
OBVIATING THE OBVIOUS? AN APPRAISAL OF PHARMACEUTICAL PATENTS

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I. Introduction

Pharmaceutical research and development is a multi-billion dollar industry across the globe.¹ The United States, in particular, is the current world leader of the pharmaceutical market, having accounted for thirty-seven percent of the global market with \$286 billion in sales in 2008.² The United States represents this considerable portion of the market because it offers optimal conditions for facilitating pharmaceutical innovation with its economic environment, a free market capitalist system, and the economic incentives provided by its patent system.³ Because of these advantages coupled with the escalating demand for health care, the United States' pharmaceutical industry has experienced explosive growth over the past four decades.⁴ Ac-

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1. See THOMAS M. JACOBSEN ET AL., MODERN PHARMACEUTICAL INDUSTRY: A PRIMER 203 (2010) (stating the U.S. pharmaceutical industry aggregate for research and development is upwards of \$30 billion); see also Press Release, Piribo, Global Pharmaceutical Market will reach \$929 billion in 2012, says New Report, (Dec. 5, 2008) (on file with the author). Piribo's report, "Pharmaceutical Market Trends 2008 - 2012," states the global pharmaceutical market grew to \$712 billion (US) in 2007. *Id.*

2. See *Statistics 2009: The Pharmaceutical Industry in Germany* (vfa, German Association of Research-based Pharmaceutical Companies, Berlin, Germany), July 2009, at 39 [hereinafter *Statistics 2009*]. For the purposes of this note, all monetary values are expressed in terms of the United States dollar (USD) unless otherwise specified.

3. See U.S. CONST. art. I, § 8, cl. 8. "To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writing and discoveries..." *Id.*

4. See MADHU AGRAWAL, GLOBAL COMPETITIVENESS IN THE PHARMACEUTICAL

cordingly, patents and the exclusive rights they secure are pivotal to the success of any pharmaceutical company.⁵

This note addresses the extent of the market for pharmaceutical research and development in the United States and how pharmaceutical companies have evolved to meet this demand. It also explains the notable relationship that has developed between the major pharmaceutical companies, collectively known as “Big Pharma,”⁶ including, but not limited to, major corporations such as Pfizer Inc., Johnson & Johnson, and Bristol-Myers Squibb, and their generic drug manufacturing competitors, like Mylan Inc., Teva Pharmaceutical Industries Ltd. (Teva), and Sandoz.⁷ Consequently, this note will explore whether the emergence of this relationship has become a critical factor in the future of the pharmaceutical patent system, to the extent that it has the capacity to effectuate the evolution of the field through the continued innovative, legal, and economic presence of the pharmaceutical industry, or alternatively, to the extent it can effectuate the deterioration of the same.⁸

INDUSTRY: THE EFFECT OF NATIONAL REGULATORY, ECONOMIC, AND MARKET FACTORS ix (1999); STUART O. SCHWEITZER, PHARMACEUTICAL ECONOMICS AND POLICY 6 (2d ed. 2007). “The Office of Technology Assessment (OTA) of Congress reported that R&D spending by U.S. pharmaceutical companies was between \$5.7 billion and \$6.6 billion in 1990, having grown at an annual rate of between 7.6% and 9.4% per year since 1976 (U.S. Congress, OTA 1993).” *Id.*

5. See JACOBSEN ET AL., *supra* note 1, at 203. Intellectual property systems across the globe provide incentives to the pharmaceutical industry for vigorous R&D by offering the means for protecting such developments. *Id.*

6. See Michael Rosen, *Top 20 Big Pharmas Represent Majority of World Pharma Market*, WTN NEWS, June 13, 2005, archived at <http://www.webcitation.org/5owEr9xhu/>.

7. See *FDA Listing of Authorized Generics as of 01/22/2010* (2010), <http://www.fda.gov/downloads/AboutFDA/CentersOffices/CDER/UCM183605.pdf>. For basic corporate information and facts, see generally About Pfizer, <http://www.pfizer.com/about/>, About Johnson & Johnson, <http://www.jnj.com/connect/about-jnj/?flash=true> (providing general facts about the company); Bristol-Myers Squibb: Our Company, <http://www.bms.com/ourcompany/Pages/home.aspx> (presenting basic information about BMS mission); Mylan: About Us, http://www.mylan.com/about_us/ (introducing function and purpose of company); Teva—Company Overview, <http://www.tevapharm.com/about/> (discussing overview of company profile); and Introduction—About Sandoz, http://www.sandoz.com/site/en/about_sandoz/index.shtml (expressing basic information about company as a generics producer).

8. See Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 505-06 (2009) (discussing the value of pharmaceuti-

While the U.S. economy and patent system are indeed conducive to pharmaceutical business, it is ultimately the competition between businesses that drives the markets forward.⁹ This rivalry is necessary to regulate the market and keep costs to consumers reasonable while simultaneously promoting further innovation and discovery.¹⁰ In the interest of market regulation, specifically the creation of alternatives to costly pharmaceuticals, Congress addressed the competing interests between Big Pharma and its generic manufacturing competitors through the creation of the Drug Price Competition and Patent Term Restoration Act of 1984, more commonly known as the Hatch-Waxman Act.¹¹ This note discusses the Hatch-Waxman Act in more detail in part II-C *infra* and uses it as a supplement to assess the extent to which Big Pharma and their intellectual property have been subsequently weakened or strengthened in light of the recent decisions of the Supreme Court and the Court of Appeals for the Federal Circuit.

The Supreme Court's ruling in *KSR International v. Teleflex Inc.* is particularly relevant to the future state of pharmaceutical patents within the United States.¹² The Court's decision arguably refocused the way obviousness is scrutinized in patent litigation, imposing a heightened standard of review.¹³ The case is especially important for assessing the current valuation of pharmaceutical patents because, as this note will explore, the refocusing of obviousness may make pharmaceutical patents more vulnerable to invalidation.¹⁴ Special attention is paid to cases arising be-

cal patents compared with the development of generics). For a discussion of the potential impact of favorable policy for generic pharmaceuticals, *see generally* Wendy H. Schacht & John R. Thomas, *Patent Law and Its Application to the Pharmaceutical Industry: An Examination of the Drug Price Competition and Patent Term Restoration Act of 1984 ("The Hatch-Waxman Act")*, Congressional Research Service Report for Congress, Jan. 10, 2005.

9. *See* Schacht & Thomas, *supra* note 8, at 31.

10. *See* Schacht & Thomas, *supra* note 8, at 31-32.

11. Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585 (1984) (codified as amended 21 U.S.C. §355 (2006)).

12. 550 U.S. 398 (2007).

13. *See* Esther H. Steinhauer, *Pharmaceutical Patents After KSR: Withstanding the Obviousness Challenge*, FDLI UPDATE, (Food & Drug Law Inst., Wash., D.C.), September/October 2007, 39, at 39, *archived at* <http://www.webcitation.org/5owEwqMQT>.

14. *Id.*

tween Big Pharma and their generic counterparts to illustrate this proposition and to investigate whether the *KSR* obviousness inquiry has given generic manufacturers a newfound confidence in contesting issued patents.

To investigate whether these highly lucrative pharmaceutical patents may be more vulnerable to attack following the Supreme Court's decision in *KSR*, this note evaluates three material cases: *Takeda Chemical Industries v. Alphapharm Pty.*,¹⁵ *Ortho-McNeil Pharmaceutical Inc. v. Mylan Laboratories*,¹⁶ and *Eisai Co. v. Dr. Reddy's Laboratories*.¹⁷ These cases were selected on the basis that each is illustrative of stereotypical patent disputes that arise between the principal pharmaceutical companies and their generic drug competitors. Typically, litigation involving pharmaceutical technology of this order is premised on an allegation of either the infringement or invalidity of a given patent, if not both, directly attributable to the origin of the moving party.¹⁸ Such cases further incorporate the formulaic defenses parties systematically apply to assert their respective positions as noninfringers or to reinforce patent validity.¹⁹

Finally, this note will address the strategies generic drug manufacturers employ in challenging their competitor's patents. This leads to the discussion of how generics defeat an issued patent through challenges to validity and inequitable conduct, although inequitable conduct is generally only available in the most extreme cases.²⁰ Because inequitable conduct is a unique defense to patent infringement, this note will assess the quality of the defense in the cases presented, and the courts' application to the ex-

15. 492 F.3d 1350 (Fed. Cir. 2007).

16. 520 F.3d 1358 (Fed. Cir. 2008).

17. 533 F.3d 1353 (Fed. Cir. 2008).

18. See, e.g., *Takeda*, 492 F.3d 1350; *Ortho-McNeil*, 520 F.3d 1358; *Eisai*, 533 F.3d 1353.

19. See generally CRAIG NARD, *THE LAW OF PATENTS*, 591-785 (2008) (discussing the general types of defenses to patent infringement).

