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Advancing Patient Safety and Public Health: Lessons Learned From Serial Number Decommissioning Workshop Sponsored by NABP

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Abstract

The global pharmaceutical industry faces ongoing challenges in ensuring the safety and legitimacy of medications entering supply chains around the world; the Pharmaceutical Security Institute estimated that there were 6,897 incidents in 2023, representing an increase of 4% over 2022, with almost half of those incidents reported in the United States market. Pharmaceutical crime is real, and while it is often difficult to quantify, studies that have attempted to measure this significant illegal market estimate that total global sales are between $200 billion and $431 billion annually.

In the US market, a study conducted by the Pacific Research Institute estimated that counterfeit drugs reduce total industry revenues somewhere between $37.6 billion and $162.1 billion, depending on the estimated size of the counterfeit market. The impact of economic activity is only an indicator of the implications on patient safety and outcomes. As media has reported in recent years, several cases have impacted patients and health care practitioners, including those involving Avastin®, Keytruda®, Biktarvy®, Symtuza®, and, most recently, the weight loss drugs Ozempic® and Wegovy®, as well as other prescription drugs.

While full implementation of the Drug Supply Chain Security Act (DSCSA) has been delayed, even when fully implemented, the law has some limitations that have been and will continue to be exploited. For instance, product verification can be performed at any time but is only required in certain instances, such as for salable returns by wholesalers, and to respond to suspect product investigations. Such limitations can be exploited, as seen in recent counterfeit events where valid unique product identifiers were duplicated or reused by bad actors to insert dangerous products into the legitimate supply chain.

A potential solution to increase security is to decommission serial numbers (SNs). Decommissioning involves "removing" from the supply chain the SN of a product that has been dispensed, destroyed, or otherwise deemed unusable. This has become a significant opportunity to further strengthen the security of the pharmaceutical supply chain in the US. SN decommissioning is a promising strategy for closing gaps in the current tracking systems, ensuring that medicines that are no longer in circulation are properly marked, and preventing counterfeit drugs from entering the legitimate supply chain.

In 2024, the National Association of Boards of Pharmacy® (NABP®) conducted a pilot, in collaboration with participating prescription drug manufacturers and dispensers, from April through May 2024, to test the feasibility of SN decommissioning. The pilot demonstrated that it is possible to capture product identifier (including SN) information at the point of dispensing and to relay this information to the manufacturer of record, thereby allowing the manufacturer to decommission the SN.

Drawing from the recommendation found in the NABP Serial Number Decommissioning Pilot Report to share findings with additional members of the prescription drug supply chain, including distributors, chain pharmacies, and other stakeholders, NABP organized a workshop in December 2024 to expand discussions around feasibility. In this document, we examine what decommissioning is, its benefits, challenges, and the next steps required to advance SN decommissioning across the industry.

The Why Behind Decommissioning

The discussion on SN decommissioning is timely due to a combination of escalating pharmaceutical crimes and the limitations of existing supply chain security measures. Despite significant progress under DSCSA, counterfeit drugs continue to enter the legitimate supply chain and pose serious risks to patient safety.

There have been recent cases where criminals have been able to circumvent the protections intended by DSCSA through various means, for example, by reintroducing valid SNs on illegitimate products that might have been "transacted" in the supply chain at some point in time. These "loopholes" allow criminals to continue to introduce illegitimate products that might be even less suspicious in sight, given the existence of an SN.

Despite not being required from a regulatory perspective, decommissioning could help further close these loopholes and become a critical tool in fighting counterfeiters, as it ensures that once a product is no longer available for sale, its SN is invalidated, preventing it from being reintroduced into the legitimate supply chain.

Why NABP Is Leading This Effort

Through its long-standing mission to protect public health, NABP has been leading the topic of SN decommissioning for the last year through a series of pilots and studies.

Where is NABP's interest in SN decommissioning stemming from? It stems from the recognition that to fulfill the Association's mission to protect public health, coordinating initiatives such as SN decommissioning will be critical as it responds to the increasing counterfeit issues.

As such, NABP is proactively exploring SN decommissioning as an additional layer of security to reduce the risk of counterfeit drugs being dispensed.

