

THE NATION'S WEALTH ABOVE SENIORS'
HEALTH? DRUG SHORTAGES RESULTING
FROM MEDICARE PART B LEGISLATION

Lindsey Weltman

Since the enactment of the Medicare Drug Improvement and Modernization Act of 2003, affordable, generic medicines have experienced ever-increasing shortages which have impacted the health of patients, especially the elderly. These shortages have been most severe in the field of sterile injectables. By calculating maximum Medicare reimbursements based on historical sales data rather than manufacturer-generated list prices, the Act drastically reduced the cost of Medicare Part B. Unfortunately, it resulted in a commensurate reduction in the profit—and thus the motivation—of manufacturers of these generic medicines to continue to produce these drugs. Combined with unstable supply chains for key ingredients, this has caused manufacturers to choose between operating on an incredibly narrow profit margin and leaving the generic sterile injectable industry altogether.

Lindsey A. Weltman was Topics Editor 2014-2015, Member 2013-2014, *The Elder Law Journal*; J.D. 2015, University of Illinois, Urbana-Champaign; Bachelor of Liberal Arts and Sciences, 2012, Psychology & History, University of Illinois, Urbana-Champaign.

To Mom, Dad, and Talor—Thank you for your continuous love and support.

While several measures have been taken to prevent or mitigate these shortages, they have universally targeted the symptoms—rather than the cause—of the problem. Quality control measures and early warning requirements are laudable goals and are being addressed by the FDA. Unfortunately, these solutions put further financial strains on an already beleaguered industry and fail to reach the root of the problem. This Note suggests that, given the direct and indirect costs associated with the ever-increasing shortages, re-evaluation of the Part B pricing scheme would benefit producers and consumers, alike. The stability and quality of the generic sterile injectable medicine industry could be restored with relative ease, simply by allowing prices to more accurately reflect the realities of the business.

I. Introduction

Every day in the United States, drug shortages adversely affect the health of patients, especially those who are elderly. Drug shortages can increase the chance of medical errors, stall medical procedures, increase costs and, in the very worst cases, cause death.¹ The Food and Drug Administration (FDA) defines a drug shortage as “a situation in which the total supply of all clinically interchangeable versions of an FDA-regulated drug is inadequate to meet the current or projected demand at the patient level.”² This Note will focus on “medically necessary” drugs, which means medication that is required “to treat or prevent a serious disease or medical condition for which there is no other adequately available drug product” to effectively replace it.³ In 2010 and 2011, more than ninety-three percent of drug shortages were categorized as “medically necessary;”⁴ this means that the vast majority of drug shortages are for vital drugs.⁵

1. Erin R. Fox et al., *ASHP Guidelines on Managing Drug Product Shortages in Hospitals and Health Systems*, 66 AM. J. HEALTH-SYST. PHARM. 1399, 1401 (2009).

2. Kevin Born, *Time and Money: An Analysis of the Legislative Efforts to Address the Prescription Drug Shortage Crisis in America*, 33 J. LEGAL MED. 235, 235 (2012) (quoting *Examining the Increase in Drug Shortages: Hearing on H.R. 2245 Before the Subcomm. on Health of the H. Comm. on Energy and Commerce*, 112th Cong. 2-3 (2011), available at <http://republicans.energycommerce.house.gov/Media/file/Hearings/Health/092311%20Drug%20Shortages/Kohtestimony.pdf>).

3. Eric Friske, Note, *Addressing Looming Prescription Drug Shortages Through Legislative and Regulatory Approaches*, 14 MINN. J. L. SCI. & TECH. 521, 521 (2013) (quoting OFFICE OF NEW DRUGS, DRUG SHORTAGE MANAGEMENT 8 (2012), available at <http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/StaffPoliciesandProcedures/ucm079936.pdf>).

4. FDA, A REVIEW OF FDA'S APPROACH TO MEDICAL PRODUCT SHORTAGES (2011), available at <http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/Reports/UCM277755.pdf>.

5. *Id.*

Drug shortages have become progressively more numerous and severe.⁶ Since 2005, drug shortages have been rising at an alarming rate; they have almost tripled from 2005 to 2010.⁷ Within the FDA, and as part of the Center for Drug Education and Research (CDER), the Drug Shortage Program (DSP) oversees drug shortages and tries to mitigate them as much as possible through different procedures.⁸

While the FDA has been able to slightly lower the amount of drug shortages in the past three years through a better notification and response process, the shortages are nowhere near resolution because a more efficient notification and response system does not attack the root cause of the drug shortage problem. "In 2012, there were 117 new drug shortages, 84 of which involved sterile injectable drugs."⁹ As of July 2013, there were 302 active drug shortages.¹⁰ The drugs that are most likely to be in short supply are generic sterile injectables, which account for seventy-four percent of reported drug shortages.¹¹ This number has risen in recent years and is disproportionately greater than the number of other types of drugs that have experienced shortages.¹² Generic sterile injectables can be distinguished from other drugs in a number of different ways that make them more prone to shortages. First, generic sterile injectables are drugs that are administered in the doctor's office or hospital, so they fit into the Medicare Part B category, which is governed by different legislation than other drugs.¹³ Second, injectables are harder to manufacture because they demand unique procedures and equipment.¹⁴ Injectables are made from microorganisms, so they require higher quality control and a sterile environment, which increases manufacturing

6. Exec. Order No. 13,588, 3 C.F.R. § 281 (2011).

7. Friske, *supra* note 3; Doug Trapp, *Despite FDA Efforts, Shortages of Drugs Tripled in 5 Years*, AMEDNEWS.COM (Oct. 3, 2011), <http://www.ama-assn.org/amednews/2011/10/03/gvl21003.htm>.

8. Valerie Jensen, Lorene M. Kimzey & Mark J. Goldberger, *FDA's role in responding to drug shortages*, 59 AM. J. HEALTH SYST. PHARM. 1423, 1423 (2002).

9. FDA, DRUGS: FREQUENTLY ASKED QUESTIONS ABOUT DRUG SHORTAGES, available at <http://www.fda.gov/Drugs/DrugSafety/DrugShortages/ucm050796.htm#q1> (last updated Oct. 9, 2014).

10. David Pittman, *FDA Issues Plan to Prevent Drug Shortages*, MEDPAGE TODAY (Oct. 31, 2013), available at http://eyewiretoday.com/view.asp?url=20131101-fda_issues_plan_to_prevent_drug_shortages.

11. FDA, *Medical Product Shortages and FDA Approach*, CCH DRUG & COSMETICS L. REPORTER 7 (2011) [hereinafter *Medical Product Shortages*].

12. *Id.*

13. Medicare Prescription Drug, Improvement, and Modernization Act of 2003, Pub. L. 108-173, (2003).

14. *Medical Product Shortages*, *supra* note 11.

cost.¹⁵ Despite these challenges in manufacturing injectables, some generic injectable cancer drugs cost only one dollar per vial, which is unsustainable for manufacturers.¹⁶ A large category of generic sterile injectables is oncology drugs, those drugs used for the treatment of cancer, which older adults have an increased risk of developing.¹⁷

The FDA and other government entities rarely address the most important cause of drug shortages: unprofitability.¹⁸ The economic cause began with the 2003 Medicare legislation, named the Medicare Drug, Improvement and Modernization Act of 2003 (“2003 Medicare Legislation”).¹⁹ This legislation places a cap on reimbursement of generic drugs under Medicare Part B at “six-percent above the average sales price (ASP) paid during the preceding two quarters for a given agent.”²⁰ This capped amount of reimbursement creates shortages because the manufacturers of Part B drugs have no incentive to manufacture the drugs, since the profit margin is so small.²¹ Because of specialized, expensive equipment that is necessary for some injectables, the cost of production of the drug is high, and the profit margin is reduced by the 2003 Medicare Legislation.²² Manufacturers will often

15. See JOHN R. GRAHAM, MACKINAC CTR. FOR PUB. POL’Y, THE SHORTAGE OF GENERIC STERILE INJECTABLE DRUGS: DIAGNOSIS AND SOLUTIONS 1 (2012), available at <http://mackinac.org/archives/2012/s2012-04sterileinjectables.pdf>.

16. CMTY. ONCOLOGY ALLIANCE, FAQs: PATIENT ACCESS TO DRUGS IN SHORTAGE ACT, available at http://blog.communityoncology.org/userfiles/76/Frequently_Asked_Questions_on_PADSA_HR6611.pdf (last visited Oct. 13, 2014).

17. *Cancer Incidence by Age*, CANCER RESEARCH UK (Jan. 14, 2014), <http://www.cancerresearchuk.org/cancer-info/cancerstats/incidence/age/>; see GRAHAM, *supra* note 15.

18. U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-14-194, DRUG SHORTAGES: PUBLIC HEALTH THREAT CONTINUES, DESPITE EFFORTS TO HELP ENSURE PRODUCT AVAILABILITY (2014) ([hereinafter GAO-14-194] mentioning the 2003 Medicare legislation as a possible cause of drug shortages); see generally *Overview of U.S. Drug Shortages*, CTR. FOR DRUG EVALUATION AND RES. (Apr. 29, 2014), <https://collaboration.fda.gov/p8nkxn6yp2b/?launcher=false&fcsContent=true&pbMode=normal> (explaining that the FDA does not discuss plans to analyze or change the 2003 Medicare Legislation, since the FDA has no authority over pricing issues.).