20. See *Id.*, at 718. See also Posting of Kevin E. Noonan to Patent Docs, http://www.patentdocs.net/patent_docs/inequitable_conduct/ (Aug. 26, 2008, 11:55 PM).

tent there may be a need to reiterate a clarified standard for inequitable conduct.²¹

II. The Pharmaceutical Industry

A. Growth and Value of the Market

The global pharmaceutical market has grown at an exceptional pace since the mid-twentieth century, supported by the ever increasing demand for health care.²² For example, the United States, a repeat market leader, reported growth for expenditures on prescribed drugs at annual rates of 7.5% and 8.2% in 1970 and 1980, respectively, to increased rates between 10% and 20% in the late 1990s.²³ Recent sales data shows that the global pharmaceutical market grew to \$773 billion in 2008, based on figures reported by Verband Forschender Arzneimittelhersteller ("vfa"), a trade association representing research-based pharmaceutical companies in Germany.²⁴ Individually, the U.S. accounted approximately thirty-seven percent of the entire global market with \$286 billion in sales for 2008.²⁵ Meanwhile, market research indicates that global pharmaceutical sales are expected to rise.²⁶ IMS Health, a leading provider of pharmaceutical mar-

21. See *Aventis v. Amphastar*, 525 F.3d 1334, 1350 (Fed. Cir. 2008) (Rader, J. dissenting) (stating how recently the court has emphasized materiality almost to the exclusion of any analysis of the intent requirement).

22. See AGRAWAL, *supra* note 4. "World consumption doubled between 1975 and 1990, with the world's per capita consumption of drugs increasing almost seventy percent in the same years." *Id.*

23. See SCHWEITZER, *supra* note 4, at 5.

24. See *Statistics 2009*, *supra* note 2, at 39. The report provides a comprehensive analysis of the global pharmaceutical market and associated trends for the years 2000 through 2008. The Pharmaceutical Industry in Germany, *Statistics 2009*, available at <http://www.vfa.de/download/SHOW/en/vfa-en/publikationen-en/e-statistics/e-statistics-2009.pdf>, archived at <http://www.webcitation.org/5ppM7gLM3>.

25. See *Statistics 2009*, *supra* note 2, at 39.

26. See, e.g. Press Release, Piribo, Global Pharmaceutical Market will reach \$929 billion in 2012, says New Report, (Dec. 5, 2008) (on file with the author); Press Release, IMS Health, IMS Health Forecasts 4.5 – 5.5 Percent Growth for Global Pharmaceutical Market in 2009, Exceeding \$820 billion, (Oct. 29, 2008) (on file with the author) (projecting \$162–172 billion in sales for 2009 from the top five European Union countries, including France, Germany, Italy, Spain, and the United Kingdom, while another \$84–88 billion is expected from Japan).

ket intelligence, stated in its latest market projections that it expects the global pharmaceutical market to exceed \$825 billion in sales in 2010.²⁷ Its forecasts further predict that the global pharmaceutical market value will expand upwards of \$1 trillion by 2013.²⁸

The pharmaceutical industry functions as profitably as it does in the United States because of the combination of two controlling factors—the demand for innovation and favorable intellectual property laws, specifically patent law.²⁹ The pharmaceutical industry thrives as a result of constant innovation.³⁰ In fact, innovation is so essential to the industry that noticeable amounts of sales profits are typically reinvested in companies to further new drug development.³¹ The drug development process re-

27. See Press Release, IMS Health, IMS Forecasts Global Pharmaceutical Market Growth of 4-6% in 2010; Predicts 4-7% Expansion Through 2013 (Oct. 7, 2009), archived at <http://www.webcitation.org/5owFBpHXW>. Operating in more than 100 countries, IMS Health is the world's leading provider of market intelligence to the pharmaceutical and healthcare industries." *Id.*

28. The global pharmaceutical market is expected to expand to at least \$975 billion by 2013. *Id.* All pharmerging countries are expected to experience an aggregate growth of 12-14% in 2010, and 13-16% over the next five years, while China's pharmaceutical market is expected to increase by at least 20% annually, contributing 21% of the overall global growth through 2013. *Id.*

29. See U.S. CONST. art. I, § 8, cl. 8. "A patent is a limited monopoly to a particular invention, and as a legal monopoly, it is therefore a very valuable form of property." JACOBSEN ET AL., *supra* note 1, at 203.

30. The extent to which there has been extensive growth in the pharmaceutical industry in the United States is further evidenced in part by the number of patents that have been granted each year for pharmaceutical inventions. See United States Patent and Trademark Office, Patent Statistics Reports Available For Viewing Statistics By Calendar Year, January 1 to December 31: Count of 1969 – 2007 Utility Patent Grants, By Calendar Year of Grant, With Patent Counts Based on Primary Patent Classification: Class 424, Drug, Bio-Affecting and Body Treating Compositions (includes Class 514), [uspto.gov](http://www.uspto.gov), June 13, 2008, archived at <http://www.webcitation.org/5owFlolZ0>. *Id.* The USPTO's statistics for patents granted show a steady influx in the number of patents granted each year involving pharmaceuticals. See generally United States Patent and Trademark website, archived at <http://www.webcitation.org/5owFMo7V8>. See also Aaron S. Kesselheim, *Intellectual Property Policy in the Pharmaceutical Sciences: The Effect of Inappropriate Patents and Market Exclusivity Extensions on the Health Care System*, THE AAPS JOURNAL, Aug. 3, 2007, E307, <http://www.aapsj.org/view.asp?art=aapsj0903033>, (refer to Figure 1: number of new drug-related patents granted that the USPTO designated as falling within class of inventions known as "drug, bio-affecting, or body-treating compositions.").

31. See Press Release, PhRMA, R&D Spending by U.S. Biopharmaceutical

quires a considerable time investment to get a new drug on the market.³² Consequently, patent law provides the financial motivation to continue discovery in the art and make the industry profitable.³³ Patents play a crucial role in the pharmaceutical, chemical and biotechnological arts because the value of the patent is essentially the equivalent of the value of the product released on the market.³⁴ Because of this unusual relationship, intellectual property protection is paramount to a successful pharmaceutical company.

B. Generic Manufacturers

Coupled with the ever-increasing demand for innovation in the health care sector and favorable laws implemented by Congress in the latter half of the twentieth century, the market for generic pharmaceuticals, more simply acknowledged as generics, has unsurprisingly morphed into an undeniable presence in an

Companies Reaches Record \$58.8 Billion in 2007, (Mar. 24, 2008) (on file with the author). PhRMA also reports that during the past seven years (2001-2007) American pharmaceutical research companies have consistently invested around 18% of sales on R&D activities. *Id.* PhRMA is an industry trade group representing the leading pharmaceutical companies in the US. *Id.* See also Press Release, PhRMA, R&D Spending by U.S. Biopharmaceutical Companies Reaches Record Levels in 2008 Despite Economic Challenges, (Mar. 10, 2009) (on file with the author) (reporting that America's pharmaceutical research companies invested a record \$65.2 billion in R&D last year).

32. See *The Pharmaceutical Industry in Figures: Key Data 2009 Update*, (European Fed'n of Pharm. Indus. & Ass'ns, Brussels, Belg.), 2009, at 6, available at <http://www.efpia.eu/content/default.asp?PageID=559&DocID=4883>, archived at <http://www.webcitation.org/5ppMHZfeZ>. This report, provides a graphical depiction of the phases of the research and development process for a new pharmaceutical in the European Union. *Id.* See also Gerald J. Mossinghoff, *Overview of the Hatch-Waxman Act and Its Impact on the Drug Development Process*, 54 FOOD & DRUG L.J. 187, 193 (1999) (providing graphical depiction of drug development timeline in the United States).

33. See PHARMACEUTICAL INNOVATION: INCENTIVES, COMPETITION, AND COST-BENEFIT ANALYSIS IN INTERNATIONAL PERSPECTIVE 4 (Frank A. Sloan & Chee-Ruey Hsieh eds., 2007). Pharmaceutical R&D is a lengthy and costly process, where the consensus for introducing a new drug on the market averages in the hundreds of millions of dollars at cost. *Id.* In most countries, patents are available to confer market power on new products, whose monopoly profits provide the cash flow to cover and generate a return on the substantial investment firms place into R&D. *Id.*

34. Bruce Lehman, President, International Intellectual Property Institute, *The Pharmaceutical Industry and the Patent System*, at 2 (2003), <http://www.earthinstitute.columbia.edu/cgsd/documents/lehman.pdf>.

industry pioneered by Big Pharma. Following the implementation of the Drug Price Competition and Patent Term Restoration Act of 1984, more affectionately referred to as the Hatch-Waxman Act in homage to its advocates, the industry saw annual revenues on the order of \$1 billion skyrocket to nearly \$63 billion in revenue today.³⁵ According to IMS Health, the generics industry is expected to continue to expand at a rate of 7.8%, making it faster than the world's market for pharmaceuticals.³⁶

C. Market Competition and the Hatch-Waxman Act

The major pharmaceutical companies that have come to be known as "Big Pharma" operate successful businesses, in part, as a result of the exclusive rights they secure through patents on the compounds and new molecular entities (NMEs) they develop.³⁷ Without the right to exclude others from practicing their pharmaceutical technology, companies like Pfizer and Bristol-Myers Squibb would have difficulty recouping their development investments while competing with the therapeutically equivalent but more cost-effective generics on the market.³⁸ Due to the societal implications of the technology involved in the pharmaceutical industry, Congress saw a need to create a balance between the protection of Big Pharma's investment and public policy interests.³⁹ Congress elected to balance these competing interests by enacting the Drug Price Competition and Patent Term Restoration Act of 1984 ("Hatch-Waxman Act").⁴⁰

The Hatch-Waxman Act gives generic drug manufacturers additional latitude, as market competitors, which they would not

35. Themedica, *The U.S. Generic Drugs Industry Overview*, Apr. 6, 2009, <http://www.themedica.com/articles/2009/04/the-us-generic-drugs-industry.html>.

36. *Id.*

37. *See* Rosen, *supra* note 6.

