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Electronic Authentication of Pharmaceutical Packaging and the Assurance of Public Safety: Position of the Pharmaceutical Research and Manufacturers of America

Overview

This White Paper establishes the position of the Pharmaceutical Research and Manufacturers of America (PhRMA) on the use of electronic authentication technologies, such as two-dimensional bar codes and radio-frequency identification (RFID) tags, to secure the U.S. drug supply against counterfeiting threats. PhRMA issues this White Paper to engage patients, trading partners, state regulatory authorities and the Food and Drug Administration (FDA) in discussions that will lead to a safer and more secure pharmaceutical supply chain.

In its final report on Combating Counterfeit Drugs issued on February 18, 2004 (Final Report), FDA concluded that the use of RFID technology to establish an electronic pedigree represented the "single most powerful tool available to secure the U.S. drug supply." Since then, the pharmaceutical industry has worked closely with other industry stakeholders, including wholesalers, pharmacies and federal and state regulators, to examine and test the feasibility of establishing a nationwide electronic pedigree system to secure the nation's drug supply.

PhRMA recognizes the goal of implementing a fully operational RFID track and trace system that effectively combats counterfeiting is still many years off. While this process should be accelerated, the immediate danger of counterfeit medicines entering the U.S. supply chain argues for prompt implementation of the pedigree requirements of the Prescription Drug Marketing Act (PDMA). PhRMA reiterated this position at the FDA Part 15 hearing in October 2000. This White Paper does not change PhRMA's belief in the necessity of moving forward with that requirement while progress is made on the technology front. PhRMA also supports the states efforts at immediate implementation of paper pedigree requirements.

In addition however, and in light of practical experience not available in early 2004 and the complexity of any electronic pedigree solution, PhRMA has concluded that it is important to make progress in adopting electronic mechanisms that will permit the real-time authentication of prescription pharmaceutical packaging directly at the dispensing level. The implementation of an RFID-based electronic pedigree system is likely to be complex and not fully achievable for five or more years. Current use of RFID chips is limited by robustness and the impact on the affordability of medicines.

The dispensing site is a critical link in the drug distribution chain, since it is the last stop before a drug is dispensed to a patient. Authentication of drug products at this juncture would have a direct, immediate and lasting impact on patient safety. This PhRMA proposal does not preclude other trading partners from authenticating pharmaceutical packaging, and in fact PhRMA encourages this as a means of migrating towards an electronic pedigree. PhRMA believes that the goal of real-time authentication at the dispensing site can be accomplished in the near term using mass serialization and available electronic technology, such as bar coding or RFID tags.

Focusing on the dispensing site permits electronic authentication systems to be implemented in a timely manner, benefiting patients in the earliest stages of development. In later stages, electronic

authentication could be expanded throughout the distribution system to cover all trading partners. The resulting “electronic pedigree” essentially becomes a series of authentication steps electronically recorded in a database. PhRMA believes that the interests of patient safety in securing the drug supply are too important to delay electronic authentication at the dispensing level while extensive “electronic pedigree” systems are developed.

Background

PhRMA member companies have a strong interest in ensuring that the drugs they discover and manufacture are safe, effective and of the highest quality. This interest extends beyond the factory gates all the way to the patient, since even the most innovative medicines cannot help the patients who need them if those medicines are compromised by breakdowns in the distribution system. PhRMA member companies are committed to doing their part to protect the integrity of the American drug supply. Critical to this enterprise is the ability to verify the authenticity and integrity of the original pharmaceutical packaging unit before drug product is dispensed to a patient.

Given the complexity of the drug distribution system in the United States, this is no easy task. It has been estimated that there are approximately 80,000 dispensing sites in the United States that are supplied by a shifting group of primary and secondary wholesalers. While three major drug distributors dominate the primary market, there are a much larger number of both licensed primary and secondary distributors. Secondary buying and selling of packaged pharmaceuticals is common as a normal part of inventory adjustment; however it is often the way in which counterfeit medicines have entered the U.S. distribution system. Personal importation of small amounts of pharmaceuticals has been documented with increasing frequency. In addition, numerous Internet sites offer consumers pharmaceuticals at deeply discounted prices even though these products are of dubious origin and quality. Repackaging of pharmaceuticals takes place at a variety of levels despite the fact the manufacturer’s original container/closure system has been breached and product quality may suffer as a result. Collectively, all of the above practices may create opportunities for counterfeit or diverted drugs to enter the system, thus potentially compromising the public health of patients.

Pharmaceutical companies use a variety of counterfeit resistant technologies on drug packaging and labeling to help protect the integrity of the U.S. drug supply. These include overt and covert packaging and labeling features, such as color-shifting inks, holograms, and micro-printing, as well as chemical taggants embedded in the drug product itself. These technologies provide multiple layers of security that make drug products more difficult for counterfeiters to reproduce accurately. They also are useful for assessing the authenticity of drug products already identified as “questionable.”

