Leveraging Manufacturer Unit Dose Bar Codes
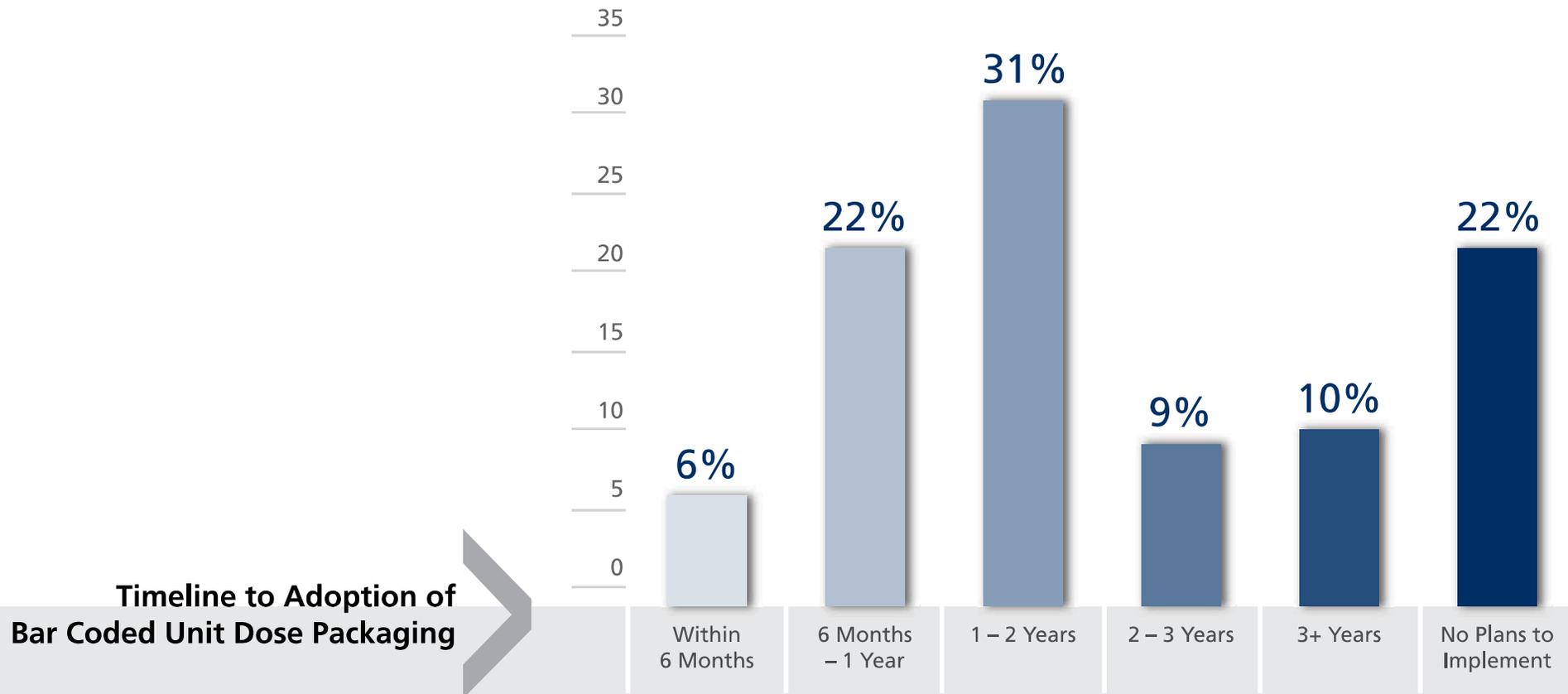
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The Opportunity

The Opportunity

The Food and Drug Administration's 2003 mandate on bar coding
has had far-reaching effects. Today, a substantial majority of
medications are available in bar coded unit dose form, including more
than 80% of the top 500 most commonly used oral solids.

The ISMP*, ASHP**, Joint Commission, State Boards of Pharmacy, and
other organizations support the use of bar coded unit dose medications
and bar-code-based dispensing systems, and recognize the benefits
of using manufacturer unit dose packaging whenever possible.