NABP is well positioned to lead this effort because of its extensive experience in coordinating and facilitating cross-industry collaboration, such as through its nationwide accreditation programs and PMP Interconnect®, which both required collaboration between regulatory authorities, digital health providers, pharmacy operations, and other stakeholders to ensure that they adhere to rigorous quality and data-sharing standards. These collaborative efforts have equipped NABP with the knowledge and credibility to guide the industry toward developing standardized practices for decommissioning.

Additionally, NABP's position as a neutral industry leader in pharmacy regulation and safety allows it to drive discussions around decommissioning in an unbiased, balanced way that will enable stakeholders across the industry to participate.

Finally, NABP has conducted an industry-wide decommissioning pilot with trading pharmacies, manufacturers, and wholesalers to test the feasibility of decommissioning, and has identified several lessons that will help inform the path to conversations about decommissioning. NABP is committed to working closely with stakeholders, recognizing that this is not a new regulation but an operational improvement the industry could adopt that will benefit everyone in the drug supply chain and, most importantly, could further protect patients and the overall public health.

Decommissioning Industry Workshop Overview

The structure of the NABP Serial Number Decommissioning Workshop was designed to facilitate even deeper collaboration among stakeholders. Participants – see organization participants in the appendix – were able to discuss the importance and benefits of SN decommissioning, as well as the complexities and challenges of implementing such an industry-wide initiative.

The workshop was organized into two days, with each day focusing on the specific aspects of SN decommissioning, including its benefits and challenges, along with strategies for advancing its implementation across the drug supply chain.

Participants went through a series of interactive exercises in small groups and were asked to discuss the main benefits of SN decommissioning across the supply chain. Several aligned themes evolved on benefits for the system, companies, and, most importantly, patients. See the benefits section for more information.

Following the exercise, participants were asked to describe the challenges the industry will face in decommissioning SNs. Several operational, regulatory, and financial reasons surfaced, highlighting the barriers that must be overcome to effectively implement decommissioning practices across dispensers. See the challenges section for more details.

Day two of the workshop focused on identifying potential action steps if industry stakeholders decided to move forward with the adoption of decommissioning, including the areas where more research is needed to test feasibility and explore future pilot programs and opportunities for industry collaboration.

The diverse workshop attendance allowed participants to bring their daily issues and perspectives; participants had the same opportunity to share opinions, regardless of industry and size. Throughout the workshop, NABP was in a facilitative role, guiding the discussions and ensuring that all participants were able to contribute to the conversation.

Key Findings and Insights

Benefits of SN Decommissioning

Discussions on the benefits of decommissioning were limited to areas directly impacted, without considering combining the related data with other information flows, which may provide further value drivers in the future.

Enhanced Patient Safety: The most critical benefit, shared unanimously by participants in the workshop about adopting SN decommissioning, was its potential to reduce the risk of counterfeit drugs entering the legitimate supply chain and its correlation with improving the safety of medications being dispensed to patients. SN decommissioning will positively impact overall public health and could aid in improving public perception of the US health care industry.

It was highlighted that a critical gap in DSCSA is the absence of a requirement to remove an SN after the medicine was administered, used, or destroyed. Some participants shared their belief that recent counterfeit cases could have been prevented or more easily identified if SNs had been decommissioned from the system, which would have resulted in less impact on patients and companies.

Improved Supply Chain Efficiencies: Decommissioning SNs generates new data insights that can be utilized across various workflows, resulting in improved efficiencies. For instance, it allows faster response rates on product shortages and recalls. It can also support pharmacy communication to share supply and inventory, allowing for better responsiveness to patient-level stockouts.

Operational Efficiencies: It was also highlighted that SN decommissioning event data could help pharmaceutical companies and wholesalers streamline their operations by reducing demand variability, resulting in lower inventory levels required for operation. In addition, the need for data reconciliation would be reduced through improved data accuracy, which would also streamline communications across stakeholders.

Dispenser Operations: If dispensers scan products at the point of dispensing, it could improve inventory management visibility, accurately account for unusable stock, facilitate audits, and help with other regulatory requirements.

