *Id.*

toxicity, and cost were the same, while 28% disagreed with this statement.[16] Strang et al. surveyed Canadian general practitioners and specialists on their attitudes toward sales representatives.[17] Ninety-two percent of the physicians thought that drug promotion was a major goal of sales representatives, while only 37% saw physician education as a major goal of sales efforts.[18] Forty-seven percent of the physicians thought that sales representatives provide all information to describe a drug, while 80% thought that detailers overemphasized the effectiveness of a drug.[19]

In 1996 Caudill et al. surveyed physicians about their attitudes toward the educational value and behavioral influence of pharmaceutical sales representatives.[20] Physicians agreed that sales representatives provided useful and accurate information about newly and already established drugs, but only slightly agreed that they performed an important teaching function.[21] Physicians strongly agreed that sales representatives should be banned from making presentations where the physicians practice.[22] McKinney et al. examined physicians' attitudes toward detailing and its potential for ethical compromise.[23] They found that physicians had somewhat negative attitudes toward the educational and informational value of detailing activities, but also acknowledged sales representatives' support for conferences and speakers.[24]

Hopper et al. collected information on the effects of an educational intervention aimed at training physicians in interactions with sales representatives.[25] They surveyed residents and faculty before and after the intervention. Before the intervention, physicians slightly agreed that contact with detailers was not beneficial, but strongly disagreed that it might influence their

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16. *Id.*

17. David Strang et al., *National Survey on the Attitudes of Canadian Physicians Toward Drug-Detailing by Pharmaceutical Representatives,* 29 ANNALS ROYAL C. PHYSICIANS & SURGEONS CAN. 474 (1996).

18. *Id.* at 476.

19. *Id.*

20. T.S. Caudill et al., *Physicians, Pharmaceutical Sales Representatives, and the Cost of Prescribing*, 5 ARCHIVES FAM. MED. 201 (1996).

21. *Id.* at 204.

22. *Id.*

23. W. Paul McKinney et al., *Attitudes of Internal Medicine Faculty and Residents Toward Professional Interaction with Pharmaceutical Sales Representatives*, 264 JAMA 1693 (1990).

24. *Id.* at 1695.

25. John A. Hopper et al., *Effects of an Educational Intervention on Residents' Knowledge and Attitudes Toward Interactions with Pharmaceutical Representatives*, 12 J. GEN. INTERNAL MED. 639 (1997).

prescribing in negative ways.[26] However, physicians were rather neutral about whether interactions were likely to influence the prescribing behavior of other physicians in negatives ways.[27] Residents believed significantly more than faculty that sales representatives sometimes use unethical marketing practices and that the residents have too much contact with the detailers.[28] Two items of the post-intervention survey were found to have statistically significant differences between the intervention and nonintervention resident groups: Participating residents more strongly believed than nonintervention residents that sales representatives may use unethical marketing practices and that interaction with detailers is likely to influence the prescribing of other physicians in negative ways.[29]

Other studies have documented more neutral physician attitudes to detailing and pharmaceutical sales representatives. Andaleeb and Tallman's examination of physicians' relationships with sales representatives showed that although physicians viewed sales representatives as an important source of information, they thought they could also get the needed information from another source.[30] The study found that physicians had friendly relationships with sales representatives and did not distrust them, but did not consider them a vital part of their practice. Selling methods were not viewed as manipulative, nor were sales representatives perceived negatively.[31] The median overall attitude toward sales representatives was also reported as neutral in a study by Thomson et al. based on a survey of general practitioners in New Zealand.[32] One specific attribute of this study was that only 77% of the physicians reported having access to colleagues.[33] Physicians also tended to see more sales representatives if colleagues' advice was less readily available. Eighty-seven percent of the respondents reported having seen detailers; one physician would have liked to see sales representatives, but was never visited because of the isolated location of his practice.[34] The reasons given most often for seeing sales representatives were

26. *Id.* at 640.

27. *Id.*

28. *Id.*

29. *Id.* at 641.

30. Syed S. Andaleeb & Robert F. Tallman, *Relationships of Physicians with Pharmaceutical Sales Representatives and Pharmaceutical Companies: An Exploratory Study*, 13 HEALTH MARKETING Q. 79, 84-85 (1996).

31. *Id.*

32. A.N. Thomson et al., *Attitudes of General Practitioners in New Zealand to Pharmaceutical Representatives*, 44 BRIT. J. GEN. PRAC. 220 (1994).

33. *Id.* at 221.

34. *Id.* at 221.

practical prescribing information, samples, a feeling of politeness, or pressure.[35] Relative to all respondents, practitioners favorably disposed to detailers saw more sales representatives. Also relative to physicians in smaller practices, physicians in larger practices saw fewer detailers.

2. Physician Attitudes Toward Gifts

Another dimension on which physicians have very strong attitudes is the practice of gift-giving from pharmaceutical sales representatives to physicians. As part of the detailing process, sales representatives often not only give samples, but also give trinkets, books, or meals. Sixty-seven percent of the faculty and 77% of the residents in the McKinney et al. study indicated that they believed that physicians could be compromised by accepting gifts from sales representatives.[36] Specifically, the authors found that 50% of the faculty and 42% of the residents perceived gifts of $100 or more to be likely to compromise a physician's judgment.[37] Keim et al. questioned residents and directors in emergency medicine about their interactions with the biomedical industry[38] and found that 74% of the residents who responded to the survey believed that representatives "sometimes cross ethical boundaries by giving gifts to physicians."[39] While 75% of the program directors believed that marketing techniques of sales representatives affected residents' prescribing, only 49% of the residents believed the same to be true.[40] However, in a 1997 study Madhavan et al. found that doctors slightly agreed that pharmaceutical companies gave gifts to physicians to influence their prescribing, but disagreed that, in general, gift-giving influenced most physicians' prescribing behavior.[41] The physicians surveyed strongly disagreed that they themselves could be influenced in their prescribing behavior by the gifts they receive.[42] Aldir et al. also reported that physicians disagreed that their prescribing was influenced by gifts such as lunches or dinners, but the physicians surveyed admitted that their prescribing

35. *Id.*

36. McKinney et al., *supra* note 23.

37. *Id.* at 1695.

38. Samuel M. Keim et al., *Beliefs and Practices of Emergency Medicine Faculty and Residents Regarding Professional Interactions with the Biomedical Industry*, 22 ANNALS EMERGENCY MED. 1576 (1993).

39. *Id.* at 1578.

40. *Id.*

41. S. Madhavan et al., *The Gift Relationship Between Pharmaceutical Companies and Physicians: An Exploratory Survey of Physicians*, 22 J. CLINICAL PHARMACY & THERAPEUTICS 207, 212 (1997).

42. *Id.*

might be affected by sample giving.[43] Reeder et al. surveyed chief residents in emergency medicine programs about their attitudes surrounding their "gift relationship" with pharmaceutical companies.[44] One-fifth of the chief residents believed that accepting gifts could affect their own prescription habits.[45]

While the studies above suggest that gifts are not generally acceptable, the ones that asked about the value of the gift found that gifts below a certain threshold—typically $100—are acceptable.[46] Aldir et al. also found that the majority of physicians agreed that gifts above $100 were inappropriate, but found no relationship between physicians' values regarding gifts and their attitudes regarding scientific information provided by the pharmaceutical industry.[47]

3. Antecedents of Physician Attitudes

While the studies described above have expressed attitudes, there is relatively little research on the antecedents (or causes) of this attitude formation. A 1991 study by Lagace et al. showed that the salesperson's ethical behavior and expertise positively affected physician attitudes (especially trust and satisfaction).[48] It also found that the frequency of visits did not significantly affect satisfaction.[49] Brotzman and Mark provided an alternative set of antecedents;[50] they argued that regulatory policies affect physicians' attitudes toward sales representatives.[51] By comparing residents from free and restricted programs,[52] Brotzman and Mark found those from free programs to be twice as likely to view overall interactions, educational information, and extracurricular

43. Rodolfo E. Aldir et al., *Practicing and Resident Physicians' Views on Pharmaceutical Companies*, 16 J. CONTINUING EDUC. HEALTH PROFS. 25, 31 (1996).

44. Mike Reeder et al., *Pharmaceutical Representatives and Emergency Medicine Residents: A National Survey*, 22 ANNALS EMERGENCY MED. 1593 (1993).

45. *Id.* at 1595.

46. *See* Aldir et al., *supra* note 43; McKinney et al., *supra* note 23; Reeder et al., *supra* note 44.

47. Aldir et al., *supra* note 43, at 29.

48. Rosemary Lagace et al., *The Relevance of Ethical Salesperson Behavior on Relationship Quality: The Pharmaceutical Industry*, 11 J. PERS. SELLING & SALES MGMT. 39, 44 (1991).

49. *Id.*

50. Gregory L. Brotzman & David H. Mark, *The Effect on Resident Attitudes of Regulatory Policies Regarding Pharmaceutical Representative Activities*, 8 J. GEN. INTERNAL MED. 130 (1993).

51. *Id.* at 132.

