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THE POLIO VACCINE AND THE RESTATEMENT (THIRD) OF TORTS: WHY THE CONTROVERSIES?

Thuy D. Pham* & Annette P. Martinez**

I. INTRODUCTION

Controversy is a fact of life. The diverse nationalities, religions, and opinions in America foster a sense of pride in freedom of speech and in controversial views in areas as far-reaching as viruses in vaccines and the law. However, when these controversies adversely affect the lives of ordinary citizens, an imperative need to peel away the layers of controversies arises in order to arrive at a fundamental truth, so that a more protective system could be created for providing relief to injured individuals.

Regarding the polio vaccine, two major controversies have surrounded its use since it was developed. The first—"Vaccine Associated Paralytic Poliomyelitis" (VAPP)¹—is well recognized. Members of the scientific medical profession and national and international health institutions have accepted it as an inevitable public health problem.

Although known since the 1960s, the second controversy—the subject of this essay—has not been adequately addressed. The

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¹ See infra notes 24-31 and accompanying text.
scientific community has kept it quiet, confined within its walls and hidden from public discussions and scrutiny.

In 1960, Bernice Eddy, an American government researcher, discovered that when she injected hamsters with the monkey kidney mixture on which the polio vaccine was “bred,” the hamsters developed tumors.2 Alarm spread throughout the scientific community because scientists realized that the polio vaccine, which was cultured in monkey kidney cells, was contaminated with a monkey virus called Simian Virus 40, or “SV40.”3

Immediately, the scientific community performed studies on it; and, health officials decided that the virus did not cause cancer in humans. Thereafter, the apprehension regarding the carcinogenic effects of SV40 in humans faded.

However, in the mid-1990s, a brilliant scientist came forth to rock the stability of the scientific community. Using the most modern molecular techniques, Dr. Michele Carbone and his colleagues detected SV40 DNA in human tumors extracted from patients with mesotheliomas, which are tumors of the lung pleura. Since Dr. Eddy’s 1960 study, this was the first time scientists were awakened to the fact that human beings who were administered the polio vaccine contaminated with the monkey virus, SV40, may be developing cancers.4

Today, this concern becomes more frightening by the fact that an increasing number of independent laboratories in the United States, Europe, and Asia likewise reported the detection of SV40, not just in human mesotheliomas, but also in various human tumors such as bone tumors (osteosarcomas), and brain tumors (e.g. medullablastomas, choroid plexus papillomas).5

However, a number of laboratories argued that they were unable to detect SV40 in mesothelioma tumors, that positive findings of SV40 in various tumors may be due to laboratory contamination, and that it was doubtful that SV40 plays a role in causing cancer.6 Thus, a controversial scientific debate emerged, as to whether or not SV40 plays a role in causing human cancer.

Although there is no solid scientific agreement on SV40, the issue of its cancer-producing effects has reached the courts, with

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2 See infra notes 32-37 and accompanying text.
3 “40” because it was the fortieth Simian virus discovered.
4 The term “cancer” refers to any malignant tumor.
5 See infra notes 55-59 and accompanying text.
6 See infra notes 60-67 and accompanying text.
plaintiffs beginning to sue SV40-contaminated polio vaccine manufacturers for negligence.⁷

In an article entitled *Drug Designs are Different*,⁸ the American Law Institute (ALI) and the Reporters of the *Restatement (Third) of Torts: Products Liability* ("*Restatement (Third)*," which include James A. Henderson and Aaron D. Twerski, argue that the *Restatement (Third)* permits courts to determine the defectiveness of a drug or vaccine design. The courts evaluate the drug or vaccine, which is approved by the Food and Drug Administration (FDA) and is already in the market, but does not allow a plaintiff to claim that a safer drug or vaccine could have been developed and marketed by the manufacturer.⁹ Henderson and Twerksi state that the *Restatement (Third)’s* refusal to consider unapproved alternatives in assessing the defendant’s drug design “does not rest on judicial deference to FDA expertise."¹⁰ Rather, the Reporters’ question whether courts have “the institutional competence” to determine if a safer, alternative drug or vaccine could have been approved by the FDA and marketed at the time in order to have prevented the plaintiff’s injuries.¹¹

On the other end of the scale, George Conk,¹² along with other critics,¹³ argued that the *Restatement (Third)’s* creates a pro-defendant approach that limits the liability of drug manufacturers for drug design defect. Conk argued that during the late 1970s and early 1980s, the absence of a reasonable alternative design standard for prescription drugs allowed distributors of blood to escape liability for supplying blood products contaminated with the Hepatitis C virus and the HIV

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⁹ Id. at 163-64.
¹⁰ Id. at 162.
¹¹ Id.
¹² See infra notes 91-99 and accompanying text.
virus. Conk expresses concern that the Restatement (Third) rule would tolerate and perpetuate such hazards in the future. Additionally, Conk and critics argued that the Reporters and the Restatement (Third) rely too heavily on FDA expertise.

These controversies traverse diverse fields: law, medicine, science, economics, government organization, and politics. Yet, when such fields build a system of collaboration, interdependence, and reliance, a vacuum is created that endangers the people. This is when the system needs to be penetrated in order to protect human life.

Part I of this essay presents a background on polio vaccination, along with the scientific account of the controversial SV40 story. Part II analyzes whether manufacturers of SV40-contaminated vaccines could be held liable based on the Restatement (Third)’s three standards of product defects, namely: design, manufacturing, and warning defects. Part III discusses the role of the Food and Drug Administration and how other government health agencies network for information in the SV40 contamination controversy. It also shows the weakness in the FDA process that may spell the difference between safety and risk, specifically in the area of vaccines. Part IV uncovers the role of the scientists in the SV40 controversy and exposes the impact of scientific misconduct on government health agencies’ decisions, which in turn affect the public. Part V illustrates the dynamics of a powerful “system of triangulation” at work. With a system of interdependence and reliance among manufacturers, the FDA-government and the scientists, the SV40 controversy remains hidden from public scrutiny. Part VI suggests that a powerful system of triangulation can be overcome by tort litigation, as exemplified by the experience in tobacco litigation.

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15 *Id.* at 1088-90.
16 See *id.* at 1089 (discussing how Restatement (Third) is silent on blood products and thus incorporates the statutory ban on strict liability claims for blood products).
II. THE HISTORY OF SV40 AND THE ORAL POLIO VACCINE

A. Polio and Polio Vaccination

Polio, or poliovirus, is a highly ubiquitous and contagious disease, which is caused by a virus.\(^{17}\) When the poliovirus invades the nervous system, infection can cause permanent total or partial paralysis and, in some cases, death. Polio mainly affects children under five years of age. However, it can strike anybody and could infect nearly every person in a given population. Also, unlike other diseases, such as measles from which most children either recover or die, society is reminded everyday of the devastating crippling effects of this disease. There is no medication to cure polio; however, it can be prevented by vaccination. Today, the polio vaccine is the most powerful weapon against the disease.

Two vaccines were developed in the 1950s in order to control polio. First, Dr. Jonas Salk developed the killed-poliovirus vaccine, which was done through inactivation of poliovirus by formalin. This was licensed as inactivated poliovirus vaccine (IPV),\(^{18}\) and must be injected into the recipient three times. Second, Dr. Albert Sabin developed the live attenuated poliovirus vaccine or oral poliovirus vaccine, also known as OPV.\(^{19}\)

OPV has been scientifically proven to curtail epidemics and greatly reduce the incidence of polio worldwide.\(^{20}\) The most significant example of its effectiveness is the success of the “Global Polio

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\(^{19}\) See, e.g., Gary Ebbert et al., Overview of Vaccine Manufacturing and Quality Assurance, in Vaccines 3rd ed. supra note 18, at 40.

Eradication Initiative,\(^{21}\) which was spearheaded by the World Health Organization (WHO), Rotary International, U.S. Centers for Disease Control and Prevention (CDC), the UNICEF, and other partners. In 1994, the entire Western Hemisphere, including the United States, was certified free of poliovirus by an International Certification Commission convened by the Pan American Health Organization.\(^{22}\)

Due to massive vaccination campaigns, rarely has a serious disease been controlled as rapidly and as dramatically as has polio in the United States and the rest of the world.\(^{23}\)

### B. Two Problems with the Polio Vaccine

But, two problems exist with the polio vaccine. The first problem is related to an adverse event known as "Vaccine Associated Paralytic Poliomyelitis" or VAPP. The public is aware of the VAPP adverse event, the subject of most polio litigation cases today.\(^{24}\) The second problem—SV40 contamination—has been hidden from public awareness. A clear distinction needs to be made between the two problems because the scientific basis of their difference is crucial in the evaluation of concepts in products liability law.

#### 1. Vaccine-Associated Paralytic Poliomyelitis (VAPP)

In rare events, oral polio vaccine (OPV) administration has been associated with paralysis in healthy recipients and their contacts.

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\(^{22}\) *See generally* Centers for Disease Control & Prevention, Certification of Poliomyelitis Eradication – the Americas, 43 MORBIDITY & MORTALITY WKLY. REP., Oct. 7, 1994, at 720, [available at](http://www.cdc.gov/MMWR/preview/mmwrhtml/00032760.htm).


OPV causes the VAPP adverse event in an estimated one case in 2.4 million doses administered. This happens because the live attenuated poliovirus in the vaccine may revert back to virulence in the human host, and therefore, produce full blown effects of the actual polio disease with the potential for epidemic spread. Scientists, physicians, and public health officials agree that the VAPP adverse event is specifically unavoidable. IPV, the inactivated killed-poliovirus vaccine which is administered by injection is does not cause VAPP.

Dr. Stanley Plotkin, a world renowned expert in the field of vaccination, summarizes the consensus of the medical-scientific community with regard to the VAPP event: “VAPP is an inescapable scientific phenomenon that has been consistently observed after OPV administration.” In other words, the VAPP adverse event is a problem that is scientifically unavoidable. It occurs even though the vaccine is properly prepared and accompanied by proper directions and warnings.

American public policy addressed this problem through the enactment of the National Child Vaccine Injury Act of 1986. Under this Act, a “no-fault” compensation program (known as the National Vaccine Injury Compensation Program) was established in which awards can be made quickly and efficiently to individuals injured by


26 See e.g. Kew OM, Sutter RW, et. al., Vaccine-derived Polioviruses and the Endgame Strategy for Global Polio Eradication; 59 ANN. REV. MICROBIOLOGY 2005 587; see also, Kew O, Morris-Glasgow V. et. al., Outbreak of Poliomyelitis in Hispaniola Associated with Circulating Type 1 Vaccine-Derived Poliovirus; 12 SCIENCE 356 (2002) (explaining that for instance, an outbreak of paralytic poliomyelitis occurred in the Dominican Republic (13 confirmed cases) and Haiti (8 confirmed cases)). The polio outbreak was associated oral polio live vaccine itself.


28 Id. at 359.

29 See Randall B. Keiser, Déjà Vu All Over Again? The National Childhood Vaccine Injury Compensation Act of 1986, 47 FOOD & DRUG L.J. 15, 19 fn 36 (1992) (discussing the National Childhood Vaccine Injury Compensation Act of 1986, which acknowledges there are some injuries that are associated with the Polio Vaccine).

adverse events of childhood vaccines. Victims of VAPP can claim monetary compensation for their injury; rules and other legal procedures are relaxed to accelerate the compensation process.\(^{31}\)

2. \textbf{SV40 Viral Contamination}

In June of 1955, a report appeared in the University of Michigan Medical Bulletin by John Enders, a Harvard virologist who won the Nobel prize for his work in developing the polio vaccine. Enders suggested that the technique for producing the polio vaccine was “not entirely satisfactory.”\(^{32}\) The defective technique raised the “risk of including other agents whose presence may or may not be recognized.”\(^{33}\) These contaminating “agents” to which Enders referred, was isolated in 1957, when Dr. Maurice Hilleman joined Merck laboratories. Dr. Hilleman, together with Dr. Sweet, reported the isolation of the virus that caused vacuolation\(^{34}\) in monkey cells and named it SV40.\(^{35}\)

But there was more to SV40. In 1960, Bernice Eddy, a United States government researcher, discovered that when she injected hamsters with the monkey kidney mixture on which the vaccine was bred, the hamsters developed tumors.\(^{36}\) Dr. Hillman recalls, “At first it was just a finding of one more virus, just another damn thing we had to screen for....Then we started to develop tumors in hamsters. My

\(^{31}\) Id.; see also EDMUND KITCH ET AL., U.S. LAW, in VACCINES 3rd ed., supra note 18, at 1175. Compensation is given to a vaccine recipient whose injury correlates with the vaccine injury listed in the Vaccine Injury Table of the Act and whose injury occurred within the specified time periods. \textit{Id.} at 1174-1175.


\(^{33}\) Wechsler, \textit{supra} note 32. Even as Enders published his warning, scientists in the United States and Britain were conducting experiments with these “viral contaminating agents.” \textit{Id.}

\(^{34}\) A term used in the science of histology to describe the formation of vesicles within the cytoplasm of the cell.


God, this was a great revelation." Other scientists isolated the virus as well, but the government did not take action until much later.

Meanwhile, as early as the 1960s, vaccine batches of both the OPV and the IPV were tested and found to be contaminated with SV40. The gravity of this finding becomes evident considering that from 1955 through early 1963, approximately 98 million people worldwide were unknowingly exposed to the SV40 virus through contaminated polio vaccines. The public was not told. "I don't think anybody along the way was irresponsible," Dr. Hilleman says. "It was important not to convey to the public [this] information, because you could start a panic. They had already had production problems with people getting polio. If you added to that the fact they found live [monkey] virus in the vaccine, there would have been hysteria..."

Alarm spread throughout the scientific community. Immediately, a series of studies were done and health officials decided that—thankfully the virus did not cause tumors in humans.

Thereafter, for the next thirty years or so, the controversy of polio vaccines being contaminated with possible cancer-producing SV40 remained at a lull.

Then, in 1994, Dr. Michele Carbone, a prominent Italian physician-researcher at Loyola University Medical Center, revived the issue of SV40 contamination in polio vaccines. Dr. Carbone had just completed a series of experiments in which he had injected the monkey virus SV40 into dozens of hamsters. Every single one of them formed

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37 Wechsler, supra note 32, at 1-2.
38 Wechsler, supra note 32, at 1-3.
39 Id.; see also Robbins, supra note 18, at 17; P. Gerber et al., Inactivation of Vacuolating Virus (SV40) by Formaldehyde, 108 PROC. SOC'Y FOR EXPERIMENTAL BIOLOGY & MED. 205 (1961) (explaining that SV40's inactivation curve with formaldehyde was such that some active virus might survive an exposure that was fully sufficient to inactivate the poliovirus).
40 Centers for Disease Control and Prevention, National Immunization Program (NIP), Concerns about Vaccine Contamination, Simian Virus 40 (SV40), Polio Vaccine and Cancer, http://www.cdc.gov/nip/vacsafe/concerns/cancer (last visited Feb. 1, 2006) [hereinafter CDC-NIP Concerns]; see also Michele Carbone et al., Simian Virus 40, Poliovaccines and Human Tumors: A Review of Recent Developments, 15 ONCOGENE 1877 (1997); Bookchin & Schumacher, supra note 36, at 68.
41 Wechsler, supra note 32, at 1.
42 Id.
44 Bookchin & Schumacher, supra note 36, at 68.
45 Id. at 68-69.
a rare form of malignant lung cancer called mesothelioma and died within three to six months.\footnote{46}

Dr. Carbone then teamed up with Dr. Harvey Pass, then chief of thoracic surgery at the National Cancer Institute in Bethesda, for further experimentation.\footnote{48} Dr. Harvey Pass had carefully saved tumor tissues from the mesothelioma surgeries he had performed and now had one of the largest collections of mesothelioma biopsies in the world.\footnote{49} Dr. Carbone, Dr. Pass, and another colleague, Antonio Procopio used a new molecular technique called the Polymerase Chain Reaction (PCR) to look for SV40 DNA in Dr. Pass’ tumor samples. Results were published in “Oncogene,” one of the world’s largest leading cancer journals, showing 60% of human mesothelioma samples contained SV40 DNA; non-tumor control samples were negative for SV40 DNA.\footnote{50}

Great concern was elicited by the fact that in most of the positive samples Dr. Carbone has tested, SV40 was actively producing proteins—suggesting that SV40 was not just an opportunistic “passenger virus” that had found a comfortable resting place in malignant tumor cells, but was likely to have been involved in producing the tumors.\footnote{51} This was the first time scientists uncovered persuasive evidence that the polio vaccine contaminant—SV40—might cause cancer not just in rodents, but also in human beings.\footnote{52}

Other scientists at the National Institutes of Health were not receptive to Dr. Carbone’s work.\footnote{53} They told Dr. Carbone that the last thing anyone wanted to hear was that the polio vaccine was associated with cancer. Implying that the vaccine contaminated by SV40 was linked to cancer, even if the contamination occurred forty years ago, would easily shake public confidence in vaccination.\footnote{54}

\footnote{46} Claudia Cicala et al., \textit{SV40 Induces Mesothelioma in Hamsters}, 142 AM. J. PATHOLOGY 1524, 1533 (1993) (reporting that macroscopic, microscopic, ultramicroscopic, and histochemical techniques have confirmed the presence of virus-induced mesotheliomas in mammals).

\footnote{47} See generally, Michele Carbone et al., \textit{New Molecular and Epidemiological Issues in Mesothelioma: Role of SV40}, 180 J. OF CELLULAR PHYSIOLOGY 167, 168 (1999).

\footnote{48} Bookchin & Schumacher, \textit{supra} note 36, at 68-70.

\footnote{49} \textit{Id.} at 69.