Better inventory visibility could also improve dispenser financials by lowering inventory holding costs, obsolescence costs, and other related operational expenses. Additionally, pharmacies could respond to suspect product investigation requests in a more streamlined way, providing the necessary information with less effort, as there is more visibility at the SN level.

Decommissioning could see voluntary adoption if dispensers were compensated for the cost of performing SN decommissioning. Similar health care workflows where data fees are customary could be used as a proxy.

Improve Decision Making: Decommissioning data could improve decision making across the health care system. For instance, more visibility through dispensing could allow wholesalers to better allocate products, help manufacturers reduce shortages, and conduct more targeted awareness campaigns for patients.

Customer Experience: When integrated into patient-interacting tools, SN decommissioning has the potential to improve customer experience by creating a more interactive channel with the patient and proactively providing important information about the medicine in a very targeted way (information about drug recalls, the availability of medicines, reminders, side effect data, etc).

Challenges of SN Decommissioning

Implementing decommissioning broadly across the supply chain requires overcoming several barriers. During the workshop, participants highlighted several challenges that were grouped by sector.

Dispensers:

Operational Barriers: Adapting pharmacy systems to handle SN decommissioning may require significant investments in hardware, software, and staff training. It was also highlighted that the variety of infrastructure within the dispensing community will require flexibility and options in standards and systems.

Cost of Implementation: The vast majority of smaller community pharmacies could not afford the investments needed to upgrade their operations and staff to decommission SNs. Different cost recovery and financial incentive models would need to be developed if broader adoption is desired.

Data Management Issues: The lack of standardized processes and data sharing among stakeholders might hinder the ability to ensure data sharing in a heavily regulated pharmacy environment.

Workflow Integration: Integrating SN decommissioning into existing pharmacy workflows could disrupt operations and require changes to current procedures. Excessive manual processes, staff buy-in, and potential increased liability issues are some of the main concerns.

Pharmacy Business Models and Lack of Standardization: The wide variety and number of dispensing procedures across the supply chain will make SN decommissioning adoption challenging. Even though there was recognition that decommissioning should occur as close to the "dispensing event" as possible, the various pharmacy models, from retail to specialty, hospital, white bagging, etc, will make simple standardization very unlikely. Standards across dispensers must be balanced with the flexibility to drive adoption across this variety of practices. For example, standards for sharing dispensing statuses may need to include different indicators for "at pharmacy receiving dock," "at central fill," "stocked on shelf," "sent for compounding," "prepped for infusion," or "out for home delivery" in cases where the capture at the actual dispense is not feasible.

Drug Manufacturers:

Systems Integration: Manufacturers must build systems to integrate decommissioning events with their existing serialization systems, which often include external parties such as third-party logistics providers (3PLs) or contract manufacturing organizations.

As a result, a larger number of serialization service providers with different software characteristics and integration models will need to be accounted for when integrating decommissioning events with serialization systems.

Cost of Implementation: Dispensing data would most likely cost manufacturers and, depending on the size and budget of the drug manufacturer, this could be a potential barrier to adopting decommissioning.

Supply Chain Coordination: It was recognized that the manufacturer serialization system should record the decommissioning event, as it is the source of the origination of the SN. This will require coordination across the entire supply though, as wholesalers play a critical role in the flow of information and data. Decommissioning events may also be communicated to wholesalers to ensure alignment across systems. Misalignment of the information could lead to decommissioned products being missed or to inefficiencies and gaps in tracking.

Wholesalers:

Technology Infrastructure: Wholesalers may need to upgrade their existing technology integrations or infrastructure to support SN decommissioning.

Operating Model Variations: How will wholesalers ensure that decommissioning events are recorded in their system if manufacturers or dispensers do not inform them? There is high variability in wholesaler operating models that will need to account for this process.

Saleable Returns: Wholesalers are responsible for checking SNs on returnable sales today. How will SN decommissioning impact this process and other exception-handling processes in reverse logistics?

Overall System Challenges:

Incentives: Several challenges were highlighted regarding the need to create an incentive system for dispensers to engage in SN decommissioning, as it will entail an incremental activity that will most likely increase the dispenser's cost. Open questions remain about the potential for certain stakeholders, such as smaller drug manufacturers and smaller wholesalers, to not purchase decommissioning data and how this might affect the system's viability.