19. See Medicare Prescription Drug Improvement, and Modernization Act of 2003, Pub. L. 108-173, § 303(c), 117 Stat. 2239–45 (codified as amended at 42 U.S.C. § 1395w–3a (2012)).

20. *Id.*; Bruce A. Chabner, *Drug Shortages-A Critical Challenge for the Generic-Drug Market*, 365 NEW ENG. J. OF MED. 2147, 2149 (2011).

21. See Ali Yurukoglu, *Medicare Reimbursements and Shortages of Sterile Injectable Pharmaceuticals*, 10 (Nat’l Bureau of Econ. Research, Working Paper 17987, 2012), available at <http://www.stanford.edu/~ayurukog/shortages.pdf>.

22. GRAHAM, *supra* note 15, at 2 (explaining that injectable drugs need greater care during the manufacture and storage process).

choose to stop making a drug if it is not profitable, which amplifies the risk of shortages.²³

Medically necessary drug shortages harm the elderly population more than it does the general population. Medicines that have a high percentage of Medicare payers have a greater chance of being in short supply, which means that the elderly are more likely to have their medically necessary drugs in shortage.²⁴ Not only are the elderly more negatively impacted because of the 2003 Medicare Legislation, they are also more likely to experience adverse treatment and effects from substituted drugs or from not receiving the drug in shortage.²⁵ Additionally, rationing of drugs by providers might have an unfair effect on the elderly if distribution decisions are made based on age or overall health.²⁶ Despite great efforts by the FDA to mitigate drug shortages, none of the solutions so far address the potential underlying cause of the shortages: the change in Medicare reimbursement and the subsequent unprofitability of drugs.²⁷ Thus, drug shortages remain a very serious problem,²⁸ especially for the elderly in the United States.

23. Lars Noah, *Triage in the Nation's Medicine Cabinet: The Puzzling Scarcity of Vaccines and Other Drugs*, 54 S.C. L. REV. 371, 377 (2002).

24. See Yurukoglu, *supra* note 21, at 2-4, 7-10.

25. See generally P.A. Routledge et al., *Adverse Drug Reactions in Elderly Patients*, 57 BRIT. J. CLIN. PHARMACOLOGY 121 (2003).

26. AM. HOSP. ASS'N, AHA SURVEY ON DRUG SHORTAGES 9 (2011) (stating how rationing takes place more than three out of four times when there is a drug shortage); Jaimy Lee, *Hungry for a Solution*, MODERN HEALTHCARE, (June 8, 2013), <http://www.modernhealthcare.com/article/20130608/MAGAZINE/306089971> (giving an example of rationing that prioritizes NICU patients over the ICU patients).

27. See GAO-14-194, *supra* note 18, AT 21-39; see also U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-339T, DRUG SHORTAGES: THREAT TO PUBLIC HEALTH PERSISTS, DESPITE ACTIONS TO HELP MAINTAIN PRODUCT AVAILABILITY 6 (2014) [hereinafter GAO-14-339T].

28. See, e.g., GAO-14-339T, *supra* note 27; Press Release, Northwestern Memorial Hospital, Newly Published Survey Shows Drug Shortages Still Have Major Impact on Patient Care (Jan. 9, 2014), *available at* <http://www.nmh.org/nm/research-shows-drug-shortages-still-have-major-impact-on-care>.

II. Background

A. Causes of Drug Shortages

1. MEDICARE REIMBURSEMENT AS A CAUSE OF DRUG SHORTAGES

Medicare Part B reimbursement is a discussed cause of drug shortages.²⁹ Medicare predominately covers people that are “age sixty-five or older.”³⁰ Medicare Part B covers “physician services, outpatient services, and some health and preventative services,” which are most often drugs administered by shot or fluids.³¹ These drugs include injectables, vaccines, oral anti-cancer drugs, osteoporosis drugs, and drugs that are administered through durable medical equipment.³² Historically, Medicare made reimbursements based on the Average Wholesale Price (AWP).³³ AWP is a “published list price,” much like the sticker price for a new car; it is the price at which manufacturers want to sell their drug, not the discounted price they give to some or most providers.³⁴ It is unknown how manufacturers came up with the AWP. Theoretically, manufacturers had financial motivation to artificially inflate the price, which would increase the AWP and subsequently lead to a higher reimbursement level for manufacturers.³⁵ In most instances, the AWP was much higher than the actual market value of the drug, and Medicare did not want to pay large amounts of money that would go straight to manufacturers’ profits.³⁶

To lower Medicare costs, payments were first lowered to ninety-five percent of AWP in 1998.³⁷ Because of the continued unsustainable increases in healthcare costs, Medicare decided to change the reim-

29. See *Drug Shortages: Why They Happen and What They Mean: Hearing Before the S. Comm. on Fin.*, 112th Cong. 6-7 (2011) (statement of Dr. Patrick W. Cobb, Oncologist, Frontier Cancer Center); see also GAO-14-339T, *supra* note 27, at 34.

30. *Medicare Benefits*, SOCIAL SECURITY, <http://www.ssa.gov/pgm/medicare.htm>.

31. *Examining Reforms to Improve the Medicare Part B Drug Program for Seniors*, Cliff Binder, Health Care Financing Analyst, Congressional Research Service (June 28, 2013), available at <http://democrats.energycommerce.house.gov/sites/default/files/documents/Testimony-Binder-Health-Medicare-Part-B-Reform-2013-6-27.pdf>.

32. GAO-14-194, *supra* note 18, at 35 n.83.

33. See Binder, *supra* note 31, at 3.

34. See *id.* at 3.

35. See Yurukoglu, *supra* note 21, at 10.

36. *Id.*

37. *Id.*

bursement system to Average Sales Price (ASP).³⁸ The Medicare Drug, Improvement and Modernization Act of 2003 reimburses generics at “no more than 6% above the average sales price (ASP) paid during the preceding two quarters for a given agent.”³⁹ The FDA transitioned to the present pricing system by setting payments to eighty-five percent of AWP in 2004, and then started to base the payment on Average Sales Price on January 1, 2005.⁴⁰ The ASP includes volume discounts, prompt pay discounts and rebates, but does not include Medicaid rebates.⁴¹ Thus, any discount that purchasers receive on a specific drug will later be reflected in that drug’s ASP price.⁴² The reimbursement switch from AWP to ASP has decreased Medicare Part B spending significantly, especially compared to increases in cost for other parts of Medicare, such as Part D.⁴³ Curiously, a few Part B drugs are still paid at ninety-five percent of the AWP, such as blood products and certain vaccines.⁴⁴ Private prices for drugs closely follow the price or reimbursement price that Medicare pays, and, thus, the Medicare price strongly influences the entire market.⁴⁵ The supply chain for the purchase of drugs, no matter how many links there are, has three major actors: providers, wholesalers, and manufacturers.⁴⁶ Providers, such as hospitals, buy their drugs from manufacturers through wholesale distributors.⁴⁷ (See Figure 1). However, providers, such as large hospital systems or physician practices, can join Group Purchasing Organizations (GPO’s), which negotiate with suppliers to “have stronger leverage for a volume discounted price.”⁴⁸ Medicare’s switch in payment plans—from AWP to ASP—lowered the Medicare reim-

38. *Id.* at 10-11.

39. Medicare Prescription Drug Improvement, and Modernization Act of 2013, Pub. L. 108-173, § 303(c), 117 Stat. 2239-45 (codified as amended at 42 U.S.C. § 1395w-3a (2012)); Chabner, *supra* note 20, at 2149.

40. Binder, *supra* note 31, at 4.

41. *Id.*

42. DOUGLAS HOLTZ-EAKIN & HAN ZHONG, AMERICAN ACTION FORUM, MEDICARE PART B DRUG REIMBURSEMENT: WHY CHANGE A MARKET-DRIVEN SYSTEM THAT WORKS WELL (Oct. 26, 2011), available at http://americanactionforum.org/sites/default/files/OHC_PartB_Drug_Reimb_Reduction_10-26-2011.pdf.

43. *Id.*

44. GAO-14-194, *supra* note 18, at n.83.

45. Jeffrey Clemens and Joshua D. Gottlieb, *In the Shadow of a Giant: Medicare’s Influence on Private Payments 2-7* (Nat’l Bureau of Econ. Research, Working Paper No. 19503, 2014).

46. Yurukoglu, *supra* note 21, at 9, 30.

47. *Id.*

48. HOLTZ-EAKIN & ZHONG, *supra* note 42. For a chart detailing the supply chain, see Figure 1.

bursement amount to providers for generic sterile injectable drugs by fifty percent.⁴⁹ (See Figure 2). This low payment is passed on to manufacturers as shown by Figure 3, which depicts the median ASP by health care providers to manufacturers.⁵⁰ (See Figure 3).

