

Addressing Looming Prescription Drug Shortages Through Legislative and Regulatory Approaches

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INTRODUCTION

An alarming increase in drug shortages in recent years presents a crisis affecting medical facilities across the nation, compromising patient care in a wide variety of serious illnesses. Many of the medications affected by these shortages are critical products, including oncology drugs, anesthetics, and antimicrobials.¹ Over ninety-three percent of drugs shortages during 2010 and 2011² were classified as “medically-necessary” drugs required “to treat or prevent a serious disease or medical condition for which there is no other adequately available drug product” to act as an appropriate substitute.³

The frequency of drug shortages has steadily increased since 2005, nearly tripling over the span of five years.⁴ 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

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1. Matthew T. Corso, *Crisis Averted? Manufacturers Scurry to Meet Demand for Drugs*, ONCLIVE (Mar. 12, 2011), <http://www.onclive.com/publications/obtn/2011/march-2011/crisis-averted-manufacturers-scurry-to-meet-demand-for-drugs>.

2. FDA, A REVIEW OF FDA'S APPROACH TO MEDICAL PRODUCT SHORTAGES 13 (2011) [hereinafter FDA'S APPROACH] available at <http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/Reports/UCM277755.pdf>.

3. OFFICE OF NEW DRUGS, DRUG SHORTAGE MANAGEMENT 8 (2012), available at <http://www.fda.gov/downloads/AboutFDA/ReportsManualsForms/StaffPoliciesandProcedures/ucm079936.pdf>.

4. 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>.

meet the current or projected demand” at the patient level.⁵ The Center for Drug Evaluation and Research (CDER) reported 178 drug shortages in 2010,⁶ and a record 267 shortages were reported in 2011,⁷ as compared to just 61 in 2005.⁸

According to the FDA, the majority of drug shortages involve generic sterile injectables, accounting for approximately seventy-four percent of all reported shortages.⁹ Sterile injectables are potentially at a greater risk of shortage, as compared to oral drugs, because of the more complex and specialized process required for manufacturing. Because the manufacturing process of sterile injectables is complex, shortages involving these drugs can last for months.¹⁰ Of the drug shortages reported since the beginning of 2010, approximately fifty percent were generic or unapproved drugs.¹¹

This Note proceeds in two parts. Part I provides background on the recent drug shortage problems afflicting patients and medical facilities throughout the country and the current and proposed regimes available to address these problems. Part I.A provides background on the numerous underlying causes of drugs shortages, including the role of raw material supplies and manufacturing capabilities, and Part I.B examines the subsequent impact of shortages on patient care and the resources of medical facilities. Part I.C, Part I.D, and Part I.E explain the FDA’s existing drug shortage program, provide background on both the pending legislation in Congress meant to address current and future shortages, and the recent executive order issued in response to the shortage problem, respectively. Part II of this Note provides analysis of the proposed legislation for addressing the drug shortage problem and provides addi-

5. OFFICE OF NEW DRUGS, *supra* note 3, at 7.

6. *FDA and Manufacturers Work to Prevent Drug Shortages*, U.S. FOOD & DRUG ADMIN., <http://www.fda.gov/Drugs/DrugSafety/DrugShortages/ucm257746.htm> (last updated June 9, 2011).

7. Awi Federgruen, *The Drug Shortage Debacle—And How to Fix It*, WALL ST. J., Mar. 2, 2012, at A13.

8. *FDA and Manufacturers Work to Prevent Drug Shortages*, *supra* note 6.

9. FDA’S APPROACH, *supra* note 2, at 13.

10. *See id.* Shortages involving oral drugs are typically resolved more rapidly than sterile injectables. *Id.*

11. *Id.* at 14. Unapproved drugs are generally older drugs that have been marketed without required FDA approval. *Id.*

tional, alternative approaches for mitigating the occurrence and severity of shortages. This Note concludes that existing legislation makes important steps in assisting the FDA to adequately manage these shortages, but ultimately falls short of providing the multifaceted approach necessary to address the many underlying problems influencing these shortages.

I. BACKGROUND

A. CAUSES OF DRUG SHORTAGES

Although it is difficult to determine a singular causative agent of drug shortages, there are many underlying factors contributing to decreased availability. Often, these factors are a combination of perturbed supply, manufacturing capacity, and utilization.

1. Supply of Raw Materials

Changes in the supply levels of raw materials necessary for the manufacture of drug products may contribute to the creation of shortages. Essential raw materials, sometimes referred to as the “active pharmaceutical ingredients” (API), are necessary components for the synthesis of final drug products.¹² Even though there may exist multiple manufacturers of a particular drug product, there may be few, or even just one, supplier of the API.¹³ Any interruptions in supply will inevitably exert downstream effects on the manufacturer’s ability to produce final products, potentially leading to a drug shortage.¹⁴ Certain externalities, including political upheaval, disease, or environmental conditions can also perturb the availability of raw materials.¹⁵

12. See *Examining the Increase in Drug Shortages: Hearing Before H. Comm. on Energy & Commerce Subcomm. on Health*, 112th Cong. 3 (2011) (testimony of Jonathan Kafer, Vice President Sales & Marketing, Teva Health Systems), available at http://democrats.energycommerce.house.gov/sites/default/files/image_uploads/Kafer_Testimony_HE_09.23.11.pdf.

13. See *id.*

14. See *id.* at 3–4. Inadequate supply levels could be the result of increased demand for particular drugs and insufficient ability to increase production or availability of necessary raw materials, or instead could be the result of decreased supply as a result of decreases in supply level due to bankruptcy, changes in production, or other externalities. See *id.*

15. Erin R. Fox et al., *ASHP Guidelines on Managing Drug Product Shortages in Hospitals and Health Systems*, 66 AM. J. HEALTH-SYS. PHARMACY 1399, 1400 (2009).