52. In a free program, residents' access to sales representatives is not overseen by the facility. However, in a restricted program, the quality and quantity of contact between residents and sales representatives is determined by the policies of the facility. This restriction usually results in much less access relative to that in a free program.

activities as beneficial, and four times more likely to view detailing as helpful.[53] Physicians from free programs had more contacts with sales representatives and, as measured by eight categories, they were more likely to feel that gift acceptance was appropriate.[54] However, in contrast, Ferguson et al. found no differences in the likelihood of meeting with sales representatives or accepting samples between internists from hospitals with and without regulatory policies.[55] Andaleeb and Tallman also identified factors that influenced physicians' attitudes toward sales representatives.[56] They found that physicians' attitudes were influenced by the information and educational support they receive, selling techniques, and their volume of patients.[57] The more informational and educational support from sales representatives and the higher the number of patients, the more favorable were physicians' attitudes toward sales representatives.[58] In contrast, a manipulative and aggressive selling style was associated with an unfavorable attitude.[59]

B. Detailing as a Source of Information

The classic role of detailing is to provide (medical) information to a physician. This information ranges from awareness-building to detailed technical information. The importance of detailing as one of physicians' sources of information about drugs has often been investigated, as is outlined in Table 2. These studies were perceptual by nature and asked physicians how much importance they attributed to either detailing in general or its certain aspects.

In general, physicians perceive detailers to be useful sources of information. Fassold and Gowdey surveyed Canadian physicians, about one-half general practitioners and one-half specialists, on their reactions to drug promotions.[60] Forty-six percent of the respondents considered detailing the most informative and/or acceptable form of drug promotion.[61] Among the general practitioners,

53. Brotzman & Mark, *supra* note 50, at 132.

54. *Id.* at 132.

55. Robert P. Ferguson et al., *Encounters with Pharmaceutical Sales Representatives Among Practicing Internists*, 107 AM. J. MED. 149 (1999).

56. Syed S. Andaleeb & Robert F. Tallman, *Physician Attitudes Toward Pharmaceutical Sales Representatives*, 20 HEALTH CARE MGMT. REV. 68 (1995).

57. *Id.* at 73.

58. *Id.*

59. *Id.*

60. R.W. Fassold & C.W. Gowdey, *A Survey of Physicians' Reactions to Drug Promotion*, 98 CAN. MED. ASS'N J. 701 (1968).

61. *Id.* at 702.

56% ranked it first while only 37% of the specialists did so.[62] Only 13% considered detailing as the least informative and/or acceptable form of drug promotion.[63] Twenty-four percent of the physicians (18% specialists, 31% general practitioners) stated that detailing and other spoken forms of manufacturers' advertisements were their preferred choice of information on new drugs.[64] Another study by Henley et al. surveyed Iowa physicians on the frequency with which they use certain sources of drug information.[65] Pharmaceutical textbooks were ranked first, followed by drug salesmen.[66] Fifty-five percent of the physicians indicated that they relied on pharmaceutical representatives very often or often.[67] Twenty-seven percent indicated occasional use of this information source, and 17% seldom or never rely on detailers.[68] A 1976 study by Eaton and Parish surveyed general practitioners in Great Britain concerning how they gathered information and what sources they found useful.[69] Ninety-three percent of the respondents indicated seeing sales representatives at least once a week, and 67% thought they would lose an important source of information if they did not see any detailers.[70] While 90% of the physicians indicated that sales representatives were a helpful source to find out about the existence of a drug, only 51% said they were a helpful source in finding out about the usefulness of a drug.[71] Reeder et al. found that 80% of the respondents thought their residency program benefited from interaction with pharmaceutical representatives, usually through the presentation of new clinical data.[72] Finally, Connelly et al. studied knowledge resources of family physicians and found that they regarded detailers to provide information that was less extensive and credible than secondary (e.g., *Physicians' Desk Reference*, medical texts, *Index Medicus*) and primary sources (colleagues).[73] In terms of information availability, searchability, understandability, and applicability, information from detailers was regarded as higher than information from secondary sources such as

62. *Id.*

63. *Id.*

64. *Id.* at 703.

65. Scott Henley et al., *Dissemination of Drug Information*, 42 HOSPITALS 99 (1968).

66. *Id.* at 100.

67. *Id.*

68. *Id.*

69. Gail Eaton & Peter Parish, *Sources of Drug Information Used by General Practitioners: Prescribing in General Practice*, 26 J. ROYAL C. GEN. PRAC. 58 (Supp. 1976).

70. *Id.* at 61.

71. *Id.* at 62-63.

72. Reeder et al., *supra* note 44, at 1595.

73. Donald P. Connelly et al., *Knowledge Resource Preferences of Family Physicians*, 30 J. FAM. PRAC. 353 (1990).

research articles, *Index Medicus*, and a computerized bibliography.[74]

The underlying assumption in the above studies is that physicians are good at extracting relevant information from detailers. However, as this is usually not part of medical school training, Shaughnessy et al. investigated whether physicians would benefit from such training.[75] They developed a curriculum to teach hospital faculty and residents to evaluate information provided by pharmaceutical representatives.[76] After receiving this training, physicians had generally positive attitudes toward the detailers' services and did not feel overly influenced by them relative to pre-training. This effect, while statistically significant, was small in magnitude.[77] Samourai and Avorn summarize a series of studies that also show that education of physicians about detailing leads to more accurate and cost-effective prescription outcomes.[78]

In contrast, some studies have found detailers lacking in this regard. Williams et al. found that a minority (19%) of Canadian physicians viewed detailers to be an important source of information (though a quarter of high prescribing physicians found them to be an important source).[79] Caudill et al. also asked physicians to rate sales representatives as a source of information on the three dimensions of credibility, availability, and applicability.[80] The mean responses were all nearly neutral, and there was a significant positive correlation between the three measures.[81] Fassold and Gowdey's 1968 study asked physicians to grade sales representatives on several characteristics.[82] While detailers were rated good or excellent with respect to personality, reliability, and honesty by 86%, 65%, and 69% of the physicians respectively, sales representatives' general knowledge, knowledge of drugs, and usefulness was rated fair or poor by 67%, 63%, and 59% of the practitioners, respectively.[83]

A more interesting question is the importance of detailing as an information source relative to other information sources. A study by Kalb tried to assess the

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74. *Id.* at 356 fig. 1.

75. Allen F. Shaughnessy et al., *Teaching Information Mastery: Evaluating Information Provided by Pharmaceutical Representatives*, 27 FAM. MED. 581 (1995).

76. *Id.*

77. *Id.* at 584.

78. Stephen B. Soumerai & Jerry Avorn, *Principles of Educational Outreach ('Academic Detailing') To Improve Clinical Decision Making*, 263 JAMA 549 (1990).

79. A. Paul Williams et al., *The Physician as Prescriber: Relations Between Knowledge About Prescription Drugs, Encounters with Patients and the Pharmaceutical Industry, and Prescription Volume*, 3 HEALTH & CAN. SOC'Y 135, 164 (1995).

80. Caudill et al., *supra* note 20, at 203.

81. *Id.*

82. Fassold & Gowdey, *supra* note 60.

83. *Id.* at 704.

relative importance of six information sources for physician prescribing.[84] When directly asked whether sales representatives were the primary motivation in their prescribing habits, only 13% of the physicians felt this way.[85] When asked to rank the six information sources they relied on for making prescribing decisions, physicians rated sales representatives as fourth on average, whereby the score was not significantly different from the third source, company reputation.[86] Gambrill and Bridges-Webb surveyed general practitioners on their most recent, regular, and most useful sources of information about therapeutics and prescribing.[87] Journals were ranked first on all three criteria, followed by sales representatives.[88] Strickland-Hodge and Jeqson surveyed general practitioners in Great Britain about their usage of information sources.[89] The sales representative was ranked seventh on a general evaluation as a source of information, but fourth on its general usefulness among twenty sources.[90] Hatton et al. studied physicians' sources of information about teratogenic effects of drugs (drug use during pregnancy).[91] They asked physicians to indicate their general drug information sources and sources used for specific information about potential teratogenicity of drugs. In both cases, sales representatives were ranked fifth, but the mean use rate was only about one-half in the second case.[92] Bower and Burkett conducted a survey in 1987 to learn about factors influencing prescribing of generic drugs.[93] Thirty-two percent of the physicians indicated that they rely a great deal on sales representatives as a source of information and 61% of the physicians reported relying to some extent.[94] In Eaton and Parish's study, physicians ranked articles and partners ahead of detailing.[95]

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84. Clifford C. Kalb, *Psychological Motivations in Physician Prescribing Habits*, 13 MED. MARKETING & MEDIA 43 (1978).

85. *Id.* at 49.

86. *Id.* at 52.

87. J. Gambrill & C. Bridges-Webb, *Use of Sources of Therapeutic and Prescribing Information by General Practitioners*, 9 AUSTL. FAM. PHYSICIAN 482 (1980).

88. *Id.* at 483.

89. B. Strickland-Hodge & M.H. Jeqson, *Usage of Information Sources by General Practitioners*, 73 J. ROYAL SOC'Y MED. 857 (1980).

90. *Id.* at 859.

91. Randy C. Hatton et al., *Physicians' Sources of Information About Teratogenic Effects of Drugs*, 16 DRUG INFO. J. 148 (1982).

92. *Id.* at 150.

93. Anthony D. Bower & Gary L. Burkett, *Family Physicians and Generic Drugs: A Study of Recognition, Information Sources, Prescribing Attitudes, and Practices*, 24 J. FAM. PRAC. 612 (1987).

94. *Id.* at 613.