2. EXTERNAL, UNAVOIDABLE CAUSES OF DRUG SHORTAGES

Besides the Medicare reimbursement change, there are other international factors that cause and complicate drug shortages.⁵¹ One external cause is a disruption of raw materials that a manufacturer needs as ingredients for the drugs.⁵² Many ingredients are not found in the United States and must be imported.⁵³ In fact, “[e]ighty percent of domestically manufactured drugs contain an active pharmaceutical ingredient from a foreign supplier.”⁵⁴ Different factors—such as war, disease, or environmental conditions—can harm the raw materials that are being produced in foreign countries.⁵⁵ For example, Hurricane George damaged production factories in Puerto Rico, which caused shortages of Nitrostat, a nitroglycerin tablet used to treat heart failure.⁵⁶ These international disruptions cannot be fixed by a strategic economic solution in United States nor by changing the healthcare system because many raw materials are not present in the United States.⁵⁷

Fortunately, disruption of raw materials accounts for only a small proportion of shortages.⁵⁸ The unavailability of raw materials accounts for only ten percent of the different possible reasons for drug shortages.⁵⁹ Factors outside the economics of the United States, including external causes and symptoms of drug shortages, can predominantly be addressed by the FDA’s notification and mitigation system.⁶⁰ The FDA’s ongoing development of mandatory notification for manufacturers in advance of a shortage will help the FDA plan out

49. Yurukoglu, *supra* note 21, at 4.

50. *Id.*

51. See GAO-14-194, *supra* note 18.

52. See Born, *supra* note 2, at 241.

53. *Id.*

54. *Id.*

55. Friske, *supra* note 3, at 523.

56. Born, *supra* note 2, at 241.

57. *Id.*

58. *Medical Product Shortages*, *supra* note 11.

59. *Id.*

60. FDA, STRATEGIC PLAN FOR PREVENTING AND MITIGATING DRUG SHORTAGES 18-20 (2013) (explaining mitigation strategies of the FDA) [hereinafter STRATEGIC PLAN].

alternative treatments that do not use this raw material.⁶¹ The FDA will then try to get manufacturers to ramp up production of these alternative drugs to mitigate the upcoming shortage.⁶² Because of the time lapse between acquiring the raw materials and completion of manufacture, there must be adequate time to remedy the situation before the shortage hits providers.⁶³ For instance, one aspect of the new FDA initiative to improve communication is a real-time notification system that would use an application on smartphones to notify individuals of shortages.⁶⁴ This would cut down on the length of time that shortages exist and possibly prevent shortages.⁶⁵ Thus, the FDA's evolving requirements are able to cope fairly well with disruption of raw ingredients if reported before the shortage hits providers.⁶⁶

3. ADDITIONAL CAUSES OF DRUG SHORTAGES: UNEXPECTED DEMAND

Shortages can also be caused by an unexpected need for certain drugs.⁶⁷ This demand can be triggered by events such as a disease outbreak or a change in medical treatment protocol.⁶⁸ As a result of the FDA's strategic plan released in late October 2013,⁶⁹ manufacturers should have advance notice of these events because of better communication within the FDA.⁷⁰ This should mitigate and prevent most shortages that are caused by unexpected demand.

B. Symptom of Drug Shortages

1. GRAY MARKETS

While events like unanticipated demand resulting from a disease outbreak and a disruption in raw materials are clearly causes of drug shortages, certain things that aggravate drug shortages are not true

61. *Id.*

62. *Id.*

63. *Id.*

64. Nick Paul Taylor, *FDA working on drug shortages smartphone app*, FIERCEBIOIT (Nov. 4, 2013), available at <http://www.fiercebiotechit.com/story/fda-working-drug-shortages-smartphone-app/2013-11-04>.

65. *Id.*

66. See STRATEGIC PLAN, *supra* note 60.

67. Born, *supra* note 2, at 242.

68. *Id.*

69. STRATEGIC PLAN, *supra* note 60, at 16.

70. Press Release, FDA, FDA News Release: FDA takes two important actions on drug shortages, (Oct. 31, 2013), <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm373044.htm> [hereinafter 2013 FDA Press Release].

instigators of the shortage.⁷¹ These are symptoms of drug shortages that exacerbate shortages, but do not cause them.⁷² The first symptom of drug shortages is the “gray market” for drugs. This is when distributors purchase supplies, of which shortage is imminent, and re-sell them at a huge markup price.⁷³ While some have called the gray market a cause of drug shortages, in reality, it is a consequence or symptom of drug shortages.⁷⁴ It is sometimes hard to tell, especially for regulators, what distributors are legitimate, and which are operating in the gray market.⁷⁵ To find out about possible future shortages, these gray market distributor operations monitor manufacturers’ quantities of drugs for indications of a shortage and even contact providers, such as hospitals, to ask about current and upcoming shortages.⁷⁶ One study estimates that the average markup in the gray market is 650% and the highest markup is more than 4500%.⁷⁷ Once the gray market distributors buy up the drugs in shortage, they then fiercely market these drugs to health-care providers.⁷⁸

In a survey by the Institute for Safe Medication Practices (ISMP), just over half of hospital purchasing agents and pharmacists reported receiving daily solicitations from gray market vendors and about half reported buying drugs from gray market vendors in the last two years.⁷⁹ When providers spend more to get drugs from the gray market, it contributes to the rising cost of healthcare.⁸⁰ Besides the high cost component, drugs in the gray market may not follow FDA regu-

71. *Drug Shortages: Why They Happen and What They Mean: Hearing Before the Subcomm. on Healthcare of the H. Comm. on Oversight and Gov’t Reform* (2011) (statement of Scott Gottlieb, Resident Fellow, American Enterprise Institute) (“[W]e need to be careful not to confuse the consequences of the problems for its root causes”) [hereinafter Gottlieb].

72. Yurukoglu, *supra* note 21, at 24.

73. Fox et al., *supra* note 1, at 1401.

74. Friske, *supra* note 3, at 527 (“While it is not likely that gray-market distributors are actually causing drug shortages, their hoarding of critical drugs and exploitation for financial gains exacerbates the severity of the shortage and amplifies its harmful impacts.”).

75. Brittany Mahugh, *Lost in the Gray: Navigating the Problem of Pharmaceuticals in the Gray Market*, 25 HEALTH L. 1, 5 (2013).

76. *Id.*

77. Friske, *supra* note 3, at 527.

78. Born, *supra* note 2, at 239.

79. There were 549 total respondents in the ISMP 2011 online survey. 56% percent received daily solicitations from the gray market and 52% bought drugs from the gray market within the past two years. Press Release, Institute for Safe Medication Practices, ISMP Survey on Drug Shortage “Gray Market” Shows Widespread Impact on Hospitals (Aug. 25, 2011), available at <http://www.ismp.org/pressroom/PR20110825.pdf>.

80. Mahugh, *supra* note 75, at 6.

lations and rules, and they “may be stolen, diluted, or . . . of dubious quality . . .”⁸¹ Thus, these drugs are potentially expensive dangers for patients,⁸² especially for frail, older patients.

The formation of the gray market is a sign that the prices given for some drugs are not high enough and that the market is unable to respond to supply and demand.

2. SECONDARY DRUG SHORTAGES

Another symptom of drug shortages is when there are secondary shortages of drugs, which is caused from the initial drug shortage.⁸³ When there is a drug shortage, providers switch to an alternative drug, which then becomes low in supply because the manufacturer was not expecting such a high demand for the alternate drug or did not have the machinery on hand necessary to produce more.⁸⁴ This process shows how drug shortages can become even more severe through the gray market or can create additional shortages of alternative, second-choice drugs.⁸⁵ Communication of shortages by the FDA will likely help relieve these symptoms of the original shortage.⁸⁶

3 STOCKPILING DRUGS THAT ARE IN SHORTAGE

Lastly, another symptom of a drug shortage is stockpiling. Drugs may be stockpiled when there is fear of an impending shortage or when there is a current shortage.⁸⁷ When some hospitals or other providers stockpile drugs, patients elsewhere may lack the drugs they need immediately. Because these patients' providers will not be able to locate the necessary medications, the patients with an urgent need for the drugs may not have access to them.⁸⁸ Stockpiling of drugs is expensive and can make a shortage artificially high and, consequently, more severe.⁸⁹

81. Born, *supra* note 2, at 239.

82. *Id.*

83. *See id.* at 242.

84. *Id.*

85. Joseph M. Hill & Cynthia Reilly, *Can the United States Ensure an Adequate Supply of Critical Medications?*, 1 FOOD AND DRUG POL'Y FORUM 1, 2 (2011).

86. *See* STRATEGIC PLAN, *supra* note 60.

87. Fox et al., *supra* note 1, at 1401.

88. *See id.*

89. *Id.*

C. Other Problems Associated with Drug Shortages

Besides external, independent causes and symptoms of drug shortages, there are also problems that are intrinsic to the drug market and healthcare system. First, the healthcare market has very low “price responsiveness.”⁹⁰ The price for drugs is not elastic on the demand side or the supply side.⁹¹ Patient demand of drugs is not affected by the price of drugs because patients will buy medically necessary drugs regardless of price (especially because they are usually not paying for them entirely out of pocket⁹²).⁹³ Likewise, people only buy medications when they need them, so a lower price will not cause people to buy more medications unless they are already in the market for that kind of drug.⁹⁴ In addition, consumers buy their injectable drugs in limited quantities because they have to go to the doctor’s office or hospital in order to receive the drug.