\footnote{50} \textit{Id.} at 70; Michele Carbone et al., \textit{Simian Virus 40-like DNA Sequences in Human Pleural Mesothelioma}, 9 ONCOGENE 1781 (1994).

\footnote{51} Bookchin & Schumacher, \textit{supra} note 36, at 75.

\footnote{52} \textit{Id.} at 68-75.

\footnote{53} \textit{Id.} at 71-74.

\footnote{54} \textit{Id.}
Since Dr. Carbone and colleagues published their first study in 1994, more and more scientists from different laboratories in the United States, Europe and Asia, have confirmed Dr. Carbone’s results in detecting the presence of SV40 in mesotheliomas from human lung tissue. More troubling is the fact that the virus has also been detected in other kinds of tumors—not just mesotheliomas—but also in bone tumors (osteosarcomas) and brain tumors (e.g. medulloblastomas, ependymomas & choroids plexus tumors). Virologist Dr. Janet Butel of Baylor College of Medicine in Texas and her chief collaborator, Dr. John Lednicky, reported that they had found SV40 in a number of children’s brain tumors.

As of today, the presence of SV40 in different types of human cancer has been reported by many independent laboratories from all over the world.

Yet, other influential and prominent scientists remain skeptical about the relationship between SV40 contaminated vaccines and cancer. Dr. Howard Strickler at the Viral Epidemiology Branch of the National Cancer Institute decided to see whether Carbone’s work could be reproduced by a researcher of the Branch’s choosing. Strickler

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55 Id. at 73-74; see also, J.R. Testa et al., A Multi-institutional Study Confirms the Presence and Expression of Simian Virus 40 in Human Malignant Mesotheliomas, 58 CANCER RES. 4505-09 (1998); Christopher Pepper et al., Simian Virus 40 Large T Antigen (SV40LTAg) Primer Specific DNA Amplification in Human Pleural Mesothelioma Tissue, 51 THORAX 1074, 1076 (1996).

56 See, e.g., Michele Carbone et al., SV40-like Sequences in Human Bone Tumors, 13 ONCOGENE 527 (1996); Michele Carbone et al., supra note 47.

57 See, e.g., Daniel Bergsagel et al., DNA Sequences Similar to Those of Simian Virus 40 in Ependymomas and Choroid Plexus Tumors of Childhood, 51 NEW ENGL. J. MED. 988 (1992).


59 See, e.g., H.N. Zhen et al., Expression of the Simian Virus 40 Large Tumor Antigen (Tag) and Formation of Tag-p53 and Tag-pRb Complexes in Human Brain Tumors, 86 CANCER 2124 (1999); H. Yamamoto et al., High Incidence of SV40-like sequences Detection in Tumour and Peripheral Blood Cells of Japanese Osteosarcoma Patients, 82 BRIT. J. CANCER 1677 (2000); R. Vilzez, et al. Association Between Simian Virus 40 and Non-Hodgkin Lymphoma, 359 LANCET 817 (2002); BHART JASANI and KATIE ROSS, Molecular Detection of Simian Virus 40 in Human Mesothelioma, in MALIGNANT MESOTHELIOMA: ADVANCES IN PATHOGENESIS, DIAGNOSIS, AND TRANSLATIONAL THERAPIES (Harvey Pass, MD; Nicholas Vogelzang, MD; Michele Carbone, MD, PhD eds., Springer 2005) [hereinafter MALIGNANT MESOTHELIOMA].

60 Bookchin & Schumacher, supra note 36, at 71; Wechsler, supra note 32, at 3.
explained that if Carbone’s results could not be duplicated, then further tests for the presence of SV40 in human tumors would not be necessary.\textsuperscript{61}

The scientist selected to lead the research effort for the National Cancer Institute was Dr. Keerti Shah of Johns Hopkins School of Public Health.\textsuperscript{62} Earlier in his career, Dr. Shah had done work on SV40.\textsuperscript{63}

In 1996, Dr. Strickler and Dr. Shah published a paper in the Journal of Cancer Epidemiology, Biomarkers and Prevention.\textsuperscript{64} Strickler’s and Shah’s study has greatly influenced the direction of SV40 research and funding. In contrast to Carbone and other scientists, Strickler and Shah failed to detect SV40 in their tumor samples, and the Viral Epidemiology Branch of the National Cancer Institute considered the case closed.\textsuperscript{65} Their work is cited again and again by federal health officials as evidence that the dozens of scientific publications, including Dr. Carbone’s, are not persuasive.\textsuperscript{66} Because Dr. Strickler and Dr. Shah are respected prominent scientists, their work has been highly influential in government response to this controversy. Nonetheless, science-wise, the issue of whether SV40 causes cancer in humans is still controversial and is still undergoing vigorous debate.\textsuperscript{67}

The SV40 controversy has roused the involvement of the legal profession as well. Lawyer Donald MacLachlan spent almost two years investigating whether the government and drug manufacturers could have acted sooner to prevent the spread of SV40 through the polio vaccine.\textsuperscript{68} Together with a colleague, Robert Brownson, MacLachlan had stumbled upon troubling data of what the government had been aware of for decades. Tests of stored vaccine – conducted by the National Cancer Institute in 1963 – showed that nineteen states, including Pennsylvania, New York, and most of New England, received heavily contaminated shipments of polio vaccine between

\begin{itemize}
  \item Wechsler, \textit{supra} note 32, at 3.
  \item \textit{Id.}
  \item H.D. Strickler et al., \textit{Simian Virus 40 and Pleural Mesothelioma in Humans}, \textit{5 CANCER EPIDEMIOLOGY BIOMARKERS & PREVENTION}. 473 (1996).
  \item Bookchin & Schumacher, \textit{supra} note 36, at 71.
  \item \textit{Id.} at 71-72.
  \item CDC-NIP Concerns, \textit{supra} note 40 (explaining, “SV40 has been found in certain types of human cancers . . . however, some research results are conflicting and more studies are needed”).
  \item Wechsler, \textit{supra} note 32, at 3.
\end{itemize}
May and July 1955. This meant that close to four million children were inoculated with polio vaccine containing high levels of SV40.

Today, government regulations mandate that polio vaccine manufacturers screen for known viruses including SV40 and guarantee that the vaccine is free from any adventitious agents. Medical and scientific literature emphasize the fact that cell lines currently used for polio vaccine production come from monkeys raised in colonies free of SV40 or from continuous well-characterized cell lines. The World Health Organization (WHO), the international agency that provides regulations that manufacturers must follow to be eligible to sell the vaccine through the UNICEF, assures the public that all currently-produced oral polio vaccine is now tested for SV40, and none has been found positive. Government health agencies like the CDC, National Institutes of Health (NIH) and the FDA assure the public that SV40 is not present in current lots of the polio vaccine.

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69 Id.
70 Id.
71 21 C.F.R. § 610. See also Centers for Disease Control and Prevention; Cancer, Simian Virus 40 (SV40), and Polio Vaccine Fact Sheet, explaining, “Polio vaccines being used today do not contain SV40. All of the current evidence indicates that polio vaccines have been free of SV40 since 1963” available at http://www.cdc.gov/od/science/iso/concerns/archive/polio_and_cancer_factsheet.htm (last visited December 16, 2007).
72 See, e.g., Robbins, supra note 18, at 387; Sutter, supra note 23, at 17.
73 WORLD HEALTH ORG., REQUIREMENTS FOR POLIOMYELITIS VACCINE (ORAL), (REQUIREMENTS FOR BIOLOGICAL SUBSTANCES No. 7, (REVISED 1989)) (1990) available at http://www.basics.org/pdf/WHO_BASICS_VaccinesProcurement3_eng.pdf; see also Sutter, supra note 23, at 377-80 (explaining that around 18 manufacturers worldwide are producing OPV using the Sabin vaccine seeds, which are now under control of the WHO).
75 CDC-NIP Concerns, supra note 40. Does polio vaccine being given in the U.S. today contain SV40? No, polio vaccines being used today do not contain SV40. SV40 was completely removed from the seed strains of the vaccine viruses in the early 1960’s. The polio vaccine currently used in the U.S. (inactivated polio vaccine, or IPV) . . . has been extensively tested for contaminants, including SV40. . . . Today’s testing methods are better. Any live SV40 would be detected by these methods. Id. See also Sutter, supra note 23, at 387.
C. Today: Concerns of SV40 Contamination Re-emerge

Today, concerns of SV40 contamination in polio vaccines are re-emerging. Lawyer Stanley Kops has done intensive research on the history and manufacturing processes of the oral polio vaccine since it was first licensed in 1963.76 He expressed the need for a re-examination of at least one of the three licensed oral polio vaccine manufacturers.77

Kops expressed concern that there was conflicting information on the whether the oral polio vaccine has been free of the viral contaminant SV40 matter, although scientists and government agencies restate the fact that after 1963 it was free of any SV40 matter.78

In an international symposium in January 1997 at which the NIH, the FDA, and the CDC met in Bethesda, Maryland, representatives from Lederle, an oral polio vaccine manufacturer, stated publicly that “all subsequent working seed strains have been prepared in CMK cells and screened to assure that they are free from SV40 virus.”79 At this meeting, Lederle provided details on the procedures used for screening, testing, and neutralization of SV40 in the seed lots.80

However, Kops counters that Lederle’s internal documents failed to show that SV40 was removed from all of the seed lots.81 According to Kops, a technical superintendent of polio vaccine production at American Cyanamid stated in a 1979 internal memoranda: “It should be made clear that Lederle did not test the original Sabin seeds for extraneous agents or neurovirulence since only 50 ml or less of each seed were provided by Dr. Sabin.”82

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78 Id.
79 Id. at n.16.
80 Id. at n.17.
81 Stanley P. Kops, Oral Polio Vaccine and Human Cancer: A Reassessment of SV40 as a Contaminant Based upon Legal Documents, 20 ANTICANCER RES. 4745, 4750 (2000) (article on file with author).
82 Id. at n.24.
Furthermore, Dr. Mary Ritchey testified in a 1998 litigation suit pertaining to the Lederle oral polio vaccine, that American Cyanamid, the parent company of Lederle, could not ascertain whether all the polio vaccine seeds and strains were tested for SV40 contamination because Lederle did not have protocols in its possession for all of its seed materials.\textsuperscript{83}

Dr. Ritchey testified that there were no protocols for the three master seeds (Type I, Type II, and Type III), as well as for any of the following seed numbers: 3101, 3102, 1102, 45B51, 2107, and 45B52. Dr. Ritchey also testified that in addition to the master seeds mentioned above, American Cyanamid utilized intermediate seeds in the manufacturing process of the oral polio vaccine. Whether these intermediate seeds were free from SV40 contamination could not be determined, because there are no records to prove that these seeds were tested for SV40.\textsuperscript{84}

Kops believes that as scientific knowledge has advanced, the capability to test for the presence of SV40 with more precision and accuracy has increased.\textsuperscript{85} He declares there was no indication that Lederle incorporated new, modern molecular techniques to screen for SV40 contamination in the oral polio vaccines.\textsuperscript{86} No independent scientific investigation has been conducted to determine whether all of the seeds of the Orimune manufacturer, Lederle, including intermediated seeds, were free of SV40.\textsuperscript{87}

Although government agencies have assured the public that SV40 is not present in current lots of polio vaccines,\textsuperscript{88} there is no universally accepted scientific publication to date that confirms the absence of SV40 in polio vaccines, using the most modern molecular techniques available.

\textsuperscript{83} Kops, \textit{supra} note 76, at n.21.
\textsuperscript{84} \textit{Id.}
\textsuperscript{85} \textit{Id.} at 4747.
\textsuperscript{86} \textit{Id.}
\textsuperscript{87} \textit{Id.}
\textsuperscript{88} CDC-NIP Concerns, \textit{supra} note 40.
III. SV40 CONTAMINATION IN THE ORAL POLIO VACCINES: CAN MANUFACTURERS BE HELD LIABLE BASED ON THE RESTATEMENT (THIRD) OF TORTS?

Under the Restatement (Third) of Torts Products Liability, a commercial seller's liability for harm caused by a defective product will depend upon the type of product defect involved in each case: (1) a manufacturing defect, (2) a design defect, or (3) a defect based on inadequate warnings or instructions.

Liability for selling or distributing a product that contains a manufacturing defect is strict, whereas liability for products which are defective because of design or inadequate warnings rests upon the test of reasonableness.

A. Prescription Drug Design Defect and the Debate on its Application

Under the general rule of Section 2(b) of Restatement (Third) regarding design defect, a product is defective in design when the foreseeable risks of harm posed by the product could have been avoided by the adoption of a reasonable alternative design by the seller, and the omission of the alternative design renders the product unsafe. Currently undergoing a heated debate is Section 6(c) of Restatement (Third), which specifically pertains to prescription drug design defect.

1. Background of the Design-Defect Debate

a. Conk’s Critique of the Restatement (Third)’s (Section 6(c))

George Conk criticizes the Restatement (Third) saying “a design defect lurks in the heart of the Restatement (Third).” He focuses his critique on section 6(c), which is the standard to be utilized for defective design of prescription drugs and biologics. Conk argues

90 Restatement (Third) of Torts: Products Liability § 2(a).
91 Id. at § 2(b), (c).
92 Conk, supra note 14, at 1087.
93 Id. at 1087-90.
that in contrast to the general rule of Section 2(b) of the *Restatement (Third)*, Section 6(c) has added a unique "super-qualifier" standard of liability for prescription drugs, biologics, and medical devices, which exempts sellers of prescription drugs and medical devices from the alternative-safer-design standard of Section 2(b) applied to all other products.\textsuperscript{94}

*Restatement (Third)* Section 6(c) states:

A prescription drug or medical device is not reasonably safe due to defective design if the foreseeable risks of harm posed by the drug or medical device are sufficiently great in relation to its foreseeable therapeutic benefits that reasonable health-care providers, knowing of such foreseeable risks and therapeutic benefits, would not prescribe the drug or medical device for any class of patients.

Conk argues that Section 6(c) protects a highly favored industry. He says that in the presence of an alternative design, if the product causes harm, yet its therapeutic effects are deemed to be greater in relation to the harm posed by the drug, it will not be considered defective (net-benefit test).\textsuperscript{95} According to Conk, to prevail on a design defect claim, the manufacturer need only persuade the factfinder that the product does more good than harm for one class of consumers, so that a reasonable physician would prescribe it. Thus, even if the product causes significant unnecessary harm, yet benefits any class of patients or at least one class of patients, it will not be considered defective.

Conk argues that using this highly protective standard of design defect, manufacturers of drugs, biologics, and medical devices will not be held liable even if their products could have been made safe.\textsuperscript{96} He worries about the consequences of maintaining a separate, highly protective liability regime for drug manufacturers as he recounts the history of the HIV and Hepatitis epidemics among hemophiliacs:

[A] massive epidemic of hepatitis struck hemophiliacs in the 1970's, transmitted through factor concentrate and other

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\textsuperscript{94} Id.

\textsuperscript{95} Conk, *supra* note 14, at 1101-03.

\textsuperscript{96} Id. at 1107-14.
blood products...Despite the dangers associated with factor concentrates, physicians concluded that treatment with these products provided a net benefit to hemophiliacs. Even when the risk of HIV transmission through blood became known in the 1980’s, reasonable health care providers continued to prescribe factor concentrate to hemophiliacs because often there was no alternative. The imminent threat to life presented by hemophilia-related emergencies was deemed more compelling than the risk of contracting a chronic illness from the blood products used to respond to these emergencies... But in fact, viral inactivation methods were being researched. In the 1970s, every factor-concentrate manufacturer, unknown to the medical community and each in isolation from its competitors, conducted research into the possibility of using heat pasteurization to kill viruses in blood products. However, this process was not implemented by the blood manufacturers until well after the hepatitis epidemic had exacted its toll on hemophiliacs. It was only in the early 1980’s, as it became clear that AIDS was a blood-borne disease, that the manufacturers of concentrated blood products applied for FDA licensing of heat-treatment processes. Approval was quickly granted, and the techniques proved to be completely effective in preventing viral transmission. . . .

According to Conk’s research, “the prevalence of hepatitis among hemophiliacs had moved blood-products manufacturers to begin research into viral inactivation methods, but it was only the shock of the AIDS epidemic that caused them to... implement pasteurization across the board. . . .” Conk argues that if the heat pasteurization method was implemented earlier, it would have prevented the mass infection of hemophiliacs with hepatitis and HIV.  

On the legal front, Conk asserts that during this time period, the epidemics struck in an environment insulated from liability concern—the remedy of design-defect review was essentially foreclosed both by statute and by the common

97 Id. at 1107-10.
98 Id. at 1110-14.
law’s tacit acceptance of the conventional wisdom that the dangers presented by blood products and other drugs were unavoidable. But it was later determined that they were not unavoidable; rather, there were practical and technically feasible alternative safer designs for blood products. If the alternative design test of Section (2) had been applicable to the blood manufacturers during this period, courts might reasonably have concluded that an entire industry was negligent in its failure to develop and adopt alternative safer designs in a timely manner. . . .

Finally, Conk asserts that the reasonable alternative design (RAD) standard for other products, usually applicable to nonprescription products, should also apply to prescription drugs and medical devices because blood cases in the 1980s would have been decided differently if blood products had been subjected to the general RAD rule of the *Restatement (Third).*

b. Henderson and Twerski’s Response

The American Law Institute (ALI) Reporters, namely James A. Henderson Jr. and Aaron D. Twerski, react to Conk’s arguments and those who have criticized the *Restatement (Third).* The Reporters “identify significant errors in Conk’s critique: he has read the *Restatement (Third)* incorrectly, and his reliance on the blood cases is misplaced.” They clarify that “drug designs are different from other product designs,” and thus cannot be subject to the same provisions of the rule in 2(b). Furthermore, they “question the institutional competence of courts to decide whether safer drugs could have received FDA approval and be brought to the market in time to have helped any given patient.”