95. Eaton & Parish, *supra* note 69, at 63.

Given the rich availability of information sources to physicians over the last two or three decades, it is possible that detailing, while important (as the studies above have documented), may be losing out to other sources over time. In 1991 Williams and Hensel reviewed twenty empirical analyses between 1952 and 1986 and conducted a meta-analysis of these studies about drug information sources, their importance, or use by physicians.[96] They classified all possible sources of information into four categories. These categories were commercial sources (direct mail, journal advertising, and detailing), noncommercial sources (journal articles, meetings, conventions, pharmacists, and colleagues), personal sources which require a face-to-face contact (detailing, colleagues, pharmacists, and conventions/meetings/conferences), and nonpersonal sources (journal articles, journal advertising, and direct mail). They found that commercial sources declined in importance over time and personal sources gained in importance, while the difference for nonpersonal sources was insignificant.[97] The importance of detailing specifically has declined over time. While it was mostly ranked first in studies in the 1950s, results from the 1970s or later (there were no studies between 1959-1970) ranked it the fourth to seventh most important source of information.[98] The new most important sources were colleagues and journal articles; pharmacists and other sources also gained more weight.[99] The observed declining ranking of detailing is congruent with lower reported means of detailing in studies where physicians had to rate the importance of sales representatives on a scale.[100]

C. Physicians' Responsiveness Toward Detailing

Building on the previous discussion, the important question for physicians, pharmaceutical firms, and policymakers is whether detailing indeed influences prescription behavior (or sales). We begin by focusing on physicians' perceptions about this question (which we describe in greater detail in Table 3). We then look at studies that have examined this issue using behavioral (market) data.

1. Studies Using Perceptual Data

In one of the earliest studies of physicians' responsiveness, Caplow and Raymond found that detailing was a minimal factor in motivating physicians to

96. Williams & Hensel, *supra* note 11.
97. *Id.* at 55.
98. *Id.* at 54-55.
99. *Id.* at 54.
100. *Id.* at 55.

prescribe a drug.[101] This is consistent with a 2000 study by Abratt and Lanteigne.[102]

However, this message was somewhat less clear in other studies. For example, Pitt and Nel found physicians perceived sales calls as the third most dominant factor after personal experience with the product and recommendations from colleagues.[103] This information implied that physicians regarded detailing as more influential than seminars, conferences, ads in journals, samples, or direct mail. Lurie et al. surveyed internal medicine faculty and housestaff at teaching hospitals about the nature, frequency, and effects of their contacts with sales representatives.[104] Both faculty and housestaff averaged 1.5 brief conversations per month with sales representatives.[105] Twenty-five percent of faculty and 32% of residents reported having changed their practices at least once in the preceding year based on contact with a detailer.[106] But detailing activity also potentially influences prescribing through another channel: hospital formularies. Based on the suggestion of a sales representative, 20% of faculty and 4% of residents had recommended an addition to the formularies at least once during the past year.[107] Using stepwise logistic regression, Lurie et al. found that brief conversations, extended conversations, and free meals predicted a change in faculty prescribing practice.[108] Taylor and Bond studied the association between new prescriptions and factors of influence.[109] They collected prescription behavior of 189 British practitioners and asked them to indicate up to two influences. Pharmaceutical representatives were listed as the second most important source (20% of total number of times mentioned) and mostly influenced the prescription of anti-infective preparations and non-steroidal anti-inflammatory agents.[110] Swanson et al. found that twenty-seven out of thirty-one family physicians felt that detailers

101. *See* Theodore Caplow & John J. Raymond, *Factors Influencing the Selection of Pharmaceutical Product*, 19 J. MARKETING 18, 20 (1954).

102. Russell Abratt & Julie Lanteigne, *Factors Influencing General Practitioners in the Prescription of Homeopathic Medicines*, 31 AFR. J. BUS. MGMT. 91, 94 (2000).

103. Leyland Pitt & Deon Nel, *Pharmaceutical Promotion Tools—Their Relative Importance*, 22 EUR. J. MARKETING 7, 10 (1988).

104. N. Lurie et al., *Pharmaceutical Representatives in Academic Medical Centers: Interaction with Faculty and Housestaff*, 5 J. GEN. INTERNAL MED. 240 (1990).

105. *Id.* at 241.

106. *Id.* at 242.

107. *Id.*

108. *Id.*

109. Ross J. Taylor & Christine M. Bond, *Change in the Established Prescribing Habits of General Practitioners: An Analysis of Initial Prescriptions in General Practice*, 41 BRIT. J. GEN. PRAC. 244 (1991).

110. *Id.* at 246.

affected their prescription behavior.[111] However, the physicians felt that this influence was small.[112] Strang et al. surveyed 262 practitioners, of whom 70% agreed that detailing affected their prescribing habits.[113] Williams et al. also found a strong positive association between the number of visits by detailers and the number of prescriptions per week.[114]

Bower and Burkett found that family physicians who relied least on sales representatives were most likely to prescribe generic drugs (33%), while only 12% of those who said they relied "a great deal" on detailers prescribed generic drugs.[115] Physicians who relied "some or not at all" on sales representatives as a source of information also recognized more generic and trade name drugs.[116] Chren and Landefeld used survey data to test three hypotheses: whether physicians who interacted with drug companies were no more likely than other physicians to (1) make formulary requests; (2) request drugs manufactured by those companies; and (3) request drugs manufactured by those companies than drugs manufactured by other companies.[117] They measured interaction with pharmaceutical companies in the following four forms: traditional detailing, acceptance of money to support attendance at educational symposia, acceptance of money to speak at educational symposia, and acceptance of money for research. The results demonstrate a strong, consistent, and specific association between physicians' behavior and many types of interactions with pharmaceutical companies, including detailing.[118]

From the discussion above, it seems that physicians are beginning to acknowledge that detailing has an impact on physician prescription behavior. However, the general perception that detailing has no effect on prescription behavior still persists. This perception may exist because physicians are unwilling to admit their reliance on detailing or their lack of awareness of such influence.[119] Finally, Roughead et al. provided some insights into how and why

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111. Rick W. Swanson et al., *Pharmaceutical Representatives–Educators or Product Marketers?*, 69 ACAD. MED. 128, 128 (1994).

112. *Id.*

113. Strang et al., *supra* note 17, at 476.

114. Williams et al., *supra* note 79, at 165.

115. Bower & Burkett, *supra* note 93, at 614.

116. *Id.* at 615.

117. Mary-Margaret Chren & C. Seth Landefeld, *Physicians' Behavior and Their Interactions with Drug Companies: A Controlled Study of Physicians Who Requested Additions to a Hospital Drug Formulary*, 271 JAMA 684 (1994).

118. *Id.* at 687.

119. *See* Jerry Avorn et al., *Scientific Versus Commercial Sources of Influence on the Prescribing Behavior of Physicians*, 73 AM. J. MED. 4 (1982). Not surprisingly, other studies have also documented contradictory statements made by physicians. For example, Ferguson et al. found

physicians were affected by detailing.[120] They used sixteen taped visits where sixty-four medicines were detailed. They found that the most common method, which was seen in all sixteen visits, was reciprocation where detailers gave gifts such as samples and printed material to physicians.[121] Such gift-giving made the physicians feel bound to make a repayment and encouraged an automatic response. Social validation claims were used in 41% of the cases.[122] The peer groups to whose established practices sales representatives referred when using social validation were mostly vaguely defined as "other doctors." Commitment acts appealed to the need and desire to be consistent in order to influence physicians' behavior. These acts were applied in 39% of details either in the form of a direct request to prescribe the product or in a series of questions or statements that gradually moved to agreement to prescribe the drug.[123] And last, detailers appealed to authority in the form of experts in 14% of the interactions.[124]

2. Studies Using Market Data

Most of the studies about physicians' responsiveness to detailing have concentrated on either estimating sales response models to detailing (and other advertising tools) or estimating sales response models to the total marketing mix.

a. Detailing Response Models

We first focus on models that focus exclusively on modeling the impact of detailing on demand (dollar sales, market share, or number of prescriptions). Parsons and Vanden Abeele carried out one of the first studies estimating sales response to detailing.[125] They observed an established drug in the growth phase of a product class with ten products, none of which was dominant. Using time-varying coefficients, they estimated a multiplicative model with pooled data and

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that physicians describing themselves as busy practitioners were significantly less likely to abstain from meeting sales representatives and that physicians with frequent contacts were virtually all busy practitioners, even though presumably busier physicians should have less time to meet detailers. *See* Ferguson et al., *supra* note 55.

120. E.E. Roughead et al., *Commercial Detailing Techniques Used by Pharmaceutical Representatives To Influence Prescribing*, 28 AUSTL. & N.Z. J. MED. 306 (1998).

121. *Id.* at 308.

122. *Id.*

123. *Id.*

124. *Id.*

125. Leonard J. Parsons & Piet Vanden Abeele, *Analysis of Sales Call Effectiveness*, 18 J. MARKETING RES. 107 (1981).

found sales call elasticity to be negative if no samples or handouts were additionally given out.[126]

However, this study seems to be the only one that has not found a strong positive effect of detailing on sales. Cleary studied the impact of detailing on physician antibiotic prescribing at a university hospital.[127] He evaluated the effectiveness of sales representatives on the average number of new prescriptions, the average number of grams prescribed, and their dollar value.[128] He found a significant correlation between detailing and the number of new prescriptions, but not with the number of grams or dollar value.[129] He concluded that the latter two variables were less reliable measures of the impact of detailing. Leeflang et al. proposed a method to measure complex time lag structures and to select the most appropriate model.[130] They applied their procedure to sales representatives' activities in the pharmaceutical industry and found positive effects on sales.[131] Rizzo also found that detailing stock positively affected sales, while current detailing was insignificant.[132] Conducting a subgroup analysis for on-patent drugs only, the same pattern was confirmed.[133] Wosinska examined the effects of DTCA on the demand for drugs.[134] She found that detailing had a significant positive brand switching effect, even stronger than the one from DTCA.[135]

Using a hierarchical model, Manchanda and Chintagunta studied physicians' response to detailing at the individual level.[136] They modeled the number of prescriptions as a function of detailing frequency and quality measured by the

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126. *Id.* at 111.