Another factor is that suppliers cannot raise prices because they are pre-negotiated or preset by health insurers.⁹⁵ Thus, during each term, the prices of drugs are locked in and cannot change unless the drugs somehow get into the gray market.⁹⁶

Additionally, manufacturers cannot increase supply just because the demand rises.⁹⁷ To increase their production, they would need to purchase more raw material ingredients, buy new highly-specialized equipment and acquire regulatory approval—a process that normally takes years.⁹⁸ Also, in times of shortage, manufacturers cannot sell their drugs at a higher price and, subsequently, do not have an incentive to make more.⁹⁹ Moreover, few manufacturers make medically necessary injectable drugs.¹⁰⁰ To complicate matters, manufacturers

90. Sharona Hoffman, *The Drugs Stop Here: A Public Health Framework to Address the Drug Shortage Crisis*, 67 FOOD & DRUG L.J. 1, 6 (2012).

91. KEVIN HANINGER, AMBER JESSUP & KATHLEEN KOEHLER, DEP’T OF HEALTH & HUM. SERVS., ECONOMIC ANALYSIS OF THE CAUSES OF DRUG SHORTAGES, ASPE ISSUE BRIEF 3-4 (Oct. 2011) [hereinafter ECONOMIC ANALYSIS OF THE CAUSES OF DRUG SHORTAGES].

92. *Id.* (stating that usually the drugs are paid for, in part, by health insurance).

93. *See Hoffman, supra* note 90, at 6.

94. *See id.*

95. *Id.*

96. *Id.*

97. *See id.*

98. ECONOMIC ANALYSIS OF THE CAUSES OF DRUG SHORTAGES, *supra* note 91.

99. *See Hoffman, supra* note 90, at 6–7.

100. ECONOMIC ANALYSIS OF THE CAUSES OF DRUG SHORTAGES, *supra* note 91, at 4.

do not want to hold a surplus of injectable drugs since their low shelf life would cause a monetary loss for their company.¹⁰¹

Furthermore, it is difficult to enter the drug market as a manufacturer or even to expand the manufacture of current or new drugs.¹⁰² The price of market entry for producing drugs is extremely high because of the specialized, new equipment that is needed and the large detrimental cost of overproducing.¹⁰³ Hence, companies do not want to start production or expand their current production of a drug in shortage, especially if the shortage is transitory and the drug is low-profit.¹⁰⁴ It is hard to convince manufacturers that they need to take action when it might be a detriment to them later.¹⁰⁵ For instance, if a manufacturer temporarily produces a drug that is in shortage, once the shortage is over, the manufacturer will be stuck with the (now surplus) drugs and the additional expensive equipment they invested in to increase production of the drug.¹⁰⁶ Because companies don't want to take these risks and the FDA cannot force them to,¹⁰⁷ these drug shortages tend to last longer than necessary.

D. How the FDA Addresses Drug Shortages

The FDA has taken many steps throughout the years to address some of the aggravating consequences of shortages, but has only addressed the symptoms, and not the cause of the shortages. The FDA currently acts to mitigate the shortages once they receive notification of impending or current shortages.¹⁰⁸ In 2011, because drug shortages were an increasing health hazard, President Obama issued an executive order requiring: 1) manufacturers to provide notice of medically necessary drug discontinuances to the FDA, 2) the FDA to expedite regulatory review, and 3) any illegal stockpiling of drugs that are in short supply to be reported.¹⁰⁹ This was subsequently codified into law in the Food and Drug Administration Safety and Innovation Act

101. *Id.*

102. Born, *supra* note 2, at 241.

103. *Id.*

104. *Id.*

105. *See id.*

106. *See* ECONOMIC ANALYSIS OF THE CAUSES OF DRUG SHORTAGES, *supra* note 91.

107. Born, *supra* note 2, at 241 (noting that the FDA cannot force manufacturers to make a specific drug).

108. STRATEGIC PLAN, *supra* note 60, at 18-20 (explaining mitigation strategies of the FDA).

109. Exec. Order No 13,588, 3 C.F.R. § 281 (2011).

(FDASIA).¹¹⁰ The FDA now has the authority to expedite review when necessary, speeding up the approval process for new facilities, new drugs, and raw materials.¹¹¹ The FDA approval process has been shortened, from a time of almost two years, to a matter of weeks.¹¹² In addition, the FDA can temporarily import drugs from foreign sources if necessary and can also request that other manufacturers of the drug experiencing shortage, if there are any, increase production of that drug.¹¹³ However, the FDA lacks the authority to require a manufacturer to produce a drug, regardless of the severity of the shortage, or the necessity of the drug.¹¹⁴

The FDA gained much-needed authority in 2012 through FDASIA, specifically titles VI-X.¹¹⁵ Through FDASIA, manufacturers have an affirmative duty to notify the FDA at least six months before discontinuing drugs that are “life-supporting,” “life-sustaining,” or “intended for use in the prevention or treatment of a debilitating disease or condition.”¹¹⁶ Manufacturers also must give notice if they have interruptions in their drug supply.¹¹⁷ If, for some reason, notifying the FDA six months before discontinuing drugs isn’t practicable, the manufacturer must notify the FDA as soon as possible.¹¹⁸ If a company does not notify the FDA when they have such a duty, the FDA will release a letter of non-compliance and display it on the FDA website.¹¹⁹ Thus, besides a chance of reputational damage, currently, there is no real penalty for not reporting to the FDA.¹²⁰ The FDA must also create a publicly available list of drugs in shortage.¹²¹ In addition to the other ways in which the FDA helps mitigate shortages, Title VII of FDASIA implements an improved monitoring system of the drug’s journey

110. 2013 FDA Press Release, *supra* note 70.

111. GAO-14-194, *supra* note 18, at 39-44.

112. Born, *supra* note 2, at 243.

113. Fox et al., *supra* note 1, at 1405.

114. Born, *supra* note 2, at 241.

115. Food and Drug Administration Safety and Innovation Act, Public Law 112-144, 126 Stat. 993 § 701-18 (2012).

116. 21 U.S.C. § 356(c) (2012).

117. Daniel S. Wittenberg, *Impacts of the FDASIA and Recent Drug Law Litigation*, FOOD AND DRUG LITIGATION STRATEGIES: LEADING LAWYERS ON BUILDING STRONG DEFENSES AND ADAPTING TO EVOLVING FDA REGULATIONS 119 (2013).

118. *Id.*

119. *Drug Shortages: Non-compliance with notification requirement*, FDA (2014), available at

<http://www.fda.gov/Drugs/DrugSafety/DrugShortages/ucm403902.htm>.

120. *Id.* (showing a list of non-compliance letters on the FDA website).

121. Food and Drug Administration Safety and Innovation Act, Public Law 112-144, 126 Stat. 993 § 701-18 (2012).

from manufacture to provider.¹²² It also allows the FDA to track imported drugs and seize unacceptable drugs.¹²³ Through these measures, the FDA has stepped up to the challenge of mitigating drug shortages largely through early notification. Unfortunately, the FDA still has limited authority and cannot stop the biggest cause of drug shortages.

The FDA's 2013 strategic plan involves enhancing communication, informing manufacturers of their own responsibilities to prevent shortages, and improving the internal organization of the FDA for early notification of drug shortages.¹²⁴ The strategic plan also considers quality problems and develops an office under CDER called the "Office of Pharmaceutical Quality," which would identify quality issues and consider incentives for high quality manufacturing.¹²⁵

III. Analysis

A. Change in Medicare Reimbursement Causes Drug Shortages

The change in Medicare reimbursement reduces the incentives of Part B drug manufacturers and subsequently causes shortages.¹²⁶ In a statistical study that investigated shortages of sterile injectables, Ali Yurukoglu found that "[d]rugs whose average sales price dropped differentially more due to the Medicare policy change had a greater increase in shortages."¹²⁷ This shows that manufacturers do not have the incentives to maintain their production and, therefore, voluntarily exit the market for these low profit drugs because of the low reimbursement payment by Medicare.¹²⁸ Additionally, "drugs which serve more Medicare patients experience a greater increase in shortages."¹²⁹ Thus, drugs that have a bigger percentage of Medicare patients are more likely to have a shortage.¹³⁰

In a regular competitive market, "profit-maximizing firms would raise [the] price, consumers would be willing to pay this in-

122. *Id.*; Wittenberg, *supra* note 117, at 19.

123. Food and Drug Administration Safety and Innovation Act, Public Law 112-144, 126 Stat. 993 § 701-18 (2012); Wittenberg, *supra* note 117, at 19.

124. STRATEGIC PLAN, *supra* note 60; 2013 FDA Press Release, *supra* note 70.

125. STRATEGIC PLAN, *supra* note 60; 2013 FDA Press Release, *supra* note 70.

126. Yurukoglu, *supra* note 21, at 7.

127. *Id.*

128. *See id.*

129. *Id.* at 6.