* Institute for Safe Medication Practices
** American Society of Health-System Pharmacists

Most hospitals are implementing or planning bedside point-of-care initiatives using bar coded unit dose medications, based on dramatic, documented impacts on medication safety.

Timeline to Adoption of Bar Coded Unit Dose Packaging

Within 6 Months	6 Months – 1 Year	1 – 2 Years	2 – 3 Years	3+ Years	No Plans to Implement
6%	22%	31%	9%	10%	22%

↑ **78% of hospitals that have not yet implemented bar coded unit dose packaging plan to do so, with the majority planning to do so within the next two years.**

Source: *Pharmacy Purchasing & Products*, 2009 Survey

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The American Society of Health-System Pharmacists (ASHP) calls for the use of manufacturer-packaged unit dose medications.

"ASHP urges the Food and Drug Administration (FDA), other regulatory agencies, standard-setting bodies, contracting entities, health systems, and others to mandate that pharmaceutical manufacturers use symbologies that are readily deciphered by commonly used scanning equipment to code for the National Drug Code (NDC), lot number, and expiration date on all unit-dose, unit-of-use, and injectable drug packaging. **Pharmaceutical manufacturers should also provide all medications used in health systems in unit dose packages.**"

— ASHP Statement on Bar-Code-Enabled Medication Administration Technology, Automation and Information Technology – Statements, pp. 6-8, 2008

The Veterans Health Administration prefers manufacturer bar coded meds.

"The U.S. Veterans Health Administration has announced that it prefers its 173 hospitals, when purchasing medications, to purchase those whose unit doses have been labeled with bar codes. Similar messages by other large healthcare systems should provide a major competitive incentive for manufacturers to accelerate the investments and develop the production lines that packaging unit doses of medications with bar codes will require."

— *Drug Topics*, "How pharmacy technology has evolved: what is and what could be," March 19, 2007

The Institute for Safe Medication Practices (ISMP) prefers manufacturer bar coded meds.

"ISMP strongly recommends that hospitals obtain the majority of products
in unit-dose or ready-to-use packaging whenever possible from manufacturers.
This includes oral as well as intravenous products."

— *"A Call to Action: Safeguard Drug Administration Within 2 Years!*
Bar Coding of Unit Doses Can Reduce Medication Errors,"
Institute for Safe Medication Practices, 2002

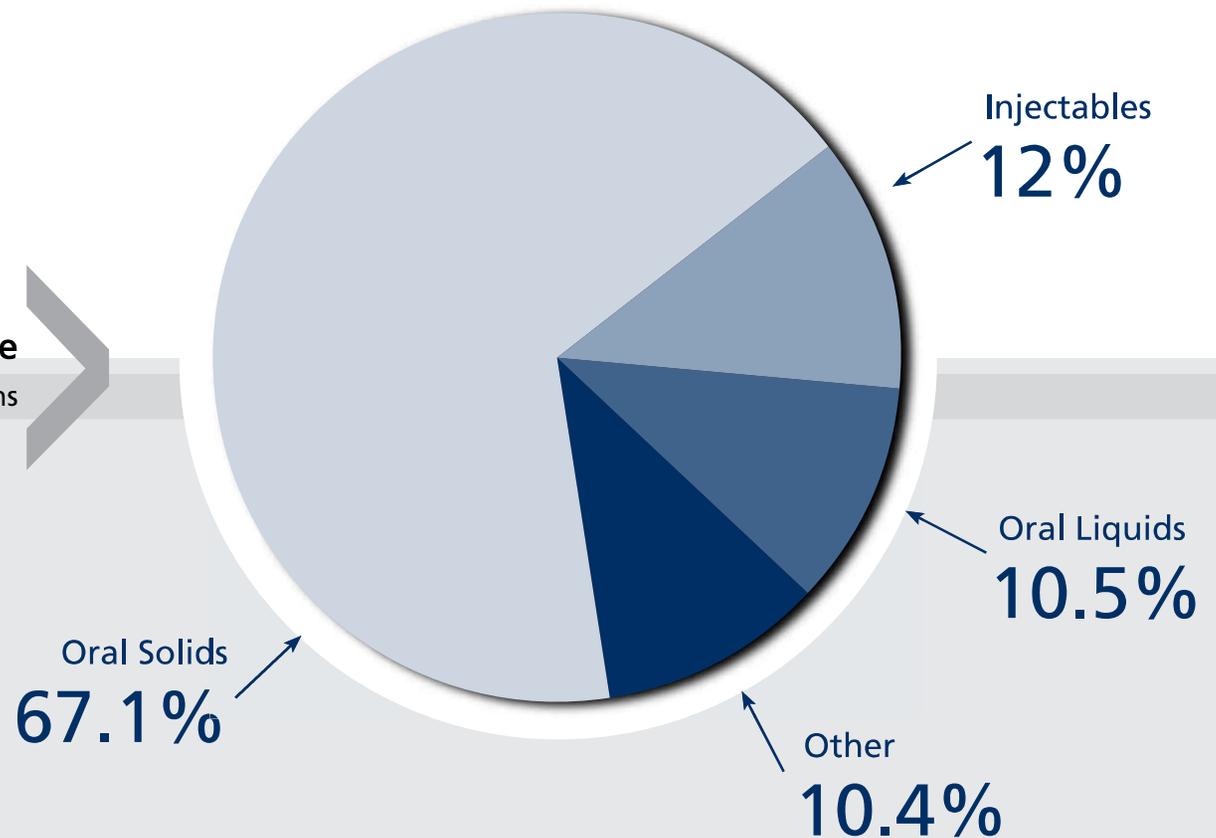These medications have additionally been recognized for their Quality Assurance (QA) value by leading experts.