Broad Adoption Needed: Broad adoption by targeted use-case areas was discussed as a prerequisite for decommissioning to be valuable. Reaching a certain critical mass will present challenges where certain dispensers might not be interested in performing SN decommissioning despite financial incentives, or drug manufacturers might not be willing to incur additional costs to acquire SN decommissioning data.

Exception Handling: It was discussed that several exception-handling situations will require industry-wide standardization. The fact that decommissioning is not a regulatory requirement might make it more difficult to create standards (recommissioning due to errors, charitable medications, reversals, etc). Exception handling should ensure quick turnaround times and prevent unnecessary waste.

Leverage VRS: Manufacturer and wholesaler participants shared the desire to leverage the Verification Routing Service (VRS) infrastructure to facilitate the implementation of SN decommissioning.

SN decommissioning would be a more challenging process due to the exponentially increased number of transactions and workflows. Therefore, any system design must ensure a continuous flow of products in the channel and prevent any delays in dispensing products to patients.

A Path Forward for Decommissioning

Key Ingredients for Successful Implementation and Adoption of Decommissioning Practices in the US

During the workshop, members shared their perspectives on what would be required to successfully implement decommissioning practices at scale in the US, acknowledging that the path to decommissioning will be a long-term endeavor that will require thorough steps in validation.

The main elements required to enable the path forward span various domains, including communication, research, standards of technology, and business models.

Communication was highlighted as vital to driving adoption of decommissioning practices. A clear business case must resonate with most stakeholders in the value chain who are impacted by decommissioning. Communication should emphasize the incremental benefits of decommissioning beyond DSCSA and provide a clear solution to the main barriers to implementation.

Some tactics were discussed, such as frequently asked question (FAQ) materials and myth-busting information, to clear misconceptions and provide clarity on risks by stakeholder groups. This communication must be multilayered, including trading organizations, experts, academia, and the supply chain operations of trading partners, which include drug manufacturers, repackages, wholesalers, and dispensers.

The various levels of expertise and understanding of serialization across stakeholders were acknowledged. Thus, it is very important to provide education to those stakeholders who are only recently becoming familiar with DSCSA, such as small dispensers.

Research and insights will be critical in the implementation of SN decommissioning. One of the key workshop learnings was the number of unknowns to date on decommissioning in various domains, including operational feasibility, technology, financials, and others. Even though the NABP-sponsored pilot conducted in 2024 brought great perspective around decommissioning, there is significant work required to further understand the implications of such an important industry change.

Understanding stakeholder concerns and developing key research questions will be critical to helping identify the answers to the critical barriers. A recommended research plan that is inclusive in nature over the short to medium term was seen as one of the must-do activities.

Any research initiatives must be completed with actual pilots and other related “experiments” for early adopters. Best practices and learnings from those initiatives were highlighted as necessary steps to drive adoption across stakeholders. For instance, there are implications around workflow in a retail pharmacy and/or technology upgrade requirements in manufacturers.

Standards and technology were mentioned as foundational in creating a reliable and scalable SN decommissioning infrastructure. Utilizing global standards, such as the *GS1 US DSCSA Implementation Suite*, has been shown to drive consistency across the industry and can support interoperability. Where needed, standard updates must be implemented, and expectations around data exchange will be required to ensure consistency with needed flexibility. For example, will decommissioning data be shared in real time instead of through daily data exchanges?

Exception Management and Planning: This will also be required from a standards perspective. SN decommissioning is expected to have a significant variety of exceptions, given the variability of stakeholders and

the sheer number of transactions. Exceptions should provide perspective on agreeable updates between trading partners on specific scenarios, such as SN decommissioning errors, salable returns, and others.

Leveraging the existing technology stack was highlighted as necessary. Most stakeholders agreed that leveraging VRS verification would be a good starting point for SN decommissioning and other foundational elements, such as trading partner identification. Other elements of the technology stack, such as networks and platforms that already exist, should be leveraged; otherwise, extensive investments might make the project nonviable.

Business Model: Ensuring minimal friction in the system and developing incentives for participation will help drive broader engagement from stakeholders. Additionally, implementing a collaborative model will help mitigate risks and address stakeholder concerns regarding cost, hurdles, and benefits.