Disturbances in the quality of API may similarly contribute to the prevalence of shortages.¹⁶ In 2010, at least 42% of sterile injectable drug shortages were caused by contamination or stability changes, 9% of which were attributable to the quality of raw materials.¹⁷ Problems with drug quality at manufacturing sites which resulted in disruption are one of the most prominent causes of drug shortages.¹⁸ As much as 80% of raw drug materials are procured from foreign markets, and in recent years, there has been an increasing wariness regarding the quality of these materials.¹⁹

2. Manufacturer Production Capabilities

Drug shortages may also occur when the manufacturer of a particular drug product halts production as a result of an FDA enforcement action for noncompliance with current good manufacturing practices (cGMP) or because of voluntary product discontinuation.²⁰ Factors contributing to noncompliance may vary from loss of personnel to antiquated manufacturing equipment, and could involve a long and demanding process to resolve.²¹ The resolution of these compliance issues, which could also include injunctions or seizure of products, may ultimately prevent production for a significant period of time and become a significant contributing factor toward the development of a shortage.²²

Alternatively, a manufacturer's decision to voluntarily close a manufacturing facility or discontinue a product could

16. See COLEEN CHERICI ET AL., NAVIGATING DRUG SHORTAGES IN AMERICAN HEALTHCARE: A PREMIER HEALTHCARE ALLIANCE ANALYSIS 1 (2011), available at <http://www.premierinc.com/about/news/11-mar/drug-shortage-white-paper-3-28-11.pdf>.

17. *Id.*

18. See *FDA and Manufacturers Work to Prevent Drug Shortages*, *supra* note 6. The nature of these quality problems is typically severe. "In general, inspection findings that have been followed by shortages have been serious in nature: glass shards, metal filings, and fungal or other contamination in injectable products that must be sterile and pure to be safe for patients." FDA'S APPROACH, *supra* note 2, at 35.

19. See CHERICI ET AL., *supra* note 16, at 2.

20. *Id.* at 3.

21. See FDA'S APPROACH, *supra* note 2, at 35.

22. See *Facts About Current Good Manufacturing Practices (cGMPs)*, U.S. FOOD & DRUG ADMIN., <http://www.fda.gov/drugs/developmentapprovalprocess/manufacturing/ucm169105.htm> (last updated June 25, 2009).

also have the unintended consequence of creating a drug shortage.²³ Increasing financial pressures may provide significant impetus for a manufacturer to discontinue a drug product line in favor of a more lucrative alternative.²⁴ Even in the absence of more lucrative options, the potential profitability of a particular drug might simply be insufficient to justify production. For example, pragmatic manufacturers might conclude that the high costs associated with meeting safety requirements and regulatory user fees exceed projected profits based on the expected market demand.²⁵ Under the current regulatory regime, manufacturers are not required to notify the FDA about their plans to discontinue production unless the drug is life-supporting, life-sustaining, or used to prevent a debilitating disease or condition, and the manufacturer is the sole source of production.²⁶

Recent economic constraints have further contributed to drug shortage risks by leading many drug manufacturers to employ leaner inventories, reducing the overall stockpiles of drug ingredients.²⁷ Although the effect of this trimming process is to improve capital efficiency for the firm, it simultaneously reduces the manufacturer's ability to respond to fluctuations within the pharmaceutical market and creates greater risk associated with the potential unavailability of necessary drug ingredients.²⁸

B. IMPACT OF DRUG SHORTAGES

1. Patient Care Impact

Shortages in the supply of critical drugs have potentially dangerous effects on the administration of patient care. The unavailability of necessary medications may force physicians to cease or delay important procedures or employ less effective alternatives.²⁹ There also exists the risk that physicians may not

23. See CHERICI ET AL., *supra* note 16, at 1–2.

24. Fox et al., *supra* note 15, at 1400–01.

25. See CHERICI ET AL., *supra* note 16, at 1–2.

26. See *id.*

27. See *id.* at 2.

28. See *id.*

29. Consider, for example, the specific case of Bleomycin at the Lancaster General Health Hospital. Bleomycin is a drug that is “critical to curative therapies for Hodgkin’s lymphoma (ABVD regimen) and testicular cancer (BEP regimen), especially for young adult patients with curative diseases and good performance status.” *Examining the Increase in Drug Shortages: Hearing Be-*

be as knowledgeable about alternative products. This increases the probability for dosing errors and preventable adverse reactions between drug products.³⁰

In some instances, drug shortages may effectively deny patients access to curative therapy and leave them with no meaningful alternatives.³¹ Aside from the potential psychological and emotional impact on patients who are unable to receive necessary treatment, even when substitute drugs are available, there is often less data available to the physician regarding the use of the product.³² This is particularly relevant when the unavailable drug has historically represented the gold standard treatment for a particular condition to the exclusion of other drugs whose risks and outcomes are less attractive.³³

2. Financial Impact

Drug shortages can impose significant financial impacts on

fore the H. Comm. on Energy & Commerce Subcomm. on Health, 112th Cong. 5 (2011) (testimony of Richard D. Paolotti, Vice President Operations- Pharmacy, Laboratory, and Radiology Lancaster General Health), available at http://democrats.energycommerce.house.gov/sites/default/files/image_uploads/Paoletti_Testimony_HE_09.23.11.pdf. Shortages have forced the hospital to delay initiation of treatments for these cancer patients, and alternative treatments are “more toxic and impair fertility in young patients.” *Id.* A survey by Premier Healthcare Alliance found that 80% of hospitals “experienced shortages that resulted in a delay or cancellation of a patient care intervention,” and 34% suggested this occurred more than six times. CHERICI ET AL., *supra* note 16, at 3. Among the types of procedures delayed due to drug shortages were chemotherapy and surgical treatments. *See id.*

30. Approximately eighty-nine percent of hospitals experienced shortages that had the potential to cause a medication safety issue or an error in patient care, and fifty-three percent suggested this occurred more than six times. CHERICI ET AL., *supra* note 16, at 3.

31. Acute myelogenous leukemia (AML) is an example:

For many patients, AML is a potentially curable disease. Cytarabine (Ara-C) is an essential component of treatment for AML, but this drug is in short supply today. There is simply no substitute, leaving many of our physicians in the situation of telling patients that this potentially curative therapy is not available to them.

Examining the Increase in Drug Shortages: Hearing Before the H. Comm. on Energy & Commerce Subcomm. on Health, 112th Cong. 3 (2011) [hereinafter Penley Testimony] (testimony of Charles W. Penley, American Society of Clinical Oncology), available at http://archives.republicans.energycommerce.house.gov/Media/file/Hearings/Health/092311%20Drug%20Shortages/Penley_Testimony.pdf.

32. *See id.* at 3–4.