127. John D. Cleary, *Impact of Pharmaceutical Sales Representatives on Physician Antibiotic Prescribing*, 8 J. PHARMACY TECH. 27 (1992).

128. *Id.* at 28.

129. *Id.*

130. Peter S.H. Leeflang et al., *Identification and Estimation of Complex Multivariate Lag Structures: A Nesting Approach*, 24 APPLIED ECON. 273, 281 (1992) (recommending the use of a geometric (multiplicative) lag).

131. *Id.*

132. John A. Rizzo, *Advertising and Competition in the Ethical Pharmaceutical Industry: The Case of Antihypertensive Drugs*, 42 J.L. & ECON. 89, 108 tbl. 3 (1999).

133. *Id.* at 110.

134. MARTA WOSINSKA, JUST WHAT THE PATIENT ORDERED? DIRECT-TO-CONSUMER ADVERTISING AND THE DEMAND FOR PHARMACEUTICAL PRODUCTS (Harvard Bus. Sch., Marketing Research Paper No. 02-04, 2002), http://ssrn.com/abstract=347005.

135. *Id.* at 18.

136. Puneet Manchanda & Pradeep K. Chintagunta, *Responsiveness of Physician Prescription Behavior to Salesforce Efforts: An Individual Level Analysis*, 15 MARKETING LETTERS 129 (2004).

number of provided samples.[137] Their results showed that both measures of detailing and their interaction effect positively affected the number of prescriptions.[138] They also investigated sales force effectiveness assuming partial knowledge of the response parameters.[139] Though most physicians responded positively to sales calls, they found that physicians were not detailed optimally. High-volume physicians were detailed to a greater extent than low-volume physicians without regard to their responsiveness to detailing.[140] Iizuka and Jin estimated the effects of DTCA in the prescription drug market.[141] While they found that DTCA increases the number of visits to physicians' offices and had a market-expanding effect for a whole class of drugs, they found no significant effect of DTCA on physicians' choice of a specific brand.[142] In contrast, detailing positively influenced doctors' brand choice.[143] Using a large-scale dataset, Mizik and Jacobson tried to pinpoint the effects of detailing and sampling as precisely as possible. They estimated fixed-effects distributed lag regression models for three different drugs and found that detailing, lagged up to the previous six months, was statistically significant.[144] In other words, past detailing affects current prescription behavior.

Most studies find a positive significant effect of detailing.[145] This effect is robust to differences in variable operationalization, model specification, data series, and estimation method. Table 4 shows that the effect of detailing is positive and significant across a wide variety of models and datasets.

b. Marketing Mix Models

We now focus on marketing mix models. Marketing mix models differ from the models described above as they include the effects of other marketing variables along with detailing in order to provide a more complete picture of sales and prescription behavior. Another advantage of these models is that they can pin down the effects of various instruments simultaneously.

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137. *Id.* at 136.

138. *Id.* at 138-39.

139. Puneet Manchanda et al., *Response Modeling with Non-Random Marketing Mix Variables*, 41 J. MARKETING RES. 467 (2004).

140. *Id.* at 474.

141. Toshiaki Iizuka & Ginger Z. Jin, The Effects of Direct-to-Consumer Advertising in the Prescription Drug Markets (2003) (unpublished manuscript, on file with authors).

142. *Id.* at 11, 21.

143. *Id.* at 21.

144. Natalie Mizik & Robert Jacobson, *Are Physicians "Easy Marks"?: Quantifying the Effects of Detailing and Sampling on New Prescriptions*, 50 MGMT. SCI. 1704, 1734 (2004).

145. Parsons & Vanden Abeele, *supra* note 125, is the one exception.

Berndt et al. investigated the effects of detailing, journal ads, DTCA, and pricing in an industry as well as market-share model.[146] For both models, they found detailing to have the largest positive significant effects among the marketing activities.[147] Gonul et al. measured the impact of price, detailing squared,[148] samples, and several interaction effects with physicians' characteristics on doctors' choice of drugs.[149] They found that detailing increased the prescription probability of a drug, while detailing squared decreased it.[150] The interaction effects between detailing and Medicare price were significant and negative, while detailing's effect with HMO insurance was insignificant.[151] Wittink measured the effects of several promotional instruments on return on investment (ROI).[152] He examined how ROI differed according to brand size and launch date and also provided detailed analyses for specific therapeutic categories.[153] He found that the average revenue impact estimates of detailing remained constant around one dollar for small brands; increased from $1.20 if the brand was launched before 1994 to $2.10 if the brand was launched between 1998 and 2000 for medium-sized brands; and from $3.10 if the brand was launched before 1994 to $11.60 if the brand was launched between 1998 and 2000 for large brands.[154] Based on these findings, he concluded that the most promising return target for additional resources was detailing for large brands launched after 1997.[155]

In a 2004 study, Narayanan et al. examined the effects of detailing, DTCA, other marketing efforts such as meetings and events, price and their interactions with sales, and ROI.[156] They estimated both category sales and sales share models and found that detailing did not affect category sales, but did affect the market share.[157] They found long-term effects of detailing on revenues and

146. Ernst R. Berndt et al., *Information, Marketing, and Pricing in the U.S. Antiulcer Drug Market*, 85 AM. ECON. REV. 100 (1995).

147. *Id.* at 103-04.

148. Detailing squared represents the product of detailing with itself. The role of this term is to capture non-linear (diminishing) returns to detailing.

149. Fusun F. Gonul et al., *Promotion of Prescription Drugs and Its Impact on Physicians' Choice Behavior*, 65 J. MARKETING 79 (2001).

150. *Id.* at 86-87.

151. *Id.* at 87.

152. WITTINK, *supra* note 5.

153. *Id.* at 13-19.

154. *Id.* at 19.

155. *Id.* at 28.

156. Sridhar Narayanan et al., *Return on Investment Implications for Pharmaceutical Promotional Expenditures: The Role of Marketing Mix Interactions*, 68 J. MARKETING 90 (2004).

157. *Id.* at 97, 98.

significant interaction effects between marketing variables in the market share model.[158] Iizuka et al. found an insignificant interaction effect between detailing and DTCA advertising.[159]

In general, these models all find that detailing has a positive and significant effect on sales, even after controlling for other marketing mix instruments. Most studies also find that the effect of detailing is largest relative to other marketing instruments. However, the results pertaining to detailing interactions (the joint effect of detailing and another marketing instrument) are not clear. Table 5 provides a detailed overview of these studies.

D. The Role of Detailing over the Product's Life Cycle

The discussion up to this point has shown evidence that while physicians are somewhat negatively predisposed toward detailers and detailing, they do perceive them as a source of information. There is also evidence that detailing has a positive and significant effect on prescription behavior for both physicians' perceptions and market data. An interesting question that arises particularly in pharmaceutical markets is whether the effect of detailing varies over a product's life cycle. When a new drug is launched, not much is known is about its efficacy in practice, which may make detailing more effective. Academic researchers have suggested this explanation. For example, Miller notes that detailing is likely to play a large role in the early and awareness-building phase of a new product's life.[160] Consistent with our approach, we first look at studies that examine physician perceptions about the role of detailing over the drug's life cycle and then at behavioral studies.

1. Studies Using Perceptual Data

Most studies in this area have found that detailing plays an important role in how physicians obtain information about newly launched products (see Table 6 for details). McCue et al. surveyed internists, surgeons, and general practitioners to find out their opinions about the accuracy, accessibility, and frequency of use of ten information sources for new drugs.[161] While only about 36% of the physicians considered information from sales representatives to be accurate, 72% regarded it as accessible and 45% reported its frequent use.[162] McCue et al. also

158. *Id.* at 99, 100.

159. Iizuka & Jin, *supra* note 141, at 23.

160. Miller, *supra* note 11, at 493.

161. Jack D. McCue et al., *Physicians' Opinions of the Accuracy, Accessibility, and Frequency of Use of Ten Sources of New Drug Information*, 79 S. MED. J. 441 (1986).

162. *Id.* at 442.

found that family practitioners and physicians with more than fifteen years in practice used sales representatives significantly more as a source of information than did internists, surgeons, or less-experienced physicians.[163] Stross examined the dissemination of information about the management of chronic airway obstruction in small community hospitals.[164] He surveyed internists and family physicians on information sources that were critical to changing their behavior. While sales representatives appeared irrelevant to the diagnosis of the illness, they were important in influencing decisions to use new drugs.[165] Differentiating between early and late adopters, 80% of the former cited sales representatives as their major source of information, while only 15% of the latter did so.[166] Stross explained the great role played by sales representatives in his study by the fact that there were no formal education programs on chronic airway obstruction in these hospitals.[167]

Peay and Peay studied the adoption process of a specific new drug, temazepam.[168] Among those physicians who were familiar with this drug (71%), 40% reported to have first heard from detailers about the drug.[169] Thirty-seven percent of the doctors received additional information from detailers after first hearing about the drug and before prescribing it.[170] More than 42% of the physicians identified the detailers as the most influential information source in their first decision to prescribe temazepam.[171] Sixty-one percent of the doctors familiar with temazepam reported contact with the detailers regarding the drug.[172] They concluded that contact with detailers was the most consistent predictor of choice and quantity of prescriptions of temazepam.[173] In a follow-up study, Peay and Peay confirmed their finding for medium-risk drugs but found that among specialists who evaluated relatively high-risk drugs, the importance of detailers was ranked twelfth among fifteen potential sources.[174] Manning and Denson

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163. *Id.*

164. Jeoffrey K. Stross, *Information Sources and Clinical Decisions*, 2 J. GEN. INTERNAL MED. 155 (1987).

165. *Id.* at 157.

166. *Id.* at 158.