38. *See* Lehman, *supra* note 34, at 8; U.S. CONST. art. I, § 8, cl. 8.

39. *See* Kevin J. Kraushaar, *Market Exclusivity after a Prescription to Nonprescription Drug Switch: Striking the Right Balance Between Innovation and Competition*, 54 *FOOD & DRUG L.J.* 243, 243-44 (1999).

40. Drug Price Competition and Patent Term Restoration Act of 1984, Pub. L. No. 98-417, 98 Stat. 1585 (1984) (codified as amended 21 U.S.C. §355 (2006)).

be afforded in other industries.⁴¹ Congress decided that the underlying public policy issue of introducing a more cost effective alternative on the market to regulate pricing warranted a legal bending of the rules to encourage generic drug production.⁴² The Act allows a generic manufacturer to file an abbreviated new drug application (ANDA) while the term of the patent for that pharmaceutical is still active.⁴³ This filing is particularly advantageous to generic manufacturers because it often allows for a significant reduction in the amount of time it takes to place the generic on the market.⁴⁴ Production time for the generic is also reduced as the actual manufacturing processes are typically easy to replicate once a patent has been disclosed.⁴⁵ With a properly filed ANDA, generic versions of the patented pharmaceutical are frequently introduced into the market the moment the patent term expires.⁴⁶

Essentially, the Hatch-Waxman Act makes it legal for generic drug manufacturers to practice what would typically qualify as constructive infringement of a patent without the legal ramifications.⁴⁷ However, the Act does not entirely insulate generic manufacturers against infringement claims; they may still be liable for actual infringement.⁴⁸ Under the Act, there are four phases in which a generic drug manufacturer may file to receive pro-

41. See Gerald J. Mossinghoff, *Overview of the Hatch-Waxman Act and Its Impact on the Drug Development Process*, 54 FOOD & DRUG L.J. 187, 189-91 (1999).

42. See Schacht & Thomas, *supra* note 8, at 20-23.

43. See Schacht & Thomas, *supra* note 8, at 23. An ANDA may be filed if the active ingredient of the generic drug is the bioequivalent of the approved drug. *Id.* An ANDA allows a generic drug manufacturer to rely upon the safety and efficacy data of the original manufacturer. *Id.*

44. See Schacht & Thomas, *supra* note 8, at 23. The availability of an ANDA often allows a generic manufacturer to avoid delays associated with filing a full-fledged NDA. *Id.*

45. See Lehman, *supra* note 34, at 2.

46. See Schacht & Thomas, *supra* note 8, at 23.

47. See Mossinghoff, *supra* note 32, at 190. A constructive infringement is a fictional infringement, which in effect states that filing an ANDA (with a paragraph IV certification) that the patent is either invalid or not infringed amounts to a patent infringement. *Id.* See 35 U.S.C. § 271(e)(2) (2006).

48. See Mossinghoff, *supra* note 32, at 190. All of the other provisions of Title 35 and Title 28 of the United States Code are applicable, and a patent holder can file a regular infringement action against the generic company in a federal district court. *Id.*

tection from constructive infringement.⁴⁹ The level of infringement incrementally increases by each phase, with the last phase, a Paragraph IV certification, being the most dangerous to an issued patent.⁵⁰ Paragraph IV certification allows a generic manufacturer to assert noninfringement or invalidity against a patent holder immediately upon filing.⁵¹ The patent holder then has twenty days after it receives notice of the Paragraph IV certification to respond to the filing.⁵² It is often the case that the patent owner will then file an infringement suit against its competitor.⁵³

III. A Litigious Basis

Based on the sizeable investments expended toward their development and subsequent value in the marketplace, pharmaceutical patents are frequently the subject of litigation.⁵⁴ An is-

49. 21 U.S.C. § 355 (2006).

50. David Bickart & Kaye Scholer, Practising Law Institute (PLI) Treatise Pharmaceutical and Biotech Patent Law, The Hatch-Waxman Act, § 8:1.3, at 229-30 (2008). An ANDA applicant must include one of four certifications regarding the patent status of the referenced brand-name drug, also referred to as the pioneer drug. For each patent listed, the applicant must certify that “in [its] opinion . . . and to the best of [its] knowledge”: patent information has not been submitted for listing in the FDA publication *Approved Drug Product with Therapeutic Equivalence Evaluations*, commonly called the “Orange Book” (a “paragraph I certification”); the patent has expired (a “paragraph II certification”); the patent will expire on a given date (a “paragraph III certification”); or the patent is invalid or not infringed by the manufacture, use, or sale of the new drug for which the ANDA is submitted” (a “paragraph IV certification”). *Id.*

51. See Mossinghoff, *supra* note 32, at 190; see also Schacht & Thomas, *supra* note 8, at 27.

52. See Bickart & Scholer, *supra* note 50, at 231. Notice of a paragraph IV certification must be mailed to the patent holder within twenty days after the FDA has confirmed it has accepted the ANDA for filing. *Id.*

53. See Bickart & Scholer, *supra* note 50, § 8:1.4, at 232. The holder of a valid patent (typically the pharmaceutical company) can sue on account of constructive infringement. Technical infringement occurs when the FDA receives the ANDA application (either by hard-copy, or more typically, by electronic submission). Submission of an ANDA is not a public act so the FDA is barred from disclosing its existence until the application is ready for approval. Thus, the patent owner is not likely to become aware of the ANDA submission, the act of infringement, unless the applicant notifies it; the applicant is required to provide such notice if its ANDA contains a so-called “paragraph IV” certification. *Id.*

54. See generally John R. Thomas, *Pharmaceutical Patent Litigation Settlements: Implications for Competition and Innovation*, Congressional Research Service Report for Congress, Nov. 3, 2006.

sued patent can easily become the epicenter of a legal battle between drug manufacturers by virtue of its status as the most valuable component of the drug development process, because it is this exclusive property right, and figurative security blanket, which allows its owner the ability to exclude others from practicing the protected subject matter of the patent.⁵⁵ As a result, many of the pharmaceutical patent cases are initiated by the patentee or an assignee asserting either actual or constructive infringement.⁵⁶

However, pharmaceutical patent holders do not exclusively possess the right to commence litigation procedures concerning their exclusive property grants. Alternatively, many market competitors seek to challenge the validity of an issued patent while attempting to eradicate an owner's exclusive right to practice its covered subject matter. As previously mentioned, the Hatch-Waxman Act provides challengers of pharmaceutical patents with more leniency than was the case prior to 1984 in light of public policy concerns.⁵⁷ Consequently, the increase in volume of litigation suits concerning pharmaceutical patents indicates that generic drug manufacturers may have become more confident when challenging the validity of their competitors' patents.⁵⁸

Following the initiation of an infringement action, the defendants may argue any applicable defense, ranging from patent invalidity to inequitable conduct. In pharmaceutical patent infringement cases, the defendants almost always argue that no infringement occurred (noninfringement of the patent) and counterclaim that even if infringement occurred, there is no liability because the patent in question is invalid.⁵⁹ For the most part, in-

55. U.S. CONST. art. I, § 8, cl. 8. "To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writing and discoveries..." *Id.*

56. See Mossinghoff, *supra* note 32, at 190.

57. See Schacht & Thomas, *supra* note 8, at 20-23.

58. See, e.g., Gilead Sciences files patent infringement lawsuit against Teva, World Generic Markets, Jan. 23, 2009.

59. 21 U.S.C. § 355(j)(2)(A)(vii)(IV) (2006). Although the statute refers only to invalidity and noninfringement, FDA regulations provide for a paragraph IV certification of unenforceability as well. 21 C.F.R. § 314.94(a)(12)(i)(A)(4)

fringement disputes are relatively straightforward, unlike those concerning the validity of a patent.

A. Invalidity

Although issued patents are given the presumption of validity, they are not immune from invalidation. Determining the validity of a patent is complex, because it can be proven through a variety of methods.⁶⁰ Invalidation can result from a variety of reasons including but not limited to the failure to meet statutory requirements for patentability, such as lack of novelty and obviousness.⁶¹ However, in light of the current case law, this note's focus is intentionally directed to invalidation by means of obviousness. The focus is purposefully limited because of the Supreme Court's decision in *KSR International v. Teleflex Inc.*, which involved a reassessment of the way obviousness is scrutinized in patent litigation.⁶² *KSR*'s importance as precedent with respect to pharmaceutical patents is rooted in its discussion of the obviousness analysis, which is addressed shortly hereafter.⁶³

B. Inequitable Conduct

In addition to being invalidated for content-based issues, such as lack of novelty or obviousness, patents can lose the rights they secure by being deemed unenforceable for inequitable conduct. Inequitable conduct is an atypical defense used in patent infringement cases to address unacceptable behavior occurring during the patenting process.⁶⁴ It is reserved strictly for cases in

(2006). See NARD, *supra* note 19, at 710.

60. Invalidity can occur as a result of a violation of any applicable subject matter under Title 35 of the United States Code, including 35 U.S.C. § 101 (2006) (statutory subject matter), 35 U.S.C. § 102 (2006) (novelty), and 35 U.S.C. § 103 (2006) (obviousness).

61. See generally SUNG & SCHWARTZ, PATENT LAW HANDBOOK, § 3 Infringement Defenses and Counterclaims – Invalidity (Thomson Reuters/West 2008) (discussing the elements of statutory requirements to patentability as relevant to invalidity assessments).

62. 550 U.S. 398 (2007).