33. *Id.*

hospitals and similar healthcare institutions by forcing these facilities to purchase more expensive alternative medications or therapies. At a national level, it is estimated that drug shortages may cost hospitals over \$416 million annually.³⁴

One factor exacerbating the financial costs associated with drug shortages is the activities of gray-market distributors. The gray market is a parallel, unofficial supply channel, unintended by the original manufacturer, which exhibits a tendency toward price gouging.³⁵ When a drug shortage occurs, gray-market distributors purchase available supplies and re-sell those products at significantly inflated prices for whatever the market can bear. One study, based on 1,745 gray-market offers, estimates that the average markup of gray-market distributors to providers is 650%, with the highest markups being more than 4500%.³⁶ 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.³⁷

3. Personnel Impact

As indicated earlier, drug shortages create significant logistical burdens for hospitals that must manage the various consequences arising from the unavailability of potentially critical drugs. Adequately adjusting to the reality of a drug shortage may require the collaboration of an entire host of providers and staff.³⁸ The considerable time required by staff to manage problems associated with drug shortages not only results in an ascertainable financial cost to medical facilities, but it simultaneously diverts time away from the intended function of providing substantive medical care to sick and injured patients.³⁹

34. Expenses associated with purchasing more expensive generic drugs during shortages could be at least \$200 million, and the labor costs associated with simply managing shortages might be as high as \$216 million. Rola Kaakeh et al., *Impact of Drug Shortages on U.S. Health Systems*, 68 AM. J. HEALTH-SYS. PHARMACY 1811, 1818 (2011).

35. See *Examining the Increase in Drug Shortages: Hearing Before the H. Comm. on Energy & Commerce Subcomm. on Health*, 112th Cong. 8 (2011) (testimony of Mike Alkire, Chief Operating Officer, Premier Healthcare Alliance), available at http://archives.republicans.energycommerce.house.gov/Media/file/Hearings/Health/092311%20Drug%20Shortages/Alkire_Testimony.pdf.

36. *Id.* at 9.

37. See *id.* at 7–9.

38. See *id.* at 10–12.

39. See *id.* at 5–7.

Drug shortages provoke a cascade of difficulties ranging from drug procurement to therapeutic decision-making.⁴⁰ Healthcare administrators are forced to determine the validity of the shortage and then actively manage the implications affecting their respective facilities.⁴¹ Ideally, hospital departments will assess their ability to meet future patient needs based on the existing inventory for a product and subsequently develop strategies for therapeutic alternatives.⁴²

The health system, generally, must make decisions about potential alternative therapies or agents that may be used despite the shortage.⁴³ Information about therapeutic changes, guidelines, and implementation needs to be conveyed to staff and automated systems often need to be updated.⁴⁴ When there is a concern over the availability of a drug, the health system may provide specific guidelines for the prioritization of patient care, possibly limiting product use to a specific population of patients.⁴⁵

C. FDA DRUG SHORTAGE PROGRAM

The FDA's Drug Shortage Program (DSP) is a division of the CDER and was developed in 1991 to respond to growing concerns about the public health impact of shortages and "oversee and facilitate the resolution of all [drug] shortage situations"⁴⁶

The DSP acquires information about potential drugs shortages from an assortment of sources, including internally within the FDA and externally from drug manufacturers, although the DSP has no regulatory authority to require that manufacturers report potential drug shortages unless the drug is medically necessary and is being discontinued from a "sole-source."⁴⁷

40. Fox et al., *supra* note 15, at 1402–03.

41. *Id.*

42. *See id.*

43. *See id.* at 1404.

44. *Id.*

45. *Id.*

46. OFFICE OF NEW DRUGS, *supra* note 3, at 7; Valerie Jensen et al., *FDA's Role in Responding to Drug Shortages*, 59 AM. J. HEALTH-SYS. PHARMACY 1423, 1423 (2002) [hereinafter Jensen et al., *FDA's Role*].

47. Jensen et al., *FDA's Role*, *supra* note 46, at 1423–24. The statute specifically requires that sole-source manufacturers of drugs that are either life-sustaining, life-supporting, or required in the prevention of a debilitating dis-

Once the DSP has received a report of a shortage, it must verify a disruption in supply and assess the length and severity of the shortage. If the DSP determines the drug is “medically necessary,” it posts that information on the FDA website for public availability.⁴⁸

The DSP may work with manufacturers of medically necessary drug products through the creation of short- and long-term management plans to alleviate shortages.⁴⁹ The DSP-assisted plans may involve appropriate changes in manufacturing sites, processes, or suppliers, as well as the requisite FDA review regarding these changes.⁵⁰

Overall, the CDER’s available tools for alleviating drug shortages include:

[N]otifying and encouraging manufacturers of the same or similar products to increase their production, finding another manufacturer to begin production of the product, using regulatory discretion with regard to selective release of product when accompanied by appropriate warnings or remedies (e.g., filters for products contaminated with particulates), expedited review of an Abbreviated New Drug Application (ANDA), expedited review of new manufacturing lines or raw material sources to help firms increase production, and regulatory discretion with regard to controlled importation of equivalent products approved abroad but not in the United States.⁵¹

The most common approach taken by the FDA has been to request that companies increase production, followed by regulatory discretion, and expedited reviews.⁵² The FDA does not have the authority to require that manufacturers continue production during a drug shortage.⁵³

ease must provide at least six months of notice prior to any discontinuation in manufacture. 21 U.S.C. § 356c(a) (2006).

48. Valerie Jensen et al., *An Overview of the FDA’s Drug Shortage Program*, 30 PHARMACY & THERAPEUTICS 174, 174 (2005) [hereinafter Jensen et al., *An Overview*].

49. *Id.* at 175.

50. *Id.*

51. FDA’S APPROACH, *supra* note 2, at 16.

52. *Id.* Regulatory discretion on the part of the FDA may involve determinations on the level of risk presented by manufacturing or quality problems of drugs that are potentially at risk for shortage. For example, low risk events, such as incorrect expiration dates on packages, may be more easily circumvented at the discretion of the FDA than products with particulate contaminants or sterility issues. See *Frequently Asked Questions About Drug Shortages*, U.S. FOOD & DRUG ADMIN., <http://www.fda.gov/Drugs/DrugSafety/DrugShortages/ucm050796.htm> (last updated Aug. 24, 2012).