"From a QA (Quality Assurance) standpoint, it is ideal to purchase unit dose drugs directly from the manufacturer, as their QA processes are held to higher GMP (Good Manufacturing Practices) standards."

— Noel C. Hodges, R.Ph., MBA,
"QA Practices for Bar Coded Unit Dose Packaging Operations,"
Pharmacy Purchasing & Products, pp. 30-31,
September 2006

Oral solid medications are the predominant form of drugs dispensed in U.S. hospitals.

Typical Hospital Formulary, Average

Cart Fill Medications

Injectables
12%

Oral Liquids
10.5%

Other
10.4%

Oral Solids
67.1%

Source: *CIHL Survey of Hospital Pharmacy Directors — Final Results on the Current State of the Unit Dose and Bedside Barcode-Enabled Dispensing Practice*, December 2008, University of Arkansas

Package-ready oral solids are widely available from multiple vendors. Based on 2008 oral solids sales data from MHS (McKesson Health Systems) and unit dose availability data provided by Sky Pharmaceuticals in February 2009, the top 500 oral solid National Drug Codes have an 83% availability in pre-packaged form.

Volume Rank	NDCs			Volume – Boxes			
	Unit Dose	Not Unit Dose	% Unit Dose	Unit Dose	Not Unit Dose	Total Volume	% Volume UD
1-100	79	21	79%	2,756,500	593,744	3,350,244	82%
101-200	85	15	85%	1,031,191	189,937	1,221,128	84%
201-300	80	20	80%	552,392	145,496	697,888	79%
301-400	91	9	91%	419,130	43,040	462,170	91%
401-500	90	10	90%	293,327	32,629	325,956	90%
Total	**425**	**75**	**85%**	**5,052,540**	**1,004,846**	**6,057,386**	**83%**
501+	942	321	75%	715,631	146,610	862,241	83%
All	1,367	396	78%	5,768,171	1,151,456	6,919,627	83%

Source: MHS (McKesson Health Systems) 2008 oral solids sales data; Sky Pharmaceuticals unit dose availability data, February 2009

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A number of hospitals compare the per dose cost of packaged unit dose oral solids to bulk meds, using a predetermined acquisition cost differential to rationalize bulk med purchases and self-packaging. When the total costs of self-packaging are taken into consideration, however, there are most often greater savings in buying more pre-packaged unit dose meds, instead.