In their article, the Reporters assuage Conk and critics by clarifying that Section 6(c) of the *Restatement (Third)* does not exempt prescription drug manufacturers for defective design from the

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99 *Id.* at 1112.
100 Conk, *supra* note 14, at 1118-33.
102 *Id.* at 153.
103 *Id.*
104 *Id.* at 180.
Reasonable Alternative Design (RAD) standard. They assert that "plaintiffs may establish defectiveness by showing that alternative drugs were available on the market that reasonable health care providers would have prescribed in place of a defendant's drug for all classes of patients." And, yes, the Restatement (Third) does allow courts to consider already marketed alternatives in assessing a drug design's defectiveness.

Because phraseologies and comments for section 6(c) may be ambiguous, the Reporters admit that they are as "much to blame as Conk for the confusion" and that they "should have been clearer in the relevant phraseology."

From a medical/science point of view, this paper will analyze facets of Section 6(c)’s “constructs” and “phraseologies,” which make drug designs different according to the Reporters. Subsequently, based on the Reporters’ clarifications and interpretations of section 6(c), the authors will evaluate the Restatement (Third)’s implications on the issue of SV40-contamination in polio vaccines.

2. Points of Concern from the Viewpoint of the Medical Profession

a. Health-Care Providers and the Concept of Design

According to the Reporters, the “key” to understanding the provision of section 6(c), is the reliance on the construct of whether “reasonable health-care providers” would knowingly “prescribe the drug or medical device for any class of patients.”

In an ideal system where information transmission is perfect, from manufacturer to consumer—via health care providers (also referred to as the learned intermediary)—all decisions would be socially optimal because both manufacturers and product users are able to accurately determine and internalize potential risks. Additionally,
this idealized setting assumes that the physician is in a position of infallibility, i.e., he is in a better position than a pharmaceutical manufacturer to make decisions for his patient. Not only is he informed of all the available drugs and modes of therapy in the market, but he is also perfectly able to tailor his choice of therapy and recognize, which risks are remote for a particular patient and which risks are of very real concern.\footnote{See, e.g., Charles Walsh, Steven Rowland & Howard Drofman, The Learned Intermediary Doctrine: The Correct Prescription for Drug Labeling, 48 Rutgers L. Rev. 821, 881 (1996).}

The Reporters point out that with demanding years of zealous commitment in education and training, the field of medicine disciplines physicians with the expertise to assure that the appropriate drugs reach the appropriate patients. Where some drugs are unreasonably dangerous to some consumers, yet beneficial to another class of consumers, the physician is equipped with the knowledge to decide what is best for their patients.\footnote{Henderson & Twerski supra note 8, at 156-57.} By selectively distributing the drug to a particular patient, the physician can minimize the limitations of risky drug design and maximize therapeutic effects tailored to his particular patient.

Up to a point, the Reporter's argument—that the learned intermediary will make sure that all the right drugs reach the right patients—is valid. However, the logic fails when one considers what has been mentioned time and again in legal literature regarding drug design: physicians do not make design choices,\footnote{See, e.g., George Conk, The True Test: Alternative Safer Designs for Drugs and Medical Devices in a Patent-Constrained Market, 49 UCLA L. Rev. 737, 747 (2002) [hereinafter Conk, The True Test]; Green, supra note 13, at 207, 224.} nor do they oversee the manufacturer in designing drug formulations.\footnote{Conk, The True Test, supra note 113, at 747, Green, supra note 13, at 224.} The role and focus of a private physician is healing his patient.\footnote{Medical training is patient-based. The focus of years of training to obtain an M.D. is how to treat patients from disease; not how to design drugs in order to treat disease. See, e.g., Fauci et. al., Introduction to Clinical Medicine, in PRINCIPLES OF INTERNAL MEDICINE (Anthony Fauci et. al., eds. 15th ed. 2001) [hereinafter PRINCIPLES OF INTERNAL MEDICINE].} Conceptualizing drug design does not emanate from him; instead, he chooses the appropriate
drug therapy from already available drug designs in the market and then prescribes it to his patient.

Physicians do not have independent expertise regarding the details of prescription products and do not know nearly as much as manufacturers the efficacy and safety of drugs. They may rely on manufacturers’ extensive advertising, promotional programs and medical sales representatives to learn about the product—sources that do not provide a complete or accurate picture of product risks. Furthermore, physicians do not always remain up-to-date on available information—it is not uncommon for doctors to continue to prescribe familiar forms of medication even if newer alternative drugs released out in the market are more efficacious and safe. Generally, the role of the private physician is one of passive reliance on the manufacturer as the expert.

i. The Manufacturer is Expert

Efforts to develop a new drug or vaccine begin with the manufacturer who ventures into research and development. "The FDA decides what clinical testing and data submissions are necessary to satisfy the safety and efficacy provisions of the law." In addition to determining which clinical studies are necessary, the FDA establishes minimum standards for conducting these studies. These guidelines are outlined through a set of regulations called Good Clinical Practices (GCPs), which describes the responsibilities of those who are outlined in a clinical trial: the sponsor (manufacturer), the investigators, and the Institutional Review Board, whose primary function is to see that clinical subjects are safe and that they are adequately informed about the clinical trial.

116 See, e.g., Cupp, supra note 13.
118 Id.
120 EBBERT ET AL., supra note 19, at 40. See also 21 C.F.R. § 314.1-2.
121 EBBERT ET AL., supra note 19, at 41.
122 Id.
123 Id.
In the GCP guidelines, the sponsor or manufacturer is responsible for selecting qualified investigators and providing them with the data they need in order to properly conduct the investigation. Although private physicians know general pharmacologic actions of the drug, its indications, contraindications, and adverse effects, the concept of drug design is a task that is done by an inventor—a highly specialized physician or scientist who obtains further scientific training in areas like molecular biology, molecular genetics, chemical pharmacology, biochemistry, and others. Such specialists in medicine/science may be directly employed by a manufacturer or may be affiliated with academe and collaborate with a manufacturer for drug design. In addition to selecting qualified medical/scientists to develop a product, the manufacturer monitors the investigation, making sure it is conducted in accordance with the general investigational plan and protocols outlined in the Investigational New Drug Application (IND). The IND is a proposal through which the manufacturer obtains the FDA’s approval to begin testing the new product in humans. Additionally, the manufacturer has the responsibility to keep the FDA and investigators informed of any significant new adverse effect or risk related to the product.

With vast economic resources and access to a highly specialized manpower base, the manufacturer initiates and controls the direction of research and development of a new drug or vaccine.

Therefore, a realistic examination of liability rules, especially that which concerns the design of prescription drugs, biologics and medical devices, should begin with the general observation that the manufacturer is the expert. He is most informed about his product risks than are consumers and learned intermediaries.

Because the manufacturer is clearly the expert, evaluation of manufacturer reasonableness in terms of drug or vaccine design should not be measured by the same standard as that applied to a prescribing physician. As stated by Conk, stewardship of design is the responsibility of a manufacturer, and a standard of design-based liability should emanate from his superior vantage point.

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124 Id.
125 Id.
126 Id.
127 Id.
128 Just What You’d Expect, supra note 109, at 2376-77.
129 Conk, The True Test, supra note 113, at 749.
b. The "Net-Benefit Test" via the Assessment of a Learned Intermediary

The use of the risk-benefit test or net-benefit test to determine design defect is a complex issue addressed by courts and products liability scholars. According to the Reporters, the key to Section 6(c)’s construct is the learned intermediary who, before prescribing a drug to his patient, mentally scans all the available drugs in the market and chooses an initial drug from a group of reasonable alternatives in the market—the physician does a risk-benefit analysis of the drug “in light of other alternatives.” The Reporters chide Conk:

Conk’s suggestion that the new Restatement requires the hypothetical prescribing physician to focus exclusively on the risks and benefits of a given drug in isolation, wearing blinders that prevent consideration of other readily available drugs, attributes a meaning to Section 6(c) that would require that physician to violate her Hippocratic oath ... [T]he blinders Conk reads into Section 6(c)...would otherwise constitute a gratuitous insult to the medical profession...

Actually, in clinical practice, Conk’s suggestion of doing a risk-benefit analysis of a drug “in isolation” is also correct. Physicians do a risk-benefit analysis of prescription drugs “in isolation” after choosing a particular drug from all available drugs in the market. They then do a second mental analysis on how the drug will affect their individual patients. Based on an individual patient’s unique medical history, taking into consideration multiple factors such as age, gender,

130 See Restatement (Third) Torts: Products Liability § 6(c) (stating “that reasonable health care providers, knowing of such foreseeable risks and therapeutic benefits, would not prescribe the drug or medical device for any class of patients”).
131 See, e.g., Cupp, supra note 13.
132 Henderson & Twerski, supra note 8, at 156-57. It is crucial to note that, actually, the most important accomplishments of a physician are not procedures or drug prescriptions per se, but rather, the judgments from which these and all other aspects of clinical therapy flow. It is easy for patients and laymen to overlook the crucial importance of this elusive mental activity, especially in our era of fast-paced diagnostic and therapeutic equipment (Daniel Mark, Decision-making in Clinical Medicine, in Harrison’s Principles of Internal Medicine (Anthony Fauci et. al., eds. 15th ed. 2001) [hereinafter Principles of Internal Medicine 15th ed.].
133 Henderson & Twerski, supra note 8, at 155-57.
134 Id.
genetic predisposition, patient clinical exam, and diagnostic results, among others, the physician then determines whether the known benefits of his particular drug of choice will exceed its potential harmful risks for the particular patient. For example, traditionally, the treatment of choice for severe clostridial infection\textsuperscript{135} has been the antibiotic penicillin G. However, if a physician has determined that his patient is sensitive or allergic to penicillin G, he will change this choice to suit his patient.\textsuperscript{136} Should a physician then choose an antibiotic like chloramphenicol, but finds out, during the course of treatment, that the patient is resistant to the drug, again, he will alter his choice. The medical process of doing a risk-benefit or net-benefit analysis of a drug in “isolation” may be done during the course of patient therapy or on a patient’s succeeding visits.

Indeed, as pointed out by the Reporters, there are times when physicians may “misprescribe” a well-designed, but risky, drug.\textsuperscript{137} He may fail to heed clear and adequate warnings to guard against risks to patients as stated in the package insert,\textsuperscript{138} or he may not relay warnings to his patient,\textsuperscript{139} or he may not obtain his patient’s informed consent\textsuperscript{140}

\textsuperscript{135} Bacteria of the genus Clostridium are gram-positive, spore-forming rodlike bacteria. Infections associated with clostridium bacteria range from localized wound infection to overwhelming systemic disease. Examples include: tetanus on contaminated wounds, food and intestinal poisoning, blood poisoning, among others DENNIS KASPER \& DORI ZLENZNIK, Gas Gangrene, Antibiotic-Associated Colitis, and other Clostridial Infections, in PRINCIPLES OF INTERNAL MEDICINE, supra note 115, at 906-910.

\textsuperscript{136} Penicillin sensitivity may have varied effects in different patients. In patients with impaired renal function, allergy to penicillin can manifest with severe seizures. In other patients, penicillin may induce serious hypersensitivity reactions. GORDON ARCHER, RONALD POLK Treatment and Prophylaxis of Bacterial Infections, in PRINCIPLES OF INTERNAL MEDICINE, supra note 115, at 865. See also WILLIAM PETRI, Antimicrobial Agents: Penicillins, Cephalosporins, and Other β-Lactam Antibiotics, in PHARMACOLOGICAL BASIS, infra note 156, at 1204.

\textsuperscript{137} Henderson \& Twerski, supra note 8, at 174.

\textsuperscript{138} See, e.g., Margaret Gilhooley, When Drugs Are Safe for Some but Not Others: The FDA Experience & Alternatives for Products Liability, 36 HOU S. L. REV. 927, 945 (1999); Mulder v. Parke Davis & Co., 181 N.W.2d 882, 887 (Minn. 1970) (using the drug product contrary to a drug manufacturer's recommendations is prima facie evidence of negligence by the physician).

\textsuperscript{139} See id., at 942; Restatement (Third) of Torts: Products Liability, supra note 88, § 6 cmt. b

\textsuperscript{140} Informed consent is an ethical guideline in the practice of medicine that requires physicians to discuss with his patient the nature of the proposed care, the alternatives and the risks and benefits of each. Whenever a risky procedure is involved in therapy, rule of thumb is to go with the patient’s informed decision. The warnings from the manufacturer as stated in the package insert provide the means by
regarding the use of the drug despite its adverse effects. It can also happen that because of a negligent approach to obtaining information regarding his patient’s medical history, physical examination, or diagnostic work-up, the patient suffers an adverse consequence. When these scenarios happen, liability should indeed fall on the negligent physician. Nevertheless, when a physician makes a clinical judgment\textsuperscript{141} for his individual patient, the final choice of drug therapy is based on his \textit{personal knowledge, experience, and belief} that the drug, notwithstanding its known harmful risks to another patient, will be maximally tailored to benefit that particular patient.

Thus, it follows that almost every drug out on the market, no matter how risky, will not be subject to manufacturer design liability according to section 6(c) of the \textit{Restatement (Third)}. Once a physician prescribes such as drug and has weighed the foreseeable risks of the drug in “light of all other alternatives” and in “isolation,” he has already established that prescribed drug to be beneficial and “reasonably safe” for that particular patient.

c. When Manufacturer Design-based Liability Can Occur

What then is the legal standard for defectively designed drugs? To this query, in their essay “Drug Designs are Different,”\textsuperscript{142} the Reporters mention three scenarios: (1) when such a drug does not provide any net benefit to any class of patients; (2) when such a drug should never had been marketed in the first place; and (3) when a plaintiff can show that alternative safer drugs were available in the market, which physicians would have prescribed in place of a defendant’s drug for all classes of patients.


\textsuperscript{142}Henderson & Twerski, \textit{supra} note 8.
i. **When Such a Drug Provides No Net Benefit to Any Class of Patients**

As Mr. James H. Henderson of the Reporters explains, "The emphasized language clearly indicates that if one class of patients is found to exist for whom the defendant's drug is the one of choice, then it is not defective." To assume that a particular prescription drug out in the market would not benefit any "class of patients" or any patient, is an assumption that is superficially plausible, yet misguided in its approach when one considers that unless some form of demand or need for a product exists, a manufacturer will not provide for such. Like any business entity, before a drug manufacturer invests in a business venture, he knows that there already exists a demand for the drug product, he is certain that there exists a niche of consumers (i.e. "class of patients") who will need his product and support its sales once it is launched into the market. Basic business sense dictates that he will not venture into drug development blindly without thorough knowledge of the drug market; he has done an extensive market research on his product; he has done strategic analysis on the costs of production, how the specific operations and distribution network will proceed, the projected market share of his product, and the potential return of investment over a set time period. He knows a good deal about his customer profile: who his patients are, and the degree of their buying power. He has consulted physicians on what types of patients will need the potential drug, notwithstanding its known adverse effects. Furthermore, the manufacturer has done research on specific medical practitioners who will most frequently prescribe his product. The manufacturer knows all about the prescription drug market and more.

Therefore, through significant market research, the result is an underlying confidence that there already exists an initial "class of patients" who will need the drug and who will support its sales via the recommendation of a learned intermediary once the product is released into the market.

How then could a plaintiff prevail on a design defect claim? Richard L. Cupp Jr. attempts to explain,

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143 *Id.* at 174.

If a plaintiff can show that the reasonably foreseeable risks posed by a drug are so great that a reasonable health-care provider, who is informed of the risks, would not prescribe the drug to any patient then the design is defective and the plaintiff is entitled to recovery from the manufacturer.\textsuperscript{145}

Logistically, a plaintiff needs to locate a representative physician to testify that he will not prescribe the drug or device to any class of patients, thereby permitting a design defect liability.\textsuperscript{146}

However, finding a representative physician to testify that he will not prescribe the prescription drug or medical device to any class of patients is almost impossible because of this crucial concept: a physician knows that select colleagues in the medical/scientific community work in solid partnership with industry manufacturers in all technical aspects of the prescription drug market: from conceptualization of the drug, to development, to safety and efficacy clinical trials to manufacturing operations, and its final distribution to patients.

Although there are cases when drugs are withdrawn from the market post-sale, at that point in time, when a private physician prescribes a drug, even if it is a new risky drug, there is a margin of confidence that the drug is safe because he trusts that his colleagues have tested and re-tested the drug for safety and efficacy for a period of years before the drug is released into the market. Needless to say, when a drug or therapeutic device is released into the market, it has undergone extensive consultation and evaluation with the medical profession. The very same professionals will be responsible for the distribution, consumption and sale of their products—ensures the manufacturer that there exists a market, a niche of patients, for whom the drug would be prescribed, once the product is released into the market.

Thus, when the Reporters suggest that Section 6(c) requires a plaintiff to find a physician to testify that he would not prescribe the drug or medical device for any class of patients, this solution is practically unworkable because the manufacturer collaborates with and

\textsuperscript{145} Cupp, supra note 13, at 248 (citing Andrew Barrett, Note, The Past and Future of Comment k: Section (4)(B)(4) of the Tentative Draft Restatement (Third) of Torts - Is It the Beginning of a New Era for Prescription Drugs?, 45 SYRACUSE L. REV. 1291, 1324 (1995)).

\textsuperscript{146} Id. at 244-46.
relies on the medical/scientific profession in all aspects of drug development, from clinical testing, to (FDA) regulation until its distribution to the consumer. This establishes the fact that even before the drug reaches the market, the network of physician involvement and support (in industry, government, and colleagues in private practice) guarantees that there already exists a class of patients who will need the drug and to whom it will be prescribed once it hits the market. In other words, it is almost impossible for a physician to testify that such a drug provides no net benefits to any class of patients or “should never have been marketed in the first place,” when he himself knows that the initial need for that drug has already been established by expert colleagues, select members of the medical profession who are involved in drug conceptualization and development in conjunction with the manufacturer.