53. FDA’S APPROACH, *supra* note 2, at 18.

D. PROPOSED DRUG SHORTAGE LEGISLATION

In response to the emerging health crisis posed by increasing drug shortages, there are currently two bills within Congress, one in the House and one in the Senate, each entitled the "Preserving Access to Life-Saving Medications Act."⁵⁴ The House of Representatives' bill was introduced by Congresswoman Diana DeGette of Colorado and Congressman Tom Rooney of Florida, and the Senate bill was introduced by Senator Amy Klobuchar of Minnesota and Senator Bob Casey of Pennsylvania.⁵⁵ The primary distinguishing factor between the two pieces of legislation is the House bill's inclusion of biologics within the bill's mandate.⁵⁶

Both bills would act to create an early warning system by amending the Federal Food, Drug, and Cosmetic Act to provide the FDA with the ability to require notification from pharmaceutical companies in the event of an interruption in manufacturing.⁵⁷ The bills would require notice at least six months prior to a "discontinuance or planned interruption or adjustment" of the manufacture of a drug and as soon as practicable "in the case of any other interruption or adjustment."⁵⁸ Adjustments would include changes "related to the supply of raw materials, including active pharmaceutical ingredients; [adjustments to production capabilities;] business decisions that may affect the manufacture of the drug . . . ; and [other adjustments as determined appropriate by the Secretary]."⁵⁹ To enforce compliance on the part of pharmaceutical manufacturers, failure to submit a required notification would subject the manufacturer

54. Preserving Access to Life-Saving Medications Act, S. 296, 112th Cong. (2011); Preserving Access to Life-Saving Medications Act of 2011, H.R. 2245, 112th Cong.

55. Press Release, PRNewswire, Capitol Hill Briefing from Nation's Leading Patient Advocacy Organization Calls Attention to Impact of U.S. Drug Shortage Crisis on Patients' Ability to Receive Life Saving Treatment (Apr. 24, 2012), available at <http://www.prnewswire.com/news-releases/capitol-hill-briefing-from-nations-leading-patient-advocacy-organizations-calls-attention-to-impact-of-us-drug-shortage-crisis-on-patients-ability-to-receive-life-saving-treatment-148695355.html>.

56. Compare S. 296 § 2, with H.R. 2246 § 2(b)(4)(B).

57. S. 296 § 2(a); H.R. 2245 § 2(b).

58. S. 296 § 2(a)-(b); H.R. 2245 § 2(b)(2) (using slightly different language than the Senate bill).

59. S. 296 § 2(a)(4); H.R. 2245 § 2(a)(3)(B) (using slightly different language than the Senate bill).

to a civil monetary penalty.⁶⁰

Both bills would also require the FDA to establish “evidence-based criteria for identifying drugs that may be vulnerable to a drug shortage.”⁶¹ The criteria would be based on the “[n]umber of manufacturers of the drug; [t]he sources of raw material or active pharmaceutical ingredients; [t]he supply chain characteristics . . . ; and [t]he availability of therapeutic alternatives.”⁶² If a drug fell within the implemented criteria, the Secretary of Health and Human Services would notify the manufacturer of the vulnerable drug and collaborate with the manufacturer to improve plans to prevent shortages. The House bill requires that “with respect to drugs that are vulnerable to a drug shortage . . . , the Secretary shall collaborate with manufacturers and other stakeholders . . . to establish and improve continuity of supply plans.”⁶³ The Senate bill provides for similar “continuity of operations plans,” although only when the vulnerable drugs are “medically necessary.”⁶⁴

E. PRESIDENTIAL EXECUTIVE ORDER

On October 31, 2011, President Obama issued an executive order in an effort to address the proliferation of drug shortages.⁶⁵ The executive order instructs the FDA to employ its existing authority and administrative tools “to require drug manufacturers to provide adequate advance notice of manufacturing discontinuances that could lead to shortages” for drugs required in life support, sustainment, or debilitating diseases, “to expand its current efforts to expedite its regulatory reviews, including reviews of new drug suppliers, manufacturing sites, and manufacturing changes,” and to “communicate to the Department of Justice (DOJ) any findings that shortages have led market participants to stockpile the affected drugs”⁶⁶

60. Under H.R. 2245, the penalty shall not “exceed \$10,000 for each day on which the violation continues, and not to exceed \$1,800,000 for all such violations adjudicated in a single proceeding.” H.R. 2245 § 2(b)(7). Alternatively, the Senate bill states that within 180 days of enacting the bill, “the Secretary shall promulgate regulations establishing a schedule of civil monetary penalties.” S. 296 § 2(a)(6).

61. S. 296 § 2(d)(2); H.R. 2245 § 2(c)(3)(B).

62. S. 296 § 2(d)(2)(A); H.R. 2245 § 2(c)(3)(B).

63. H.R. 2245 § 2(c)(4).

64. S. 296 § 2(d)(3).

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

66. *Id.* at 282.

II. ANALYSIS

This section will examine the existing legislation designed to address drug shortages, analyze the effectiveness of these bills, and suggest additional approaches not provided within these pieces of legislation that could be utilized to alleviate and prevent future shortages.

A. PENDING LEGISLATION

The current legislative proposals within the House and Senate represent an essential step toward recognizing and confronting potential drug shortages and mitigating the severity of those that occur. However, the existing bills, in their present state, fail to provide the comprehensive approach necessary to address the multitude of factors that contribute to shortages.

1. Notification Requirement

The Preserving Access to Life-Saving Medications Act's creation of an early notification system to ensure manufacturers provide the FDA with important information pertaining to discontinuances, interruptions, or adjustments is critical in allowing the FDA to initiate its collaboration with manufacturers and utilize available tools to solve preventable drug shortages. Historically, drug manufacturers have not been required to provide the FDA with regular notification of factors that may ultimately contribute to the existence of future drug shortages, limiting the agency's effectiveness in taking preemptive steps which could alleviate the risk occurrence.⁶⁷ From a public health perspective, disclosure of potential shortages will provide doctors and patients with the information necessary to make informed decisions relating to the selection of future therapeutic approaches or otherwise make arrangements for alternative treatments.

Because current law requires that only manufacturers of single source, medically necessary drugs must inform the FDA when there is an interruption in production, the FDA's ability

67. See *Examining the Increase in Drug Shortages: Hearing Before the H. Comm. on Energy & Commerce Subcomm. on Health*, 112th Cong. 7–8 (2011) [hereinafter Colgan Testimony] (testimony of Kevin Colgan, Corporate Director of Pharmacy, Rush University Medical Center), available at http://archives.republicans.energycommerce.house.gov/Media/file/Hearings/Health/092311%20Drug%20Shortages/Colgan_Testimony.pdf.

to marshal its full force against shortages is hamstrung by the relatively sparse available information.⁶⁸ Notifications by manufacturers could assist the FDA in making an assessment of the potential length and severity of production interruptions and prospective shortages, and allow the agency to make determinations as to which remedial steps will be most effective. With the expanded notification requirements provided by the proposed legislation, the FDA would be better able to cooperate with manufacturers to expedite approvals from alternate domestic manufacturing sites, approve importation from foreign manufacturing sites that meet cGMP requirements, and approve new sources for raw materials, to help prevent shortages.⁶⁹ The FDA may also exercise discretion in alleviating shortages by choosing to allow the shipment of drugs that do not necessarily create safety issues but are otherwise not compliant with FDA regulation.⁷⁰ Further, the legislation provides an important enforcement mechanism in the form of monetary penalties for manufacturers that fail to notify the FDA of conditions presenting a risk of shortage.⁷¹

68. See *id.* at 7–8. Manufacturers of non-medically-necessary drugs are not required to provide the FDA with notification of any interruption in production, but they may choose to do so voluntarily. This similarly applies to product discontinuations. See *id.* at 7.