130. *See id.*

creased price for a medically necessary therapy, and, over time, suppliers would increase the quantity supplied, eventually eliminating shortages.¹³¹ However, this cannot happen in the current market for drugs because of Medicare's ASP-plus-six-percent caps on the prices.¹³² Because manufacturers are not able to raise prices, they either stop making the drugs or put little money and effort into production, which then prompts shortages.¹³³ Lower prices of drugs correlate to impending drug shortages in this way.¹³⁴ Thus, "among the group of drugs that eventually experience a shortage, average prices decreased in every year leading up to a shortage. In contrast, the average prices of drugs that never experienced a shortage over this period did not change substantially either in the earlier or later period."¹³⁵

Further, the extent of drug profitability determines when manufacturers take actions, "such as double sourcing ingredients, performing maintenance on manufacturing lines, and building new manufacturing lines that partially determine the likelihood of shortages."¹³⁶

Because manufacturers never get more than the ASP, despite demand for their products, some manufacturers limit or end their production when it is not as profitable.¹³⁷ Through its ASP reimbursement, Medicare "assigns a single billing code to each category of medicines. The agency, Centers for Medicare & Medicaid Services, then establishes a single rate that it will reimburse for each code."¹³⁸ Despite one manufacturer having new upgraded equipment and one manufacturer having older, cheaper, riskier equipment, the drugs they produce are reimbursed in the same amount.¹³⁹ Since quality is not recognized, a "race to the bottom" is created.¹⁴⁰ Thus, one of the main causes of drug shortages is a problem with low-quality manufacturing.¹⁴¹ This is because manufacturing plants may be shut down

131. RENA M. CONTI, AN ECONOMIC ASSESSMENT OF THE CAUSES AND POLICY IMPLICATIONS OF CURRENT SPECIALTY DRUG SHORTAGES 2 (2012), available at http://www.uchospitals.edu/pdf/uch_029003.pdf.

132. See Medicare Prescription Drug Improvement, and Modernization Act of 2013, Pub. L. 108-173, 117 Stat. 2066 (2003).

133. Yurukoglu, *supra* note 21, at 6.

134. ECONOMIC ANALYSIS OF THE CAUSES OF DRUG SHORTAGES, *supra* note 91, at 4-8.

135. *Id.* at 8.

136. Yurukoglu, *supra* note 21, at 2.

137. See *Id.*

138. Gottlieb, *supra* note 71.

139. *Id.*

140. *Id.*

141. *Medical Product Shortages*, *supra* note 11.

by the manufacturer itself or by the FDA through its inspections due to problems with drug quality.¹⁴² Shutdowns stop drug manufacturing and lead to drug shortages. Currently, the FDA enforces Current Good Manufacturing Practices (cGMP), which acts as a minimum quality control system.¹⁴³ In recent years, there have been more shutdowns and warnings because of quality issues; quality issues caused over fifty percent of the shortages in generic sterile injectables.¹⁴⁴ Serious quality issues include finding “glass shards, metal filings, [and] fungal or other contamination in injectable products that must be sterile or pure to be safe for patients,” but there are also less serious quality issues that would also be a violation of cGMP.¹⁴⁵

One reason behind the lapse in quality is the low profits of manufacturers.¹⁴⁶ Generic Part B drugs are fixed by Medicare legislation and so are produced as inexpensively as possible “using older and less efficient production facilities, and with limited inventories to reduce carrying costs for the company.”¹⁴⁷ Conversely, manufacturers perform more maintenance—build new lines and double-source ingredients—if the drugs are more profitable.¹⁴⁸ One example of a cGMP violation is using old equipment.¹⁴⁹ If there is not enough profit to buy expensive new equipment, then manufacturers will not keep their machinery or technology up to date to meet the regulations or quality control.¹⁵⁰ In fact, manufacturers sometimes stop production when they receive GMP violations.¹⁵¹ In these cases, it is a good business decision for the manufacturer to discontinue the production of an unprofitable drug, because replacing the equipment to make the drugs would cost more than the profit that would be generated.¹⁵² Some solutions addressing drug shortage have advocated for relaxing the strictness of the GMP rules.¹⁵³ However, GMP safety regulations are made to protect the public from inferior quality, and making them

142. GAO-14-194, *supra* note 18.

143. *Facts About Current Good Manufacturing Practices (cGMPs)*, FDA, (May 2, 2013) available at <http://www.fda.gov/drugs/developmentapprovalprocess/manufacturing/ucm169105.htm>.

144. Born, *supra* note 2, at 245.

145. *Medical Product Shortages*, *supra* note 11, at 23, n.51.

146. See Yurukoglu, *supra* note 21, at 2.

147. Chabner, *supra* note 20, at 2148.

148. Yurukoglu, *supra* note 21, at 2.

149. FDA, *supra* note 4, at 13.

150. Yurukoglu, *supra* note 21, at 2.

151. *Medical Product Shortages*, *supra* note 11.

152. *Id.*

153. GAO-14-194, *supra* note 18 at 6-9, 21-24, 40-44.

less strict would affect the quality of the drugs and possibly cause fatal accidents to patients.¹⁵⁴

In addition, the low profit margin for making generic drugs pushes firms to “find market niches to become the primary supplier of a given product.”¹⁵⁵ This means there will be fewer companies that can make a generic drug.¹⁵⁶ In fact, a large number of mergers and acquisitions have taken place in manufacturing.¹⁵⁷ One report found that the generic sterile injectable industry only has seven manufacturers and that these were further concentrated into “specific therapeutic classes.”¹⁵⁸ The small number of manufacturers exacerbates any shutdown that the FDA demands for noncompliance with cGMP.¹⁵⁹ In addition, a shutdown of a manufacturer by the FDA or by the company itself usually takes a long time to resolve. Often, new equipment will be needed or the drug will need to be entirely redeveloped.¹⁶⁰ Over “the past 3 years, 4 of the top 10 manufacturers of sterile injectable drugs received warning letters from the FDA that they chose to address by closing establishments or slowing production.”¹⁶¹ To cut costs, manufacturers use the “Just-in-Time” inventory practice, in which they only carry what they need for the near future in stock.¹⁶² While this saves them money, it also makes it harder to respond to any variation in quantity, need, or other problems, making some shortages stretch out from months to years.¹⁶³ In fact, drug shortages average a little over a year and a half in duration.¹⁶⁴

The FDA has loosened its standards with FDASIA and now works with the manufacturing company to salvage what it can from any issues with drug production and availability rather than just shut-

154. *Id.*

155. Born, *supra* note 2, at 241.

156. *Id.*

157. Valerie Jensen, Lorene M. Kimzey, & Mark J. Goldberger, *FDA's role in responding to Drug Shortages*, 59 AM. J. HEALTH SYST. PHARM. 1423, 1424 (2002).

158. GAO-14-194, *supra* note 18, at 28, n.63.

159. *Id.* at 28-31.

160. *See id.* at 23, n.51.

161. *Id.* at 23, n.51.

162. Fox et al., *supra* note 1, at 1401.

163. *Id.*

164. Thomas Sullivan, *Tufts Center for the Study of Drug Development: Study on the Structural Roots of Drug Shortages and The Shortages Effects on Kids*, POL'Y AND MED. (March 1, 2013), <http://www.policymed.com/2013/03/tufts-center-for-the-study-of-drug-development-study-on-the-structural-roots-of-drug-shortages-and-the-shortages-effects-on.html> (stating that shortages last an average of nineteen months).

ting down all production.¹⁶⁵ One example of this took place with the cancer drug Cytarabine.¹⁶⁶ The manufacturer stopped production after finding crystals in the drug.¹⁶⁷ The FDA used the advance notice of the shortage to tell other manufacturers of the drug to ramp up production.¹⁶⁸ Through the FDA working with the manufacturer, it was found that the vials could be heated to dissolve the crystals and that, by communication to the providers of this fact, the medicine could still be used.¹⁶⁹ The FDA's new rules mitigate shortages, but they do not prevent them.¹⁷⁰

Aside from manufacturing problems, some companies decide to completely stop production of a drug because of low profits.¹⁷¹ For example, drugs that lose their patents are sold for much less, and manufacturers switch to newer products to generate a bigger profit.¹⁷² Even though the "pharmaceutical industry participate[s] in a variety of charitable activities, altruism alone will not maintain product lines that generate little or no profit."¹⁷³ All together, quality issues or discontinuation by the manufacturer causes sixty-six percent of drug shortages.¹⁷⁴

An additional complication in the successful operation of the free market involves the method used for the calculation of the Average Sales Price.¹⁷⁵ Because it is calculated by using data from the two previous quarters, it may further reduce the already low price responsiveness of drug manufacturing and not allow the price to move up or down in real time.¹⁷⁶ For example, if a manufacturer faced higher production costs and raised its prices to mirror those costs, Medicare will not pay the slightly higher price until six months later.¹⁷⁷

Another sign that incentives are too low for manufacturers producing generics is that companies are selling their generic drugs

165. Born, *supra* note 2, at 243.

166. *Id.*

167. *Id.*

168. *Id.*

169. *Id.*

170. See STRATEGIC PLAN, *supra* note 60.

171. Noah, *supra* note 23, at 377.

172. *Id.*

173. *Id.* at 384.