167. *Id.*

168. Marilyn Y. Peay & Edmund R. Peay, *The Role of Commercial Sources in the Adoption of a New Drug*, 26 SOC. SCI. & MED. 1183 (1988).

169. *Id.* at 1185.

170. *Id.*

171. *Id.*

172. *Id.*

173. *Id.*

174. Marilyn Y. Peay & Edmund R. Peay, *Patterns of Preference for Information Sources in the Adoption of New Drugs by Specialists*, 31 SOC. SCI. & MED. 467, 470 (1990).

surveyed Californian general internists about how they learned about a specific new drug, cimetidine.[175] Fifty-six percent of these physicians named more than one information source.[176] Detailing was ranked sixth among seventeen sources from which practitioners first gained knowledge of the drug and learned about the principles of using it.[177] As a means to update information about cimetidine, detailing was ranked seventh.[178] Colleagues were ranked third on all three criteria.[179]

Differentiating between the awareness and evaluation stage of a new drug, physicians ranked sales representatives first on the former and sixth on the latter among twelve sources in Strickland-Hodge and Jeqson's study.[180] Single-practice doctors cited detailers significantly more often for drug evaluation than did joint-practice doctors.[181] The authors also found that "industrial information . . . was cited significantly more often by older, single-practice doctors who had a first degree only, did none of their own dispensing, and who did not specialize."[182]

While most physicians note that detailing plays an important role in their understanding and adoption of new products, at least one study finds mixed results. Christensen and Wertheimer studied sources of information and influence on new drug prescribing by surveying pediatric and adult medicine practitioners working in a health maintenance organization.[183] When asked how they learned about the existence of two specific new drugs, detailing played only a minor role for one of the drugs, while it was most often identified as the first source of information for the second drug.[184] The authors provided three explanations for this result: differences in preferred information sources among physician specialties, differences in promotional practices for the two drugs, and "attributes or activities of the detailers involved."[185] For both new drugs, detailing was unimportant when the physicians were asked about the most important information source influencing their decision to prescribe a drug for the first

175. Phil R. Manning & Teri A. Denson, *How Internists Learned About Cimetidine*, 92 ANNALS INTERNAL MED. 690 (1980).

176. *Id* at 690.

177. *Id.* at 691.

178. *Id.*

179. *Id.*

180. Strickland-Hodge & Jeqson, *supra* note 89, at 860.

181. *Id.* at 861.

182. *Id.* at 862.

183. Dale B. Christensen & Albert I. Wertheimer, *Sources of Information and Influence on New Drug Prescribing Among Physicians in an HMO*, 13A SOC. SCI. & MED. 313 (1979).

184. *Id.* at 316.

185. *Id.*

time.[186] However, this organization's policy allowed only for minimal contact with detailers. The presence of this policy may explain why detailing was ranked last among eleven as the most frequently used source of information concerning drug therapy.[187]

2. Studies Using Market Data

In contrast to the studies above, market data-based studies examine the relationship between the sales performance of a new drug and detailing post-launch. Lilien et al. developed a repeat-purchase diffusion model to forecast and control the rate of sales for a new product using Bayesian estimation.[188] They noted two phenomena: Early prescribing doctors prescribed more, and the effectiveness of detailing decayed over time. Both phenomena were linked to decreasing returns to detailing spending over time.[189] Assuming similar market characteristics for all drugs, they found positive effects of detailing on sales.[190] Berndt et al. studied a diffusion process with consumption externalities.[191] They estimated the effects of advertising on market share and simulated it until the market reached its equilibrium shares. They found a significant positive effect of detailing as well as detailing elasticities of about one.[192] Manchanda et al. found that detailing had a significant and positive effect on the decision to adopt a drug even after controlling for the adoption behavior of "near" physicians.[193]

Azoulay investigated "how different sources of information influence the diffusion of pharmaceutical innovations."[194] He found a significant positive effect of detailing on market share.[195] He also found support for the hypothesis that marketing plays an important informative role in increasing demand, but a

186. *Id.* at 317.

187. *Id.* at 315.

188. Gary L. Lilien et al., *Bayesian Estimation and Control of Detailing Effort in a Repeat Purchase Diffusion Environment*, 27 MGMT. SCI. 493 (1981).

189. *Id.* at 495.

190. *Id.* at 502.

191. Ernst R. Berndt et al., *Consumption Externalities and Diffusion in Pharmaceutical Markets: Antiulcer Drugs,* 51 J. INDUS. ECON. 243 (2003).

192. *Id.* at 262.

193. PUNEET MANCHANDA ET AL., THE ROLE OF TARGETED COMMUNICATION AND CONTAGION IN PRODUCT ADOPTION (Rutgers Bus. Sch. Marketing Dep't, Working Paper No. RBS-MKT-2004-02, 2004).

194. Pierre Azoulay, *Do Pharmaceutical Sales Respond to Scientific Evidence?*, 11 J. ECON. & MGMT. STRATEGY 551, 551 (2002).

195. *Id.* at 574.

relatively minor persuasive role.[196] Narayanan et al., who investigated the role of detailing over a product's life cycle, confirmed some of these results in their own study.[197] They hypothesized that early in the product's life cycle, detailing would play largely an informative role (i.e., it would reduce uncertainty about a product's efficacy) while later, detailing would play a more persuasive role.[198] They found this situation to be true using data on three new drugs in the antihistamine category.[199] Specifically, they found that the effect of detailing was larger on sales in the early stages when there was both an informative (indirect) and persuasive (direct) effect, as opposed to later stages, when there was only a persuasive effect.[200] This result was also found in a subsequent study that examined the effects of detailing in the erectile dysfunction category using individual physician data.[201] Note that in both the perceptual and the market data-based studies, very little effort has been focused on understanding the exact information transfer during detailing over the life cycle. This area remains open for research.

II. DISCUSSION

At this point, it is worthwhile to try to summarize the main message from these studies. Note that given our broad span of studies and disciplines, it is hard to provide objective (or quantitative) findings. Thus, the following represents our subjective interpretation, based on all the studies discussed up to now, of the role and effects of detailing.

We first began by examining physician attitudes toward detailing and detailers. Broadly speaking, it seems that physicians have negative (at one extreme) to neutral attitudes (at the other) toward pharmaceutical sales representatives. The variance in attitude is explained by a variety of factors. First, the more informational and educational support provided by the representative and the higher the number of patients, the more favorable a physician's attitude toward sales representatives. Second, detailer style and detail content also affect attitude. For example, a manipulative and aggressive selling style is associated with an unfavorable attitude. The overemphasis of drug promotion versus

196. *Id.* at 583.

197. Sridhar Narayanan & Puneet Manchanda, *Temporal Differences in the Role of Marketing Communication in New Product Categories*, 42 J. MARKETING RES. (forthcoming 2005).

198. *Id.* (manuscript at 15).

199. *Id.* (manuscript at 14).

200. *Id.*

201. Sridhar Narayanan, Puneet Manchanda, & Pradeep K. Chintagunta, Heterogeneous Learning and the Targeting of Marketing Communication for New Products (Nov. 2004) (unpublished manuscript, on file with authors).

information delivery also tends to engender negative attitudes. Finally, it also seems that the physician's environment helps determine her attitude toward detailers. For example, physicians who have relatively little access to colleagues seem to have a less negative attitude toward detailers. Also, physicians in practices that restrict access to detailers tend to be more negative in their attitudes toward detailing and detailers. Attitudes toward gifting are mostly negative, though several studies note that gifts below a certain threshold are acceptable. A more disturbing finding is that these gifts induce reciprocal feelings among physicians.

Given this somewhat negative picture of the relationship between physicians and detailers, the question is why the practice of detailing persists. The answer seems to lie in the fact that detailing and interaction with detailers acts as an inexpensive and convenient source of information. Studies that have explicitly investigated this question seem to suggest that detailers (and detailing) do provide pertinent information. While physicians are aware of the potential conflicts of interest, they still find this information to be of some value. Two other interesting themes also emerge. First, relative to other sources of information, it is clear that detailing is not the most important source. The most important source of information seems to be either medical journals or other colleagues.[202] Second, to the extent that our studies are representative of each decade, the relative importance of detailing as a source of information has declined over the past five decades. More recent studies have found that it occupies a rank between four and seven in contrast to one or two.

However, from the patient, physician, firm, and policymaker's point of view, it is important to establish that detailing does have a significant effect on physician prescription behavior. Interestingly enough, many studies that have asked physicians this question find that physicians believe that it is likely that prescription behavior can be influenced by detailing. This opinion is supported by virtually all the studies that have investigated the effect of detailing (either in isolation or with other marketing instruments) using behavioral data either at the market or the individual physician level. While there seems to be little consensus about the size of the effect, it is clear that the effect is positive and significant in a statistical sense.

This result is somewhat puzzling, especially considering that over a drug's life cycle, most information about the drug is likely to be disseminated early on.[203] This observation implies that if indeed the role of detailing is to provide information, its effect should die out soon after launch. However, we do not see

202. Given that these studies are all based on survey data, it should be noted that this reply represents the "correct" professional response.

203. *See* discussion *infra* Section I.D.

this result in the studies cited above. We carry this notion further and investigate the role of detailing for new products. As physicians typically need more information about new products, it is clear that detailing should play a larger role at the beginning of a drug's life cycle. The survey studies that have investigated this question seem to confirm that detailing does play an important role, especially in the early, awareness-building, phase of a new product's launch. Presumably, this effect should diminish as a drug enters the maturity phase of its life cycle.