69. All of these approaches are currently available under the existing regulatory regime, but their effectiveness is limited by the dearth of information made available to the FDA by drug manufacturers. See Kate Murphy, *How the FDA is Addressing Drug Shortages*, FIGHT COLORECTAL CANCER (Oct. 5, 2011), http://fightcolorectalcancer.org/policy_news/2011/10/how_the_fda_is_addressing_drug_shortages. By the agency's own account, when voluntary notifications were available, the FDA avoided as many as thirty-eight drug shortages during the year of 2010. Colgan Testimony, *supra* note 67, at 7.

70. Murphy, *supra* note 69. For example, the FDA may choose to allow the shipment of drugs that are mislabeled or packaged improperly. It may approve requests to extend drug expiration dates or increase manufacturing capacity. Other possibilities may include FDA approval of shipment of drugs that present some health risks that can be removed with appropriate steps. *Examining the Increase in Drug Shortages: Hearing Before the H. Comm. on Energy & Commerce Subcomm. on Health*, 112th Cong. 6–7 (2011) (testimony of Howard K. Koh, Assistant Secretary of Health, U.S. Department of Health and Human Services), available at <http://archives.republicans.energycommerce.house.gov/Media/file/Hearings/Health/092311%20Drug%20Shortages/Kohtestimony.pdf> (“In [a] recent case . . . , [the] FDA worked with the manufacturer and found that if the vials were warmed the crystals would dissolve and the danger to patients was mitigated.”).

71. See *supra* note 60 and accompanying text.

2. Continuity of Supply Plans

Further empowering the effectiveness of the notification system, the proposed legislation would allow the Secretary to “collaborate with manufacturers of drugs . . . to establish and improve continuity of operations plans with respect to medically necessary drugs, as defined by the secretary, so that such plans include a process for addressing drug shortages.”⁷² Although the present opacity and lack of information exchange impairs the FDA’s ability to engage in meaningful collaboration with drug firms, with mandated notification and flow of information, the FDA will be better able to implement countermeasures “such as manufacturing redundancies or backup supplies; more effective communication among FDA, manufacturers and other in the supply chain; and finally, development of plans that utilize production capabilities of other manufacturers either here in the United States or abroad to ensure availability of a drug in short supply.”⁷³

This type of collaboration also facilitates contingency planning that could, among other approaches, help with the importation of foreign drugs, establish back-up suppliers for necessary raw materials, and create alternative production sources.⁷⁴ Undertaking these preemptive planning steps to ensure continuity is critical in addressing drug shortage vulnerabilities, and the pending legislation would provide the FDA with the necessary tools to do so.

72. Preserving Access to Life-Saving Medications Act, S. 296, 112th Cong. § 2(d)(3) (2011). The House bill contains a slightly different mandate. *See supra* notes 63–64 and accompanying text.

73. Colgan Testimony, *supra* note 67, at 9. Additionally:

In 2010, FDA worked with APP Pharmaceuticals to help alleviate a shortage of propofol, a widely used anesthetic preferred by anesthesiologists because of its excellent safety profile compared to other available drugs. By enabling the company to work with its German counterpart to import the drug, FDA was able to substantially improve product availability after the shortage occurred. Using this example, if an acceptable foreign alternative could be identified before a shortage occurs through establishment of continuity of supply plans for vulnerable drugs, then importation could be expedited and the negative impact of a specific shortage on patient care could be minimized or averted.

Id.

74. *See id.*

3. Identifying Vulnerable Drugs through Evidence-Based Criteria

The proposed legislation would also create an important process to identify critical drugs that may be vulnerable to shortages through the use of evidence-based criteria.⁷⁵ Like the mandatory notification system, this information will bolster the FDA's ability to collaborate with manufacturers and potentially preempt shortages.⁷⁶ Certain drugs that are manufactured by a limited number of firms, or require an API from limited suppliers, are likely among the various drugs that are particularly vulnerable to shortages from changes in production or market shifts.⁷⁷ Information regarding vulnerability of particular drugs will permit the FDA to undertake efforts to increase overall production or rapidly respond to shifting availability and demand.⁷⁸ Knowledge regarding the potential vulnerability of certain drugs to shortages may also assist drug distributors and healthcare providers to make informed decisions that may impact patient treatments, health, and safety.⁷⁹

While these recent legislative efforts would empower the FDA to work more closely with entities within the drug supply chain and would improve monitoring of drugs that may be vulnerable to shortages, the enactments do not provide adequate incentives to entice manufacturers into the production of these vulnerable drugs and neglect any effort to streamline approval.

75. S. 296 § 2(d)(2); Preserving Access to Life-Saving Medications Act of 2011, H.R. 2245, 112th Cong. § 2(c)(3)(B).

76. Public information regarding the vulnerability of certain drugs could contribute to the occurrence of shortages if gray-market participants or medical facilities anticipatorily purchase vulnerable drugs based on these identification programs. See FDA'S APPROACH, *supra* note 2, at 29 (noting that "taking advantage of shortages has emerged as a new business model for some in this sector"). While keeping this information private could prevent inadvertent shortages through gray-market purchasers, it would defeat one of the important functions of disseminating relevant information to physicians and their patients for treatment planning. These contingencies only further demonstrate the importance of effectively dealing with and preventing gray-market purchasers from exploiting shortages.

77. Jensen et al., *An Overview*, *supra* note 48, at 175.

78. See *supra* notes 69–70, 73–74 and accompanying text for a discussion of potential FDA responses for drugs identified as vulnerable to a shortage.

79. Knowledge of vulnerability could allow distributors and providers to undergo the complex task of planning for management of a drug shortage. See Fox et al., *supra* note 15, at 1402–05 (outlining the decision-making process for managing a drug shortage).