174. *Overview of U.S. Shortages*, CTR. FOR DRUG EVALUATION & RES., OFFICE OF COMM'C'N, DIV. OF DRUG INFO. (Apr. 23, 2014), <https://collaboration.fda.gov/p8nkn6yp2b/?launcher=false&fcsContent=true&pbMode=normal>.

175. Gottlieb, *supra* note 71.

176. *Id.*

177. *Id.*

abroad instead.¹⁷⁸ The prices of generics in other countries are higher, so manufacturers can make a bigger profit if they sell the generic drugs abroad rather than in the United States where the 2003 Medicare Legislation sets price caps for Part B generic drugs.¹⁷⁹

B. Drug Shortages Affect Elderly More Than General Population

Not only is the cause of drug shortages interwoven with Medicare, but drug shortages also affect the elderly more than the general population. First, the elderly are more likely to find that the drugs they need are in short supply.¹⁸⁰ Most drugs that have shortages are the ones that have the biggest percentage of Medicare users.¹⁸¹ Thus, the drugs that are more affected by the change in price are the drugs that primarily treat ailments that elderly patients have as Medicare covers this section of the population.¹⁸²

Second, the elderly are more likely to experience negative effects from drug shortages because they are more vulnerable to adverse events that occur as a result of switching to alternative medications.¹⁸³ Using alternative drugs can create accidents and adverse events for patients.¹⁸⁴ A survey of health-care practitioners in 2010 showed that thirty-five percent of patients experienced a “near miss” because of a drug shortage, twenty-five percent experienced a medication error and about twenty percent experienced an adverse event because of drug shortages.¹⁸⁵ There is a high probability that adverse events will occur because alternative drugs are less effective and have different side effects, and the healthcare practitioners have a lack of familiarity with the drugs.¹⁸⁶ This can translate into medical complications, longer recovery times, and even death.¹⁸⁷ The number of deaths cannot be traced because it would be impossible to tell the exact cause of death

178. Chabner, *supra* note 20, at 2148-49.

179. *Id.*

180. Yurukoglu, *supra* note 21, at 10.

181. *Id.*

182. *Id.* at 6.

183. See Eric J. Thomas & Troyen A. Brennan, *Incidence and Types of Preventable Adverse Events in Elderly Patients: Population Based Review of Medical Records*, 320 *BMJ* 741, 744 (2000).

184. GAO-14-194, *supra* note 18, at 5, 18-19, n.12.

185. *Drug Shortages: National Survey Reveals High Level of Frustration, Low Level of Safety*, Institute for Safe Medication Practices, ISMP MEDICATION SAFETY ALERT (Sept. 23, 2010), <http://www.ismp.org/newsletters/acutecare/articles/20100923.asp>.

186. GAO-14-339T, *supra* note 27.

187. *Id.*

or whether the adverse event would have happened with the original drug.¹⁸⁸

Additionally, the elderly are at a higher risk for adverse events than the general population.¹⁸⁹ Elders are more likely to be on a greater amount of medications, which could interact negatively with each other.¹⁹⁰ Also, doctors may not be as informed and experienced with alternative products and all of the possible interactions they might have,¹⁹¹ especially relating to elderly patients. Another potential issue is giving the proper dosage to the elderly.¹⁹² Sometimes, too large of a dose of the drug is given to elders because the frailty or the sensitivity of their cardiovascular and central nervous system is not taken into account.¹⁹³ Also, the older a patient, the more likely he or she will have complications because of other health issues.¹⁹⁴ For instance, elders are more susceptible to infections.¹⁹⁵ Moreover, the elderly are more likely to have additional health issues that prevent them from taking certain drugs.¹⁹⁶

Furthermore, the elderly might experience lesser-known or unknown side effects or greater complications from drugs than the general population.¹⁹⁷ These side effects might be less recognized for the elderly as a group because older patients are less likely to be in the experimental groups that test out the newer drugs.¹⁹⁸ Other times, symptoms show up differently in the elderly.¹⁹⁹ Doctors who administer drugs to patients that are seventy-five years or older "often must base decisions partly on results from studies in younger patients, partly on their clinical experience and partly on guesswork."²⁰⁰ When a

188. Hoffman, *supra* note 90, at 8.

189. Routledge et al., *supra* note 25, at 121-24; See Thomas & Brennan, *supra* note 183, at 743 (While not statistically significant, this study also found that the elderly tended to have more instances of permanent disability and death from preventable adverse events).

190. Routledge et al., *supra* note 25, at 122-23.

191. Friske, *supra* note 3, at 525-26.

192. Routledge et al., *supra* note 25, at 123.

193. *Id.*

194. See Shari J. Lynn, *Adverse Drug Reactions in the Elderly*, 7 A. NURS. TODAY 1, 1-3 (2012).

195. Paul B. Beeson, *Alleged susceptibility of the elderly to infection*, 58 YALE J. BIOL. MED. 71, 71-76 (1985).

196. See Lynn, *supra* note 194, at 1-3.

197. See Thomas & Brennan, *supra* note 183, at 743-44.

198. Michele Basche et al., *Barriers to Enrollment of Elderly Adults in Early-Phase Cancer Clinical Trials*, 4 J. ONCOL. PRACT. 162, 162-68 (2008).

199. See Thomas & Brennan, *supra* note 183, at 741-44.

200. *Shortage of Elderly in Drug Research Affects Physician Knowledge*, MCKNIGHT'S LONG-TERM CARE NEWS & ASSISTED LIVING (May 9, 2005), <http://>

physician does not normally use the alternate drug, it means the guesswork and younger patient's reactions are weighed more heavily.²⁰¹ Some of the complications of the drug's common interactions with the elderly don't even show up until the drug is already on the market.²⁰²

In addition to causing increased likelihood of mistakes, drug shortages can create delays in treatment, suspension of surgical procedures, and postponements in clinical trials.²⁰³ Delays in treatment can harm the effectiveness of a treatment or even nullify its effects all together.²⁰⁴ An American Hospital Association study found that eighty-two percent of respondents delayed treatment because of a drug shortage, sixty-nine percent reported that the patient had received a less effective drug, and thirty-five percent reported that a patient had experienced an adverse outcome.²⁰⁵ Even the disruption of clinical trials affects the elderly.²⁰⁶ For example, a phase three clinical trial that treats Acute Myeloid Leukemia, which has a median age of onset of seventy, had to be stopped because of shortages in Daunorubicin and Cytarabine.²⁰⁷ Many trials of new cancer drugs need to be compared to the old generic injectables in order to get approval by the FDA, so shortages of the older generic drugs delay the production of new drugs as well.²⁰⁸

While Medicare pays a limited ASP in order to save money, it might actually make the elderly pay more if their Part B drug is in short supply. First, if the patient is solely on Medicare, they will pay twenty percent of the Part B's drug price as a co-pay while Medicare pays eighty percent.²⁰⁹ Thus, if the substitute drug or brand name

www.mcknights.com/shortage-of-elderly-in-drug-research-affects-physician-knowledge/article/101785/.

201. *Id.*

202. *Id.*

203. Milena McLaughlin, et al., *Effects on Patient Care Caused by Drug Shortages: A Survey*, 19 J. OF MANAGED CARE PHARMACY 783, 783-88 (2013); *Medical Product Shortages*, *supra* note 11, at 5.

204. GAO-14-194, *supra* note 18, at 18-19.

205. AM. HOSP. ASS'N, *supra* note 26, at 8.

206. Madhumita Venkataramanan, *Drug Shortages May Derail Careers Along with Trials*, 17 NATURE MED. 1328, 1328 (2011).

207. *Id.*

208. Heidi Ledford, *Drug shortage slows clinical trials*, NATURE (Oct. 3, 2011), www.nature.com/news/2011/031011/full/news.2011.570.html.

209. Binder, *supra* note 31, at 8.

drug is more expensive, elders will pay a higher deductible.²¹⁰ These substitute or brand name drugs can be extremely expensive. For example, Paclitaxel, a generic cancer treatment, sells for \$312, which correlates to a deductible of \$62. The brand name drug Abrazane costs \$5,824, which means the patient has a deductible of \$1,165.²¹¹ This is a price increase of \$5,512 that the Medicare patient must absorb through their deductible. There is no cap on the Medicare patient's twenty percent co-payment.²¹² About sixty-five percent of Medicare recipients also have supplemental health insurance that covers their coinsurance costs.²¹³ However, "insurers may refuse to cover a treatment that has been substituted for a drug in shortage because the alternate medication does not constitute standard therapy. For patients who pay out-of-pocket, an insurers unfavorable decision can be a death sentence."²¹⁴

The elderly are put at a further disadvantage because medicines that have a high percentage of Medicare payers have a greater chance of being in a shortage.²¹⁵ This means that the elderly, who rely on Medicare, are more likely than the general population to have one of the drugs they need be in a shortage.²¹⁶ Furthermore, if the hospital does get the drug in shortage through a gray market supplier, which it might do inadvertently since it is tough to know who is a legitimate distributor, the drug will be much more expensive, causing the elder's co-payment to be pricier and, more importantly, the drug's quality to be in question.²¹⁷

In addition to the actual cost of the drugs, people who are admitted to hospitals pay for the shortages indirectly. The elderly as a group visit the hospital and get Part B drugs from the doctor's office more than the general population.²¹⁸ In fact, "one in five elderly patients are back in the hospital within thirty days of leaving."²¹⁹ Thus, this vulnerable age group is exposed to the issue more frequently than

210. Doug Schoen, *The Drug Shortage Crisis in America*, FORBES (February 13, 2012), <http://www.forbes.com/sites/dougschoen/2012/02/13/the-drug-shortage-crisis-in-america/>.