It is important to recognize, however, that counterfeit resistant technologies may not provide a mechanism for identifying counterfeit drugs in real time, particularly at the dispensing level. First, counterfeit resistant technologies can themselves be duplicated, often within 12-18 months, and thus need to be rotated on a regular basis. Second, neither pharmacists nor patients realistically can be expected to routinely check, or even be aware of, the wide variety of overt features used on the thousands of different drug products available through pharmacies, particularly if those features are rotated on a regular basis. Third, overt and covert packaging technologies are rendered useless if a drug product is repackaged, a practice that is common in the industry and subject to only minimal regulation. That is why the integrity of the drug supply chain needs to be protected through safeguards throughout the distribution system to prevent the entry of counterfeit drugs into the US.

Near-Term Electronic Authentication Leads to an Electronic Pedigree

The use of bar coding and/or RFID technology for electronic authentication has numerous advantages. Electronic authentication is more direct, less complex, could be implemented more expeditiously, could

be expanded easily, and would provide immediate safety benefits where they are most needed – to patients at the dispensing level.

Electronic authentication at the dispensing level provides a direct means of determining in real-time whether a particular packaging unit is authentic (e.g., labeled by the manufacturer). This differs from a pedigree system, which is, ultimately, the recording of a series of authentications at each trade once the package unit has left the manufacturer. Because some trading partners have argued it cumbersome and unworkable, the PDMA paper pedigree regulations have yet to be implemented. As a result, states are taking the initiative to require the implementation of a paper pedigree as a condition of drug distribution in the state, prior to the availability of an electronic system, as a means to safeguard the drug distribution system. Widely available bar-coding technology and mass-serialization of packaging units can help in the authentication process at the dispensing site and by trading partners. RFID tags can replace bar coding when their robustness is demonstrated.

Initial focus on electronic authentication may be less complex in terms of required participants. Whereas an electronic pedigree system will not be effective unless widely adopted throughout the distribution system all the way to the dispensing level, electronic authentication can be effective with the active participation of manufacturers and dispensers. . However, the participation of all trading partners at this early stage is encouraged and will lead to the migration to a robust electronic pedigree system as design features can be piloted at the same time that improved protection of the drug supply is being realized.

Although FDA and some states have stated that an electronic pedigree system could be operational as early as 2007, PhRMA believes these projections are overly optimistic. Even if stakeholders could quickly resolve the complex technological, legal, regulatory and policy issues associated with establishing a nationwide, electronic pedigree system throughout the distribution chain, there are still basic scientific issues that need to be addressed, such as the readability of RFID tags at the item, case and pallet level.

Implementing electronic authentication in a stepwise fashion with a simplified information infrastructure allows technological and other issues to be resolved (e.g., tag readability), but also provides immediate safety benefits during the implementation period. Coupled with the paper pedigree system to fill in the authentication gaps, this approach may have immediate benefits and offer needed safeguards to patients who receive medications in the U.S. Approaches that begin the migration path for electronic pedigree systems at the wholesale level and focus on the tagging of pallets and cases, rather than units, may provide great benefits to wholesalers in terms of inventory control but little or no safety benefit to patients. With electronic authentication, PhRMA proposes a migration path that begins at the manufacturers' packaging facility and ends at the most critical juncture – the dispensing site – since this is the point at which patient safety is paramount. Consequently, while electronic track and trace processes are developing throughout the distribution chain with the building out of the necessary Information Systems, patients will be benefiting from the real-time authentication of drug packaging units at the dispensing site.

PhRMA Proposal for Implementing Electronic Authentication

In order to move towards early adoption of electronic authentication, PhRMA proposes the following steps:

1. All package units of targeted prescription medicines should contain a machine- readable serial number that includes the company identifier. The applicable package-level to uniquely serialize includes the pallet, case, and item level.
2. The machine- readable code can include bar codes, such as linear bar code (space permitting), two dimensional DataMatrix, or RFID tags. The chosen code should be robust and reliable in

terms of readability and cost effective (e.g., not materially affect the affordability of the medicine).

3. Standards for serialization, tag data, and frequencies (in the case of RFID) must be developed in accordance with packaging hierarchy.
4. An appropriate information technology (IT) infrastructure should be constructed that will allow the dispensing site, and other trusted parties, to query through a central data portal. Data will be routed to the distributed database where information on the package unit in question is kept. The dispensing site will receive a real-time signal back that the identification number is authentic for the product in question.
5. Electronic authentication should focus initially on the end-user dispensing site, but is not intended to exclude other supply chain participants. Targeted pilots should also be undertaken by the pharmaceutical industry with the goal of furthering the development of electronic pedigrees.
6. Operating rules must be established regarding the point and time of authentication. Following dispensing of the package unit (or the opening of a container containing multiple dispensing amounts) steps should be taken to prevent the subsequent illegal use of that unit's serial number.
7. Following successful demonstration of the viability of dispensing site authentication, this technology can be added to other partners in the supply chain, adding another tool to assure authentic pharmaceutical product flow from the manufacturer to the end dispensing site.

PhRMA is prepared to collaborate with trading partners and Federal and State policy makers to achieve the near term goals set forth in this White Paper with the goal of establishing uniform standards throughout the United States.