63. See Steinhauer, *supra* note 13, at 39.

64. See *Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 872 (Fed. Cir. 1988) (stating the standard for a showing of inequitable conduct). "A party seeking to have a patent declared unenforceable has a heavy burden

which the defendant alleges that the patentee acted in a deceptive manner with respect to obtaining its patent.⁶⁵ A finding of inequitable conduct requires the satisfaction of two elements: the misrepresentation or omission of a material fact and intent to deceive the Patent Office.⁶⁶ Further, any party seeking to have a patent declared unenforceable by inequitable conduct must meet the heightened standard of clear and convincing evidence for both prongs of the test because it is such a harsh bar to patent protection.⁶⁷ Some examples of inequitable conduct include failure to disclose material information⁶⁸, misleading the patent examiner (PTO)⁶⁹, and submitting false material information.⁷⁰

Inequitable conduct may be imposed when there is sufficient evidence to support its existence regarding any element of an issued patent. Its result is the unenforceability of the *entire* patent.⁷¹ This denotes a clear difference between patent invalidation and patent unenforceability. In particular, the distinction relates to the extent which the claims of a patent are affected.

to meet. Inequitable conduct requires misrepresentation or omission of a material fact, together with an intent to deceive the PTO. Both of those distinct elements must be shown by clear and convincing evidence." *Id.*

65. *Id.*

66. *Id.* Prior to 1992, information was defined as being material "where there was a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent." *Eli Lilly & Co. v. Zenith Goldline Pharm., Inc.*, 364 F. Supp.2d 820 (S.D. Ind. 2005) (quoting 37 C.F.R. § 1.56 (1990)). The revised rule provides that information is material to patentability only when it is "not cumulative to information already of record or being made of record in the application" and either "establishes ... a *prima facie* case of unpatentability of a claim" or "refutes, or is inconsistent with a position the applicant takes." 37 C.F.R. § 1.56(b) (1992).

67. *Kingsdown*, 863 F.2d at 874. "When inequitable conduct occurs in relation to one claim the *entire* patent is unenforceable." (emphasis added) *Id.*

68. *See, e.g., Aventis Pharma S.A. v. Amphastar Pharm., Inc.*, 525 F.3d 1334 (Fed. Cir. 2008) (holding the applicant's failure to disclose dosage information evidenced intent to deceive examiner).

69. *See, e.g., Merck & Co., Inc. v. Danbury Pharmacal, Inc.*, 873 F.2d 1418 (Fed. Cir. 1989) (method patent for using drug as muscle relaxant unenforceable for misrepresenting drug was free of side effects ordinarily associated with nervous system depressants).

70. *See, e.g., Pharmacia Corp. v. Par Pharm., Inc.*, 417 F.3d 1369 (Fed. Cir. 2005) (holding glaucoma patent unenforceable based on patent applicant's submission of inaccurate and misleading declaration to overcome obviousness objection).

71. *Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 874 (Fed. Cir. 1988)

For a patent rendered unenforceable, no claims remain enforceable regardless of validity, whereas invalidation may only apply to select claims, leaving the others valid and enforceable.⁷² Therefore, inequitable conduct is not a defense to be taken lightly. Recently, there appears to be the start of a rift among federal judges on what the exact standard is for finding a patent unenforceable based on inequitable conduct. This note addresses these diverging views on inequitable conduct in light of the current precedent.⁷³

IV. Obvious In So Many Ways

A. The Obviousness Inquiry

The main question this note presents is whether pharmaceutical patents are more vulnerable to invalidation as a direct response to recent court decisions, particularly in line with cases similar to the *KSR* decision. Examination of this question, therefore, must begin with an understanding of the concept of obviousness. The standard for obviousness is set forth in 35 U.S.C. §103(a) nonobvious subject matter, which states:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.⁷⁴

72. *Id.*

73. See Dennis Crouch, Obviousness of Chemical Compounds; Split over Inequitable Conduct, Patently-O Blog, <http://www.patentlyo.com/patent/2008/07/obviousness-of.html> (July 28, 2008, 15:01 PM). See also Dennis Crouch, Inequitable Conduct: Failure to Submit Full Experimental Details, Patently-O Blog, <http://www.patentlyo.com/patent/2008/05/inequitable-con.html>, (May 19, 2008 15:27 PM).

74. 35 U.S.C. § 103(a) (2006).

Obviousness is ultimately a legal question based on underlying factual determinations.⁷⁵ These factual determinations, or “Graham factors”, originally outlined in *Graham v. John Deere Co.*, include the following: (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the difference between the claimed invention and the prior art, and (4) evidence of secondary factors.⁷⁶ While the Graham factors operate as a starting point for an obviousness inquiry, they alone are not always determinative.

Examples of secondary considerations, such as commercial success, long felt but unresolved needs, and the failure of others, are often evaluated in determining whether a patent is obvious or nonobvious.⁷⁷ Additionally, in the chemical and pharmaceutical arts, the occurrence of unexpected results is relevant to the obviousness inquiry.⁷⁸ This is true because it is not uncommon for a compound having structural similarities to another, its homolog, to react differently than expected.⁷⁹ Even though they alone are not *prima facie* evidence of nonobviousness, unexpected results can be used to rebut a case of *prima facie* obviousness.⁸⁰

Many inventions are the result of combinations of previously known elements.⁸¹ Often, -the combination of known

75. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (infringement suit involving mechanical device designed to absorb shock from plow shanks).

76. *Id.* The secondary factors referred to in part four of the analysis are also commonly known as objective indicia of nonobviousness.

77. *Id.* at 17-18.

78. *In re Peterson*, 315 F.3d 1325, 1331 (Fed. Cir. 2003). An applicant may overcome *prima facie* obviousness by showing that the claimed range achieves unexpected results relative to the prior art range. *Id.* See, e.g., *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1369 (Fed. Cir. 2007) (finding that amlodipine besylate clearly and unexpectedly illustrates a superior combination of properties as compared to amlodipine maleate).

79. *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356 (Fed. Cir. 2007).

80. *Id.* at 1354.

81. *KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007). “Inventions usually rely upon building blocks long since uncovered, and claimed discoveries almost necessarily will be combinations of what, in some sense, is already known.” *Id.*

elements can be considered obvious, and further inquiry of the prior art is required.⁸² Consequently, the court established the teaching, suggestion, or motivation (TSM) test to address these obviousness ambiguities and prevent a hindsight bias.⁸³ The TSM test requires a showing of some teaching, suggestion, or reason [motivation] to combine the prior art references. A patent claim is only proven obvious when the prior art, the nature of the problem, or the knowledge of a person of ordinary skill in the art reveals some motivation to combine the prior art teachings.⁸⁴ Although the TSM test was devised to promote consistency and uniformity in obviousness determinations, it has been the subject of much criticism for being applied too rigidly.⁸⁵ Consequently, the Supreme Court used the *KSR* case as an opportunity to refocus the standard under which the TSM test is applied to obviousness inquiries.⁸⁶

B. The *KSR* Hurdle

On April 30, 2007, the Supreme Court decided the highly anticipated case of *KSR International Co. v. Teleflex Inc.*⁸⁷ In *KSR*, the Court addressed the Federal Circuit's rigid application of the TSM test for determining obviousness.⁸⁸ The Court held that the

82. *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1348 (Fed. Cir. 2000) (noting that the dispute focuses on the combinability of the prior art). *See also* *Gambro Lundia AB v. Baxter Healthcare Corp.*, 110 F.3d 1573, 1579 (Fed. Cir. 1997) (discussing how Baxter's obviousness argument is deficient without a teaching or suggestion to combine the prior art elements).

83. *In re Kahn*, 441 F.3d 977, 986 (C.A. Fed. Cir. 2006). The teaching, suggestion, motivation requirement protects against the entry of hindsight into the obviousness analysis. *See also* *Ortho-McNeil Pharm. Inc., v. Mylan Labs.*, 520 F.3d 1358, 1364 (Fed. Cir. 2008) (stating a flexible TSM tests remains the primary guarantor against a non-statutory hindsight analysis).

84. *See* *SUNG & SCHWARTZ*, *supra* note 61, at § 3. "A claim can be obvious even where all of the claimed features are not found in specific prior art references, where there is a showing of a suggestion or motivation to modify the teachings of the prior art to the claimed invention." *See KSR*, 550 U.S. at 399-400.

85. *SUNG & SCHWARTZ*, *supra* note 61, at § 3:17. Before *KSR*, the district court endorsed a "rigorous application" of the TSM test. *Id.*

86. *SUNG & SCHWARTZ*, *supra* note 61, at § 3:17.

87. 550 U.S. 398 (involving infringement action brought by exclusive licensee of a patent for a position-adjustable wheel pedal assembly against its competitor).

88. *Id.* at 399-400. The Federal Circuit has employed a "teaching, suggestion, or motivation, or TSM test, under which a patent claim is only proved ob-

Federal Circuit's application of the TSM test to the facts in *KSR* was inconsistent with existing precedent on obviousness.⁸⁹ While the TSM test often provides helpful insight, the Court reasoned that an affirmative finding of obviousness based on the TSM test alone is not necessarily conclusive, because when applied too rigidly, the test is blind to other factors that may promote nonobviousness.⁹⁰

The Court held that the Federal Circuit erred in three ways.⁹¹ First, the Federal Circuit erred by holding that courts and examiners should only look at the problem the patentee was trying to solve.⁹² Second, the court erred in assuming that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem.⁹³ Third, the court erred in concluding that a patent claim cannot be proven obvious merely by showing that the combination of elements was obvious to try.⁹⁴ Moreover, the Court stated that the circuit court erred by drawing the wrong conclusion.⁹⁵

vious if the prior art, the problem's nature, or the knowledge of a person having ordinary skill in the art reveals some motivation or suggestion to combine the prior art teachings. *Id.*

89. Vincent L. Capuano, *Obviousness of Chemical Compounds: The "Lead Compound" Concept*, INTELLECTUAL PROPERTY TODAY, July 2007, at 35.