Example: Community Hospital Unit Dose Cost Analysis

Summary of Purchase Analysis of Oral Solids | November 1, 2008 through April 30, 2009

Saving Opportunity >

Current State				
Total	Bulk	Packaging Cost	Unit Dose	
$518,068	$131,519	$15,727	$370,821	

UD Cost/Benefit Balanced State				
Total	Bulk	Packaging Cost	Unit Dose	
$483,469	$103,874	$10,884	$368,711	

Savings of New Formulary: $34,599

Dose Volume >

Current State				
Total	Bulk	% of Total	Unit Dose	% of Total
606,192	131,062	21.6%	475,130	78.4%

UD Cost/Benefit Balanced State				
Total	Bulk	% of Total	Unit Dose	% of Total
606,192	90,702	15%	515,490	85%

21.6%

78.4%

15%

85%

Source: Joint study by McKesson Automation and a Community Hospital, April 2009
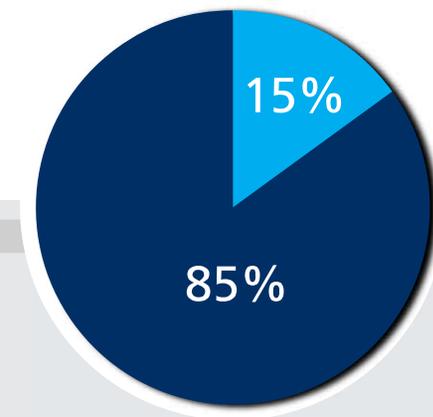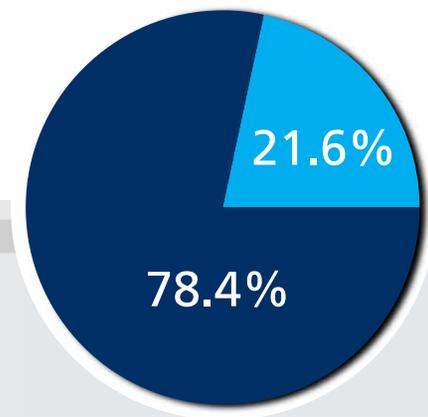
Internally packaged meds can also have unforseen drawbacks.
In September 2009, the Virginia State Board of Pharmacy made it possible
to use a robotic picking system without board approval. However,
any pharmacy using self-packaged or repackaged meds in a robotic system
has to comply with this regulation – eliminating the major system benefit
of reduced pharmacist involvement.

"Pharmacists shall verify and check for the accuracy of all drugs packaged or repackaged for use by the robot by a visual check of both labeling and contents prior to stocking the drugs in the robotic pharmacy system. A repackaging record shall be maintained in accordance with 18VAC110-20-355 A, and the verifying pharmacist shall initial the record. Packaging and labeling, including the appropriate beyond-use date, shall conform to requirements of this chapter and current USP-NF standards."