Therefore, the phraseology, “that reasonable health care providers, knowing of such foreseeable risks and therapeutic benefits, would not prescribe the drug or medical device for any class of patients,” as applied to the rule of Section 6(c) would hardly find any application. Through the extensive network of physician involvement and support, the manufacturer is confident that there already exists a market niche—a class of patients, who will be prescribed the medication, and who will benefit from the drug product once it is released into the market. The logistic unworkability of this approach in court is illustrated by this example: plaintiffs in the court in Sita v. Danek Medical asserted that a manufacturer defectively designed a surgical screw system. However, the defendants presented “an impressive compendium” of 270 surgeons’ testimony that the use of the medical device was helpful and appropriate.

ii. When Such a Drug Should Never Have Been Marketed in the First Place

The Reporters assert that design-based liability can be imposed when a drug should never have been marketed in the first place. Although there are occasions when drugs have been withdrawn from the market, most drugs that reach the market have undergone, as

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147 Henderson & Twerski, supra note 8, at 174.
148 Cupp, supra note 13, at 244 (citing Sita v. Danek Medical, Inc. 43 F. Supp. 2d 245 (E.D.N.Y. 1999)).
149 Id.
150 Henderson & Twerski, supra note 8, at 174.
explained above, an extensive risk-benefit analysis of safety and efficacy: first, by physicians and scientists who have done clinical research together with the manufacturer in conceptualizing and developing the drug; and second, by competent physicians and scientists who work in conjunction with the FDA.

Nevertheless, granted that design-based liability can be imposed when such a drug should never have been marketed in the first place, the Reporters explain that, "...Section 6(c) tacitly assumes that the FDA will occasionally approve or (fail to order withdrawal of) a drug that should not be allowed on the market. . . ." This situation is, however, rare.

iii. When a Plaintiff Can Show that Alternative Safer Drugs were Available in the Market, which Physicians would have Prescribed in Place of a Defendant’s Drug for All Classes of Patients

The Reporters assure critics that “plaintiffs may establish defectiveness by showing that alternative safer drugs were available on the market that reasonable health care providers would have prescribed in place of a defendant’s drug for all classes of patients.” Although medical books are written about signs and symptoms of specific medical conditions, a physician’s approach to his patient is not textbook-based because even as textbooks explain general signs and symptoms of that disease, a physician may be faced with an individual patient who does not exhibit the standard signs and symptoms of that particular disease entity.

A physician treats each patient as a unique individual. Every therapeutic encounter with an individual patient is personal and special. Thus, it must be emphasized that a physician’s approach regarding the choice of drug for his patient is individualized.

In addition to unlimited human variables which interact with drug metabolism, many other variables influence a physician’s prescribing practice: his personal knowledge, training, and bias from experience—all of which are shaped by powerful, sometimes perverse, external forces. Thus, no two physicians are exactly alike in drug prescribing practices, even among specialists of the same medical field.

151 Id.
152 Id. at 152.
153 MARK, supra note 134, at 8-14.
It is crucial to understand the extent of variable considerations a physician must face in medical practice, how unlimited patient variables are, how the combinations of such factors can affect the presentation of the same disease entity, and how infinite the interactions range between patient factors and drug factors. This is why physicians can never assure the safety or efficacy of a drug in an individual patient.\footnote{ALAN NIES, Principles of Therapeutics, in GOODMAN & GILMAN'S: THE PHARMACOLOGICAL BASIS OF THERAPEUTICS 45-58 (Joel Hardman & Lee Limbird eds., 10th ed., 2001) [hereinafter PHARMACOLOGICAL BASIS].} Even if two patients seek consultation for the same medical condition, no two patients will have exactly the same medical history, no two patients will exhibit exactly the same clinical symptoms and severity of disease.

Thus, any slight change in patient variables or severity of disease coupled with the patient's opinion on the effectiveness of the prescribed drug will alter a physician's choice of therapeutic strategy for that individual. Therefore, it cannot be prescribed for \textit{all} classes of patients within the same medical condition or disease entity. There hardly exists a single alternative drug, which a physician will prescribe to \textit{all} classes of patients within the same medical condition or disease.

\subsection*{a. A Note on the Use of the Phraseology “Class of Patients”}

Section 6(c) of the Restatement (Third) uses the phraseology, “class of patients.” In the field of medicine, an absolute number of “class of drugs” may exist, but the term “class of patients” cannot be numerically quantified. “Classes of patients” can be continually created and can be observed by one physician and not by another. Unlimited patient variables, which exist in combination with different drug interactive factors and which can be discovered every time a physician sees a patient, may constantly create new, emerging “classes of patients” just as easily as science has discovered new uses for old, risky drugs like Thalidomide.

In the 1960s, Thalidomide's original use was as a sedative. Yet, it created a massive public panic when it was discovered to cause severe and life-threatening (teratogenic) birth defects when administered to pregnant women. Today, medical science has discovered a new use for the drug—one that is unrelated to Thalidomide’s original use as a sedative. The FDA has approved the drug for the treatment of a “class” of patients with leprosy, specifically for the “sub-sub class” of those suffering from lepra reactions, known
as *erythema nodosum leprosum* or ENL, manifestations of which may include painful skin lesions and high fever.\textsuperscript{155}

One may ask if there exists alternative drugs in treating ENL which are not teratogenic like Thalidomide—the answer is yes. Alternatives range from antipyretics to steroid drugs (glucocorticoids). Still, as mentioned earlier, a physician's approach to treating his patient is individualized. If ENL manifestations in a patient are mild (i.e. without fever or other organ involvement, with only a few skin lesions), patients may be treated with antipyretics alone.\textsuperscript{156} In patients with many skin lesions, fever, malaise, and other tissue involvement, glucocorticoids are effective.\textsuperscript{157} However, if ENL appears to be recurring and persisting, it is recommended that Thalidomide therapy be initiated.\textsuperscript{158} Although alternative glucocorticoids do not possess the teratogenic effects of Thalidomide, a patient who has undergone prolonged treatment with glucocorticoids may also suffer from some of its life threatening toxic effects, which include adrenal suppression, metabolic effects (growth inhibition, diabetes, muscle wasting, osteoporosis), salt retention, and psychosis.\textsuperscript{159} In these types of patients, the steroid-sparing drug, Thalidomide, may be the only avenue in preventing morbidity associated with ENL.

Under Section 6(c) of the Restatement (Third), in light of available alternatives like glucocorticoids in treating ENL, the fact that Thalidomide is useful in treating ENL but may cause birth defects does not mean that the manufacturer has defectively designed the drug. Thalidomide should not be defective, because it must be made available to a class of patients who suffer from ENL, albeit warnings are required to alert pregnant users of disastrous side effects.

Interestingly, Thalidomide is also today a new and experimental drug in the treatment of new, emerging "classes of patients:" those with Inflammatory Bowel Disease (IBD), those with Crohn's disease (a

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\textsuperscript{156} GELBER, supra note 154, at 1035-40.

\textsuperscript{157} Id.

\textsuperscript{158} Id.

\textsuperscript{159} Id.
chronic disease of the gastrointestinal tract), and a "class of patients" with severe, refractory rheumatoid arthritis.

Through a typical example of the use of Thalidomide in ENL, one can now visualize the workings of the healer's craft: because physicians treat each patient as an individual, it is important to understand that the choice of drug therapy, considered to be risky for one patient, may be beneficial to another. A "dangerous" drug not normally prescribed to a general number of patients may be needed by another patient or a select class of patients. Similarly, if a physician does not detect a toxic effect in one particular patient, it does not mean that it will not occur in others. Additionally, although alternative drugs exist in the market which are known to be safe from a particular adverse event, these alternative drugs may still cause other unavoidable adverse reactions, which may pose to be more serious in another "class" of patients. Thus, even if a second safer alternative drug in the market exists, to the judgment and experience of a clinically trained eye, a drug may still have medical benefits for a certain class or sub-class of patients, depending on each patient's unique medical need.

The Reporters attempt to assure critics that "plaintiffs may establish defectiveness by showing that alternative safer drugs were available on the market that reasonable health care providers would have prescribed in place of a defendant's drug for all classes of patients."

However, in actual medical practice, such concept is unworkable. First, because a physician's approach to treatment is governed by the principle of "individualized patient therapy" and not therapy, as applied to "all classes of patients." Second, the phraseology, "class of patients" as stated in Section 6(c), which attempts to picture a definite numeric boundary of types of patients and disease entities, is inapplicable in the field of medicine. Science continually discovers new emerging classes of patients for whom a defendant's risky drug can still benefit, and would still be prescribed by some physician, even if such a drug has been removed from the market, as shown by the Thalidomide example.

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160 Syed Jafri & Pankaj Pasricha, Agents Used for Diarrhea, Constipation, and Inflammatory Bowel Disease; Agents Used for Biliary and Pancreatic Disease, in Pharmacological Basis, supra note 153, at 1054.

161 Id. See also N. Keesal et al., Thalidomide in the Treatment of Refractory Rheumatoid Arthritis, 26 J. Rheumatology 2344 (1999).

162 Nies, supra note 153, at 48.

163 Henderson & Twerski, supra note 8, at 152 (emphasis added).
Impracticability of the concept can further be illustrated in court when questions like these arise: how many physicians do you need to testify in order to establish that they would all opt to prescribe an alternative safer drug in the market? Suppose one hundred physicians agree that they would prescribe alternative drugs, but still one physician opts to prescribe the defendant's drug, would that drug be defective?  

From the above explanation, it is not difficult to see that the Section 6(c) phraseology, "that reasonable health-care providers, knowing of such foreseeable risks and therapeutic benefits, would not prescribe the drug or medical device for any class of patients..." is an unworkable concept as applied to medical practice, a concept that considerably narrows the standard of liability of manufacturers.  

d. **Under the Restatement (Third), a Plaintiff cannot argue that a Drug Manufacturer Should Have Developed a Safer Alternative Drug**

The Reporters provide a convincing argument that the Restatement (Third) is correct in not allowing plaintiffs to argue that a drug manufacturer should have developed a safer alternative drug; it is impossible for courts to replicate the FDA approval process. As Michael Green and the Reporters point out, "With such careful regulatory oversight, we need not have tort law (and inexpert juries) second-guessing FDA expert determinations."  

Certainly, on the surface, the FDA is almost "fail-safe." But Conk, along with legal scholars and critics of Section 6(c), point out one crucial factor: the FDA is not per se involved in initiating or conceptualizing prescription drug or vaccine design, nor does the

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164 Cupp, supra note 13, at 244-47.  
165 Conk, supra note 14; Cupp, supra note 13; Green, supra note 13. These authors, along with other critics, prove a point: The reasonable physician standard of § 6(c) of the Third Restatement has been described as a standard that in effect will hardly allow any liability.  
166 Henderson & Twerski, supra note 8, at 163-64.  
167 Green, Prescription Drugs, supra note 13, at 220-21.  
168 See 21 U.S.C. § 355(b) (2006) (describing criteria for FDA approval or rejection of NDA--the FDA has a general picture of the drug, and approves it when, after evaluation of documents it has decided that benefits of the new drug outweighs its risks); see also Dixie Farley, Benefit vs. Risk: How FDA Approves New Drugs, 21 FDA CONSUMER MAG. 7 (Dec. 1987- Jan. 1988).
agency actively test for optimum drug design. Whether a drug can be redesigned in order to improve its therapeutic benefit-to-risk ratio is not a task assigned to the FDA. The FDA does not examine whether there were other safer, more efficacious, alternative designs of drug available to the manufacturer, which he could have employed in the processing of his drug product. Conceptualizing the particular details of drug or vaccine design that may spell the difference between safety and risk emanates from the creativity of a manufacturer who has the financial resources to capitalize on patents and licensing rights, the scientific specifications of which largely remain a secret.

Still, the only other way to ascertain the highest quality of safety and efficacy is to consider new scientific strategies of designing and improving a prescription drug or vaccine, but this avenue reaches a dead-end when the Reporters assert that the Restatement (Third) only allows courts to consider only alternatives that have received FDA approval.

e. The Tort System Must Not Remove from the Market an Beneficial Drug for a Certain Class of Patients

The Reporters are correct in their concern that the tort system must not remove prescription drugs from the market, no matter how risky they may be, because to do so, may deprive another class of patients access to the same drug for whom it is deemed beneficial. This is exemplified by Thalidomide and OPV. Furthermore, scientific research may find breakthrough therapeutic discoveries using old drugs in combination with new strategies.

However, the crux of the issue here is not the removal of such products from the market, but to guarantee that one who produces it is monitored for possible negligence. Leave the product on the market—just make sure that producers are doing everything scientifically

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170 See, e.g., Gilhooley, supra note 138; Peter B. Hutt & Richard Merrill, Food and Drug Law: Cases and Materials 1178-1206 (2d ed. 1991); Green, supra note 13.

171 See discussion infra Part VI.B.2. See also Conk, The Real Test, supra note 113.

172 Henderson & Twerski, supra note 8, at 162-67.

173 Id. at 168-70.
possible to "clean up" the vaccines, and simply discard those that are contaminated with dangerous matter.

3. An Analysis of the Restatement (Third), Section 6(c) Standard of Design Defect

From a medical-scientific view, the authors observe some important facets of Section 6(c)'s constructs and phraseologies that according to the Reporters make drug designs different. Interestingly, the authors observe subtle dynamic effects of such reasoning on the psyche of the lawyer.

The Reporters claim that the Restatement (Third) has been "misread," incorrectly interpreted, and that it does not exempt drug manufacturers for defective design. In fact, they reason that the Restatement (Third) does allow courts to consider already marketed alternatives. However, to this rule, very narrow standards of liability seem to attach: conditions that will almost always shield manufacturers from liability, and divert thorough scrutiny of the rule of Section 6(c) away from an intelligent lawyer.

First, lawyers are pacified by the reasoning that the Restatement (Third) does allow courts to consider already marketed alternatives. However, doing this would entail a risk-benefit assessment or a net-benefit assessment of available drugs in the market by expert medical practitioners, which, from a medical perspective, is an unworkable standard for manufacturer design-based liability. It is unworkable because generally, every drug out in the market will benefit a patient. Once a drug is prescribed, a physician has already taken into consideration the multiple patient variables, drug interaction variables, and other variables that affect disease progression, and has determined that the foreseeable therapeutic benefits of the drug are sufficiently great in relation to its foreseeable risks of harm. In other words, based on the rule of Section 6(c), any drug (including those that have been withdrawn from the market), once prescribed by a physician would not be subject to a design-based defect, because the physician has already established the drug to be beneficial and "reasonably safe" for that particular patient at that particular time period.

In effect, the use of the "net-benefit" or "risk-benefit" test already acts as a frontline shield against a manufacturer's responsibility of producing the most technologically superior and safe prescription

174 Id. at 152.
175 Id. at 155-156.
drug and vaccine design, by limiting manufacturer responsibility under the assumption of learned intermediary expertise. Yet, such assumption suffers from incongruence because in the reality of medical practice, private physicians essentially rely on manufacturer expertise.

Second, the Reporters assert that, "as long as one or more classes of patients need a particular drug, it should not effectively be removed from the market by judicial decree." However, the issue is not to drive the biologic away from the market, because unquestionably, such products must be available to those who need them. Further, the issue does not pertain to a "no-win" choice between contaminated blood transfusion, or no transfusion at all, in the way Conk explains, his hemophiliacs had to choose. Nor does the issue pertain to a choice of whether or not the immediate benefits of OPV vaccination in preventing crippling polio outweigh the risk of contracting a latent disease like cancer in the future, because clearly world eradication of polio is a must.

The critical issue is to guarantee that a manufacturer has fulfilled his responsibility as expert. The manufacturer must use his resources to analyze all possible alternative scientific designs available at present, in order to guarantee the highest quality of safety and efficacy of such products that enter the human body. No choice should be necessary when there exists alternative, safer, more efficacious scientific designs which an expert manufacturer can create to clean up blood products or vaccines.

Third, the Restatement (Third) intimidates the lawyers when it plays them against FDA expertise. The Reporters reason that courts cannot replicate the huge financial investments and the work involved in drug development. Of course, the concept of "FDA expertise" plays well when accepted by the lawyer, because it can then be asserted that "The Restatement is correct in not allowing plaintiffs to argue that a drug manufacturer should have developed a safer alternative drug" that has not received FDA approval. Still, as explained above, the FDA process is not entirely fail-safe because the agency does not initiate the conceptualization of prescription drug or vaccine design; it generally relies on manufacturer expertise.

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176 Id. at 168-75 (explaining that "Restatement Rejects an Aggregative, All-Patients – Considered Approach to Defective Drug Design").
177 Conk, supra note 14, at 1107-14.
178 Id. at 164-67.
179 Id. at 153, 175-80.
Fourth, the Reporters’ assumption that the prescription drug industry gives full disclosure of their marketing practices to the medical-scientific community or to the FDA is naïve. Obviously, in a highly competitive, patent-controlled industry, secrecy rules. “Micro-scientific details,” which may spell the difference between safety and risk, calibrated against cost efficiency and business expansion, remain internal to a manufacturer.

In the event of litigation based on design defect, plaintiffs are up against the insurmountable obstacle of credibly proving that an alternative method of decontaminating blood or oral polio vaccines is reasonably available at the time of sale. Defendants are prepared to play the game. Even if plaintiffs call in scientific expert witnesses who believe that there are currently available alternative modern molecular methods of screening for the SV40 virus in polio vaccines, defendants can easily respond that such methods are already undergoing experimentation, and that such methods could not yet be implemented at the time the plaintiff suffered injury. Defendants can then establish that such molecular techniques will be implemented as soon as they are technologically able to do so. This is the way plaintiffs in Conk’s contaminated blood cases lost, as asserted by the Reporters.