90. *KSR*, 550 U.S. at 400-01. Helpful insights need not become rigid and mandatory formulas; and, as so applied the TSM test is incompatible with existing precedent. *Id.* The precedent the Court is referring to comes from *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

91. *KSR*, 550 U.S. at 402-03. The flaws in the Federal Circuit's analysis relate mostly to its narrow conception of the obviousness inquiry consequent in its application of the TSM test. *Id.*

92. *Id.* However, following the test correctly, any need or problem known in the field and addressed by the patent can provide a reason for combining the elements in the manner claimed. *Id.*

93. *Id.* Common sense suggests that familiar items may have obvious uses beyond their primary purpose, and a person of ordinary skill will often be able to fit the teachings of multiple patents together. The process is like fitting together pieces of a puzzle. *Id.*

94. *Id.* When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his technical sphere. *Id.*

95. *KSR*, 550 U.S. at 402-03. The court drew its erroneous conclusion from the risks of courts and patent examiners falling prey to hindsight bias. Rigid preventative rules that deny recourse to common sense are inconsistent with case law. *Id.*

Although *KSR* involved a dispute over the validity of a mechanical pedal assembly and not a chemical compound, its decision remains relevant in disputes arising from challenges to the validity of pharmaceutical patents. This is true in cases where the obviousness of the patented compound is being disputed. Many of these cases which involve chemical compounds turn on the analysis of the third Graham factor, the difference between the claimed invention and the prior art, which can be critical to the obviousness inquiry.⁹⁶ As previously mentioned, prior to *KSR*, the TSM test was applied rigidly, requiring an explicit showing of any teaching, suggestion, or motivation in the prior art.⁹⁷ However, following *KSR*, an application of the TSM test allows any teaching, suggestion, or motivation implicit from the prior art as a whole, rather than expressly stated in the references.⁹⁸ Whether this shift to a more flexible application of the TSM test is detrimental to pharmaceutical patent protection will be examined through the selected cases below.

C. Three Post-*KSR* Pharmaceutical Patent Cases

Answering the question of whether pharmaceutical patents are more vulnerable to invalidation following the Supreme Court's decision in *KSR* requires an examination of subsequent decisions in pharmaceutical patent cases. *Takeda*, *Ortho-McNeil*, and *Eisai* were selected to represent the present state of pharmaceutical patent protection in the United States. The cases all involve infringement actions filed by a major pharmaceutical corporation against at least one generic drug competitor.

96. *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356 (Fed. Cir. 2007).

97. *SUNG & SCHWARTZ*, *supra* note 61, at § 3:17.

98. *SUNG & SCHWARTZ*, *supra* note 61, at § 3:17. *See* *Aventis Pharma Deutschland GmbH v. Lupin, Ltd.*, 499 F.3d 1293, 1301 (Fed. Cir. 2007). By following the lead of *KSR*, the requisite motivation can come from any number of sources and need not be explicit. *Id.*

1. *Takeda v. Alphapharm*

The first case for consideration is *Takeda v. Alphapharm*.⁹⁹ Alphapharm, a generic drug manufacturer, filed an ANDA seeking approval to market a generic version of Takeda's patented compound, pioglitazone, a blood sugar controller for patients with Type 2 diabetes.¹⁰⁰ In its ANDA filing, Alphapharm also filed a Paragraph IV certification, asserting that Takeda's patent was invalid based on obviousness.¹⁰¹ Immediately thereafter, Takeda filed an infringement suit against Alphapharm.¹⁰²

Alphapharm's primary defense relied on the argument of noninfringement as a result of patent invalidity. Alphapharm contested that Takeda's patent was invalid as a result of a prior art compound, identified only as "compound b", which differed slightly from pioglitazone, rendering Takeda's patent obvious.¹⁰³ Alphapharm contended that the changes between the structure

99. See generally *Takeda Chem. Indus.' Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1350 (Fed. Cir. 2007). A class of drugs known as thiazolidinediones ("TZDs") was introduced in the 1990's as a treatment for Type 2 diabetes. Takeda developed ACTOS®, a drug used to control blood sugar in patients who suffer from Type 2 diabetes, which contains the compound pioglitazone, the active ingredient. *Id.* at 1352-53.

100. *Id.* at 1354.

101. See Pauline Farmer-Koppenol, *Effect of KSR on Obviousness Analysis of Chemical Compounds*, FENWICK & WEST SUMMER 2008 IP BULLETIN 1 (2008), available at <http://www.ipfrontline.com/depts/article.asp?id=20038>, archived at <http://www.webcitation.org/5ppMLC1ru>. Filing an ANDA is an artificial but legally cognizable act of patent infringement which gives the patentee standing to sue.

102. Note that there is a common trend in these types of cases for a drug manufacturer to sue a generic manufacturer for infringement. Typically, the generic manufacturer will assert the defense of obviousness against the patent for any said number of chemical compounds. Generic manufacturers will also use the defense of inequitable conduct, whenever applicable, to render a patent unenforceable. See, e.g., *Eli Lilly & Co. v. Zenith Goldline Pharm., Inc.*, 364 F. Supp. 2d 820 (S.D. Ind. 2005) (defendant manufacturers asserted invalidity and unenforceability defenses against schizophrenia drug patent); *Janssen Pharmaceutica N.V. v. Mylan Pharm., Inc.*, 456 F. Supp. 2d 644 (D. N.J. 2006) (generic manufacturers asserted patent invalidity and unenforceability in infringement action); *Bayer AG v. Dr. Reddy's Laboratories, Ltd.*, 518 F. Supp. 2d 617 (D. Del. 2007) (generic competitors asserted invalidity and unenforceability of anti-bacterial drug patent in infringement suit).

103. *Takeda Chem. Indus.' Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1354 (Fed. Cir. 2007). Both compounds include a ring of five carbons and one nitrogen, a pyridyl ring. See Farmer-Koppenol, *supra* note 101.

of pioglitazone and “compound b” were structurally obvious because they were examples of two common practices in the pharmaceutical industry.¹⁰⁴ However, the district court held that Alphapharm failed to prove by clear and convincing evidence that Takeda’s patent was invalid as obvious under 35 U.S.C. § 103.¹⁰⁵

On appeal, Alphapharm reasserted its defense of invalidity due to obviousness. Alphapharm focused its argument on Takeda’s selection of compound b as the lead compound for the development of pioglitazone.¹⁰⁶ Citing the *KSR* opinion, Alphapharm argued that the changes to get from compound b to pioglitazone were “obvious to try.”¹⁰⁷ Basically, Alphapharm implied that the use of compound b as a starting point for experimentation would have been obvious to a person having ordinary skill in the art based on the structural similarities of the two compounds.¹⁰⁸ However, Alphapharm did not take into consideration the weight given to unexpected results in an obviousness inquiry when utilizing homologs.

Takeda’s selection of “compound b” as the lead compound led to improved toxicity, a result sufficient to rebut a *prima facie* case of obviousness.¹⁰⁹ In its decision, the appellate court reiterated that the unexpected properties of pioglitazone and the number of possible alternatives for group substitution to the original methyl in the 6-position rebutted any *prima facie* show-

104. See Farmer-Koppenol, *supra* note 101. The argued common practices in the pharmaceutical industry included replacing one group with a similar group (ethyl or methyl) or homologization, and relocating the substituent group’s position on the pyridyl ring. *Id.*

105. See Farmer-Koppenol, *supra* note 101. See also *Takeda*, 492 F.3d at 1354. The district court upheld validity on the grounds that there was no motivation in the prior art to select compound b as the lead compound for anti-diabetic research, and that the prior art taught away from its use. *Id.*

106. Eileen McDermott, *Eisai Patent Survives Obviousness Claim Post-KSR*, *Managing Intellectual Property*, Jul. 28, 2008, archived at <http://www.webcitation.org/5owFf4DMR>. “A lead compound is one that serves as a starting point for chemical modification to a pharmaceutical invention.” *Id.* See also Capuano, *supra* note 89, at 33.

107. See Farmer-Koppenol, *supra* note 101. It is important to note that at the time of the district court’s decision *KSR* had not been decided, which is why Alphapharm did not cite the case as precedent until its appeal.

108. See Farmer-Koppenol, *supra* note 102.

109. *Takeda*, 492 F.3d at 1355.

ing of obviousness.¹¹⁰ Thus, the Federal Circuit upheld the validity of the Takeda patent, reiterating that Alphapharm had failed to demonstrate via clear and convincing evidence that Takeda's patented compound was invalid due to obviousness.¹¹¹

2. *Ortho-McNeil v. Mylan*

The next case, *Ortho-McNeil Pharmaceutical Inc. v. Mylan Laboratories*, involved a dispute over Ortho-McNeil's patent for topiramate, an anticonvulsive used in the treatment of epilepsy.¹¹² Following procedure, Mylan filed an ANDA, for market approval of a generic version of the drug, including a Paragraph IV certification, asserting invalidity on the grounds of obviousness.¹¹³ Ortho-McNeil subsequently filed a patent infringement suit after receiving notice of the Paragraph IV certification.¹¹⁴

What distinguishes *Ortho-McNeil* from *Takeda* is the manner in which its patented compound was realized. Originally, Ortho-McNeil's research was focused on drug development for applications involving Type 2 diabetes.¹¹⁵ More specifically, the re-research program aimed at using FBPase inhibitors to treat the disease.¹¹⁶ However, during the program topiramate was discovered to have desirable anticonvulsive properties, beneficial to applications in epilepsy management.¹¹⁷ It was this fact that My-

110. *Id.* at 1357-58

111. *Id.* at 1350.