— Virginia State Board of Pharmacy Regulations

The Obstacles
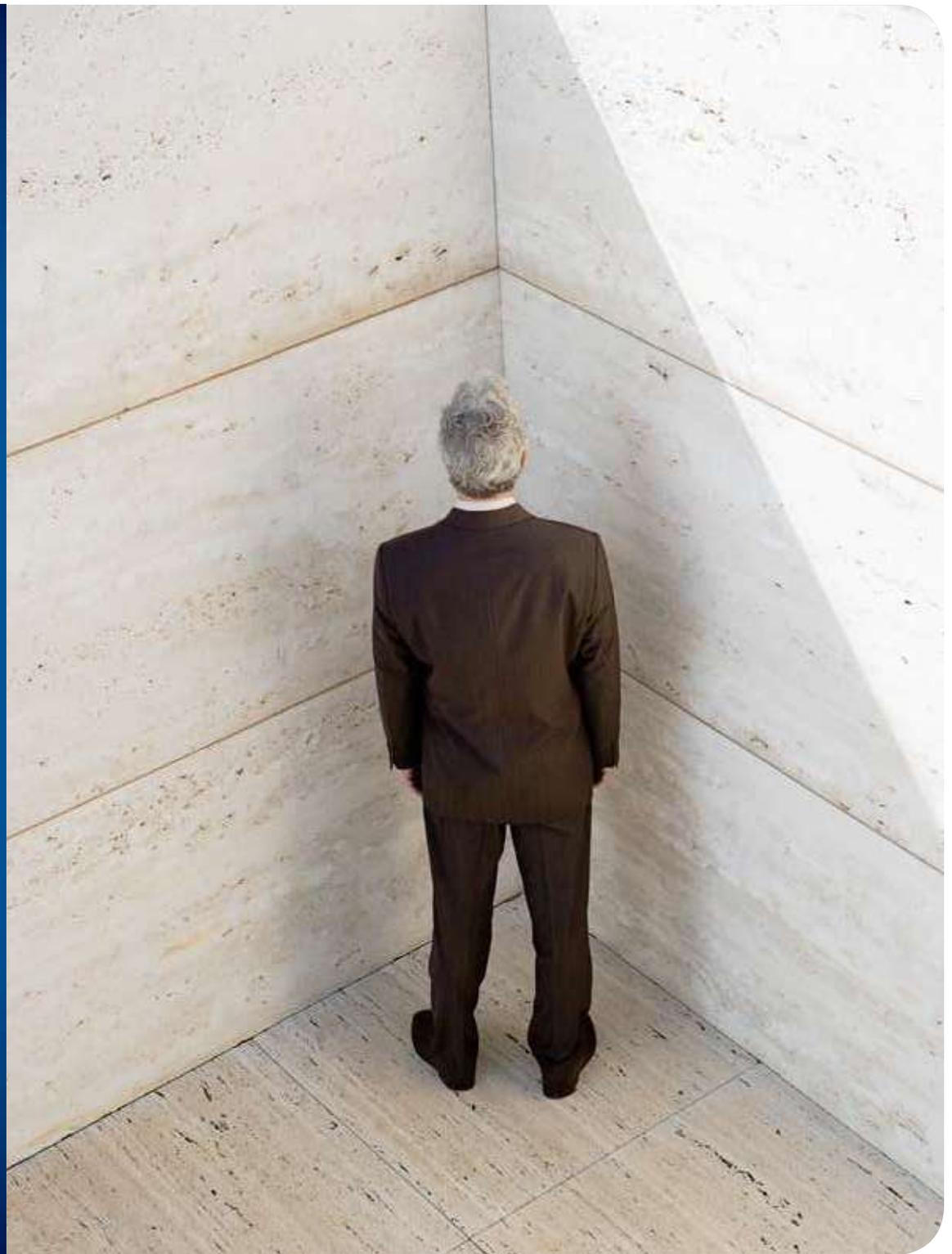
The Obstacles

Fully automated patient-specific dispensing of bar coded medications is proven to reduce errors, increase efficiency, eliminate labor and costs, and allow pharmacists to spend more time on clinical duties.

So why aren't more hospital pharmacies fully automating patient-specific dispensing?

The answer largely lies with existing automated systems. Some require repackaging, either internally – with pharmacist and technician labor, costs, and liability – or through outsourcing, with its increased inventory and costs.

The Obstacles

Automated systems are also large in size, taking up several hundred feet of floor space – even though they often offer limited "line item" capacity based on physical storage. In addition, they require a special three-phase power supply and compressed air, which add to installation and remodeling costs.

In sum, the capital and operating expenses and physical space demands make these systems impractical for many hospitals.

The Obstacles

Do you really need an automated system? Ask yourself these simple questions.

— Are patient and medication safety initiatives a high priority?
— Could your pharmacists add more value to the organization if they were no longer involved in packaging and dispensing processes?
— Are you dispensing a minimum of 1,000 patient-specific oral solid doses per day?
— Do you want to get the maximum benefit possible from the bar coded medications you need for bedside point-of-care programs?

If you answered "yes" to any of these questions, you would probably benefit from a patient-specific automated dispensing system.