Therefore, based on the rule of Section 6(c), cancer victims of SV40-contaminated vaccines are not expected to prevail on a design-based litigation, in precisely the same manner that Conk’s victims of viral-contaminated blood products did not stand a chance.

B. Manufacturing Defect

Differentiating a design defect from a manufacturing defect can be difficult. Henderson and Twerski chide Conk:

Before reaching the merits of Conk’s argument, some conceptual confusion must be eliminated... the contaminants that caused their harm constituted manufacturing defects for which manufacturers are generally held strictly liable under section 2(a) of the new Restatement...Thus, when Conk argues that application of the RAD-based design standard in section 2(b) would have produced different outcomes in the blood cases, from a

\(^{180}\) *Id.* at 178-80.

\(^{181}\) *Id.* at 161.

\(^{182}\) Conk, *supra* note 14, at 161.
technical standpoint, he is mixing apples with oranges...  

The Code of Federal Regulations defines the term "manufacture" as follows: "Manufacturing means all steps in propagation or manufacture and preparation of products and includes but is not limited to filling, testing, labeling, packaging and storage by the manufacturer."  

In other words, the manufacturing process includes all the steps, methods and processes utilized in making the final product until it reaches the consumer. A product contains a manufacturing defect when "the product departs from its intended design." It fails to meet the manufacturer's quality standards or fails to perform its intended function. Only a small number of individual products in a product line will contain manufacturing defects. On the other hand, in the context of a design defect, every product in the assembly line will be defective.

In the case of a manufacturing defect, the manufacturer will be liable for harm caused by the defect despite the fact that he exercised all possible care in preparing and marketing the product. For example, the court in the American Tobacco Co. v. Grinnell noted that alleged pesticide residues in tobacco, even if they "may be found in many if not all cigarettes," is a manufacturing defect rather than a design defect, because the residues were "not an ingredient American intended to incorporate into its cigarettes."

In the case of a design defect, the manufacturer's standards of quality are being challenged. It might meet the manufacturer's specifications and quality standards but will still be unreasonably dangerous. Because it is a manufacturer's standards which are being challenged, such standards cannot be used to determine whether a

183 Id. at 160.
184 21 C.F.R. § 600.3(u) (2006)(emphasis in original).
185 See Restatement (Third) of Torts: Products Liability § 2(a) (referring to products that are physically flawed, damaged, or incorrectly assembled).
186 See James A. Henderson, Jr., & Aaron D. Twerski, A Proposed Revision of Section 402A of the Restatement (Second) of Torts, 77 CORNELL L. REV. 1512-16 (1992); Rutherford, supra note 89, at 233.
187 See Rutherford, supra note 89, at 233.
188 Id. at 229.
189 See Restatement (Third) of Torts: Products Liability § 2(a).
190 951 S.W.2d 420, 434 (Tex. 1997).
191 See Rutherford, supra note 89, at 233.
192 Id.

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product is defective in design. Rather, courts must resort to standards of reasonableness as an independent standard.\footnote{Id.; Restatement (Third) of Torts: Products Liability § 2 (b).}

With respect to Conk's contaminated blood products, during the 1970s, the use of heat pasteurization as a method to inactivate blood-borne viruses was reportedly undergoing scientific research\footnote{Conk, supra note 14, at 1109, 1109 n.25 (citing a report from The Institute of Medicine, HIV and the Blood Supply: An Analysis of Crisis Decision-making 223 (1995)).} and was therefore not yet employed as part of the manufacturing process of the final blood product. Every blood product distributed to consumers at that time, carried with it a hundred percent risk of being contaminated with Hepatitis, HIV, or both. Thus, Conk's contaminated blood products as referred to at the time period of the 1970s, falls under the rule of design defect. The manufacturer's standards of quality are being challenged—i.e., whether he could have employed a reasonable alternative design to decontaminate the unsafe blood products at that time. It follows then, that at the given time period, Conk's blood cases were still subject to an evaluation of design defect as stated in Section 6(c)—not under a manufacturing defect or the strict liability rule of Section 2(a).

Only after the FDA has licensed and approved the heat pasteurization method to decontaminate blood products and once manufacturers employ such method and incorporate it as part of their standards of safety and quality, may blood products be subject to a manufacturing defect as stated in the rule of Section 2(a).

Henceforth, every blood product on the production line must undergo the heat pasteurization method to guarantee its safety. Should a hypothetical blood product escape the heat pasteurization process through error or otherwise and is found to be contaminated, that product is of a different quality from that intended and could be considered a manufacturing defect.

The distinction of whether a defect is design-based or manufacturing-based is critical. In the case of a manufacturing defect, the Restatement (Third) does not require proof of an existing alternative design—the rule imposes liability regardless of whether the defendant's quality control efforts comply with standards of reasonableness,\footnote{See Rutherford, supra note 89, at 233. See also Henderson & Twerski, supra note 8, at 160.} as stated in section 2(a) of the Restatement (Third).
It should be made clear that whether the defect is one that involves manufacturing or design, the crucial characteristic of a safe biologic like blood in Conk’s example, or a vaccine in this case, is its purity—the guarantee that all manufacturing and testing procedures used in production of the final vaccine eliminates any microbial or viral agent capable of producing human disease.\(^{196}\)

In parallel, lawyer Stanley Kop’s challenge on whether a manufacturer could have employed new molecular methods to clean up or screen for contaminated SV40 in vaccines or not,\(^{197}\) is a matter of design defect as stated in Section 6(c) of the Restatement (Third) because he challenges manufacturers’ current standards of quality and safety. If manufacturers know that there exists at the time scientific knowledge regarding reasonable modern molecular techniques to screen vaccines against a cancer-producing virus like SV40, yet still not use them because of concern with economy or profit, then evidently, they should be held liable.

C. Warning Defect

A manufacturer has a duty to warn not only of risks or side-effects of the marketed drug, but also risks that are discovered subsequent to its distribution.\(^{198}\) After SV40’s forty-year history of contamination in polio vaccines, the official package insert\(^{199}\) of the polio vaccines marketed in the U.S. in 1999 that are addressed to physicians and health care providers regarding product risks only has this statement of precaution regarding carcinogenesis: “Long term

\(^{196}\) See 21 C.F.R. § 630.10-630.19 (1996) (instructing “if any extraneous agent is present at the time of viral harvest, the viral harvest should not be used for poliovirus manufacture. Or if any test or observation demonstrates the presence of any microbial agent known to be capable of producing human disease, the virus grown in each tissue culture preparation should not be used for vaccine production).

\(^{197}\) Kops, supra note 76, at 4747.

\(^{198}\) Restatement (Third) of Torts: Products Liability § 4(b), cmt. d. In the absence of federal preemption, compliance with FDA warnings is not dispositive of liability. Thus, "[f]ailure to instruct or warn is the major basis of liability for manufacturers of prescription drugs and medical devices." See also e.g., Jeffrey N. Gibbs & Bruce F. Mackler, Food and Drug Administration Regulation and Products Liability: Strong Sword, Weak Shield, 22 TORT & INS. L. J. 194, 228 (1987).

\(^{199}\) The package insert (warnings) is a cooperative effort between the FDA and the pharmaceutical company directing physicians on the use of the product. It contains basic pharmacological information, as well as essential clinical information in regard to approved indications, contraindications, precautions, warnings, adverse reactions, usual dosage, and available preparations.
studies in animals to evaluate carcinogenic potential...have not been conducted. . .”

1. Scientifically Unknowable Risk

The critical aspect with respect to warnings is information. Obviously, a manufacturer cannot be held liable for failure to warn of "scientifically unknowable" risks—risks which are not known or knowable, until the product has been out in the market for some time.

The FDA has emphasized that package labels should be supported by scientific evidence and has advised only of "known hazards and not theoretical possibilities." For a plaintiff to establish proof of what could have been known, would be tedious, confusing and costly. It would require a medical/scientific debate among experts, with differing opinions and ideas regarding scientific concepts and theoretical possibilities.

The warning approach is beset with more obstacles than might initially appear. First, a plaintiff would have to establish that there is SV40 contamination in the oral polio vaccine and second, that the SV40 contamination is the direct cause of his cancer injury. The second obstacle is the bigger one, the source of our polio vaccine controversy—causation.


202 Labeling and Prescription Drug Advertising; Content and Format for Labeling for Human Prescription Drugs, 44 Fed. Reg. 37,434, 37,441 (June 26, 1979) (to be codified at 21 C.F.R. pts. 201-02).

203 See generally Ausness, supra note 201, at 731-34.

204 Id.

2. Establishing Causation

Establishing that an adverse event is caused by exposure to an agent (e.g. to a vaccine) can be a tiresome and tedious process. Courts have dismissed OPV vaccine-related claims involving other conditions such as transverse myelitis (an inflammatory disease of the spinal cord) and Guillain-barre Syndrome based on the lack of proof of causation. Likewise, a serious vaccine-associated adverse event like cancer will not permit easy inferences on causality.

In the scientific framework, the first question that can be raised is whether the association with OPV vaccination can either produce a carcinogenic outcome or induce it in certain high-risk populations. Secondly, is the association purely coincidental and vaccination is blamed because it is a highly distinctive, memorable event followed by local and systemic manifestations such as swelling at the injection site and fever? Thirdly, the common simplified approach used in the Vaccine Injury Compensation Program is to assume that adverse events occur at a particular time period, ranging from hours to months. Yet, what if an adverse event like SV-40 tumor formation occurs after a latent period of time—say, after twenty years later?

Still, the main problem in scientific research with regard to viruses like SV40 is the weighty opinion of world-renowned science experts. While Dr. Carbone together with many laboratories from all over the world report the presence of SV40 DNA in human tumor tissues, prominent scientists Dr. Strickler and Dr. Shah report that none of their tumor specimens tested were clearly positive for SV40 DNA. Such experts play a major role in the credibility of scientific information such that results obtained from rigorously conducted

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206 See ROBERT CHEN, Safety of Vaccines, in VACCINES 3rd ed. supra note 18, at 1150-51 (describing the process to prove causality between exposure to an agent and an adverse event).

207 See generally, KITCH ET AL., supra note 31, at 1181.

208 See CHEN, supra note 206, at 1150 (describing process to prove causality between exposure to an agent and an adverse event).

209 Id.

210 Id. at 1147-49, 1157-59; see also supra notes 28-31 and accompanying text.

211 See generally CHEN, supra note 206 (concluding that there should be a longer timeline to assess effects of vaccines that have a longer latency period before adverse events are noticeable).

212 Id.; see also The International SV40 Working Group, A Multicenter Evaluation of Assays for Detection of SV40 DNA and Results in Masked Mesothelioma Specimens, 10 CANCER EPIDEMIOLOGY BIOMARKERS & PREVENTION 523 (2001).
scientific studies are less satisfying than their consensus.\footnote{See, e.g., \textit{Chen}, supra note 206, at 1151 (explaining that the opinions of experts play the major role in this form of causality assessment).} Basically then, a manufacturer’s obligation to warn, coupled with FDA’s standards to warn, will rely heavily on the credibility of scientific information to-date. Ultimately, the ability of judges and juries to make appropriate decisions regarding this issue is suspect in the face of conflicting scientific evidence.\footnote{See generally Neil Vidmar \& Shari Diamond, \textit{Juries and Expert Evidence}, 66 \textit{BROOK L. REV.} 1121 (2001); Brewer, \textit{supra note 202}; Joseph Sanders, \textit{Scientifically Complex Cases, Trial By Jury, and the Erosion of Adversarial Processes}, 48 \textit{DEPAUL L. REV.} 355 (1998); \textit{Shiela Jasanoff, Science at The Bar: Law Science and Technology in America} 4 (1995).} But, what if such expert scientists are found to be misrepresenting their findings or their findings are not based on the most up-to-date molecular techniques and scientific processes? Aside from the defense of being a scientifically unknowable risk, manufacturers of SV40-contaminated polio vaccines can escape warning liability by asserting that compliance with FDA standards relieves them from a warning defect liability (FDA regulatory compliance defense).\footnote{For discussions on the FDA Regulatory compliance defense, see generally Robert Rabin, \textit{Keynote Paper: Reassessing Regulatory Compliance}, 88 \textit{Geo. L.J.} 2049, 2054-61 (2000); Kip Viscusi et al., \textit{Deterring Inefficient Pharmaceutical Litigation: An Economic Rationale for the FDA Regulatory Compliance Defense}, 24 \textit{SETON HALL L. REV.} 1437 (1994).}

The FDA is meticulous in its job regulating the format and contents of the labels for product containers and package inserts,\footnote{\textit{PARKMAN \& HARDEGREE}, supra note 25, at 1138.} such that compliance with FDA regulations has been considered “compelling evidence that the manufacturer has satisfied its duty to warn the physician.”\footnote{\textit{Perez v. Wyeth Laboratories, Inc.}, 734 A.2d 1245 (N.J. 1999).} In this light, the Reporters remark that should a manufacturer be found to misrepresent his findings to the FDA, the plaintiff can have classic failure-to-warn claims against the manufacturer to redress the resulting injury.\footnote{\textit{Henderson \& Twerski}, supra note 8, at 177.}

Within the context of SV40-contaminated vaccines, a claim that a manufacturer has misrepresented data to the FDA would require tedious logistic processes and excessive costs. First, medical-scientific experts would need to analyze all the steps and procedures involved in polio vaccine manufacture and examine them in detail, vis-à-vis FDA Federal regulations. Second, medical-scientific experts would need to go through the manufacturer’s extensive internal records for testing and
handling of the product, which includes complex scientific techniques, esoteric formulas, mathematical figures, and computations (which are sometimes hand-written illegibly), and then pinpoint exactly where such misrepresentation was done. Finally, all of these must be explained to a jury.

III. THE ROLE OF THE FDA AND GOVERNMENT HEALTH AGENCIES IN THE SV40 CONTROVERSY

The United States government has shown the greatest concern for the protection and safety of its citizens from unsafe products. Everything from common food ingredients to complex medical drugs and devices are subject to FDA regulation and testing for safety.\(^{219}\) Stringent FDA regulatory control over the approval and distribution of prescription drugs is more elaborate and extensive over any other class of products in society.\(^{220}\) Its enviable standards for drug safety outshine any regulatory agency in the world.\(^{221}\)

A. FDA Stringency

The Reporters vividly present a picture of the intricate procedures and tests involved in FDA prescription drug approval,\(^{222}\) from the conduct of human clinical trials (which take place in three phases and usually take at least five years to complete)\(^{223}\) to filing of a New Drug Application (NDA). At any stage in testing, the FDA may require additional studies before the manufacturer can proceed with further clinical trials.\(^{224}\) The Investigational New Drug (IND) process alone takes, on the average, twelve years, and costs more than $200 million to develop and obtain approval for a new drug.\(^{225}\) NDA


\(^{221}\) See Ochs supra note 219 at 330 (arguing that research quality would improve if other countries harmonize drug standards to those of the FDA).

\(^{222}\) Henderson & Twerski supra note 8, at 162-67.

\(^{223}\) Id. at 165.

\(^{224}\) Id.

\(^{225}\) Henderson & Twerski supra note 8, at 165; see also Michael D. Green, Statutory Compliance and Tort Liability: Examining the Strongest Case, 30 U. MICH. J.L. REFORM 461, 486 (1997) [hereinafter Green, Statutory Compliance].
applications can only be submitted to the FDA once the previous IND testing stage is completed and most drugs subjected to human clinical trials never even reach NDA processing.\textsuperscript{226} NDA reports typically consist of a hundred thousand pages or more.\textsuperscript{227} Michael Green observes, "the NDA for Prozac consisted of a million pages that included reports on twenty-five pre-marketing studies of the drug."\textsuperscript{228}

Indeed, in light of the FDA’s superior-performance level, courts cannot replicate stringent agency procedures and the Reporters are well-positioned in their argument that: "Trials are compressed in time and scope; they do not allow for the expansive multi-year analysis and interaction between the manufacturer and the FDA that characterize the American drug regulatory process."\textsuperscript{229}

### B. FDA Regulation is not as Fail-safe as Publicly Perceived

Nonetheless, the FDA is not as fail-safe as the public perceives it to be\textsuperscript{230} especially in the area of vaccines. This is so for three main reasons: first, most of the ill-effects of a vaccine occur post-sale; second, FDA relies on manufacturer expertise; and third, FDA relies on science and scientists’ expertise.