112. *Ortho-McNeil Pharm. Inc., v. Mylan Laboratories*, 520 F.3d 1358, 1360 (Fed. Cir. 2008). Topiramate, marketed as Topo-Max® is an epilepsy drug with sales exceeding \$1 billion annually. *Id.*

113. *Id.* at 1360. The cause of action arose under the Hatch-Waxman Act. 21 U.S.C. § 355 (2006).

114. *Ortho-McNeil*, 520 F.3d at 1360.

115. Susan A. Cahoon & Alton L. Absher III, *Fed. Cir., KSR and Pharmas: The First Year and a Half*, Law 360, Dec. 31, 2008, at 3, archived at <http://www.webcitation.org/5owFl5CGt>.

116. See Cahoon & Absher, *supra* note 115, at 3. See also Farmer-Koppenol, *supra* note 101, at 2. "Topiramate was an intermediate compound made in the synthesis of an FBPase inhibitor." *Id.* See also News Release, PRNewswire-FirstCall, Metabasis' Second Generation FBPase Inhibitor for the Treatment of Diabetes enters Clinic, (Feb. 14, 2006 09:00 CST) archived at <http://www.webcitation.org/5owFp7jGz>. FBPase is the enzyme fructose 1,6 bisphosphatase, a key component of the pathway responsible for the production of glucose known as the gluconeogenesis pathway. *Id.*

117. *Ortho-McNeil*, 520 F.3d at 1360.

lan asserted as a central argument in its defense against Ortho-McNeil's infringement action.

Similar to Alphapharm's defense in *Takeda*, Mylan's defense was premised on an assertion of noninfringement due to patent invalidity.¹¹⁸ Mylan argued that it was obvious-to-try to make drugs that are FBPase inhibitors for the treatment of diabetes, citing *KSR* as precedent.¹¹⁹ However, the record showed no indication that a person having ordinary skill in the art would have chosen topiramate had that person sought an FBPase inhibitor.¹²⁰ As Mylan had no other basis for its obviousness argument, the district court upheld Ortho-McNeil's patent as valid.

On appeal, the Federal Circuit affirmed the lower court's holding that Mylan's argument opposing the validity of the Ortho-McNeil patent was erroneously based on hindsight analysis.¹²¹ Mylan's expert used hindsight analysis; merely retracing the path of the inventor, discounting the number and complexity of the alternatives, and reaching the conclusion that topiramate was obvious.¹²² As this case shows, hindsight reasoning is always inappropriate for obviousness inquiries because it fails to examine whether at the time of invention "the subject matter as a whole" would have been obvious.¹²³ Accordingly, the Federal Circuit affirmed the validity of the topiramate patent.

118. *Id.* at 1360

119. *Id.* at 1364. "[W]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options." (quoting *KSR*, 550 U.S. at 420). *Id.*

120. *Id.* at 1366.

121. Farmer-Koppenol, *supra* note 101, at 2. Mylan's expert was viewing the selection of topiramate as a research pathway with hindsight as it would not have been obvious at the time of invention because there were so many different possible starting compounds and different pathways to produce the desired compound. *Id.*

122. *Ortho-McNeil*, 520 F.3d at 1364.

123. *Id.* (referencing 35 U.S.C. § 103(a) (2006)).

3. *Eisai v. Dr. Reddy's*

The final case for consideration, *Eisai Co. v. Dr. Reddy's Laboratories*, was decided by the Federal Circuit in July 2008.¹²⁴ Much like *Takeda* and *Ortho-McNeil*, *Eisai* involved a dispute over a patented pharmaceutical, Aciphex®, which is used in the treatment of duodenal ulcers, heartburn, and associated disorders.¹²⁵ Dr. Reddy's Laboratories and Teva, two generic manufacturers, each filed ANDAs containing Paragraph IV certifications asserting that Eisai's patent was either invalid or unenforceable.¹²⁶ Accordingly, Eisai filed an infringement suit against both of its generic competitors upon receiving notice of the Paragraph IV certification.¹²⁷

Throughout the trial and appeals process, Teva maintained a defense of noninfringement on the basis of patent invalidity for obviousness. Teva argued that Eisai's patent was obvious in light of the combination of three prior art references.¹²⁸ However, the district court was not convinced and upheld the validity of the Eisai patent.¹²⁹ On appeal, the court focused on whether the facts supported a *prima facie* case of obviousness based on the "reasoned identification of a lead compound."¹³⁰

124. 533 F.3d 1353 (Fed. Cir. 2008).

125. *Eisai*, 533 F.3d at 1356. Eisai's patent claims rabeprazole, the active ingredient in Aciphex®, which is part of a class of drugs known as proton pump inhibitors, which suppress gastric acid production by inhibiting action of the enzyme H⁺K⁺ATPase. *Id.*

126. *Id.* See also Posting of Kevin E. Noonan to Patent Docs, <http://www.patentdocs.org/2008/07/eisai-co-ltd-v.html> (July 21, 2008).

127. *Id.* Eisai also filed suit against Mylan Laboratories and Mylan Pharmaceuticals Inc. (collectively Mylan) for filing ANDAs, however, that proceeding was stayed pending this lawsuit as Mylan agreed to be bound by the final judgments and any appeals. *Id.*

128. *Eisai*, 533 F.3d at 1357. The three prior art references include: Takeda's European patent claiming lansoprazole (EP '726), Junggren's U.S. patent claiming omeprazole ('431 patent), and the Brändström article, "Structure Activity Relationships of Substituted Benzimidazoles." *Id.*

129. See McDermott, *supra* note 106. Teva targeted lansoprazole (Takeda's EP '726), which is nearly identical to rabeprazole, as the lead compound, arguing it would have been obvious to someone of ordinary skill in the art to choose lansoprazole, since it contains a fluorinated substituent that increases lipophilicity. However, rabeprazole does not include this substituent so the Court determined Teva's argument was illogical. *Id.*

130. *Eisai*, 533 F.3d at 1357. Obviousness based on structural similarity can be proven by the identification of some motivation that would have led one of

The court determined Teva was unable to support its argument that the prior art references were obvious alternatives to rabeprazole (Eisai's lead compound) because it was unable to provide any reason for Eisai to modify the prior art.¹³¹ As a result, the Federal Circuit affirmed the validity of the Eisai patent.

As an additional defense, both Dr. Reddy's and Teva asserted patent unenforceability due to inequitable conduct to absolve their liability for infringement.¹³² As previously discussed, inequitable conduct is only available in certain cases and requires a showing of materiality and intent to deceive.¹³³ The defendants asserted five ways in which Eisai allegedly misled the Patent Office.¹³⁴ However, the Federal Circuit dismissed all allegations of inequitable conduct for either failure to show intent to deceive, lack of materiality, or a combination of the two, leaving both Dr. Reddy's and Teva liable for infringement.¹³⁵

ordinary skill in the art to select and modify a then-known compound. Often-times a known compound is referred to as a lead compound. *Id.* See Michael Fuller, *Eisai v. Dr. Reddy: The first application of the new KSR obviousness standard in a pharmaceutical context*, Bio-Pharma Marketplace Review, Oct. 2008, archived at <http://www.webcitation.org/5owG1MpPA>. Teva argued that the compounds described by the three prior art references would have served as equally reasonable lead compounds over rabeprazole based on supposed advantages in efficacy that the different structures provided, thereby proving the obviousness of the rabeprazole patent. *Id.*

131. *Eisai Co. Ltd. v. Dr. Reddy's Laboratories, Ltd.*, 533 F.3d 1353, 1357 (Fed. Cir. 2008). Both rabeprazole and lansoprazole are Brändström core structure compounds. They are essentially identical with the exception of one structural difference at the 4-position on the pyridine ring; lansoprazole has a trifluoroethoxy substituent, whereas rabeprazole has a methoxypropoxy substituent at the same location. *Id.*

132. *Id.* at 1356. Both manufacturers conceded to infringement of the Eisai patent.

133. See *Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 872 (Fed. Cir. 1988).

134. *Eisai*, 533 F.3d at 1360. The five allegations alleged by the defendants include the following: (1) failure to disclose co-pending '013 application claiming the "ethyl homolog" of rabeprazole; (2) withholding rejections from the '013 prosecution that would have been applicable to this rabeprazole patent; (3) failure to disclose prior art; (4) submission of a misleading declaration to the patent examiner; and (5) concealing lansoprazole from the examiner.

135. *Id.* at 1359-62.