Most of the perceptual studies confirm the importance of detailing in the early stages of the life cycle. These studies also confirm the diminishing role of detailing over the product's life cycle. In other words, these studies find that detailing has a positive, but decreasing, effect over the whole life cycle of a drug. While this finding helps us in confirming our hypothesis, we still need to explain the existence of a positive detailing effect in the late stages of the life cycle. Our explanation is that, in addition to providing a "reminder effect," the constant interaction builds a stock of goodwill between a detailer (or the firm) and the physician. This goodwill is not based on purely objective and rational factors but on social and cultural ones. Its character changes from informative to more persuasive in the later stages of the drug's life cycle. The evolution of goodwill in this manner reflects the deepening of the relationship between the physician and the pharmaceutical sales representative. Reports on the industry focus on using detailing to build lasting relationships with physicians, providing some support for our explanation.[204]

In conclusion, detailing is clearly here to stay. While physicians claim to tolerate it as a necessary evil, it evidently has an impact on prescription behavior via both a subjective and an objective path. They are therefore heavily invested in this mode of promotion. Thus, one possible approach that could be beneficial to all parties concerned—patients, physicians, firms, and policymakers—would be to ensure that this large expenditure on detailing is carried out in the most efficient manner possible. The application of economics and management science principles to the high-quality marketing data now available shows considerable potential for "optimizing" detailing expenditure. By "optimal," we mean that firms detail to the point where the marginal benefit is equal to marginal cost.

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204. *Pushing Pills*, *supra* note 12; Martin E. Elling et al., *Making More of Pharma's Sales Force*, MCKINSEY Q., 2002 Issue 3, at 86. Note that our explanation of goodwill accumulation is based on three arguments. First, this goodwill accumulation represents the residual effect of detailing *after* the informational effects have died out. Thus, these effects do not have anything to do with objective information transfer. Second, this industry is based on building lasting relationships between physicians and manufacturers. Finally, we are unable to offer an alternative explanation that is consistent with the results.

From the physician's perspective, this means that detailing should be carried out at a level that provides physicians with the amount of information (and samples) that enables them to maximize the welfare of their patients. To this end, it may be useful to provide physicians training on how to use their relationship with detailers in the most effective manner possible. Similarly, firms could also investigate other, complementary, mechanisms that could improve the efficiency and effectiveness of their detailing practices. Thus, initiatives such as e-detailing are worth investigating. The benefit of more efficient use of detailing expenditure for consumers is somewhat indirect, as it arises when firms divert the savings to developing newer products. Finally, policymakers could suggest training and educational standards for detailers such that detailers act more as collaborative problem-solvers rather than as sales professionals.

CONCLUSION

This paper attempts to synthesize research on the role and effect of detailing in the pharmaceutical industry. Our sweep is broad in the sense that we have looked at papers across various disciplines spanning five decades of research. In terms of what this research has documented, it is clear that there is a two-sided relationship between physicians and detailers. There is also strong evidence that detailing affects physician (prescription) behavior in a positive and significant manner. While this relationship is tolerated by physicians and promoted aggressively by detailers, it is clear that it will continue in the foreseeable future. Based on our reading of the research, we propose a relatively simple explanation of why this relationship exists and matters in terms of prescription outcomes. The objective part of the relationship consists of awareness-building and information transfer and is prevalent in the early part of a drug's life cycle. The subjective part pertains to building social and personal relationships between physicians and detailers. It is therefore important that physicians, firms, and policymakers recognize this reality and take appropriate steps so as to make this relationship as efficient and effective as possible.

APPENDIX

TABLE 1A: PHYSICIAN ATTITUDES TOWARD DETAILERS

Paper	Type of Dataset	Type of Analysis	Other Variables Measured?	Hospital or Practice?	Physician Specialty	Number of Physicians	Results	Scale Used	Further Results/Comments
Poirier et al. (1994)	Cross-section	Descriptive	No	-	-	26	24% (48%) (dis)satisfied with detailing; 20% (44%) believe (not) in accuracy & objectivity of information	-	56% (28%) say representatives could (not) influence formulary decisions if efficacy, toxicity, & cost are the same
Strang et al. (1996)	Cross-section	Descriptive	No	-	General practitioners, specialists	262	92% (37%) consider drugs promotion (education) major goal of detailing; 47% (80%) think detailers provide all information (over-emphasize effectiveness)	-	-
Caudill et al. (1996)	Cross-section	Descriptive	No	46% solo practice, 42.6% group practice, 12.3% academic/hospital	Family medicine, general internal medicine	446	3.59 (3.51) useful & accurate information about newly introduced (already established) drugs	1-5	3.05 important teaching function; 4.21 banned from presentation where they practice
McKinney et al. (1990)	Cross-section	Descriptive	No	Hospital	-	277 faculty & 240 residents	Important teaching function: residents 3.6, faculty 3.9; provide useful & accurate information about newly introduced (already established) drugs: residents 3.2, faculty 3.2 (residents 3.1; faculty 3.3); no impact on prescribing behavior: residents 2.5, faculty 2.3	Yes/no questions & 1-5 scale	Same degree of contact whether gifts distributed or not: residents 3.2, faculty 2.0; acceptance of promotional items with no impact on prescribing behavior: residents 1.7, faculty 1.6
Hopper et al. (1997)	Cross-section	Descriptive	No	Residents, faculty	Primary care internal medicine, internal medicine pediatrics	31 residents & 18 faculty	Contact not beneficial: 2.31; influence my (others') prescribing in negative ways: 4.27 (2.95)	1-5	Comparison of pre- & post-intervention: stronger belief in unethical practices & that one's prescribing is influenced in neg. ways
Andaleeb, Tallman (1996)	Cross-section	Descriptive	No	Hospital	35 osteopathic doctors, 58 medical doctors, 2 doctors of pediatric medicine	95	Important source of information: 4.00; Could get information from another source: 4.35; friendly relationship: 4.55; trust: 4.00; representatives are manipulative: 3.50	1-6	Total of 17 questions concerning attitude
Thomson et al. (1994)	Cross-section	Descriptive	No	Practice	General practitioners	67	Overall attitude toward detailers: 3 (median)	1-5	Provide a list of characteristics of detailers practitioners regard as pos./neg.

TABLE 1B: PHYSICIAN ATTITUDES TOWARD GIFTS

Paper	Type of Dataset	Type of Analysis	Other Variables Measured?	Hospital or Practice?	Physician Specialty	Number of Physicians	Results	Scale for Calculations	Further Results/Comments
Keim et al. (1993)	Cross-section	Descriptive	No	Hospital	Residents & directors in emergency medicine	1,385 residents & 80 directors in emergency medicine	75% believe accepting gifts is potentially ethically compromising	-	75% directors believe detailing can affect residents' prescribing; only 49% of residents believe this
Madhavan (1997)	Cross-section	Principal component, correlation	No	37.5% solo practice, 24.6% group practice, 16.7% hospital, 21.2% teaching hospital	Family medicine, internal medicine, obstetrics/ gynecology, pediatrics, surgery, others	283	Gifts to influence prescribing: 3.17; physicians are (I am) influenced in prescribing by gifts: 2.29 (1.22)	0-6	-
Aldir et al. (1996)	Cross-section	Descriptive	No	Residents, practice	Internal medicine, family medicine, OB/GYN	521	Influenced by lunches (dinners): 2.3 (2.4) practitioners/2.7 (2.8) residents	10-point rating scale	4.6% practitioners (6.0% residents) believe gifts may influence prescribing (yes/no question)
Reeder et al. (1993)	Cross-section	Descriptive	No	Hospital	Chief residents	87	20% accepting gifts can influence own prescribing	-	-

TABLE 1C: ANTECEDENTS OF PHYSICIAN ATTITUDES

Paper	Type of Dataset	Type of Analysis	Other Variables Measured?	Which Other Variables Measured?	Hospital or Practice?	Physician Specialty	Number of Physicians	Results	Scale for Calculations
Lagace et al. (1991)	Cross-section	Regression	No	-	-	-	90	Trust (satisfaction) on ethical behavior: .209 (.212); expertise: .554 (.450); no. of meetings: -.270 (.098); relationship duration: .064 (-.031); years in practice: .128 (.093)	-
Brotzman, Mark (1993)	Cross-section	Descriptive	Yes	*Physicians' Desk Reference*, AMA drug evaluations, medical letter, journal ads	Residents	Family medicine residents	265	Residents from free programs twice as likely to view overall interactions, educational information, & extracurricular activities as beneficial, four times more likely to view detailing as helpful, more likely to view gift acceptance as appropriate.	1-3
Ferguson et al. (1999)	Cross-section	Descriptive	No	-	Hospital	Internists	346	85% (80%) physicians in restricted (free) programs had seen detailers; 71% (71%) physicians in restricted (free) programs accepted samples	-
Andaleeb, Tallman (1995)	Cross-section	Factor analysis, regression	No	-	Hospital	35 osteopathic doctors, 58 medical doctors, 2 doctors of pediatric medicine	95	Regression: support: .384; style: -.190; peers: .128; own practice: .012; length of practice: .004; volume of patients: .005	1-6