International Best Practices: Leveraging learnings from other countries and experiences from serialization was discussed throughout the workshop. Participants with serialization experience in Europe provided great insights into lessons learned that should be incorporated into implementation discussions. It was also noted that the experiences made by implementing the VRS can provide insightful perspectives into the design of SN decommissioning.

Expected NDC Expansion Alignment: It was highlighted that a significant event is expected in the coming years, which may drive the adoption of scanning the two-dimensional data matrix barcode, which could help enable capture for decommissioning. Food and Drug Administration has issued a draft rule and is expected to finalize a plan that would launch significant work to address this in the coming year or two. It will be important to stay aligned with this effort to incorporate potentially needed changes as an adoption driver.

What Needs to Be Avoided

During the workshop, participants had the opportunity to discuss what must be avoided to ensure success in implementing SN decommissioning. These items were seen as lessons from previous industry-wide lessons.

The most important, and unanimously agreed upon, concern raised was the potential negative impact on patients, particularly the risk of delays in dispensing medications or disruptions in patient care. It was emphasized that SN decommissioning could not interfere with the timely delivery of medications to patients. Delays in the dispensing process related to SN decommissioning could adversely affect patients, especially those with urgent medical needs. Therefore, processes must be designed to be fast, efficient, and seamless, avoiding any bottlenecks.

Another key issue highlighted during the workshop was the risk of broad mandates that require or enforce decommissioning practices across the value chain. Mandating decommissioning without regulatory requirements could lead to friction and complexity. Stakeholders shared that the focus should be on areas where decommissioning provides clear value and will have sufficient drivers for adoption.

It was then discussed that the path to SN decommissioning should be through a targeted and scalable implementation that prioritizes products where SN decommissioning can be particularly beneficial, such as high-value or highly demanded medicines. By focusing on high-value segments, the industry can focus resources and gain learnings that can then be integrated into broader implementation.

The same case could be made for the dispensing segments. As previously discussed, the dispenser segment is broad, with many business models and tens of thousands of dispensing points. Therefore, avoiding a massive

implementation that seeks broad adoption is important. In turn, participants recommended focusing on certain dispensing operations where stakeholders might be more ready for implementation.

In line with maintaining simplicity and efficiency, the workshop participants agreed that overengineering the decommissioning process could result in a lesser likelihood of adoption. While it is essential to have clear standards and reliability, the implementation of these standards should be flexible enough to accommodate the diversity of the operational needs of the different stakeholders involved in the decommissioning process. Decommissioning systems should be flexible and not overly complex to avoid limiting scalability.

Technical solutions should also avoid recreating new systems and should take advantage of existing infrastructure as much as possible. It is critical that systems can evolve technologically and have mechanisms for the adoption of novel technological features.

Patients' protected health information should be avoided and should not be included in any dispensed information. Dispensing information should be limited to products or locations and not individual patients.

Finally, participants discussed the potential unintended consequences if decommissioning is not properly implemented or managed. One example discussed was how to approach decommissioning of undispensed medications. Decommissioning of undispensed medications raises a number of issues that will need to be addressed. However, decommissioning of undispensed medications can also reduce the risks from dumpster diving, where products that were not properly disposed of are found in trash bins and recycled into the supply chain, posing significant risks to patient safety.

Careful planning is needed to ensure that decommissioning processes are properly executed at all stages, that all stakeholders know the risks of mishandling medications, that any decommissioned products are securely disposed of, and that no medications should be inappropriately or inadvertently reintegrated into the supply chain.

Next Steps

Based on the workshop discussions, the following next steps are recommended to advance the adoption and implementation of SN decommissioning in the US pharmaceutical supply chain. These steps focus on fostering collaboration, conducting targeted research, and expanding pilot participation to ensure a smooth and effective rollout of decommissioning practices in the long run.