V. Vulnerability to Invalidation

From the outset, patents are, to a certain extent, automatically shielded from invalidation, the direct result of having been issued by the PTO.¹³⁶ Once a patent is issued, the patentee acquires the most fundamental protection against infringers—the presumption of validity.¹³⁷ This presumption directly places the burden of proof on the challenging party.¹³⁸ In order to rebut this presumption, the challenger must show that the patent in question is invalid through clear and convincing evidence.¹³⁹ While patents can be invalidated for a number of reasons, patent validity disputes involving pharmaceuticals typically arise from challenges based on obviousness.¹⁴⁰

The abundance of challenges originating from these obviousness inquiries are likely attributable to the nature of the pharmaceutical development process whose solutions frequently involve a lack of predictability. The very fact that biological effects of pharmaceuticals are often unpredictable deters the implementation of a universal standard for determining their obviousness or nonobviousness.¹⁴¹ Instead, various standards arise as needed, leaving gaps for potential infringers to challenge a patent's validity.¹⁴² These gaps are illustrated in the aforemen-

136. "A patent shall be presumed valid." 35 U.S.C. § 282 (2006).

137. *Id.*

138. See JOHN GLADSTONE MILLS III ET AL., PATENT LAW FUNDAMENTALS § 12:16 (2d ed. 2009).

139. *Id.*

140. See *supra* note 102 and accompanying text.

141. See MILLS ET AL., *supra* note 138, at § 12:14. As a very general matter, a *prima facie* case of obviousness is met if three basic criteria are established: (1) some suggestion or motivation, (2) a reasonable expectation of success, and (3) a prior art reference must teach or suggest all the claimed limitations. See *id.* at § 12:32 (discussing considerations for chemical inventions when compounds are structurally similar). Compare Gregory Mandel, *The Non-Obvious Problem: How the Indeterminate Nonobviousness Standard Produces Excessive Patent Grants*, 42 U.C. DAVIS L. REV. 57 (2008) (discussing the differentiation between different types of nonobviousness).

142. Compare Jonathan M. Spenner, *Obvious-to-Try: Obviousness of Chemical Enantiomers in View of Pre- and Post-KSR Analysis*, 90 J. PAT. & TRADEMARK OFF. SOC'Y 469, 491-94 (2008) (discussing the obvious-to-try rationale for determining obviousness) with Vincent L. Capuano, *Obviousness of Chemical Compounds: The "Lead Compound" Concept*, Intellectual Property Today, at 35, Jul 2007 (discussing how obviousness can be proven based on the modification of

tioned cases and represent how pharmaceutical patents may be vulnerable during an obviousness inquiry.¹⁴³

In *Takeda*, the manner in which its patented pharmaceutical was selected—the lead compound theory—demonstrates one of these gaps.¹⁴⁴ As previously mentioned, the lead compound concept involves the selection of a compound based on its chemical structure.¹⁴⁵ From the perspective of an obviousness analysis, selecting a compound because it is the homolog of a known compound can be a risky decision.¹⁴⁶ Not only it is possible that selecting a pharmaceutical by this means will prevent the compound from receiving patent protection as a result of obviousness stemming from the prior art, but it is likely that any issued patents will experience more vulnerability during validity challenges.¹⁴⁷

The selection of a pharmaceutical by its chemical structure invokes the scrutiny of the third Graham factor, which considers differences between the claimed invention and the prior art.¹⁴⁸ For lead compounds that perform expectedly, as inferred from their structural compositions, a finding of obviousness based on the prior art is not unreasonable.¹⁴⁹ A *prima facie* case

a known compound).

143. See *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350 (Fed. Cir. 2007); *Ortho-McNeil Pharm. Inc., v. Mylan Labs.*, 520 F.3d 1358 (Fed. Cir. 2008).

144. *Takeda*, 492 F.3d at 1355.

145. Compounds are often selected based on their structural similarities to other known compounds. See McDermott, *supra* note 106.

146. See U.S. Patent & Trademark Office, Manual of Patent Examining Procedure § 2144.09 (8th ed. 2007) [hereinafter MPEP].

147. MPEP, *supra*, note 146, at § 2144.09. “A *prima facie* case of obviousness may be made when chemical compounds have very close structural similarities and similar utilities.” MPEP, *supra*, note 146, at § 2144.09.

148. *Eisai Co. Ltd. V Dr. Reddy’s Laboratories, Ltd.*, 533 F.3d 1353, 1356-57. Where a patent claims a chemical compound, the differences between the claimed invention and the prior art often turn on the structural similarities (or differences) between the claimed compound and the prior art compounds. *Id.*

149. See MPEP, *supra* note 146, at § 2143. Exemplary rationales that may support a conclusion of obviousness include: (A) combining prior art elements according to known methods to yield predictable results; (B) simple substitution of one known element for another to obtain predictable results (lead compound concept); (C) use of known technique to improve similar products in the same way; (D) applying a known technique to a known product to yield predictable results; (E) obvious-to-try - from a finite number of solutions with

for obviousness is made when a challenger identifies some motivation to modify the known compound resulting in its selection of the structural homolog.¹⁵⁰ After *KSR*, that requisite motivation no longer needs to be explicit in the prior art, which can also increase a patent's vulnerability to invalidation.¹⁵¹

Although selecting a compound based on its structural similarities to a known compound may be risky, this method is not entirely devoid of benefits. Depending on perspective, unpredictability in the pharmaceutical arts can be either its greatest detriment or its greatest strength. Those in favor of taking a risk to select a compound based on its structural similarities to another known compound depend on the unpredictable nature of chemical compounds. The reason for this interest in unpredictability is that it can be exactly what is needed to deem a compound non-obvious, securing its patentability rights.¹⁵²

As the selected case law has shown, unexpected results and secondary consideration in the obviousness analysis, are often extremely beneficial in these pharmaceutical patent cases for removing a patent from the realm of invalidation. The *Takeda* case is a perfect example of this fact. Alphapharm ultimately was unsuccessful in invalidating Takeda's patent because it failed to demonstrate a motivation for the selection of pioglitazone.¹⁵³ More importantly, even if Alphapharm had been able to prove a

a reasonable expectation of success; and (F) known work in a field of endeavor that may prompt variations of it for use in either the same field or a different one if variations are predictable to one of ordinary skill in the art. See MPEP, *supra* note 146, at § 2143.

150. See MPEP, *supra* note 149, at § 2144.09.

151. See *Aventis Pharma Deutschland GmbH v. Lupin, Ltd.*, 499 F.3d 1293, 1301 (Fed. Cir. 2007). By following the lead of *KSR*, the requisite motivation can come from any number of sources and need not be explicit. *Id.*

152. See, e.g., *Sanofi-Synthelabo, Inc. v. Apotex, Inc.*, 470 F.3d 1368, 1379 (Fed. Cir. 2006) (granting preliminary injunction to patentee against generic competitor when court found unpredictability of salt formation an indicator of nonobviousness).

153. See Aaron F. Barkoff, *Federal Circuit Affirms Validity of Takeda's ACTOS Patent, Rejecting Alphapharm's Obviousness Arguments*, Orange Book Blog, June 28, 2007, archived at <http://www.webcitation.org/5owG9VdZA>.

The Federal Circuit agreed with the district court's finding that there was no motivation in the prior art to select compound b as a lead compound, and that the prior art taught away from its use as a lead compound. *Id.*

prima facie case of obviousness, it still would not have succeeded in invalidating Takeda's patent because it failed to recognize the importance of unexpected results during an obviousness inquiry.¹⁵⁴ The Federal Circuit, however, concluded that the improved toxicity results from Takeda's compound were enough to rebut a finding of obviousness despite "compound b's" existence in the prior art, therefore, shielding the patent from invalidation.¹⁵⁵ In effect, the facts of the *Takeda* case suggest that it is an example of how pharmaceutical patents are strengthened by invalidity challenges.

The *Ortho-McNeil* case is another example supporting continued patent validity for pharmaceutical compounds. Similar to *Takeda*, *Ortho-McNeil* helps to reinforce pharmaceutical patent validity. As previously mentioned, Ortho-McNeil's patented compound topiramate ended up as a useful epilepsy treatment; this was contrary to Ortho-McNeil's intended research for diabetes treatments. What makes this case relevant is the court's discussion of avoiding the hindsight bias in obviousness inquiries. Also, it was decided after *KSR*, so it incorporates the refocused version of the TSM test.

Critics argue that the new flexible standard of the TSM test is surrounded by difficulties, at least with respect to chemical and pharmaceutical patent cases.¹⁵⁶ The problem that many find with the new approach is that prior art references may be either explicit or implicit.¹⁵⁷ Already there appears to be some disparity between cases applying the TSM test depending on the types of pa-

154. *Takeda* would prevail because any *prima facie* case of obviousness would have been rebutted by the unexpected results of pioglitazone's nontoxicity. *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1354 (Fed. Cir. 2007).

155. *Id.*

156. Stephen G. Kunin & Andrew K. Beverina, Commentary, *KSR's Effect on Patent Law*, 106 MICH. L. REV. FIRST IMPRESSIONS 50, 52 (2007) archived at <http://www.webcitation.org/5owGRs7LH>

157. "The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis this way." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007).

tents involved.¹⁵⁸ *Takeda* and *Eisai* are examples of recent case law having applied the new TSM standard. Based on these cases, it appears that issued pharmaceutical patents have more protection and are actually less vulnerable to invalidation.¹⁵⁹ While this is beneficial to the owners of pharmaceutical patents, this may also be detrimental to the challengers of patents that arguably should never have been issued by the PTO.