#### 1. FDA Regulation is Limited Where Most Effects of Vaccines Occur Post-Sale

Compliance with FDA stringent regulations has been given appropriate weight by courts.\textsuperscript{231} Yet, a higher standard of safety is expected of vaccines because in contrast to most prescription products, which are prescribed to sick people for therapeutic purposes, vaccines are administered to healthy people to prevent disease.\textsuperscript{232} Massive populations of children and adults are exposed to vaccines, usually on a

\begin{itemize}
\item \textsuperscript{226} Henderson & Twerski \textit{supra} note 8, at 165-66.
\item \textsuperscript{227} Green, \textit{Statutory Compliance, supra} note 225, at 487.
\item \textsuperscript{228} \textit{Id.}
\item \textsuperscript{229} Henderson & Twerski, \textit{supra} note 8, at 166.
\item \textsuperscript{230} See e.g., Teresa Moran Schwartz, \textit{Prescription Products, supra} note 13; Michael Green, \textit{Safety As an Element of Pharmaceutical Quality: the Respective Roles of Regulation and Tort Law}, 42 ST. LOUIS U. L.J. 163 (1998); see also infra notes 229-45 and accompanying text.
\item \textsuperscript{231} Shwartz, \textit{Prescription Products, supra} note 13, at 1377 (citing Thomas v. Hoffman-LaRoche, Inc., 949 F.2d 806, 816 (5th Cir. 1992)).
\item \textsuperscript{232} CHEN, \textit{supra} note 206, at 1145.
\end{itemize}
compulsory basis, in order to conform with government public health policies.\textsuperscript{233}

In this scenario, FDA regulation is especially limited in the area of vaccine safety because much of the ill-effects of a vaccine—as opposed to prescription drugs—occur post-sale and may take years. In contrast to prescription drugs where safety and efficacy studies are generally completed before the drug is licensed, evaluation of vaccine safety is critical post-marketing.\textsuperscript{234} Rare reactions, reactions with delayed onset, or reactions in sub-populations may not be detected before vaccines are licensed.\textsuperscript{235} According to Susan Ellenberg, Ph.D., director of the division of Biostatistics and Epidemiology of the Center for Biologics Evaluation and Research (CBER), an office within the FDA responsible for regulating vaccines, “We obviously can’t get all the information pre-marketing...You’re never going to be able to do studies big enough to detect risks that might happen at a level of one in 100,000 or one in 1 million... Still, such risks are important to detect because of the large population exposed...”\textsuperscript{236}

2. FDA Relies on Manufacturer Expertise

a. FDA Relies on Manufacturer Test Results

Although the FDA is mandated to function as a gatekeeper, the agency does not usually carry out the actual testing of the product\textsuperscript{237} but is mainly dependent on tests results as reported by the manufacturer.\textsuperscript{238} To a manufacturer who wants to initiate the development of a new drug, the FDA only responds to the manufacturer’s New Drug Application (NDA)\textsuperscript{239}.

\textsuperscript{233} Id.
\textsuperscript{234} Id.
\textsuperscript{235} Id.
\textsuperscript{238} Id. The FDA process is generally noninvasive; the FDA does not usually conduct the actual testing, it is the responsibility of the manufacturer to produce the evidence in support of its drug or vaccine application. Id.
\textsuperscript{239} NORMAN BAYLOR AND KAREN MIDTHUN, Regulation and Testing of Vaccines, in VACCINES, 1545 (Stanley A. Plotkin & Walter Orenstein eds., Saunders Co. 4th ed. 2004) [hereinafter VACCINES, 4th ed.] (citing 21 C.F.R. § 312 (2002) (explaining that the clinical development of a new drug usually begins with a sponsor approaching the FDA to conduct a clinical study with an investigational product through submission...
With respect to vaccines, the Code of Federal Regulations mandates the tests that manufacturers must perform on each lot of vaccine. The manufacturers then send out the lot samples, along with the results of their tests to the FDA. The FDA may or may not choose to do the testing themselves. According to Jerome A. Donlon, M.D., Ph.D., director of CBER, "We either test the lot sample ourselves or go with the manufacturer's documentation." With regard to adverse events, the FDA relies on a passive system that depends on a voluntary reporting of adverse events by the healthcare community.

b. FDA Relies on the Manufacturer’s Scientific Research Publications About the Product

Dr. Marcia Angell explains:

When a drug company applies to the FDA for approval of a new drug, it is required to submit results from every one of the clinical trials it has sponsored. But it is not required to publish them. The FDA may approve the drug on the basis of minimal evidence. For example, the agency usually requires simply that the drug work better than a placebo in two clinical trials, even if it doesn’t in other trials. But companies publish only the positive results, not the negative ones. Often, in fact, they publish positive results more than once, in slightly different forms in different journals. The FDA has no control over this selective publishing. The practice leads doctors to believe that drugs are much better than they are, and the public comes to share this belief, on the basis of media reports.

of an IND application form. In this application, the sponsor describes the vaccine, its method of manufacture, a description of the proposed clinical study and the names and qualifications of each clinical investigator, and the quality control tests for release.

240 21 C.F.R. § 630.19 (c) (1996)
241 Stehlin, supra note 236.
242 ANGELL, supra note 117, at 112. Dr. Marcia Angell is former editor in chief of the New England Journal of Medicine and a member of Harvard Medical School’s Department of Social Medicine.
In addition, some manufacturers fail to adequately inform the FDA of emerging problems.\textsuperscript{243} Despite legally mandated reporting of adverse events, estimates still show significant under-reporting to the FDA.\textsuperscript{244}

3. FDA Relies on Science and the Scientist

One crucial fact must be emphasized. The FDA relies on science and the scientist.

Because of the heavy burden on the FDA to make decisions that affect public health, FDA decisions are based on the highest standards of science: "[T]he agency’s use of science covers disciplines as diverse as molecular biology and clinical pharmacology, nuclear physics and electrical engineering, clinical trials methodology, and the arcane of statistical analysis of surveillance databases . . . FDA’s scientists wrestle with cutting-edge concepts in a cosmos of constantly changing scientific advancement... The consequences may be nothing less than life and death."\textsuperscript{245} Bernard A. Schwetz affirms: "[S]cience has always been the foundation for FDA decisions, and maintaining a high quality scientific infrastructure is an ongoing challenge—one that requires continual support, resources, and attention. . . ."\textsuperscript{246}

a. Cutting-Edge Science: Rigorous Peer Review

To achieve and maintain the highest standards of science, science at FDA must be as accurate and as "cutting edge" as possible.

The field of science is characterized by the most meticulous deliberative process—impressions, ideas, and interpretations, hypotheses, and theories. All must be tested within the realms of rigorous observation, experimentation, and argument. Premature

\textsuperscript{243} See, e.g., Ochs, supra note 216, at 297.
\textsuperscript{246} Bernard Schwetz, Remarks of the Acting Principal Deputy Commissioner of Food and Drugs, 56 FOOD & DRUG L.J. 123 (2001).
scientific generalizations unsubstantiated by adequate data will be set aside by consensus until assumptions are replaced with fact.\textsuperscript{247} Scientific foundation of the highest standards of quality is "cutting-edge science"—a discipline of complexity, contradictions and dualities. In face of uncertainty, FDA-science has developed a system of extensive consultation or peer review. Peer review is a tradition wherein scientific experts, at the forefront of their fields, sit in judgment of scientific data. At professional scientific meetings and conferences, scientists will debate over the meaning of a result, the appropriateness of a scientific method employed to arrive at a result, or the interpretation of a result. The accepted conclusion is based on the dominant caliber of the argument, the data and consensus among expert peers.\textsuperscript{248}

b. Cutting-edge Science: The Backbone of Inter-government Health Agencies' Decision-making

Within the FDA is the Center for Biologics Evaluation and Research (CBER)\textsuperscript{249} responsible for regulating vaccine products. In addition to its own internal staff of physicians and scientists, the CBER mediates a continued exchange of information with the outside scientific community through advisory committees. Advisory committees consist of individuals outside the government, who are academic experts in various medical-scientific fields (i.e., vaccines, microbiology, infectious diseases, immunology and clinical studies review), industry leaders, and consumer and patient representatives. These individuals review data and issues associated with products (from safety and efficacy studies to developing recommendations for use in the product's package insert) and recommend what action the FDA should take.\textsuperscript{250}

Aside from advisory committees, the FDA collaborates or establishes partnerships with other government health agencies. The FDA works closely with its counterparts in other government agencies such as the Centers for Disease Control and Prevention (CDC) and the

\begin{flushright}
\textsuperscript{247} Id. \\
\textsuperscript{250} See, e.g., Stehlin, \textit{supra} note 236.
\end{flushright}
National Institutes of Health (NIH). The CDC is responsible for epidemiological surveillance of disease and for support of immunization programs. The National Cancer Institute (NCI), a subsidiary of the NIH, is responsible for conducting and funding biomedical research related to cancer.

C. The FDA-Inter-Government (NCI/CDC) Stand on the SV40 Controversy

In 2001, while Dr. Carbone and more than forty other laboratories around the world have detected the presence of SV40 in human cancer tissues, and government agencies like the NIH, the FDA and the CDC, are all aware of the possible link between cancer and the polio vaccine, still, at the NIH-NCI, (Viral Epidemiology Branch), scientists were still preoccupied with determining whether the virus is even present in human tumors.

As far as scientific research is concerned, Dr. Carbone’s results, together with results of multiple laboratories around the world, regarding SV40 and its role in producing human cancer, are still undergoing heavy peer review and vigorous scientific debate in national and international fora. Because current scientific debate reflects the uncertainty of whether SV40 is cancer-producing or not, the FDA, together with other government agencies like the NIH or the CDC who rely heavily on science for decision-making, assert that further research into the field of SV40 is needed.

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254 Bookchin & Schumacher, supra note 36, at 75; see also Donald Maclachlan, SV40 in Human Tumors: New Documents Shed Light on the Apparent Controversy, 22 ANTICANCER RES. 3495 (2002).
255 See supra notes 32-67, 249-251 and accompanying text.
256 See Bookchin & Schumcher, supra note 36, at 71-74.
257 See, e.g., Maclachlan, supra note 254, at 3495, 3495 n.3 (citing a July 11, 2002 meeting of the Immunization Safety Review Committee, Institute of Medicine entitled “SV40 Contamination of Polio Vaccine and Cancer”).
258 See CDC-NIP Concerns, supra note 40 (explaining, “At a glance: SV40 has been found in certain types of human cancers . . . however, some research results are conflicting and more studies are needed”).
D. The Bottom Line

The FDA relies heavily on medical scientists and the results of their research work. Collaborations between the FDA and respected science institutions in government like the CDC and NIH all rely on rigorous peer-reviewed scientific research. It is precisely because of such scientific and medical expertise that the public trusts the FDA with decisions that affect the lives of the American public. The medical-scientific community realizes that high standards of accuracy are necessary in reviewing SV40-related scientific studies and experiments because should authorities decide to withdraw a vaccine or switch strains, results on public health may have wide ramifications.

However, what happens if scientific work upon which the FDA and other government health agencies rely on is fraudulent, falsified, based on flawed processes or defective?

IV. THE ROLE OF THE SCIENTIST AND SCIENTIFIC MISCONDUCT IN THE CONTROVERSY

The world of medical science is one of the most exciting and successful ventures of mankind. Scientists have achieved a high level of respect, and their dazzling contributions to human progress are more dynamic than ever. Extraordinary and unpredictable discoveries have relieved humanity of suffering and have saved lives. Precisely because of the confidence and respect placed in scientists that accounts of scientific misconduct are deeply disturbing.

259 See CHEN, supra note 206, at 1145-46 (explaining that establishing associations between vaccines and attributable risk requires meticulous assurance in order to place adverse events in the proper risk-benefit perspective). An erroneous association can undermine public confidence in a vaccine and have disastrous consequences when disease epidemics break out. Id. For instance, in 1992, Britain withdrew the license of the mumps vaccine containing the Urabe strain when scientific studies indicated a high rate of vaccine-associated meningitis. Id. Manufacturers then withdrew this product worldwide. Id. Consequently, in countries where the Urabe strain had been the sole mumps vaccine licensed, they were left with no other alternative. Id.

260 See generally Robert M. Anderson, The Federal Government's Role in Regulating Misconduct in Scientific and Technological Research, 3 J.L.TECH 121, 147 (1988). The National Science Foundation (NSF), a federal agency responsible for funding basic science research, promulgated a set of rules governing misconduct which occurs in research projects funded by Foundation grants. Id. NSF established the following standards for actionable misconduct:
Scientific misconduct is not an isolated phenomenon.\textsuperscript{261} Several scientists throughout history have been scrutinized in modern times because of suspicions that some of those achievements may have been obtained through less than honest means.\textsuperscript{262}

The following examples illustrate the elusive problem of scientific misconduct and how internal controls expose it after it occurs.

A. Accounts of Scientific Misconduct

1. Dr. John Darsee

One scandalous incidence of misconduct involved Dr. John Darsee, a cardiovascular researcher who worked as an instructor at the Harvard Medical School and as a fellow at the National Institutes of Health (NIH). Dr. Darsee was caught fabricating raw data for a study.\textsuperscript{263} He was then dismissed from the faculty and the fellowship but was allowed to remain as a researcher. Subsequent research data collected by Dr. Darsee were questioned, which lead to investigations conducted by Harvard and by the NIH. The investigation at Harvard revealed various irregularities in Darsee’s results. Furthermore, a later investigation by Emory revealed that only two of the ten papers and only two of forty-five abstracts published by Darsee at Emory were valid.\textsuperscript{264} Peculiar to Dr. Darsee’s studies was the reported collaboration


\textsuperscript{263} See broadly BROAD \\& WADE, supra note 261, at 13-15; KOHN, supra note 261, at 84-88; see also Kuzma, supra note 261, at 360.

\textsuperscript{264} KOHN, supra note 261, at 87.
of three other researchers whose existence the investigating committees were unable to validate.\textsuperscript{265}

2. Dr. William Summerlin

Equally infamous was the case of Dr. William Summerlin,\textsuperscript{266} a dermatologist and researcher at the Sloan-Kettering Institute for Cancer Research in New York, who demonstrated a novel method for preventing tissue graft rejection. His scientific accomplishments would have been significant because his method would solve a main problem in transplant surgery.\textsuperscript{267} Unfortunately, scientists, including his own research workers, could not duplicate Dr. Summerlin’s research findings. To quell skepticisms about Dr. Summerlin’s research work, Dr. Robert A. Good, head of the Sloan-Kettering Cancer Institute, assembled a conference to discuss Dr. Summerlin's research findings. At the conference, Dr. Summerlin presented white mice bearing dark patches of skin that were obtained by transplanting tissue from dark mice that differ genetically from the white mice. Dr. Good was satisfied with the outcome of the conference. However, a laboratory technician discovered that the dark patches on a white mouse disappeared with the application of alcohol. When confronted with this issue, Dr. Summerlin confessed that he used a felt tip pen to darken the area on the animal.\textsuperscript{268} He was then terminated from the institution.

3. Dr. Hwang Woo-Suk

In December 2005, the international scientific community was shocked with controversy regarding the questionable research on stem cells conducted by South Korean cloning expert Hwang Woo-Suk\textsuperscript{269} published in the prestigious U.S. journal \textit{Science}. Investigation showed that Hwang had deliberately faked his data.\textsuperscript{270} The news has been a big

\textsuperscript{265} \textit{Id.}

\textsuperscript{266} Kuzma, supra note 261, at 360-62.

\textsuperscript{267} \textit{Id.}

\textsuperscript{268} \textit{Id.; BROAD & WADE, supra note 261, at 155.}


disappointment to the scientific world which had viewed his achievements as showing great promise for treating a variety of diseases from spinal cord injuries to Parkinson’s disease.\footnote{271}

B. Effects of Scientific Misconduct

Fraudulent scientific research wastes taxpayer’s money, grant money and public resources.\footnote{272} Falsified scientific data can lead to misdirected future funding for unnecessary research studies.\footnote{273} Humanity suffers when false data form the basis of federal decision-making and public policies which affect human life. The following examples illustrate this:

1. IBT Laboratories

In the 1970s, charges were filed against officers of Industrial Bio-Test Laboratories, Inc. of Northbrook, Illinois.\footnote{274} IBT performed contract research on a variety of products such as drugs and pesticides to determine animal toxicity levels of these products. Data provided by IBT on these products were submitted to regulatory agencies so that the agencies could determine whether these products were effective, safe and non-hazardous to humans.

In the mid-1970s, the Food and Drug Administration (FDA) raised concerns about IBT’s research results. Criminal charges were brought against IBT’s three head officers, who were subsequently convicted of violating the false statement statute and the mail fraud statute. Scientific misconduct involved failure to disclose information and false reporting or underreporting of data to the FDA.

The damage caused by IBT’s fraudulent data was significant because many governmental decisions were formed based on them. Thousands of IBT research studies had to be re-evaluated by the Environmental Protection Agency (EPA).\footnote{275} In 1986, EPA issued an emergency declaration to ban dinoseb, a chemical marketed by IBT. According to IBT’s data report, it was proven to be safe.\footnote{276} However,

\footnote{271}{Id.}
\footnote{272}{Kulynych, supra note 261, at ¶ 32.}
\footnote{273}{Kuzma, supra note 261, at 398.}
\footnote{274}{Id. at 376-80 (citing United States v. Keplinger, 776 F.2d 678 (7th Cir. 1985), cert. denied, 476 U.S. 1183 (1986).}
\footnote{275}{Id. at 380-81.}
\footnote{276}{Id.}
when other agencies performed safety tests, dinoseb was shown to be hazardous to humans.277

2. National Genome Research Institute

Fabricated data at the National Human Genome Research Institute (NHGRI) 278 came to light in April 1996, when a peer reviewer for the journal Oncogene analyzed the data in a paper co-authored by NHGRI director Dr. Francis Collins. The reviewer contacted Collins about the data. On internal investigation, Collins learned that over the course of several years, his graduate student had fabricated control data for several of the experiments. During this same period Collins and his other laboratory scientists had unwittingly published the invalid data in a series of important papers on the genetics of leukemia.279

C. The On-going Controversy among Scientists in the Frontier of SV40 Research

While close to fifty major laboratories world-wide have published literature on the presence of SV40 in various types of human cancer, 280 one study that has been highly influential in direction of scientific research and government response to the SV40 controversy is the publication by a prominent epidemiologist, Howard Strickler.281

In 1996, Strickler published a study together with Dr. Keerti Shah, of the Johns Hopkins University, School of Hygiene and Public Health. Strickler and Shah reported that they did not find SV40 virus in their mesothelioma tumor samples.282

In 1997, the International Mesothelioma Interest Group set out to study if SV40 was present in human mesothelioma tissues.283 The

277 Id.
278 See generally, Kulynych, supra note 261, at ¶¶ 1-4.
279 Id. at ¶ 2, n.4 (explaining that Dr. Collins publicly acknowledged the fraud and decided to retract two of the published papers and correct three others); see also Eliot Marshall, Fraud Strikes Top Genome Lab, 274 SCIENCE 908 (1996).
280 See supra notes 55-60 and accompanying text; see also Maclachlan, supra note 254.
281 See Bookchin & Schumacher, supra note 36, at 71-72.
283 Bookchin & Schumacher, supra note 36, at 72.
organization contacted internationally renowned molecular geneticist, Dr. Joseph Testa, the director of the Human Genetics Program at the Fox Chase Cancer Center in Philadelphia to oversee the study. Testa, who specialized in mesothelioma research, initially doubted that SV40 could be found in human mesotheliomas, because he believed that asbestos was the cause of the disease. However, results of his 1998 study changed his mind. SV40 was present in at least nine out of the twelve human mesothelioma tissues.