211. Hoffman, *supra* note 90, at 7.

212. Richard L. Kaplan, *Top Ten Myths of Medicare*, 20 ELDER L.J. 1, 10 (2012).

213. Binder, *supra* note 31, at 2.

214. Hoffman, *supra* note 90, at 9.

215. Yurukoglu, *supra* note 21, at 10.

216. *Id.*

217. See Mahugh, *supra* note 75, at 6.

218. U.S. DEP'T OF HEALTH AND HUMAN SERVS., HEALTH, UNITED STATES, 2012: WITH SPECIAL FEATURE ON EMERGENCY CARE 244, 275-78, 282-84, 287-307, 356-58 (2012), available at <http://www.cdc.gov/nchs/data/hs/hs12.pdf>.

219. *Id.*

the general population.²²⁰ Over ninety-nine percent of hospitals experience a drug shortage.²²¹ The hours that all healthcare staff must waste dealing with these shortages take away time from providing care and medical attention to patients.²²² Pharmacists spend eight or nine hours weekly managing drug shortages, which include assembling inventory and finding alternatives to the drug in shortage.²²³ It is estimated that the labor cost associated with managing drug shortages is 216 million dollars per year.²²⁴ This contributes to the rising cost of healthcare in general.

Lastly, drug shortages might have an unfair effect on the elderly if the drug in shortage is rationed. Providers must deal with “[m]icro-allocation problems [that] pose particularly difficult choices.”²²⁵ When there is a limited supply of a drug in shortage, the provider can set up a plan “for the prioritization of patient care, possibly limiting product use to a specific population of patients.”²²⁶ For example, when rationing nutritional drugs, the hospital will ration the drugs so that the Neonatal Intensive Care Unit babies will receive the drugs first, which means that the Intensive Care Unit will go without them.²²⁷ While it may be logical to some, it may result in elders not getting the drugs that they require.²²⁸ This is also a strain on the hospital if it does not have a standard plan in place to follow and if the ethics committee and interdepartmental staff have to take the time to meet and establish a protocol.²²⁹ Of the providers that experienced a drug shortage, seventy-eight percent reported rationing drugs.²³⁰ This means that these dreadful rationing decisions, which may be harmful to elders, are made a little more than three out of four times that there is a shortage.²³¹

220. *Id.*

221. Marlo Solitto, *Worst-Ever Shortage of Drugs Affects 99.5% of Hospitals*, AGINGCARE.COM, <http://www.agingcare.com/News/drug-shortage-national-health-crisis-147542.htm>.

222. Friske, *supra* note 3, at 27.

223. Hoffman, *supra* note 90, at 9.

224. Rola Kaakeh et al., *Impact of Drug Shortages on U.S. Health Systems*, 68 AM. J. HEALTH-SYS. PHARMACY 1811, 1818 (2011).

225. Noah, *supra* note 23, at 386.

226. Friske, *supra* note 3, at 527.

227. Lee, *supra* note 26.

228. *See id.*

229. Fox et al., *supra* note 1, at 1401.

230. AM. HOSP. ASS'N, *supra* note 26, at 9.

231. *See id.*

Another example of rationing is that “cancer patients may have to be triaged so that those with the best prognosis are given priority for scarce chemotherapy drugs.”²³² If age is taken into account to decide prognosis, then this rationing could also hurt the elderly. Because there is no way to plan the rationing of drugs, healthcare staff and pharmacists must decide these on a case-by-case basis, spending valuable time looking for alternative drugs and/or debating how to allocate them.²³³ Based on the medical criteria used, the drug could go to the person most likely to recover or the person who is the sickest.²³⁴ Depending on the medicine and the hospital, different decisions could be made for the same situation.²³⁵

C. Possible Solutions

While the FDA has done a lot to mitigate the effects of drug shortages, it has never addressed an important cause: no financial incentives to produce part B sterile injectable drugs. Even the newest U.S. Government Accountability Office recommendation of February 2014 continues to treat the symptoms of drug shortages and does not attack the cause.²³⁶ According to the congressional committee responsible for studying drug shortages, forty percent of reported causes of drug shortages are due to quality problems, thirty percent are due to manufacturing delays and capacity issues, and twelve percent are caused by product discontinuation.²³⁷ Together, these make up over eighty percent of the reasons for drug shortages from January 2011 through June 2013.²³⁸ All three of these reasons are, in part, caused by not having financial incentives to invest in quality or manufacturing of the drug.²³⁹ The FDA does not have the authority to fix the drug shortage problem even though it has created many departments in the past fifteen years to mitigate and prevent drug shortages. The number of drug shortages continues to rise, despite President Obama’s executive order in 2011 and the enactment of FDASIA in 2012, and the cause of these shortages is not being adequately addressed.

232. Hoffman, *supra* note 90, at 8.

233. Fox et al., *supra* note 1, at 1401.

234. *See id.*

235. *See id.*

236. *See generally* GAO-14-194, *supra* note 18.

237. *Id.* at 21-24.

238. *Id.*

239. Yurukoglu, *supra* note 21.

In 2012, the “Patient Access to Drugs in Shortage Act of 2012” was introduced.²⁴⁰ This bill proposed to amend Title XVIII (Medicare) of the Social Security Act.²⁴¹ It advised changing the Medicare reimbursement from ASP to volume-weighted average wholesale acquisition (WAC) cost.²⁴² WAC is the “manufacturer’s list price for the drug product to wholesalers or to direct purchasers not including any discounts, rebates or reductions in price.”²⁴³ There is still anxiety with this pricing system that the manufacturers will overcharge like they did with the AWP. However, WAC is supposed to be more of a real price “established in commercial transactions between manufacturer and wholesaler,” unlike AWP, which acted only as a list price.²⁴⁴

This bill was also specific to sterile injectable drugs that are “manufactured by [three] or fewer active manufacturers.”²⁴⁵ This addition seems unnecessary since there are very few manufacturers that make sterile injectables, and, thus, the majority of sterile injectable manufacturers would be covered by the bill, regardless of the bill’s addition. Furthermore, the specification of “three or fewer” manufacturers making the drug discourages other manufacturers from deciding to begin manufacturing generic injectables if there are already three active manufacturers making them.²⁴⁶ The Patient Access to Drugs in Shortage Act also exempts these drugs from 340B discounts and Medicaid rebates²⁴⁷ that lower their prices, to further incentivize these manufacturers to continue making these injectables.²⁴⁸ However, most injectables would not be subject to the Medicaid rebates anyway since they are not outpatient drugs (only outpatient drugs are included in Medicaid rebates).²⁴⁹ Additionally, the Medicare legislation of 2003 changed the pricing from wholesale pricing to ASP because the manufacturing companies were in fact just setting their own prices to gouge prices.²⁵⁰ Going back to wholesale pricing and excluding these

240. Patient Access to Drugs in Shortage Act, H.R. 6611 112th Cong. (2012).

241. *Id.*

242. *Id.* at § 2

243. GAO-14-194, *supra* note 18, at 82 n.14.

244. FAQs: Patient Access to Drugs in Shortage Act, *supra* note 16.

245. H.R. 6611, *supra* note 240.

246. GAO-14-194, *supra* note 18, at 82-83.

247. 340B Drug Pricing Program: Important Benefit, Significant Responsibility, HRSA (Jan. 9, 2014), available at <http://www.hrsa.gov/opa/update.html>.

248. H.R. 6611, *supra* note 240.

249. GAO-14-194, *supra* note 18, at 83-84.

250. See Medicare Prescription Drug Improvement, and Modernization Act of 2013, Pub. L. 108-173 (2003).

drugs from discounts could fix the shortage problem, but it could also re-create the original concern of manufacturers charging extremely high prices.

Abolishing price caps and exempting drugs from discounts could have negative consequences on the elderly. This could place a tough burden on people who usually get drugs through the 340B discounts. These exemptions would likely “increase costs to patients and the government” and might “have a minimal influence on drug shortages.”²⁵¹

The congressmen who brought in the 2012 bill defended their use of wholesale pricing and stated it was different from the pre-2003 era because wholesale acquisition cost is “a price set by wholesalers, which the group claim[ed] is a real market price and so resistant to being manipulated.”²⁵² This bill died after it was referred to committee.²⁵³ With concerns of the federal deficit growing, it is challenging to change the pricing system of Medicare such that drugs will become more expensive for any reason.