1. Establish an Industry Working Group for SN Decommissioning

The Industry Working Group should serve as a cross-functional team focused on creating a strategic roadmap for further exploring and guiding strategy for SN decommissioning across the supply chain. The group's primary objective would be to identify actionable steps and provide a collaborative environment where topics around SN decommissioning could be discussed. This group would help ensure that the initiative aligns with the diverse interests of all stakeholders (dispensers, manufacturers, wholesalers, technology providers, and regulators) while providing practical guidance on overcoming challenges. Key activities for this working group would include the following:

Identifying Critical Milestones: This consists of mapping out key steps and timelines and a long-term roadmap for the SN decommissioning, from pilot to standards, research, and implementation. This roadmap will include timelines, goals, and key performance indicators to track progress.

Coordinating Research Initiatives: The working group should also develop a research plan outlining the main questions that the industry needs to answer to enable SN decommissioning. Moreover, this team can lead/fund key research initiatives and avoid the duplication of efforts. The scope could include cost-benefit analysis, operational considerations, technology, etc.

Creating a Framework for Collaboration and Communication: This group could focus on developing clear communication guidelines and resources that each stakeholder could use to share with their respective environments.

Addressing Potential Unintended Consequences: The working group could also be used as an input source to address open questions about unintended consequences related to decommissioning that might need further research.

2. Expand Pilot Programs and Participation

Concurrently with research activities, it was also suggested that NABP, in partnership with stakeholders, could continue to conduct and expand pilot programs that test the practical application of SN decommissioning. These programs should evaluate the real-world feasibility of decommissioning and provide data on the effectiveness, cost, and scalability of the process.

Operational Impact: How does decommissioning affect daily operations in pharmacies, manufacturers, and wholesalers? Does it cause significant delays, or does it streamline operations?

Patient Safety Outcomes: Does SN decommissioning reduce the incidence of counterfeit drugs entering the supply chain and how does it impact patient safety?

Financial and Logistical Barriers: What are the economic implications for stakeholders and how can these barriers be mitigated?

Technology Readiness: Are the current systems and infrastructure adequate to support SN decommissioning, or are there significant technological gaps that need to be addressed?

Participation should also include additional stakeholders, such as health technology companies or 3PLs, to test how SN decommissioning integrates with broader supply chain solutions.

3. Ensure a Stable, Scalable, and Widely Adopted VRS Network

In isolation, the adoption of SN decommissioning, while important in addressing a gap in DSCSA, does not ensure that a product that has been previously dispensed will not find its way back into the legitimate supply chain. Product verification is the mechanism that DSCSA would use to identify products that have been subject to a decommissioning event.

In February 2025, the Arkansas State Board of Pharmacy verified a suspect Ozempic product by using Pulse by NABP™. An inspector from the Arkansas Board used the Pulse tool on his mobile phone to confirm the inauthenticity of the suspect Ozempic product quarantined at an Arkansas pharmacy. After utilizing Pulse, the Arkansas Board launched an investigation of the distributor, held an emergency hearing, and immediately suspended the distributor's license. This case points to the importance of more widespread adoption of product verification and the accompanying need to decommission SNs.

At present, trading partner participation is lagging, performance of the VRS network is inconsistent from solution provider to solution provider, and dispenser adoption is virtually nonexistent. Investments must be made to ensure that the VRS network is stable and positioned to scale utilization across the dispenser community.

4. Develop Educational Resources and Communication Strategies

To overcome the knowledge gaps and concerns raised by stakeholders, participants discussed the need to develop educational resources and communication strategies to raise awareness about the importance of SN decommissioning. This should include the following:

- FAQ materials and myth-busting resources should be utilized to address common misconceptions about the technology, cost, and regulatory implications. These should be coupled with messaging at wider industry conferences and with trade associations to help educate and build larger momentum.
- Case studies and best practices from the pilot programs should be used to show the practical benefits and address concerns related to implementation challenges.
- Training programs for dispensers, manufacturers, and wholesalers must be developed to ensure that all stakeholders have the necessary tools, knowledge, and understanding of how SN decommissioning works and how it can be integrated into existing workflows.

5. Engage Broader Stakeholders

There are several areas where a broader consulted group may provide further or better insights into benefits or challenges. This might include mail-order pharmacies, returns vendors, 3PLs, repackagers, or others not involved in the initial pilots or work group.