Strickler questioned Testa's conclusions because “the prevalence [of SV40-positive samples] were so high . . . that you have no way to make the distinction between [contamination] and a true positive result.”

In 2001, another multi-center study was again spearheaded by Dr. Howard Strickler and Dr. Shah. The study produced irregular results and concluded that, “further studies are needed to reconcile these results with previous reports of detection of SV40 DNA in tumor specimens.”

The studies by Dr. Strickler & Dr. Shah are cited again and again by federal health agencies to question whether SV40 is really present in human tumors, and that the dozens of peer-reviewed research spearheaded by Carbone, documenting the presence of SV40 in human cancer, remain equivocal and unpersuasive. Several scientists however, have criticized Strickler and Shah’s work, saying that they treated the cancer samples in a way that would not result in efficient extraction of SV40 DNA. Inefficient extraction of SV40 DNA will yield results that will not show the presence of SV40 in cancer samples.

284 Id.
286 Bookchin & Schumacher, supra note 36, at 72.
289 Bookchin & Schumacher, supra note 36, at 71-72.
290 Id. at 72. See also Maclachlan, supra note 254, at 3495-99; MARC RAMEL, Causes and Prevention of Technical Artifacts When Studying Simian Virus 40 (SV40) in Human Mesotheliomas, in MALIGNANT MESOTHELIOMA, supra note 60, at 316-319.
291 See supra notes 291-292; infra note 296 and accompanying text.
D. Concerns of Scientific Misconduct at the Mesothelioma Meeting 2001

At the April 2001 Mesothelioma Conference in Chicago, Dr. Shah was queried by a member of the scientific audience, “Which method did you follow for the DNA extraction? The Chomcynski method or the Chirgwin method?” Dr. Shah replied, “Proteinase K—it’s a crude method.”

1. On using a “crude method” for DNA extraction

The DNA extraction method is the most crucial step for molecular detection of SV40. It is the first and most important step in DNA analysis. Every succeeding step of DNA analysis to detect the presence of SV40 will rely on the DNA extraction method. It is necessary to perform the DNA extraction with utmost precision and accuracy, using the most scientifically-advanced and appropriate technique. Application of an inefficient or “crude” method to extract DNA will result in degraded DNA. If DNA is already degraded in the first step, the presence of SV40 will not be detected in any of the succeeding steps.

2. On the Relationship between the Scientist and the Pharmaceutical Industry

In scientific research, the pressure is intense—faculty advancement, recognition by peers, the need to publish the need to constantly do novel cutting-edge scientific work. Scientific breakthrough in a fiercely competitive intellectual arena demands large investments of time, human resources, and money. An economic powerhouse—like a pharmaceutical manufacturer—can make a

292 Nat'l Conference, Malignant Mesothelioma – Therapeutic Options and the Role of SV40: An Update, University of Chi., Chi. Ill., Apr. 20-21, 2001. The authors were present at this conference.
293 Id.
294 BHARAT JASANI & KATIE ROSS, Molecular Detection of Simian Virus 40 in Human Mesothelioma; in MALIGNANT MESOTHELIOMA, supra note 60, at 331-345.
scientist's dreams a reality. Almost inevitably, ubiquitous financial relationships may develop between industry sponsors and the investigators who perform laboratory or clinical research on their behalf.\textsuperscript{296}

Dr. Marcia Angell, former editor of the New England Journal of Medicine, summarizes this relationship:

[T]he ties between clinical researchers and industry include not only grant support, but also a host of other financial arrangements. Researchers serve as consultants to companies whose products they are studying, join advisory boards and speakers' bureaus, enter into patent and royalty arrangements, agree to be the listed authors of articles ghostwritten by interested companies, promote drugs and devices at company-sponsored symposiums, and allow themselves to be plied with expensive gifts and trips to luxurious settings. Many also have equity interest in the companies...\textsuperscript{297}

Thus, because of need, researchers might undertake studies on the basis of whether they can get industry funding, not whether the studies are scientifically important.\textsuperscript{298} Of greater concern is the possibility that financial ties may influence the outcome of scientific research.\textsuperscript{299} The sponsoring company may control the data and decides whether to publish or not and what to publish.\textsuperscript{300} Sometimes, the final version of the publication may not even state its origins.\textsuperscript{301}

\textsuperscript{296} Korn, supra note 295 at 2234.
\textsuperscript{297} Marcia Angell, Is Academic Medicine for Sale?, 342 NEW ENG. J. MED. 1516 (2000).
\textsuperscript{298} Id. at 1516-17.
\textsuperscript{299} Id. at 1517-18.
\textsuperscript{300} Id. See also G Levy, Publication Bias: Its Implications for Clinical Pharmacology, 52 CLINICAL PHARMACOLOGY & THERAPEUTICS. 115-19 (1992); Thomas Bodenheimer, Uneasy Alliance: Clinical Investigators and the Pharmaceutical Industry, 342 NEW ENG. J. MED. 1539, 1539-44 (2000).
\textsuperscript{301} See Bodenheimer supra note 297 at 1541-43 (discussing how sponsoring companies have wide discretion over the publication of final results).
E. How is Scientific Misconduct Corrected in the Scientific Community?

Many believe that the science community possesses various internal mechanisms to correct scientific misconduct among its members without interventions from the outside world. These mechanisms for detecting scientific misconduct include replication of experimental work, peer review of proposals for funding and peer review of scientific articles before publication. Although in theory these mechanisms function quite adequately, in reality, these mechanisms can fail to detect scientific misconduct. Scientists do not generally replicate experiments because they are more concerned to publish new, innovative research.

Additionally, the peer review process at the agency funding level cannot detect all data anomalies submitted to them. Finally, scientists serving as peer reviewers for scientific journals do not check all references because of time constraints or simply because they are disinterested in the submitted article.

Scientists do not like controversies, like scientific misconduct among colleagues, to be made public. They fear exclusion by the scientific community on which they so heavily rely on for peer review. Furthermore, scientists are afraid to question their colleagues work by replicating their work or whistle blowing, because they are fearful that their careers could be damaged.

As of this writing, the authors do not know how much progress has been generated in terms of SV40 research after Dr. Shah’s admission of using a “crude method” in his world-influential study. The authors are only aware that there still exists an ongoing debate regarding this issue.

302 See generally Andersen, supra note 260, at 132-38.
303 Id.
304 Id.
305 Id.
306 Id.
307 Andersen, supra note 260; see also Kuzma, supra note 261, at 291.
308 See generally, Maclachlan, supra note 252; See also Keerti V. Shah, SV40 and Human Cancer: A Review of Recent Data, 120 INT. J. CANCER 215-223 (2007); MARC RAMAEL, Causes and Prevention of Technical Artifacts When Studying Simian Virus 40 (SV40) in Human Mesotheliomas, in MALIGNANT MESOTHELIOMA, supra note 60, at 316-319; A. Elmishad, M. Bocchita, et.al., Polio Vaccines, SV40 and Human Tumours, An Update on False Positive and False Negative Results, 123
V. A SYSTEM OF TRIANGULATION: THE SCIENTIST—THE FDA/GOVERNMENT—THE MANUFACTURER

Science, the FDA-government, and the therapeutic industry—these are three of the most powerful partner institutions in modern life. Cooperative growth and interdependence among each other has propelled the pace of American economic development, and has been instrumental in the rise of America as a leader and a political superworld power.

Ironically, however, in select circumstances when conflict of interest occurs in a powerful system, the same cooperative growth can create a system of triangulation, one that disregards public interest.

A System of Triangulation: The FDA-government, Manufacturer, Scientist

A. Conflict of Interest in Vaccine Policy-making: An Example of a System of Triangulation

To illustrate the dynamics of the system of triangulation at work, conflict of interest among powerful players that comprise the triangle (science, industry and FDA-government) has generated a serious issue uncovered in vaccine policy-making.  

DEVELOPMENTAL BIOLOGY 109-17 (2006) (explaining that difference in the sensitivities of methodologies can lead to different interpretation of the same study).

Great concern is generated by the fact that many of the doctors and scientists who sit on federal advisory committees and influence national vaccine policy are the same individuals who may enjoy financial connections with vaccine manufacturers. For instance, RotaShield vaccine, manufactured by Wyeth-Lederle was designed to protect against the "rotavirus," which causes diarrhea in children. The FDA approved the vaccine in August 1998 and was distributed in October 1998. Seven months later, cases of intussusception, a life-threatening anatomical defect, were reported, leading to at least one death. Wyeth-Lederle halted distribution of the vaccine in July 1999 and withdrew it from the market in October of the same year.

Based on congressional investigation, clinical trials of RotaShield prior to FDA approval showed significant rates of intussusception in children. The large number of injuries and potential deaths outweighed whatever benefit the vaccine would provide in preventing diarrhea. Although advisory committees were aware of this data, they voted unanimously to approve the vaccine.

The House of Representatives Committee on Government Reform began an investigation in August 1999 regarding the approval of RotaShield vaccine. The committee issued a report which highlighted the role of two influential bodies that help define U.S. vaccine policy: (1) the FDA’s Vaccines and Related Biological Products Advisory Committee (VRBPAC); and (2) the CDC’s Advisory Committee on Immunization Practices (ACIP).

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310 Id. at 338-39.
311 Id.
312 Id.
313 Id.
315 Id. at nn.128-29.
316 Id.
317 Id.
318 The ACIP provides advice to the Secretary, Department of Health and Human Services (HHS), the Assistant Secretary for Health, and the CDC Director regarding the safety and use of vaccines. Id.
1. FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC)

The House of Representatives Committee on Government Reform conducted an investigation on the member doctors of the VRBPAC. 319 The investigation revealed intriguing conflicts of interest among its members. Members owned stock in vaccine companies, helped in licensing the vaccine to RotaShield's manufacturer, or received hundreds of thousands of dollars in grants from Wyeth-Lederle. The committee concluded: "The overwhelming majority of members, both voting members and consultants have substantial ties to the pharmaceutical industry." 320

Furthermore, the report disclosed that the same members sat on the committee for many years despite term limits. Four of the five who voted for RotaShield required waivers for conflict of interest and other conflicts of interest were allowed without a waiver.

2. CDC's Advisory Committee on Immunization Practices (ACIP)

Between February 1998 and June 1999, eight separate votes were held by the CDC's ACIP. 321 The Congressional Investigation found that the ACIP "recommended the RotaShield for universal use before it was even approved by the FDA." 322 The report revealed that a blanket waiver was granted to members regardless of conflicts of interest for up to a year and ACIP members voted on vaccine recommendations despite having financial ties to pharmaceuticals that develop related vaccines. 323 Moreover, some ACIP members did not fully disclose their conflicts of interest and contrary to the rules, some ACIP members were found to participate in both the FDA and ACIP advisory committees.

Like the FDA committee members, significant financial ties between CDC advisory members and vaccine manufacturers exist: owning the patent on a similar rotavirus vaccine; receiving grants and consulting fees from the manufacturer; and owning thousands of dollars worth of stocks in vaccine companies.

319 Horwin, supra note 309, at 340-41.
320 Id. (citing MAJORITY STAFF REPORT).
321 Id. at 341-42.
322 Id. nn.130-46.
323 Id.
In a August 10, 2000 letter to Donna Shalala, Secretary of Health and Human Services, Congressman Dan Burton, chairman of the Committee for Government Reform stated: "It has become clear over the course of this investigation that the VRBPAC and the ACIP are dominated by individuals with close working relationships with the vaccine producers..." 324 Congressman Burton suggested several recommendations to tighten the current law which include stricter standards to identify conflicts of interest in areas such as stock ownership, halting the issuance of annual conflict of interest waivers by the CDC and disallowing members with conflicts of interest from participating in drafting vaccine recommendations.

However, on November 16, 2000, Ms. Melinda K. Plaisier, Associate Commissioner for Legislation for the Department of Health and Human Services responded and explained that the FDA has the authority to allow the participation of individuals with conflicts of interest in vaccine committees because they are "the most active researchers" and the need "for their expertise outweighs the conflict of interest." 325

B. The Dynamics of a System of Triangulation

1. The FDA–Scientist Relationship

The scientist and his work form the backbone of FDA decisions. To provide the critical science base, the FDA has over 900 outside experts who are highly specialized in specific scientific areas many of whom serve in FDA advisory committees. 326 As such, these same people are often sought out by industry to develop prescription drugs and vaccines. Frequently, they have research grants from and contracts within industry. 327

A 2003 piece of investigative reporting by David Willman in the Los Angeles Times, called that picture into serious question. 328

324 Horwin, supra note 309, at 351 (citing Letter from Dan Burton, Chairman of the Committee on Government Reform, House of Representatives (Aug. 10, 2000)).
325 Id.
327 Id.
Willman reported that senior scientists (who are among the highest paid employees in government) usually supplement their income by accepting large consulting fees and stock options from drug companies that have dealings with the institutes.

For instance, according to Willman, senior scientists with financial ties to industry included the director of the National Institute of Arthritis and Musculoskeletal and Skin Disease, the director of the NIH Clinical Center (the main area for human trials research), and the former director of the National Human Genome Research Institute. Willman found out that some NIH scientists made hundreds of thousands of dollars in consulting fees.

Dr. Marcia Angell, former editor in chief of the New England Journal of Medicine and a member of Harvard Medical School’s Department of Social Medicine reiterates:

It is impossible to know to what extent these financial deals influenced NIH judgments about grants, research priorities, or the interpretation of results, but they certainly are a cause for concern. Outside activities were said to be approved by supervisors, and scientists supposedly excused themselves from direct involvement in decisions that affected their outside clients, but Willman reported instances in which even those minimal restrictions seem to have been ignored. Moreover, the NIH did not even require most senior scientists to file public disclosures of their outside income. The result was that, as of 2003, more than 94 percent of the agency’s 2259 top scientists did not have to reveal their outside consulting income.\(^{329}\)

2. The FDA-Manufacturer Relationship

Aside from an interdependent relationship with the scientists, the FDA establishes collaborations and partnerships with the resource-equipped manufacturing industry. The FDA acknowledges that "[m]ost new therapies today reach the market because a private commercial entity was willing to invest in the development and testing process necessary to bring a product to the market." As Congressman Berkley Bedell remarks, "It costs millions and millions of dollars to go through the FDA approval process. This freezes out anyone except giant corporations, and makes it utterly impossible for any low cost non-patentable medicines to get into the system."

The pharmaceutical industry, like any business entity, is fiercely devoted to business. Expectedly, incentives to develop a new drug or vaccine will be limited to those products, which industry can patent, recover its costs, and transform into sales-generating engines. When conflict of interest occurs in a symbiotic relationship between members of those affiliated with the FDA-government and the pharmaceutical industry, the goal of sales generation may overlook the expensive process of guaranteeing product safety and efficacy.

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332 Id. (citing Statement of Hon. Berkley Bedell, Patient Access to Alternative Treatments: Beyond the FDA, Hearings Before the House Government Reform Committee, 105th Cong. (Feb 4, 1998)).

333 See, e.g., Conk, supra note 112.
3. The Manufacturer-Scientist Relationship

a. Manufacturers Establish Partnerships with Top Scientists at Academic Medical Centers

There is no doubt that manufacturers provide valuable support that propels academic institutions to generate fresh talent and dazzling discoveries in medicine. In an article entitled, *Is Academic Medicine for Sale?* Dr. Marcia Angell discusses the extent to which academic medicine has become so intertwined with pharmaceutical and biotechnology companies:

...Academic medical institutions are themselves growing increasingly beholden to industry...Some academic institutions have entered into partnerships with drug companies to set up research centers and teaching programs in which students and faculty members essentially carry out industry research. Both sides see great benefit in this arrangement. For financially struggling medical centers, it means cash. For the companies that make the drugs and devices, it means access to research talent, as well as affiliation with a prestigious "brand."\(^{334}\)

Dr. Angell cites the following as some of the academic-industrial arrangements at Harvard University:\(^{335}\) Shiseido, the Japanese cosmetic manufacturer, gave Harvard’s Massachusetts General Hospital $180 million over ten years for first rights to discoveries by faculty dermatologists. The Dana-Farber Cancer Institute, a Harvard hospital, has an agreement which gives Novartis patent rights to discoveries that lead to develop cancer drugs. The pharmaceutical giant Merck is building a twelve-story research facility next door to Harvard Medical School.

The extensive association of networks among scientific-medical research in academe coupled with the support of industry, has become increasingly dense, complex and rewarding for all those concerned.\(^{336}\)

\(^{334}\) Angell, *supra* note 298, at 1516, 1518.