TABLE 2: SOURCE OF GENERAL INFORMATION

Paper	Type of Dataset	Type of Analysis	Other Variables Measured?	Which Other Variables Measured?	Hospital or Practice?	Physician Specialty	Number of Physicians	Results	Scale for Calculations	Ranking Among All Considered Variables	Comments/Further Results
Fassold, Gowdey (1968)	Cross-section	Descriptive	Yes	Direct mail, meetings, journals	-	General practitioners, specialists	531	46% (13%) physicians considered detailing as the most (least) informative &/or acceptable form of drug promotion; 56% (37%) general practitioners (specialists) considered detailing as the most informative &/or acceptable form of drug promotion	-	-	Manufacturer's spoken advertising as preferred source of information for new drugs for 24% physicians (31% general practitioners, 18% specialists); assessments of detailers on 6 attributes
Henley et al. (1968)	Cross-section	Descriptive	Yes	Pharmaceutical & medical textbooks, pharmaceutical & medical periodicals, pharmaceutical literature, other physicians, pharmacists, others	-	47.5% general practitioners, 52.5% diverse specialists	300	55.1% use detailers very often or often, 26.8% occasionally, 17.4% seldom or never	-	2/9	-
Eaton, Parish (1976)	Cross-section	Descriptive	Yes	Industry/professional sources, DHSS	-	General practitioners	453	89.6% (50.8%) use detailers to find out about existence (usefulness) of a drug	-	1/18 for drug existence, 8/18 for drug usefulness	93% see detailers at least once a week, 67% felt would lose important source of information if not seeing detailers
Reeder et al. (1993)	Cross-section	Descriptive	No	-	Hospital	Chief residents	87	80% consider interaction with detailers because of presentation of new clinical data	-	-	-
Connelly et al. (1990)	Cross-section	Regression	Yes	Numerous variables	7 in hospital, 113 in practice	Family physicians	126	Detailers rated low on extensiveness, credibility, clinical availability, searchability, understandability, & clinical applicability	5-point scale	-	-
Shaughnessy et al. (1995)	Cross-section	Descriptive	No	-	Residents	-	12	No impact on prescribing behavior: 3.1 (pre-test), 3.3 (post-test); gifts without influence: 1.8 (pre-test), 2.3 (post-test)	1-5	-	Total of 10 questions concerning attitude (pre- & post-test)

TABLE 2 CONTINUED: SOURCE OF GENERAL INFORMATION

Paper	Type of Dataset	Type of Analysis	Other Variables Measured?	Which Other Variables Measured?	Hospital or Practice?	Physician Specialty	Number of Physicians	Results	Scale for Calculations	Ranking Among All Considered Variables	Comments/Further Results
Williams et al (1995)	Cross-section	Descriptive	Yes	Meetings & conventions, articles, CME, pharmacists & pharmacologists, seminars	-	-	852	18.7% (25.1%) all (heavy prescribing) physicians view detailing as an important source of information	1-5	6/6	Pos. correlation (.37) between prescription volume & detailing importance
Caudill et al (1996)	Cross-section	Descriptive	No	-	46% solo practice, 42.6% group practice, 12.3% academic/ hospital	Family medicine, general practitioners, internal medicine	446	2.76 on credibility; 3.14 on availability; 3.17 on applicability of information provided by detailers	1-5	-	Pos. correlation between the three measures
Kalb (1978)	Cross-section	Descriptive	Yes	Journal articles, colleagues, company reputation, journal advertising, direct mail	Practice	65% general practitioners, 35% diverse specialists	204	Asked separately 13% responded detailers as primary source of information	-	4/6	57% view most important function of detailing as providing information about new drugs & dosages
Gambrill, Bridges-Webb (1980)	Cross-section	Descriptive	Yes	Journals, consultants & colleagues, drug company literature, clinical meetings	-	General practitioners	104	Most recent source: 22%, regular sources: 56%, most useful source: 17%	-	Most recent source: 2/5, regular source: 2/5, most useful source: 2/5	-
Strickland-Hodge, Jeqson (1980)	Cross-section	Descriptive	Yes	Several variables (categorized as industry/professional, active/passive)	-	General practitioners	252	-	-	General evaluation: 7/20, general usefulness: 4/20	-
Hatton et al (1982)	Cross-section	Descriptive	Yes	Various variables	84.3% private, 9% academic, 6.7% other	39.2% OB/GYN, 29.5% family practice, 17.5% pediatrics, 13.8% other	166	General information: 7.3%, specific information: 3.5%	-	General information: 5/10, specific information: 5/10	-
Bower, Burkett (1987)	Cross-section	Descriptive	Yes	Articles, advertising, colleagues	-	Family physicians	317	31.9% rely a great deal, 60.5% to some extent, & 7.6% not at all on detailers as source of information on new drugs	-	-	-

TABLE 3: PERCEPTUAL RESPONSE TO DETAILING

Paper	Type of Dataset	Type of Analysis	Other Marketing Variables Measured?	Which Other Marketing Variables Measured?	Detailing Operationalization	Dep. Variable Operationalization	Number of Physicians	Hospital or Practice?	Specialty?	Results	Scale for Calculations	Ranking Among All Considered Variables	Further Results/Comments
Caplow, Raymond (1954)	Cross-section	Descriptive	Yes	Direct mail, journal ads & articles, conventions, conferences, colleagues	Physicians' opinion	Physicians' opinion	182	Practice	-	Drugs adopted usually using more than one information source; relative importance of sources in inducing initial & continued drug usage different	-	1st mentioned: 31.1%, 2nd: 14.5%, 3rd: 11.9%; confidence in detailers as motivating drug prescription factor for .08%	-
Abratt, Lanteigne (2000)	Cross-section	Descriptive, rankings	Yes	Numerous variables	Physicians' opinion	Physicians' opinion	278	Practice	General practition-ers	1.28 (mean)	0-4	Marketing factors: 5/8; professional & marketing factors: 11/13	Homeopathic medicine
Pitt, Nel (1988)	Cross-section	Averages	Yes	Colleagues, conferences, ads, samples, direct mail	Physicians' opinion	Physicians' opinion	210	-	General practition-ers	3.2381 (mean)	1-5	3/7	No significant differences between sex & length of time in practice
Lurie et al. (1990)	Cross-section	Descriptive, logistic regression	No	-	Self-reported type & freq. of contacts with detailers	Self-reported change in behavior	240 faculty, 131 residents	Hospital	Internal medicine	Among faculty change in practice on brief conversations .016, extended conversations .036, & free meals .089; among faculty request for formulary addition on brief conversations .014, honorarium .178, & research support 1.02; among residents change in practice on brief conversations .049	-	-	-
Taylor, Bond (1991)	Cross-section	Descriptive	Yes	Several professional information sources, mailings/ ads	Physicians' opinion	Physicians' prescriptions	189	-	General practitioners	Major influence on change in prescribing habit for 20%	-	Professional & commercial factors: 2/12	Drugs most influenced by detailing: anti-infective preps. & non-steroidal anti-inflammatory agents
Swanson et al. (1994)	Cross-section	Descriptive	No	-	Physicians' opinions	Physicians'	31	-	Family physicians	87% feel detailers influence their prescription behavior; mean influence 3.50	10-point scale	-	100% of detailers feel they influence behavior of physicians; mean influence 6.01

TABLE 3 CONTINUED: PERCEPTUAL RESPONSE TO DETAILING

Paper	Type of Dataset	Type of Analysis	Other Marketing Variables Measured?	Which Other Marketing Variables Measured?	Detailing Operationalization	Dep. Variable Operationalization	Number of Physicians	Hospital or Practice?	Specialty?	Results	Scale for Calculations	Ranking Among All Considered Variables	Further Results/ Comments
Strang et al. (1996)	Cross-section	Descriptive	No	-	Given by survey	Proportion of physicians agreeing with a statement	262	-	General practitioners, specialists	Detailing affects prescribing: 2.32; 70% (strongly) agreed with this statement	1-5	-	Various questions concerning attitude toward drug-detailing process
Williams et al. (1995)	Cross-section	Descriptive	Yes	Meetings & conventions, articles, CME, pharmacists & pharmacologists, seminars	No. of visits	No. of prescriptions written	852	-	-	Correlation: .37	-	-	-
Bower, Burkett (1987)	Cross-section	Descriptive	Yes	Articles, advertising, colleagues	Physicians' opinion	Physicians'	317	-	Family physicians	Heavily (some or not at all) relying on detailers doctors prescribe mostly generic drugs: 11.8% (33.2%); heavily (some or not at all) relying on detailers doctors have confidence in generic drugs: 56.8% (64.3%)	-	-	Generic drug prescription
Chren, Landefeld (1994)	Cross-section	Nested case-control study	No	-	Physicians' opinion	Request that a drug is added to hospital formulary	105	Hospital	-	No difference in freq. of general interaction, but case physicians shared more expensive meals; significantly more likely to request formulary addition after meeting with specific detailer whether accepted money to attend symposia, speak at symposia, or perform research or not	-	-	81% met with detailers
Avorn et al. (1982)	Cross-section	Descriptive	Yes	Drug ads, patients' preference, scient. papers, colleagues, own training	Physicians' opinion	Physicians'	85	Practice	Internal medicine, general medicine	Detailers perceived as minimal/ moderate/very important source of influence by 54%/26%/20%	-	-	Measuring archival/perceptual bias
Roughead et al. (1998)	Cross-section	Descriptive	No	-	Visit's tape record	-	15	-	General practitioners	Reciprocation 100% of visits, social validation 41% of visits, commitment/consistency 39% of visits, authority 14% of visits	-	-	-