Some suggest waiving manufacturer or user fees collected by the FDA for manufacturers of drugs that are near shortage to allow higher profits or for manufacturers that build in redundancy.²⁵⁴ However, FDA officials warn that exempting or reducing fees for some manufacturers would raise these fees for other manufacturers because the total fee amount to be collected is fixed by statute.²⁵⁵ Nevertheless, Congress does have the power to change this in future bill proposals.

IV. Resolution

To remedy the trigger of drug shortages and their greater effect on the elderly, the Medicare reimbursement policy must be changed. The Food and Drug Administration can not adequately address drug shortages because they have no authority to change the pricing system that is currently in place, and they have no way of enforcing their current rules.²⁵⁶ The FDA has limited “ability to offer financial and other

251. GAO-14-194, *supra* note 18, at 83-84.

252. Thomas Sullivan, *The Patient Access to Drugs in Shortage Act*, POL'Y AND MEDICINE (Dec. 20, 2012), <http://www.policymed.com/2012/12/the-patient-access-to-drugs-in-shortage-act.html>.

253. *Bill Summary & Status, H.R. 6611: All Information*, LIBRARY OF CONG., <http://thomas.loc.gov/cgi-bin/bdquery/z?d112:HR06611:@@L&summ2=m&>.

254. GAO-14-194, *supra* note 18, at 80-81.

255. *Id.*

256. *Overview of U.S. Shortages*, *supra* note 174.

economic incentives for innovation and new investments in high-quality manufacturing.”²⁵⁷ Thus, legislation must be passed to resolve the underlying economic cause of drug shortages. If Medicare makes small increases in its payment for sterile injectables, it could make a huge difference in the severity and amount of drug shortages.²⁵⁸ Large providers and hospitals would be willing to pay more for these drugs if they knew it would prevent shortages because shortages create a huge stress (financially, morally, and emotionally) on the provider. Drugs that are harder to make—generic injectables—need to be treated differently than brand-name, regular products. Instead of using the ASP, the Medicare reimbursement plan should be changed to use the WAC to determine price. The WAC is already reported to Medicare so it would not be a hassle to collect this information.²⁵⁹ In fact, WAC is used currently to reimburse new drugs that have no ASP.²⁶⁰ Changing the ASP to the WAC would get rid of the ceilings on drug prices. This would give incentives back to the manufacturers so that they can continue to make these drugs. In addition, manufacturers would be able to invest in new machinery and maintain quality control standards. This would also help seniors by reducing the quantity of drugs that they need from being in short supply because it would be a solution through Medicare (specifically their reimbursement system). This means that drug shortages, the majority of which involved drugs that had a high percentage of Medicare payers, would no longer be more likely to impact the elderly than the general drug-seeking population. Any other solution—such as tax reimbursements—will not help the elderly with their disproportionate number of drug shortages and, consequently, would not address the cause of the problem.

In addition, the pricing of drugs should be changed so that not all of the same types of medicines fall into the same pricing category.²⁶¹ Thus, higher quality can be rewarded with increased price. If a certain type of drug is not just grouped into a large category, then the manufacturer should have more of a correlation among the drugs they make, their overall operation, and the money they receive for the

257. STRATEGIC PLAN, *supra* note 60.

258. Yurukoglu, *supra* note 21, at 26 (explaining that “coefficient estimates here suggest that modest increases [of Medicare payments] could have large effects on shortages”).

259. Clemens & Gottlieb, *supra* note 45.

260. GAO-14-194, *supra* note 18, at 81-82.

261. Clemens & Gottlieb, *supra* note 45, at 2-4.

drugs. In addition, it might allow innovation in manufacturing that would lead to a more stable supply of drugs.

While changing the Medicare reimbursement method from ASP to WAC would increase the cost of healthcare (the cost of which is already unsustainable), the drug shortages are now costing both the healthcare industry and the consumer time and money, directly and indirectly. In addition to having to deny patients drugs that may save their life, the unavailability of drugs creates a higher cost for anyone who is admitted to a hospital, and the elderly are especially likely to be in this category. Additionally, alternative brand-name drugs that patients are forced to buy are often much more expensive than the drugs that are in short supply. Thus, even with a rise in the price of generic drugs, these drugs will still cost less than drugs that are now on patent. Currently, the low price of generics benefits manufacturers of higher-priced, newer drugs because manufacturers are able to make a bigger profit and will choose more profitable drugs over other less profitable drugs.²⁶²

In order to prevent manufacturers from taking advantage of the WAC pricing system, there needs to be a limit on the total profit these companies can make. Even though WAC is different from the AWP, there are similar concerns. Manufacturing companies' pure profit should be limited to twenty percent and anything over that should be used for investing in manufacturing equipment or research and design. The challenge of imposing this kind of system will be defining what pure profit is and the limits of research and design. In reality it would be extremely hard to pass this specific portion of the recommendation since the manufacturers would spend a considerable amount of time and money to lobby against the passage of a bill with these limits.

V. Conclusion

When the United States has the ability to treat someone's critical medical condition with drugs, that person should not have to suffer from not being able to obtain the drugs. While the FDA has implemented many helpful changes that address symptoms of drug shortages and mitigate these shortages once they begin, none of their initiatives address the main cause: the controls on drug prices put in place

262. Conti, *supra* note 131.

by the Medicare Drug, Improvement and Modernization Act of 2003. This act takes away incentives for manufacturers to keep making the part B drugs. Elders are hurt more than the general population since drugs that have a high percentage of Medicare payers have a higher chance of being in short supply due to decreased reimbursements for Medicare drugs. In addition, the elderly are more likely to suffer adverse effects from taking substitute drugs or from not receiving the drugs they need. Once drugs start being rationed, elders can conceivably be treated unfairly based on their age as well. The proposed solution will change the Medicare legislation from current ASP-plus-six-percent to WAC pricing. This will allow manufacturers to reinvest in machinery and quality control, lowering the number of shortages. In addition, to prevent shortages in the future, drugs should be individually priced—not group-priced—commodities. Lastly, to keep drug manufacturers from charging inflated prices, their corporate profit should be limited, and the excess profits should be reinvested in maintaining the quality of manufacturing to decrease the occurrence of drug shortages.

APPENDIX
FIGURE 1: SUPPLY CHAIN FOR DRUGS

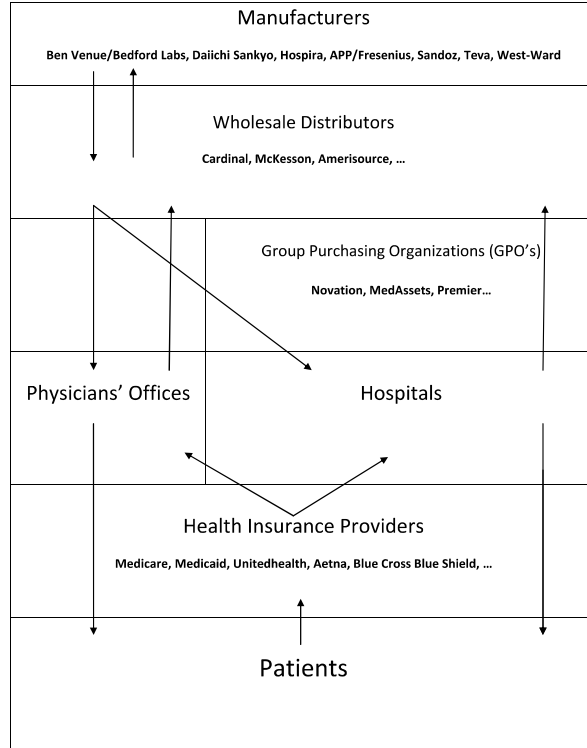


FIGURE 2: MEDICARE PART B REIMBURSEMENT TO PROVIDERS

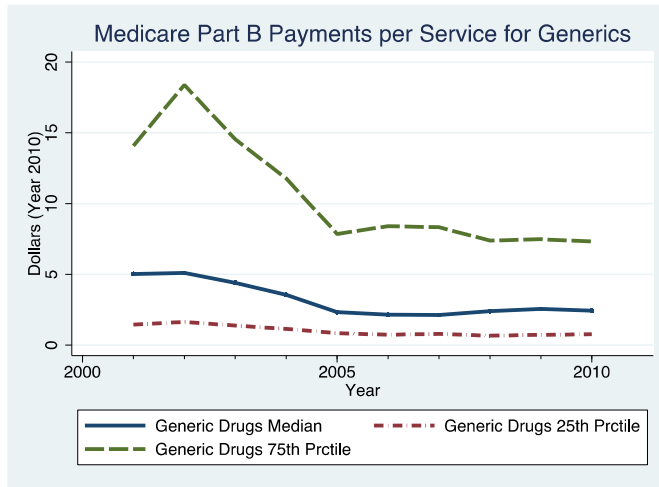


FIGURE 3: MEDIAN ASP PAYMENTS FROM PROVIDERS TO MANUFACTURERS