Dr. Moses Hamilton asks, "How can universities police themselves when they themselves own equity or they receive royalties? Additionally, how can the university oversee a scientific investigator when their interests are in parallel -- when income is both shared by the researcher and the university?"  

b. Most Research on Drugs is Sponsored by Industry–Concerns of Bias Emerge

Dr. Angell relates:

I witnessed firsthand the influence of the industry on work is sponsored by drug companies. I saw companies begin to exercise a level of control over the way research is done that was unheard of when I first came to the journal, and the aim was clearly to load the dice to make sure their drugs looked good. As an example, companies would require researchers to compare a new drug with placebo (sugar pill) instead of with an older drug. That way, the new drug would look good even though it might actually look worse than the older one. There are other ways to bias research, and not all of them can be spotted, even by experts. Obviously, we reject such papers when we recognize them, but often they would turn up in other journals. Sometimes companies don’t allow researchers to publish their results at all if they are unfavorable to the companies’ drugs. As I saw industry influence grow, I became increasingly troubled by the possibility that much published research is seriously flawed, leading doctors to believe new drugs are generally more effective and safer than they actually are.

She further explains,

most clinical research on drugs is sponsored by the companies that make them. By itself, industry sponsorship does not mean the research is biased. But in addition, drug companies now have considerable control over the way the

337 Id.
research is carried out and reported\textsuperscript{339}....You might argue that yes, the ideas for innovative drugs come from outside the industry, but ultimately it is the industry that actually brings drugs to the market. Universities can’t put pills in bottles and sell them... Publicly funded scientists come up with the ideas and early development, and drug companies put that to practical use. The companies sponsor clinical trials, they convert the drugs to forms that can be safely and readily administered, and they produce and distribute the final products.\textsuperscript{340}

Companies are involved in every detail of the research—from design of the study through analysis of the data to the decision whether to publish the results. This involvement makes bias extremely likely, where sponsors can control the results of the clinical trials.\textsuperscript{341}

Sponsoring companies usually keep the data. In multicenter trials, they may not even let the researchers see all of it. In addition, they also analyze and interpret the results, and decide what, if anything, should be published.\textsuperscript{342}

Science, the therapeutic industry, and the FDA (government)—these three entities represent great benefits to mankind. Basic principles on which these three systems are built are uncontestedly glorious: when the scientist conceptualizes medical innovation, industry actualizes the development, and production of such revolutionizing discoveries, and the FDA-government propagates regulation and support in the distribution of the product to those who need it.

While the pharmaceutical industry may be criticized as putting profit before public safety,\textsuperscript{343} this same industry has been the source of healing for mankind. Industry’s high-tech machinery, equipment, and other logistics have made possible the development and mass production of wonder drugs such as penicillin or chemotherapeutic drugs that prolong the lives of the sick. However, when conflicts of interest infiltrate the powerful system of alliance and interdependence—of which the drug industry is the main economic powerhouse—the web of complexity forms a triangle, such that, instead

\textsuperscript{339} Id. at 99-100.
\textsuperscript{340} Id. at 71-72.
\textsuperscript{341} Id. at 100.
\textsuperscript{342} Id. at 102-103.
\textsuperscript{343} See, e.g., id.; Conk, supra note 112.
of alleviating human disease, the system may become an instrument in perpetrating human debilitation.

VI. TORT LITIGATION: A CHISEL TO CRACK THE TRIANGLE?

Many believe that combating disease or compensating its victims is a responsibility that should be placed on the medical profession, because it is in the best position to address technical issues in science. They believe that it should also be the responsibility of government agencies, because it is their official function to oversee prescription drug and vaccine regulations and address sensitive issues such as scientists' misconduct.

Indeed, the FDA and NIH have policies on conflict of interest. However, scientists and physicians who work with FDA are granted waivers because the agency needs their invaluable expertise. Furthermore, action is slow and most often ineffective because of the very nature of the medical-science community. Physicians and scientists who are affiliated with institutions that play in the triangle (industry, government, and academe) safeguard controversial issues, like the SV40 controversy within the confines of the community—in closed-door seminar rooms, in medical-scientific journals and in meetings away from public scrutiny—in order to maintain public trust in their professional authority and judgments.

Others may believe that industry and the market have the intrinsic ability to correct themselves. Yet, the nature of self-correction in the market takes too long, while the risk of vaccine contamination is a pressing issue. Furthermore, the market may be like its human creators—erratic, unsure, and in need of supervision.

Of course, there is power and influence in the media. Journalists have done research and written compelling stories on the SV40 controversy for the past twenty years. But media inquiries can be easily dismissed as lacking credibility and respect among players in the triangle.

344 Conk, supra note 112, at 1098.
345 See generally, JASANOFF, supra note 211, at 50.
346 See, e.g., Henderson & Twerski, supra note 183, at 1512, 1521 (arguing that courts should leave product category decisions to the marketplace).
348 Id.
A. Tort Litigation?

The world is accustomed to thinking of the law as an instrument of justice, but not as an instrument of health. We expect epidemics to be defeated in the clinic or in the community, not in the courtroom. Yet the power of the law ...is now undeniable. Used with discipline, the law can awaken public outrage, strengthen public policies and redress injuries—results that advance both justice and health.349

To most health experts, the idea of litigation as an instrument of public health is not only mysterious, but also distinctly uncomfortable.350 By training, they expect health problems to be solved in a research laboratory or in a clinical setting—not in a courtroom.351 Legal terminology, adversarial proceedings, and complicated appeals are foreign to their experience.352

Today, however, the power of litigation has become an indispensable instrument of public health, which is demonstrated by the example of tobacco litigation.

B. The Tobacco Litigation Experience: An Example of the Power of Litigation as a Tool to Advance Public Health

Tobacco litigation began with a personal injury lawsuit in America in 1954.353 For more than forty years, the tobacco industry boasted that it had not lost a single case.354 However, this all changed in 1994 when litigation in one case in Minnesota355 ruled that tobacco industry internal documents be put into the public domain.356

350 Id. at 14.
351 Id.
352 Id.
353 Id. at 16.
354 BLANKE, supra note 349, at 17.
355 State ex rel. Humphrey v. Philip Morris Inc., 606 N.W.2d 676 (Minn. Ct. App. 2000). See also e.g., Roberta B. Walburn, The Role of the Once Confidential Industry Documents, 25 WM. MITCHELL L. REV. 431 (1999); Michael V. Ciresi, Roberta B.
1. Confidential Documents Discovered During Litigation Revealed
Fraudulence in the Industry

The Minnesota case was settled on terms favorable to plaintiffs in 1998. The most significant result was not the enormous financial settlement, but the disclosure of millions of pages of once-secret internal documents of the tobacco industry. Documents dating back to the mid-1950s proved beyond doubt that the industry had known for decades that tobacco causes addiction and death. Further, the industry manipulated it to make it more addictive, and expanded into new markets by getting more teenagers and women to smoke, which increased company profits, and covering up all of this information.


See Settlement Agreement and Stipulation for Entry of Consent Judgment, State ex rel. Humphrey, supra note 355. See also Henry Weinstein, Big Tobacco Settles Minnesota Lawsuit for $6.6 Billion, L.A. TIMES, May 9, 1998, at A1 (reporting that the settlement was unprecedented in terms of monetary relief, injunctive requirements, and disclosure of internal tobacco company documents).

Further examination of the tobacco industry's public and private statements on the issue of nicotine addiction evoked a sense of outrage. On April 14, 1994, seven CEOs of America's seven biggest tobacco companies took an oath to tell the truth to a committee of the US House of Representatives.\footnote{Todd Lewan, \textit{Dark Secrets of Tobacco Company Exposed}, 7 \textit{TOBACCO CONTROL}, 315 (1998), \textit{available at} http://tc.bmj.com/cgi/content/full/7/3/315.} They were asked whether they believed nicotine was addictive. They all said no. However, internal documents revealed that the industry knew that nicotine was an addictive substance and cigarettes are the ultimate delivery device. Industry knew that nicotine addiction may even be enhanced through cigarette design manipulations. Addison Yeaman, General Counsel of Brown & Williamson Tobacco Corporation, in a memo stated, "...Nicotine is addictive. We are, then, in the business of selling nicotine, an addictive drug effective in the release of stress mechanisms."\footnote{Addison Yeaman, \textit{BAT Speaks Out on Nicotine}, \textit{ASSOCIATED PRESS ONLINE}, (September 1998), \textit{available at} http://www.bmjg.com/data/tobarch/autumn98/indwatch.htm.}

The documents also describe how the tobacco industry singled out scientists whom they believed could be persuaded to work with, and for, them. They collaborated with some of the most respected scientific institutions and scientists who argued against studies regarding the damaging effects of tobacco.\footnote{Mackay, \textit{supra} note 358, at 911-12.}

In an article in the Bulletin of the World Health Organization, Judith Mackay, Senior Policy Adviser of the Tobacco Free Initiative (TFI)\footnote{The Tobacco Free Initiative (TFI) is a Cabinet level project created by the WHO Director General to coordinate a more strategic and aggressive response to the global problem of tobacco use. TFI seeks to increase awareness of the issue, mobilize resources and foster new partnerships -- all to stimulate adoption of more effective policies at the national, regional and global levels. \textit{See} TFI http://tobacco.who.int/repository/stp58/who_inquiry.pdf} of the World Health Organization said:

They would then pay them well to criticize the scientific methods used by others, to dispute findings of studies performed on secondhand tobacco smoke, to concoct contrary articles and appear as ‘expert witnesses’ for their side against clean indoor air measures at government hearings.\footnote{Mackay, \textit{supra} note 353, at 911; \textit{see also} \textit{WORLD HEALTH ORG., REPORT OF THE COMMITTEE OF EXPERTS ON TOBACCO INDUSTRY DOCUMENTS: TOBACCO COMPANY STRATEGIES TO UNDERMINE TOBACCO CONTROL ACTIVITIES AT THE}
Internal documents also revealed that government employees who resisted tobacco control efforts have been shown to have acted in liaison with the tobacco industry.\textsuperscript{364}

2. Internal Documents Showed Manipulation of Public Health Efforts

Furthermore, the documents contained a surprising amount of information about industry manipulation of public health efforts in particular regions, and how the industry would use front groups, "independent" consultants and secret political allies.\textsuperscript{365} For example, a stunning fifteen-page memorandum was discovered in the Minnesota documents which revealed the strategy used by the tobacco industry in 1993 to defeat a ban on tobacco advertising proposed by Dr. Sherif Omar, a member of the Egyptian parliament.\textsuperscript{366}

It was discovered that the plan was developed by the regional offices of multi-national Philip Morris Corporation, even though Philip Morris’ share of the Egyptian market was minimal.\textsuperscript{367} The plan outlined strategies for legislative maneuvering and mobilization of public opposition to the legislation, the secret use of allies and intermediaries. It suggested that these secret surrogates included prominent political figures in Egypt and neighboring countries.

3. The Effect of Tobacco Litigation on Medical Practice: Physicians Now Verified that Smoking Causes Cancer

Until then, physicians only knew that smoking was associated with cancer. Today, the medical profession identifies cigarette smoking as the single most predominant cause of lung cancer.\textsuperscript{368} Physicians now warn their patients with confidence that indeed–smoking causes cancer.

\begin{footnotesize}
\begin{itemize}
\item Mackay, supra note 358, at 911.
\item BLANKE, supra note 349, at 44-45.
\item \textit{Id.} at 45.
\item \textit{Id.} at 46.
\item \textit{Id.} at 16-17. See also e.g., Anthony Alberg, Malcolm Brock & Jonathan Samet, \textit{Epidemiology of Lung Cancer: Looking to the Future}, 4 J. Clinical Oncology 3175, 3185 (2005).
\end{itemize}
\end{footnotesize}
4. Global Policies on Tobacco Control Emerge

The Minnesota trial and the discovery of the truth about tobacco industry practices have ignited appropriate legislative and public health policy response. On October 20, 1998, the World Health Organization officially launched the global Tobacco Free Initiative (TFI), a project which seeks to increase awareness of the issue, mobilize resources and foster new partnerships—all to stimulate adoption of more effective tobacco control policies at the national, regional and global levels.

In a speech, Dr. Gro Harlem Brundtland, Director-General of the WHO said, “There is every reason to believe that through these documents we will find information that will add power to the ability of countries all over the world to press for comprehensive tobacco control measures.”

In May 2003, 191 WHO Member States convened at the 56th World Health Assembly to adopt the world’s first public health treaty, the WHO Framework Convention on Tobacco Control (WHO FCTC). This groundbreaking treaty is the first legal instrument designed to reduce tobacco-related deaths and disease around the world. The text for WHO FCTC covers tobacco taxation, smoking prevention and treatment, illicit trade, advertising, sponsorship and promotion, and product regulation.

Last February 2005, the WHO FCTC entered into full force as provisions of the Treaty was made legally binding for the first forty countries that became Contracting parties before November 30, 2004. As of today, fifty-seven countries have become party to the WHO FCTC, which represents 2.3 billion people. Its entry into force is a demonstration of governments’ commitment to reduce death and illness from tobacco use.

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372 Id.
Country parties to the WHO FCTC are supposed to translate its general provisions into national laws and regulations. For example, these countries will have three years from the day it enters into force, to implement measures to ensure that tobacco packaging has strong health warnings, or five years to establish comprehensive tobacco advertising, promotion and sponsorship bans, among others.\textsuperscript{373}

C. The Bottom Line

Often, reports of billion dollar settlements may have a mesmerizing effect on people, impairing sober understanding of the true risk and expense of litigation.\textsuperscript{374} However, successful cases, as illustrated above, show that litigation can provide solutions. While litigation is not a good way to produce great science, it can steer science to honest and ethical means in order to benefit people.\textsuperscript{375}

Tort litigation would determine whether the manufacturer knew or should have known of a warning inadequacy and petitioned the FDA for a change in the labeling to solve the inadequacy.\textsuperscript{376} Should tort litigation show that the manufacturer has petitioned the FDA for a change in labeling and the FDA rejected the petition, clearly, the manufacturer should not be held liable.\textsuperscript{377} Manufacturers are in better control of scientific research, and tort law will determine if contamination is verifiably, a risk that is within the manufacturer’s control. Judges and juries can assess conflicting evidence of whether modern molecular techniques of decontamination were doable at the time of sale and would have attained FDA approval as safe and effective. Furthermore, tort litigation can make a determination of manufacturer compliance with FDA regulatory standards and uncovering unethical business practices.

Tort litigation will speed definitive action from authorities who can impact change for society, which is shown by the Tobacco Litigation experience.

For the purposes of this paper, the goal of tort litigation should not be the removal of a drug or vaccine from the market because science may discover

\textsuperscript{373} Id.  
\textsuperscript{374} BLANKE, supra note 349, at 60.  
\textsuperscript{375} JASANOFF, supra note 214, at 50. (The adversary process exposes the conflicts of scientific knowledge; research can take off and is undertaken more vigorously after the onset of litigation).  
\textsuperscript{377} Id. at 1899.
new ways to use old risky drugs like Thalidomide. The critical goal of tort litigation then should be to guard against negligence—to guarantee that only the safest and highest quality of vaccines is made available in the market.

The difficulty in tort litigation however, is that judges and juries will have to deal with overwhelming amounts of information and they will be confronted with complicated medical-scientific theories. A debate among scientists at the frontiers of research will await them, from topics that range from modern molecular techniques, to viral inactivation methods. They must weigh scientific evidence against their knowledge of human nature regarding motivations that govern human action and then render verdict accordingly.\(^{378}\)

A jury comprised of exceptionally strong, hard-working, discerning and honest individuals is therefore crucial to arrive at the truth.

VII. CONCLUSION

[C]learly, a person subjected to the risk of latent harm has had his life changed permanently. Clearly also, we do not want injurers to escape the costs of their actions merely because those costs do not become completely manifest over a period of time.\(^{379}\)

Billions of doses of polio vaccines have already been administered worldwide in the last thirty-five years. At the time of this writing, the authors are not aware of the specific course of action undertaken by government health agencies in response to Shah’s admission of using Proteinase K, a crude method of detecting the presence of SV40 in human tumors, when more reliable and advanced scientific methods have already been recognized by the science community.

There are many unanswered questions. But it is beyond the scope of this paper to lay fault on anyone, or to investigate the detail of events in the course of SV40’s fifty-year history, when more facts are hidden within the confines of science and medicine. It is more important to focus on what must be done at present to protect the people. First and foremost, is to guarantee—using the most modern scientific techniques—that all vaccines are “clean” from contaminated matter such as SV40. Second, is to develop state of the art molecular

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\(^{378}\) See Brewer, supra note 205, at 1535, 1666; see also Michael Owen Miller & Thomas A. Mauet, The Psychology of Jury Persuasion, 549 AM. J. TRIAL ADVOC. 549-570 (1999).

assays, with an excellent, appropriate degree of sensitivity and specificity, in order to screen for SV40 in the human body. Third and most importantly, is to develop a therapeutic strategy or antidote for those who may have been infected with the virus SV40 in order to prevent possible full-blown carcinogenic effects in the future. Such efforts must start now, before the controversy reaches public alarm.

Still, one must understand the depth of public fear when an issue of contaminated vaccines reaches their understanding. Vaccines are supposed to protect one from disease and finding out that they are a source of sickness will have grave consequences on the confidence not just in the stability of the medical profession but also on the FDA and the American government it represents.

Reason dictates that the legal profession should leave this controversy to the medical-scientific profession or to the FDA. However, in a system of triangulation, when manufacturers face possible questions of negligence, which have disastrous effects on people, when the public is uncertain of government protection over their health, potentially relying on scientists who are involved in scientific misconduct—then such issues may only be resolved with the help of tort litigation. Used with proper discipline, the law can become an indispensable instrument of public health.

Yes, the authors are painting an overly-idealistic picture of how things ought to be. But significant change can only occur with a vision of principles that supersedes what lies before the eyes.

When all is said and done in medicine-science, in industry and in government—with regard to the SV40 controversy and the lives of the people at stake—then the power to revolutionize and initiate movement towards the truth, now depends on the wisdom of the lawyer. And whether the Restatement (Third) will be used to illuminate the truth or further cloud it, remains to be seen.

For the meantime—perhaps the real controversial spectacle—will be the battle in the courtroom.