B. PROPOSAL FOR ADDRESSING DRUG SHORTAGES

Much of the proposed legislation is focused on providing the FDA with important notifications and information to help in the prevention of prospective shortages through the use of already existing FDA authority. However, in order to adequately address the multilayered and complex factors that influence drug shortages, the FDA will require more than just notification of possible shortages; it must also have more effective regulatory tools at its disposal to combat these shortages when they occur.

In addition to a robust notification system, effective legislation should also function to incentivize further manufacture of potentially vulnerable drugs and streamline the drug approval process during shortages. Providing more stable drug availability and resiliency to possible market shifts will reduce the potential for price gouging and reduce exploitation by gray-market suppliers.⁸⁰ The following section will elaborate on the regulatory tools that could potentially be enacted to assist in the prevention and alleviation of drug shortages.

1. Mandatory Notification Processes

An integral component of any legislative effort to address the growing drug shortage problem will require the creation of a notification system to facilitate the flow of relevant information to the FDA about discontinuances and interruptions of drug production. With knowledge of impending shortages or vulnerable drugs, the FDA can employ its existing statutory authority to mitigate the probability of occurrence, duration, and severity of drug shortages, as discussed previously.⁸¹ Concomitant with this notification system should be the implementation of criteria for *a priori* determination of which drugs may

80. See *supra* note 36 and accompanying text for a discussion of price gouging by gray-market suppliers.

81. See Am. Hosp. Ass'n & Am. Soc'y of Health-Sys. Pharmacists, *Options for Addressing Drug Shortages*, AM. SOC'Y HEATH-SYS. PHARMACISTS <http://www.ashp.org/DocLibrary/Advocacy/Options-Addressing-Drug-Shortages.aspx> (last visited Sept. 6, 2012) (noting that the FDA can take action "to expedite the resolution of quality problems; encourag[e] alternative suppliers to ramp up production; expedit[e] internal processes to alleviate or prevent shortages, and, in rare cases, institut[e] temporary importation of drugs from other counties [sic]").

be at risk for shortages.⁸² The creation of an identification process for vulnerable drugs would assist the FDA in cooperating with drug manufacturers to ensure continuity of drug supplies.⁸³ These critical steps are reflected within the proposed legislation, under both S. 296 and H.R. 2245, currently pending in Congress.

Encouraging or mandating manufacturers to provide notification to the FDA when they are acquiring their raw materials from a single source supplier may also help inform the FDA of potential shortage risks.⁸⁴ With this information, the FDA may be better able to collaborate with manufacturers and suppliers to ensure that such shortages do not occur.⁸⁵ The previously discussed legislation does require the FDA to inquire into vulnerability of drugs through evidence-based criteria that considers the sources of raw materials,⁸⁶ but it does not require that manufacturers notify the FDA if they are only able to acquire their raw materials from a single source.⁸⁷ Alternatively, or perhaps in conjunction with manufacturer notification, regulations might seek to require suppliers of APIs and essential drug components to provide notifications where such information might be relevant to potential shortages.

A classification system pertaining to the expected length and severity of shortages could additionally assist providers and patients by allowing them to develop informed choices and plans of treatment.⁸⁸ When important therapeutics are not available, physicians may want to know information regarding the reasons for the products' lack of availability, information on

82. Both S. 296 and H.R. 2245 require the Secretary to implement an evidence-based criteria for identifying vulnerable drugs that considers the number of manufacturers, sources of raw material or active pharmaceutical ingredients, supply chain characteristics, and the availability of therapeutic alternatives. *See supra* notes 61–62 and accompanying text.

83. Am. Hosp. Ass'n & Am. Soc'y of Health-Sys. Pharmacists, *supra* note 81.

84. *Id.*

85. *See* Colgan Testimony, *supra* note 67, at 8 (“This information is, and should be considered proprietary, but this lack of transparency hinders the development of contingency plans for vulnerable drugs. A requirement that manufacturers notify FDA when there is a single source of API may help the Agency work with manufacturers to identify backup sources should supply issues arise.”).

86. *See supra* notes 61–62 and accompanying text.

87. For the notification requirements of the proposed legislation, see S. 296, 112th Cong. § 2(a)(2) (2011); H.R. 2245, 112th Cong. § 2(b) (2011).

88. Am. Hosp. Ass'n & Am. Soc'y of Health-Sys. Pharmacists, *supra* note 81.

predicted availability, and potential alternative sources of the drug before deciding whether to pursue substitute treatment regimens.⁸⁹ The creation of such a system might also better allow the FDA to prioritize its actions by employing greater resources on shortages that present greater health impact due to their severity, length, or breadth.⁹⁰ The system should similarly take into account the relative “importance” of each drug by incorporating consideration of the availability of alternative drug treatments and the severity of the respective disease, illness, or necessity in carrying out of medical procedures.⁹¹ For example, drugs could be classified into three separate categories based on how critical they may be to patient treatments: level one—drugs that cannot be missed for even a single dose or days; level two—drugs that may be missed for more than a single dose or day, but should be reinstated as soon as possible since they reduce long-term complications of disease or reduce intolerable symptoms of disease; and level three—drugs that are noncritical and can be withheld safely for a significant period of time.⁹²

2. Incentivize Manufacture of Vulnerable Drugs

Another approach to help prevent drug shortages is to provide incentives to manufacturers for the production of critical drugs that may be in short supply.⁹³ Incentives may encourage manufacturers to enter or stay in the market for producing these vulnerable drugs through a variety of mechanisms including, but not limited to, tax credits or rebates, priority ap-

89. CAN. PHARMACISTS ASS'N, DRUG SHORTAGES: A GUIDE FOR ASSESSMENT AND PATIENT MANAGEMENT 2 (2010), available at <http://www.pharmacists.ca/cpha-ca/assets/File/cpha-on-the-issues/DrugShortagesGuide.pdf>.

90. Am. Hosp. Ass'n & Am. Soc'y of Health-Sys. Pharmacists, *supra* note 81.

91. See CAN. PHARMACISTS ASS'N, *supra* note 89, at 4.

92. See, e.g., *id.* at 4–6, for a general classification system for assessing drug criticality. In addition, there may be some complicating factors in determining how critical a drug may be for treatment, such as the difference amongst patients receiving these drugs. For example, patients may be receiving the same drug for different treatments (one that is life threatening and one that is not), may be taking multiple drugs that would create prohibitive contraindications for alternative drugs, or may be unable to take alternative drugs due to intolerable side effects. *Id.* at 7–8.