The Solution
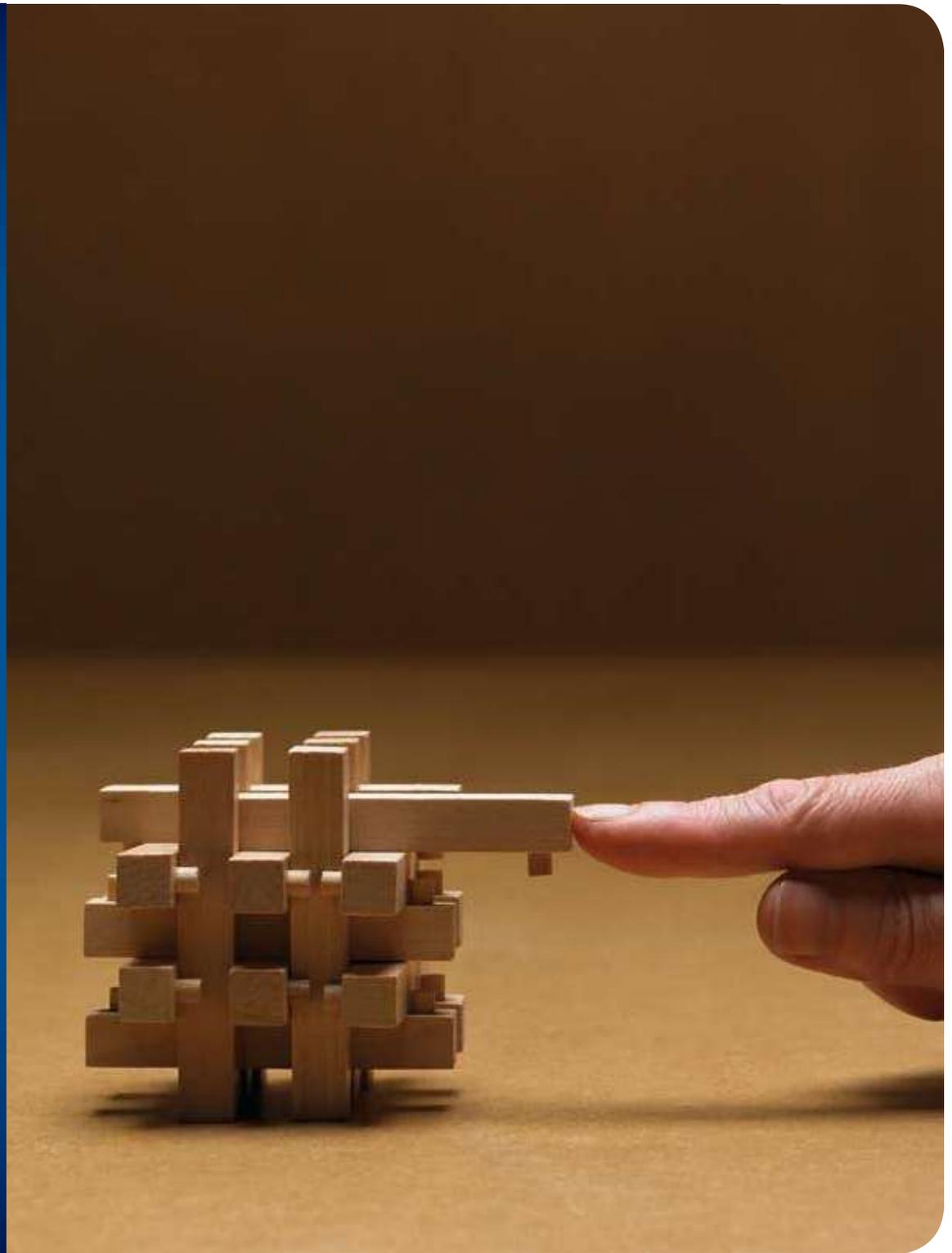
Introducing PROmanager-Rx™

It's the only fully automated system for hospital pharmacies that directly stores and dispenses manufacturer-packaged unit dose oral solid medications – decreasing dispensing errors and increasing patient safety.

Using manufacturer unit dose packaging and a bar-code-driven workflow that includes scanning every dose, PROmanager-Rx minimizes the pharmacist's involvement in packaging and dispensing.

Avoiding medication errors and focusing expensive pharmacist time on value-adding activities provides a compelling Return on Investment (ROI) for hospital pharmacies.