TABLE 4: DETAILING RESPONSE MODELS

Paper	Type of Dataset	Level	Whose Heterogeneity	Other Marketing Variables Measured?	Which Other Marketing Variables Measured?	Detailing Operationalization	Dep. Variable Operationalization	Data Pool Freq.	Model	Interaction Effects Estimated?	Specification	Estimation Method	Detailing Coefficient	Sig. Effect at p=.?
Parsons et al. (1981)	Panel	Aggregate	None	Yes	Sampling, direct mail, journal ads	No. of product calls reported by salespeople	Wholesale unit sales	Month	Sales	Yes	Double-log	OLS	-.148	.001
Cleary (1992)	Panel	Aggregate	-	Yes	Journal articles & ads	-	No. of new prescriptions/grams prescribed	Month	-	No	Descriptive	-	-	-
Leeflang et al. (1992)	Time series	Aggregate	None	Yes	Expenditure on magazine advertising, direct mail	Estimated expenditure based on time spent with practitioner	Market share	Month	Market share (geometric lag model)	No	Multinomial logit	-	.081	.01
Rizzo (1999)	Panel	Individual	Drugs'	Yes	Price	Expenditure	Annual dollar sales (nominal)/price of an initial dose of the drug (nominal)	Year	Category model	Yes	Log-linear (alternative model specifications)	OLS	.160 & .170	Insig.
Rizzo (1999)	Panel	Individual	Drugs'	Yes	Price	Cumulative expenditure	Annual dollar sales (nominal)/price of an initial dose of the drug (nominal)	Year	Category model	Yes	Log-linear (alternative model specifications)	OLS	Between .260 & .280	.01
Wosinska (2002)	Panel	Individual	Drugs'	Yes	DTCA	Expenditure	No. of new prescriptions	Month	Market share	Yes	Mixed logit	-	.185 & .152	.01
Manchanda, Chintagunta (2004)	Panel	Individual	Physicians'	Yes	Samples	No. of visits	Average no. of prescriptions	Quarter	No. of Prescriptions	Yes	Poisson	Bayesian estimation	.880	-
Manchanda, Rossi, Chintagunta (2004)	Panel	Individual	Physicians'	No	-	No. of visits	No. of prescriptions	Month	Negative binomial	No	-	Bayesian estimation	.190 in the short-run	-
Manchanda, Rossi, Chintagunta (2004)	Panel	Individual	Physicians'	No	-	No. of visits	No. of prescriptions	Month	Negative binomial	No	-	Bayesian estimation	-6.100 in the long-run	-
Iizuka, Jin (2003)	Panel	Individual	Drugs'	Yes	DTCA, journal, samples	Estimated expenditure based on time spent with practitioner	Market share	Month	Market share	Yes	Multinomial logit (log specification)	-	-.300	.01
Iizuka, Jin (2003)	Panel	Individual	Drugs'	Yes	DTCA, journal, samples	Estimated expenditure based on time spent with practitioner	Cumulative detailing expenditures estimated based on time spent with practitioner	Market share	Month	Market share	Yes	Multinomial logit (log specification)	-	1.165
Mizik, Jacobson (2003)	Panel	Individual	Physicians'	Yes	Samples	No. of visits	No. of new prescriptions	Month	Fixed effects distributed lag model	No	IV	OLS	Last 4-6 months sig, cumulative coefficient .129, .151 &	.001

TABLE 5: MARKETING MIX MODELS

Paper	Type of Dataset	Level	Whose Hetero-geneity	Other Marketing Variables Measured?	Which Other Marketing Variables Measured?	Detailing Operation-alization	Dep. Variable Operation-alization	Data Point Freq.	Model	Interaction effects estimated?	Specification	Estimation	Detailing Coefficient	Sig. Effect at p=?
Berndt et al. (1995)	Panel	Aggregate	None	Yes	DTCA, journal advertising, price	Relative cumulative detailing minutes to incumbent (allowing for spillovers)	No. of patient days of therapy	Month	Category model	No	Double-log (IV)	NL-2SLS	.553	.001
Berndt et al. (1995)	Panel	Aggregate	None	Yes	DTCA, journal advertising, price	Relative cumulative detailing minutes to incumbent (allowing for spillovers)	No. of patient days of therapy	Month	Market share	No	Double-log (IV)	NL-2SLS	.649	.001
Gonul et al. (2001)	Panel	Aggregate-		Yes	Samples, price	Discounted cumulative time	No. of prescriptions	-	Market share	Yes	Multinomial logit (linearized)	ML	.1085	.001
Wittink (2002)	Panel	Aggregate-		Yes	DTCA, journal advertising, meeting & events	Detailing expenditure	Estimated increase in revenue for $1 increase in independent variable	Month	Linear Regres-sion	No	-	OLS	~.1 (small brands), 1.2 -2.1 (medium brands), 3.1 -11.6 (large brands), all increasing with more recent launch date	-
Narayanan et al. (2004)	Panel	Individual	Brands	Yes	DTCA, price	Detailing expenditure	No. of prescriptions	Month	Categ-ory sales	Yes	Linear	IV	-.0093	Insig.
Narayanan et al. (2004)	Panel	Individual	Brands	Yes	DTCA, price	Detailing expenditure	No. of prescriptions	Month	Market share	Yes	Mixed logit	IV	.2853	.05

TABLE 6: PERCEPTUAL RESPONSE OVER PRODUCT LIFE CYCLE

Paper	Type of Dataset	Type of Analysis	Other Variables Measured?	Which Other Variables Measured?	Hospital or Practice?	Physician Specialty	Number of Physician	Results	Ranking Among All Considered Variables	Further Results/Comments
McCue et al. (1986)	Cross-section	Descriptive	Yes	Numerous variables	-	Internists, surgeons, & general practitioners	119	Accurate: 36%, accessible: 71.8%; accurate & accessible: 27.7%; frequently used: 45.5%	Accurate: 10/10; accessible: 5/10; accurate & accessible: 9/10; frequently used: 4/10	-
Stross (1987)	Cross-section	Descriptive	Yes	Formal/informal CME, journals, others	Hospital	Internists, family physicians	85	Detailers as most valuable information source on new treatment: 3%-35%; detailing as major information source for 80% (15%) of early (late) adopters	-	Detailers without influence on diagnostic tests
Peay, Peay (1988)	Cross-section	Descriptive, multi-variate	Yes	Various professional & commercial factors	Practice	General practitioners, specialists	124	40% (68.2%) of those aware of temazepam cited detailers (commercial sources) as source of first news; 37.1% (87.1%) received additional information from detailers (commercial sources); 42.6% (59.3%) of those prescribing viewed detailers (commercial sources) as most influential in first decision to prescribe	-	71% aware of temazepam, 47.6% had prescribed it; doctors with contact to detailers were earlier aware of the drug, more likely to rate it as moderate advance, more likely to prescribe it/prescribe it earlier, & routinely in preference of alternatives
Peay, Peay (1990)	Cross-section	Descriptive	Yes	Various professional & commercial factors	Hospital & community	Specialists	156	Target drug adoption: detailing source of first/most useful/most important information source for 5.0%/34.3%/2.3%	Mean usefulness rating: 12/15	Usual adoption procedure: detailing source of first/most useful/most important information source for 21.9%/14.7%/ 5.8%
Manning, Denson (1980)	Cross-section	Descriptive	Yes	Numerous variables	-	General internists	449	First knowledge: 4%; principles of drug usage: 7%; information update: 5%	First knowledge: 6/17; principles of drug usage: 6/17; information update: 7/17	Medical journals & CME as primary indicated sources of learning about cimetidine
Strickland-Hodge, Jeqson (1980)	Cross-section	Descriptive	Yes	Numerous variables	-	General practitioners	252	-	Awareness: 1/12; evaluation: 6/12	Single-practice doctors cite detailers more often than joint-practice doctors; industrial information cited more often by older, non-specialized, single-practice doctors with a first degree only, who did none of their dispensing
Christensen, Wertheimer (1979)	Cross-section	Descriptive	Yes	Numerous variables	HMO	Pediatrics, adult medicine practitioners	29	Drug A: first/second/third source of information: 4/6/2; Drug B: first/second/third source of information: 1/1/4; most important source in decision to prescribe Drug A/B 11/5	Most frequently used general information source: 11/11	-

TABLE 7: MARKET BEHAVIORAL RESPONSE OVER PRODUCT LIFE CYCLE

Paper	Type of Dataset	Level	Whose Heterogeneity	Other Marketing Variables Measured?	Which Other Marketing Variables Measured?	Detailing Operationalization	Dep. Variable Operationalization	Data Point Freq.	Model	Specification	Estimation	Detailing Coefficient	Sig Effect at p=?
Lilien et al. (1981)	Panel	Aggregate	None	Yes	Word-of-mouth among physicians, competitive detailing (assumed equal)	-	No. of prescribing doctors	Quarter	Repeat-purchase diffusion model	2-stage estimation	Bayesian estimation	-	-
Berndt et al. (2000)	Panel	Aggregate	None	Yes	Price	Cumulative detailing minutes	Real price per day of therapy	Month	Category sales	Linear & semi-log (saturation level)	GMM	-	.001
Berndt et al. (2000)	Panel	Aggregate	None	Yes	Price	Cumulative detailing minutes	Market share	Month	Market share	Multinomial logit (equilibrium shares), IV	SUR, 3SLS, GMM	Elasticities ~1.00	.001
Manchanda, Xie, Youn (2004)	Panel	Individual	Physicians'	Yes	Samples, contagion	No. of calls	Adoption	Month	Choice	Multinomial logit	Bayesian estimation	Positive	.01
Azoulay (2002)	Panel	Individual	Drugs'	Yes	Price, journal advertising	Cumulative detailing minutes	Total sales	Month	Market share	Multinomial logit	OLS, 2SLS, GMM	Between .582 & 1.081	.001
Narayanan, Manchanda, Chintagunta (2004)	Panel	Aggregate	Physicians'	Yes	Samples, price, DTCA, expenditure on meetings & events	Detailing expenditure	No. of new prescriptions	Month	Market share	Multinomial logit	Bayesian estimation	.0116	.01
Narayanan, Manchanda (2004)	Panel	Individual	Physicians'	Yes	Patient requests	No. of calls	Brand choice	Month	Choice	Multinomial logit	Bayesian estimation	Positive	.01