93. Am. Hosp. Ass'n & Am. Soc'y of Health-Sys. Pharmacists, *supra* note 81.

proval processes for manufacturers who agree to redundant production, or temporary exclusivity of new drug lines in shortage.⁹⁴

Tax incentives could be offered to drug manufacturers in an effort to encourage firms to maintain or begin the production of vulnerable drugs.⁹⁵ To ensure a desired and effective outcome, these incentives should be crafted to allow for multiple manufacturers to enter and coexist within a single generic drug market.⁹⁶ Providing rebates or credits for companies that engage in one of the following activities may help to encourage stronger production and allow for a more resilient drug market:

[Companies that] invest in infrastructure to allow sufficient excess inventory of drugs; establish robust continuity of production plans (e.g. a manufacturer that keeps extra production lines “clean” and ready to start at short notice); commit to produce drugs vulnerable to shortage for a specified uninterrupted period of time; [or] re-enter the market or increase production when a drug goes on shortage.⁹⁷

Tax incentives may help to overcome the inherent profitability problems and subsequent manufacturer aversion to critical, generic drugs that typically offer less financial upside than alternative products with higher profit margins.⁹⁸ Other approaches to incentivize the manufacture of vulnerable drugs may be to provide those manufacturers with a priority approval process⁹⁹ or to encourage production by permitting a temporary exclusivity to a drug product at risk for shortage.¹⁰⁰

94. Colgan Testimony, *supra* note 67, at 10; Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81, at 3.

95. See Colgan Testimony, *supra* note 67, at 10.

96. Penley Testimony, *supra* note 31, at 9.

97. *Id.*

98. See *id.*

99. A priority approval process could be implemented for manufacturers who agree to institute production redundancies to improve resilience to market shifts and limit the occurrence of shortages. For example, currently, many manufacturers, (as well as distributors and healthcare organizations) employ “just-in-time” inventory procurement approaches where little extra inventory supplies are actually on hand at the manufacturing site. These approaches, though ostensibly maximizing efficiency and profit, ultimately leave manufacturers susceptible to halts in production when supplier shortages occur. See CHERICI ET AL., *supra* note 16, at 2. Efforts to incentivize changes in these practices could help reduce drug shortages when supplies are temporarily disrupted.

100. See Colgan Testimony, *supra* note 67, at 10–11. Exclusivity has been commonly used by the FDA for “orphan drugs” as a way to reward companies who spend resources to develop and produce drugs for the treatment of rare conditions. *Orphan Drugs*, FDA/CDER SMALL BUS. CHRON, (Food & Drug Admin., Silver Spring, Md.), July 13, 2012, at 1, available at

3. Streamline Drug Approval Process

Since a clear method for preventing drug shortages is to ensure that there are adequate production levels of vulnerable drugs, the approval processes involved in manufacture should be as smooth and efficient as possible to allow for greater production and faster market entry.¹⁰¹ In achieving this goal, the FDA should consider implementing a “fast track” approval process related to drugs that are experiencing shortages, reexamine the current definition of “medically necessary,” and create a faster, more responsive, approval process for pre-1938 drugs.¹⁰²

The FDA’s approval process for new production lines, alternative manufacturing sites, and new suppliers of APIs for critical drugs in shortage is currently inadequate to deal with the rapid onset of drug shortages.¹⁰³ Unpredictable approval timelines foster uncertainty within the production planning process for many manufacturers.¹⁰⁴ Other requirements, such as new drug applications, can further make the process slug-

http://www.fda.gov/downloads/Drugs/DevelopmentApprovalProcess/SmallBusinessAssistance/UCM311928.pdf. However, temporary exclusivity may itself be problematic in the context of shortages, since it mimics the type of manufacturing conditions that frequently pose a significant risk for the occurrence of such shortages, i.e., one manufacturer. *See supra* Part I.A. Balancing the length of the exclusivity period may help to reduce this potential problem. Exclusivity would also allow for the manufacturer to demand higher prices in the absence of competition, which could put greater strain on healthcare facilities and professionals.

101. Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81.

102. *Id.*

103. *See id.*

104. *See* AMANDA RAE KRONQUIST, THE PRESCRIPTION DRUG USER FEE ACT: HISTORY AND REAUTHORIZATION ISSUES FOR 2012 at 2 (2011), available at http://thf_media.s3.amazonaws.com/2011/pdf/bg2634.pdf. The author explains:

An ambiguous and inconsistent approval process prevents Americans from accessing new therapies and drugs that save lives. The medical product development path in the U.S. has become more challenging, costly, and unpredictable as the previous reauthorizations have piled on regulations that detract from the FDA’s primary task of providing innovative medical products to the American public as quickly and safely as possible.

Id. “A new regulatory model that provides drug companies with transparency, clarity, and certainty is needed to continue developing innovative products without a convoluted review process.” *Id.* at 10.

gish and impair manufacturers from being able to rapidly enter into the production of a drug, potentially lengthening or exacerbating the shortage.¹⁰⁵

The implementation of “fast track” approval processes that apply specifically to drugs that are vulnerable or currently experiencing a shortage may allow the FDA and manufacturers to become more responsive to unpredictable or rapid shifts that induce shortages. Further, including other regulatory components, such as mandating manufacturing redundancies when approving applications for vulnerable drugs could help ensure there is a robust availability of any given drug product.¹⁰⁶ Steps may generally include improving the overall efficiency of the process by altering current approval protocols, giving priority treatment to approval requests related to shortages, and increasing agency resources to deal with these requests.¹⁰⁷

Reexamination of the current statutory definition of “medically necessary” could be another prudent step to augment the FDA’s authority to act in a significant number of shortages.¹⁰⁸ When alternative treatments are available, a drug does not fall within the category of “medically necessary.” However, the definition does not inquire into the nature of the alternative treatments and their potential side-effects.¹⁰⁹ The definition further does not consider how widespread the use of a particular drug may be.¹¹⁰ Expanding the definition to include analysis of substantial side-effects, prevalence of use, and the availabil-

105. See Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81. While fast-tracked approval processes may ultimately serve to put drugs onto the market faster, such processes may subject patients to drug products that have undergone potentially inferior testing for safety or effectiveness. One possible way to increase the speed of the approval process without interfering with its goals of ensuring drug safety and effectiveness may simply be to provide the FDA with increased resources that could be diverted to expediting these approvals during times of shortages or when shortages are impending, i.e., vulnerable drugs. See *id.* As with nearly all the approaches discussed, increased funding of the FDA may be necessary to effectively implement these additional regulations. Given the current economic straits and trend toward budget cuts, increased funding of the FDA may be a politically unpalatable approach and may make dealing with future shortages difficult.