Overall, pharmaceutical patents do not seem to have lost any value in the aftermath of the *KSR* decision. In fact, it appears that issued pharmaceutical patents have been strengthened against validity challenges through the refocusing of the TSM into a more flexible standard. Both *Takeda* and *Ortho-McNeil* suggest a level of confidence in the ability of the patent and federal court systems to uphold deserving innovation and discovery with for the future of the pharmaceutical arts.

VI. Inequitable Conduct: A Rift in Applying the Standard

Rendering a patent unenforceable by means of inequitable conduct requires a showing of materiality and intent to deceive the PTO by clear and convincing evidence.¹⁶⁰ Although this two-prong test is the standard set forth by the court for analysis, recent decisions involving inequitable conduct determinations by the Federal Circuit suggest that its application is not so clear, prompting the beginnings of a rift among federal judges.¹⁶¹ These decisions seem to suggest that a disagreement between the members of the bench on what constitutes “intent to deceive [the PTO]” is responsible for the emergence of the rift in applying the standard. Evidence of this divergence in views can be seen

158. *Compare* Leapfrog Enter., Inc. v. Fisher-Price, Inc., 485 F.3d 1157 (Fed. Cir. 2007) (“combination” patent deemed obvious and invalid for combining old elements despite evidence of substantial commercial success), *with Takeda*, 492 F.3d at 1350 (Fed. Cir. 2007) (rejecting obvious-to-try argument that selection of known compound later modified and patented was obvious).

159. *See* Kunin & Beverina, *supra* note 156, at 52.

160. *See* Kingsdown Med. Consultants, Ltd. v. Hollister Inc., 863 F.2d 867, 872 (Fed. Cir. 1988).

161. *See* Crouch, *supra* note 73.

through the comparison of two recent cases: *Eisai v. Dr. Reddy's and Aventis Pharma v. Amphastar Pharmaceuticals, Inc.*¹⁶²

One of the problems with applying inequitable conduct is the determination of what conduct satisfies the intent prong of the analysis. Satisfying the intent element requires that the involved conduct must indicate sufficient culpability, viewed in light of all the evidence, including evidence indicative of good faith.¹⁶³ Direct evidence is often unavailable so intent is generally inferred from the surrounding facts.¹⁶⁴ Additionally, the court is permitted to assess intent as a function of materiality, which can have the effect of setting the requisite threshold for the intent element lower than the one for materiality.¹⁶⁵

Eisai and *Aventis* are useful cases because they each illustrate the importance of a court determination of intent in an inequitable conduct case. In particular, they are relevant because they each represent a different proposition regarding inequitable conduct enforcement. *Eisai* stands for the proposition that the application of inequitable conduct is a "high bar".¹⁶⁶ Conversely, *Aventis* does not articulate such an assertive standard but suggests through its facts that the application of inequitable conduct is not as stringent as *Eisai* posits. As previously discussed, the *Eisai* case involved five allegations of misconduct.¹⁶⁷ Ultimately, the court upheld the *Eisai* patent because the record failed to indicate "any real suggestion of intent to deceive, much less the

162. *Eisai Co. Ltd. v. Dr. Reddy's Laboratories, Ltd.*, 533 F.3d 1353 (Fed. Cir. 2008); *Aventis v. Amphastar*, 525 F.3d 1334 (Fed. Cir. 2008) (involving an action for patent infringement for low molecular weight heparin based on inequitable conduct).

163. *Kingsdown*, 863 F.2d at 876.

164. *Id.*

165. "The more material the omission or misrepresentation, the less intent that must be shown to elicit a finding of inequitable conduct." *Impax Labs, Inc. v. Aventis Pharm. Inc.*, 468 F.3d 1366, 1375 (Fed. Cir. 2006). *See also* *Bristol-Myers Squibb Co., v. Rhone-Poulenc Rorer, Inc.*, 326 F.3d 1226, 1234 (Fed. Cir. 2003) (stating that the showing of intent can be proportionally less when balanced against high materiality).

166. *Eisai*, 533 F.3d at 1360.

167. *See supra* note 134 and accompanying text.

clear and convincing evidence required to support a finding of inequitable conduct.”¹⁶⁸

In contrast, *Aventis* involved a series of appeals regarding the elements of inequitable conduct where the patents were ultimately held unenforceable.¹⁶⁹ Initially, the court’s analysis was focused on the materiality of the inequitable conduct allegations involving omitted half-life data, but the court’s final decision was premised on the intent element.¹⁷⁰ The majority found sufficient intent to deceive the PTO based on failure to disclose half-life compositions used during experimentation.¹⁷¹ However, Judge Rader was not satisfied by the facts to find the necessary intent and filed a dissenting opinion, stating that the omission of the half-life data was mere inadvertence, not sufficient to meet *Kingsdown’s* standard of culpable intent to deceive.¹⁷²

Rader’s *Aventis* dissent is further relevant because it considers the nature of the conduct which the court assesses in determining whether the patentee intended to deceive the PTO during the patent process. This is seen more clearly in the *Eisai* opinion. Rader makes the distinction that there must be evidence of affirmative instances of “culpable conduct” to demonstrate intent and that gross negligence is not sufficient.¹⁷³ More importantly, Rader asserts the reasoning for this distinction is based on the severity of the inequitable conduct remedy, which is an “atomic bomb” of patent unenforceability.¹⁷⁴

Efforts have been made to reform the application of inequitable conduct in patent litigation, but so far without success. In 2007, the Senate Judiciary Committee drafted provisions for the Patent Reform Act including a new section on inequitable

168. *Eisai Co. Ltd. v. Dr. Reddy’s Laboratories, Ltd.*, 533 F.3d 1353, 1361 (Fed. Cir. 2008).

169. *Aventis v. Amphastar*, 525 F.3d 1334, 1337 Fed. Cir. 2008).

170. *Id.* at 1349.

171. *Id.*

172. *Id.* at 1351-52.

173. Noonan, *supra* note 20; *Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 876 (Fed. Cir. 1988) (citing *Norton v. Curtiss*, 433 F.2d 779 (C.C.P.A. 1970)).

174. *Aventis*, 525 F.3d at 1349.

conduct.¹⁷⁵ Most importantly, section (e) of the proposed changes would have allowed the court, under its discretion, to apply inequitable conduct as a whole or in part to a patent, thereby reducing the severity of the remedy.¹⁷⁶ Moreover, this would have allowed patentees to potentially retain some patent rights in the event of a transgression enabling them to hold infringers liable as applicable.¹⁷⁷ Unfortunately, the Patent Reform Act of 2007 was not ratified.¹⁷⁸ On March 3, 2009, the Patent Reform Act of 2009 was introduced as the latest attempt at overhauling the nation's patent system for the first time in more than fifty years.¹⁷⁹ However, this time it did not contain any provisions on inequitable conduct.¹⁸⁰ Thus the future of inequitable conduct reform remains unclear.¹⁸¹

VII. Conclusion

Pharmaceutical patents are a fundamental component to the success of the pharmaceutical industry in the United States. Patents are so valuable to the pharmaceutical industry because in most cases the value of the patent is equivalent to the value of the

175. See William F. Heinze, Senate Patent Reform Bill on Inequitable Conduct, I/P Updates, Jan. 22, 2008, *archived at* <http://www.webcitation.org/5owGd4fMn..>

176. See Heinze, *supra* note 175.

If the court finds both that material information was misrepresented to, or withheld from, the Office and an intent to deceive, after balancing the equities, the court, using its discretion, shall impose one or more of the following remedies as it deems appropriate:

Hold the patent unenforceable.

Hold one or more claims of the patent unenforceable.

Order that the patentee is not entitled to equitable relief and that the sole and exclusive remedy for infringement of the patent shall be a reasonable royalty.

Id.

177. Press Release, United States Senator Orrin G. Hatch, Senators Hatch, Leahy Introduce Patent Reform Act of 2009, (Mar. 3, 2009) *archived at* <http://www.webcitation.org/5owGhI7je>.

178. See *id.*

179. *Id.*

180. See *id.* "Inequitable-conduct reform is core to this bill, as it dictates how patents are prosecuted years before litigation. The inequitable-conduct defense is frequently pled, rarely proven, and always drives up the cost of litigation tremendously." *Id.*

181. See Gene Quinn, Senate Judiciary Committee Passes Patent Reform Bill, IPWatchdog, Apr. 2, 2009, *archived at* <http://www.webcitation.org/5owGleFdk>.

product. If there is no intellectual property protection for a new drug produced, companies essentially lose all economic incentive to further innovation and discovery because competitors can easily replicate the compounds for the same profit without the heavy financial investment. Therefore, it is essential for pharmaceutical companies to maintain their patent rights.

Recent decisions involving pharmaceutical infringement cases between major pharmaceutical companies and their generic competitors have suggested an increased susceptibility of pharmaceutical patents to invalidity challenges. This is because many invalidation challenges are based on obviousness, which can be difficult to ascertain in the pharmaceutical arts because compounds are often unpredictable by nature. Yet, cases like *Takeda* and *Ortho-McNeil* have given the impression that although invalidity challenges may have increased, pharmaceutical patents have not lost any value, and perhaps have even been strengthened by recent precedent like *KSR*.

However, pharmaceutical patent holders must remain wary of challenges to their patents based on inequitable conduct claims. While a positive finding of inequitable conduct requires a showing of materiality and intent to deceive the PTO, recent opinions of the Federal Circuit suggest a certain level of variability in determining intent, leaving patents more vulnerable to being deemed unenforceable. Because a finding of inequitable conduct is such a harsh bar to patent protection, there is a clear need to reform the doctrine.