6. Democratize Data for Patient Safety

Dispensers indicated that current agreements with solution or service producers could limit dispensers' abilities to share even anonymized data, which would prevent sharing dispensed SNs with the manufacturer of record. This information must be allowed to be shared and compensated to help offset costs to drive adoption.

Conclusion

SN decommissioning has the potential to further strengthen the security and integrity of the pharmaceutical supply chain. While serialization under DSCSA has made significant strides, gaps remain, particularly in preventing counterfeit and diverted drugs from reentering the market once dispensed.

As a proactive measure, SN decommissioning provides an incremental layer of security, ensuring that medications no longer in circulation cannot be reintroduced, thereby reducing the risk of counterfeit medicines. Though empirical evidence is still limited, given the substantial public health and economic consequences of counterfeit drugs in the US, SN decommissioning holds significant promise.

The NABP-led workshop underscored the importance of this initiative and, more critically, the need for cross-industry collaboration to drive its success. While challenges are inherent in any large-scale industry change, the potential benefits for public health and patient safety far outweigh them. However, the road to broadly adopting decommissioning will be a long-term endeavor, requiring sustained effort, coordination, and alignment across all stakeholders.

As an industry convener, NABP is committed to guiding this initiative, fostering open dialogue, and coordinating research and pilot programs. We look forward to supporting the broad adoption of SN decommissioning, which will ultimately improve patient safety and the integrity of the pharmaceutical supply chain.

Appendix

Participant Name	Company Name	Title
Arends, Jon	Walgreen Co	Director, Pharmacy Systems
Aulagnet, Pascal	Pfizer	Director Market and Regulatory Engagement
Barbic, Cathy	Novo Nordisk, Inc	Associate Director, Supply Chain
Bolin, Josh	National Association of Boards of Pharmacy	Associate Executive Director, Government Affairs and Innovation
Brown, David	Walgreen Co	Manager, DSCSA Compliance and Pharmacy Automation
Cameron, Krystal	VHA PBM-CI	Pharmacist Program Specialist
Carter, Lemrey "Al"	National Association of Boards of Pharmacy	Executive Director/Secretary
Cona, Frank	InfoNetworks	CEO
DeFlice, Ashley	Henry Schein	Senior Regulatory Affairs Specialist
Holder, Justin	Dispensary of Hope	Interim Supply Chain Director
Karhoff, Mark	NABP-TCC	DSCSA Consultant
Keller, Jonathan	Faegre Drinker	Counsel
Koch, Tim	Walmart, Inc	Senior Director, Pharmacy Compliance
Lee, Brian	BMS	Senior Director, Traceability & Compliance
Louro, Rafaella	J&J	Senior Manager, Global Brand Protection, Innovative Medicines
Macy, Justin	NABP	Director of Innovation
Mason, David	Novartis	Director of Supply Chain Compliance and Serialization

Mayall, Lori	Gilead Sciences, Inc	Head of Anti-Counterfeiting/Global Product Security
Mayeski, Ullrich	GS1 US	Director of Community Engagement, Healthcare
Medina, Pablo	Ten Count Consulting	Consultant
Mesaros, Jeff	NABP	President
Mesker, Timothy	InfoNetworks	Chief Technical Wizard
Moose, Chris	IBM	Partner - Healthcare & Life Sciences
Palage, Michael	InfoNetworks	Chief Trust Officer
Pinkwart, Emanuel	Roche	Senior Serialization Expert
Pistner, Amy	Walmart, Inc	Director, Rx Supply Chain/DSCSA Compliance
Rajaram, Vidya “Vid”	Genentech	Director, Product Traceability & Innovation
Rodriguez, Denise	Rite Aid	Manager of Pharmacy Inventory Compliance
Sample, Matt	Cencora	SVP Operations
Simpson, Kathryn	Intermountain Health	Internal Process Control Pharmacist
Sizemore, Brian	Walgreens	Senior Director
Stearns, Tim	HDA	Senior Director, Industry Relations
Tadrus, Christian	Tadrus Advisory Group, LLC	Lead Advisor
Trent, Chris	J&J	Director, Global Brand Protection
Vahst, Erika	NABP	Pulse Operations Manager
Wendel, Shane	Central Pharmacy	Owner
Wittekind, Karen	Slalom	UX/UI Lead