106. *Id.* at 2–3.

107. *Id.* at 1–2; Awi Federgruen, *The Drug Shortage Debacle—And How to Fix It*, WALL ST. J., Mar. 2, 2012, at A13. Expedited approval of ANDA, supplemental applications, and production lines are the most obvious options.

108. Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81.

109. *Id.*

110. OFFICE OF NEW DRUGS, *supra* note 3, at 8.

ity and relative effectiveness of alternative treatments may have the effect of increasing the number of “medically necessary” drugs and providing the FDA greater discretion to act when these drugs fall into shortages.

Creating an expedited approval process for pre-1938 drugs may also alleviate drug shortages.¹¹¹ Many pre-1938 drugs are widely used in therapies but continue to be unapproved. Many of these drugs possess a continuing history of safe use but have since fallen victim to increasing FDA scrutiny and been classified as unapproved.¹¹² Prioritizing, shortening, or making the process less demanding for these critical drugs may foster manufacturing and ensure availability by limiting the regulatory hurdles necessary for their production.¹¹³

Many critical drugs also fall within the ambit of Drug Enforcement Agency (DEA) regulations and are subject to manufacturing quotas due to classification as controlled substances.¹¹⁴ The limits imposed by these quotas can impair the FDA’s

111. Colgan Testimony, *supra* note 67, at 10–11; Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81.

112. Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81. Note that:

Congress originally permitted these [pre-1938] drugs to continue to be manufactured without the additional demonstrations of their safety and effectiveness otherwise required in the 1938 and 1962 FDA laws. However, increasing [c]ongressional scrutiny over the past decade has led [the]FDA to deem these drugs “unapproved[,]” and manufacturers have been required to enter into a new drug application (NDA) process for many of these drugs.

Id. Additionally:

Several drug shortages (e.g., concentrated morphine sulfate solution, levobupivacaine injection) have been precipitated by actual or anticipated action by the FDA as part of the Unapproved Drugs Initiative, which is designed to increase enforcement against [pre-1938] drugs that lack FDA approval to be marketed in the United States. . . . Some participants noted that the cost and complexity of completing a New Drug Application (NDA) for those unapproved drugs is a disincentive for entering or maintaining a market presence.

Drug Shortages Summit Summary Report, AM. SOC’Y HEALTH SYS. PHARMACISTS (Nov. 5, 2010), <http://www.ashp.org/drugshortages/summitreport>.

113. Am. Hosp. Ass’n & Am. Soc’y of Health-Sys. Pharmacists, *supra* note 81, at 2. One obvious way to expedite the approval process of these drugs is by limiting the evidentiary burden for approval placed on prospective manufacturers, based on a strong and continued history of safe use. Efforts might also include eliminating or reducing the NDA user fee altogether.

114. *Id.*

ability to collaborate with manufacturers and prevent increased production during times of shortages. To reduce the negative impact of these quotas, increased collaboration between the FDA and DEA and an expedited process for altering manufacturing quotas should be implemented to allow for quicker, more flexible, responses to potential drug shortages.¹¹⁵

4. Nonlegislative Actions

There are many nonlegislative actions that can be taken to help foster better responses to the risk of drug shortages and ensure continued availability of these critical medical products. Actions may be taken to help identify factors that contribute to the success or failure of FDA efforts to prevent shortages, identify quality issues in manufacturing practices that have affected drug shortages, encourage manufacturers to develop contingency plans in the event of supply disruption, provide additional staffing resources for the FDA, develop networks for early warning of drug shortages to the healthcare system, and improve communication between FDA investigators and the CDER.¹¹⁶

Some stakeholders have suggested that creating a national stockpile reserve for critical therapies may help buffer against drug shortages.¹¹⁷ However, given that these therapies are presumably already in limited supply or potentially vulnerable to shortage, the hoarding of these drugs may have adverse consequences on the market, manufacturers, and distribution prices.¹¹⁸ For such an approach to be applicable, the targeted drugs would need to be readily available in excess of current conditions. This task would require government agencies to deter-

115. *Id.*

116. FDA'S APPROACH, *supra* note 2, at 5–6.

117. Similar approaches with vaccines and antibiotics have been undertaken as preventative steps against counterterrorism and natural disasters. *Strategic National Stockpile (SNS)*, CTRS. FOR DISEASES CONTROL AND PREVENTION, <http://www.cdc.gov/phpr/stockpile/stockpile.htm> (last updated Mar. 8, 2012) (“CDC’s Strategic National Stockpile (SNS) has large quantities of medicine and medical supplies to protect the American public if there is a public health emergency (terrorist attack, flu outbreak, earthquake) severe enough to cause local supplies to run out.”).

118. See *Drug Shortages Summit Summary Report*, *supra* note 112. Additionally, it is possible that some drugs may not be amenable to long-term storage and could not be effectively stockpiled due to their likelihood of perishing. Even if most drugs were suitable for stockpiling, storage alone does not address the underlying causes of the shortages and would only serve as a temporary buffer.

mine which drugs are potentially vulnerable to shortage and acquire stockpiles of those products without negatively influencing the market.¹¹⁹ Whatever the value of governmental hoarding of important drug products, this approach would not be available or effective in the short term to address existing or pending crises.

III. CONCLUSION

The increasing prevalence and severity of critical drug shortages in recent years poses a significant threat to public health that demands immediate attention. Among the types of therapies affected are essential cancer drugs, anesthesia drugs, and others necessary to sustain life or prevent serious disease.

The impact of these drug shortages is detrimental to patient safety and health and induces significant financial hardship on hospitals and healthcare facilities that must struggle to manage the uncertainty associated with unavailable, yet critical, drugs.

The factors contributing to the existence of drug shortages are disparate, varied, and often unrelated, and therefore must be addressed by a comprehensive and multifaceted approach. The current legislation proposed in Congress takes several key steps toward providing the FDA with the ability to adequately manage these problems, but it falls short of addressing many underlying problems that have influenced these shortages.

Policymakers need to balance the short-term concerns of addressing the current drug shortage crises with prudent steps toward general prevention in the long term, while being simultaneously cognizant of how regulations may directly or indirectly influence the behavior of the market. In order to adequately and effectively address the proliferation of drug shortages, legislators and regulators should not only consider early notification systems to assist the FDA in its responses to impending drug shortages, but they also must work to create a more robust drug market through incentives and streamlined approval processes. A drug manufacturing infrastructure that is resilient and can simultaneously respond more rapidly to capricious market events is essential to eliminating the upward trend in drug shortages.

119. *See id.*