Introducing PROmanager-Rx

PROmanager-Rx is also the first system to eliminate the common barriers to automation:

— By using pre-packaged oral solids, it eliminates repackaging, saving pharmacist and technician labor, costs, and liability or outsourcing costs.
— It fits in an approximately 60 to 80 square foot area, while storing up to 12,000 doses.
— It runs on a standard 120v electrical outlet, requires no compressed air, and uses a standard network connection. Staff can use any convenient workstation.
— It requires little or no remodeling and can usually be installed in a matter of days.
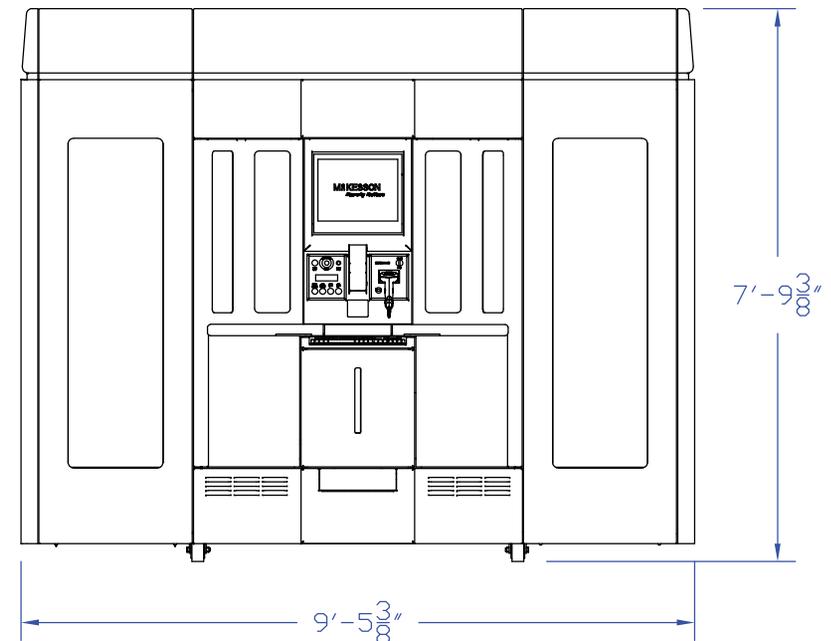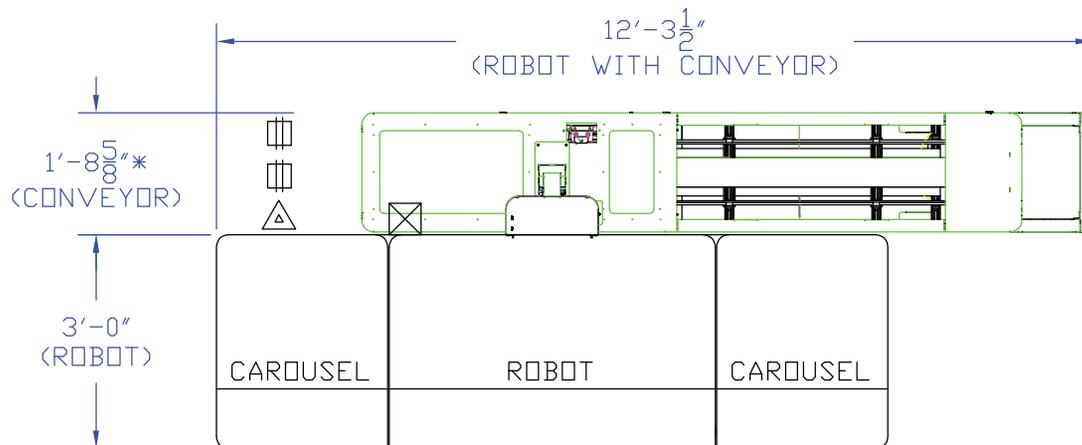
Introducing PROmanager-Rx

PROmanager-Rx has a number of unique features and benefits.

— It uses manufacturer-packaged bar coded oral solids – inherently, the safest packaging form.
— It minimizes on-site/outsourced packaging efforts and required resources.
— It qualifies for a reduced R.Ph. check waiver (where allowed).
— It alleviates the need for R.Ph. packaging integrity checks.
— It allows for longer medication expiration dating.
— Its true First-In, First-Out (FIFO) inventory management system reduces waste.
— It has an incredibly compact footprint for its 12,000-dose capacity.
— It's easy to install.

Introducing PROmanager-Rx

PROmanager-Rx also has these other important features and benefits:

Safety
— It uses bar code scanning technology.
— It can be used to more accurately perform cart fills and first doses.
— It integrates with the Connect-Rx® platform for fill modes and R.Ph. checking.

Efficiency
— It increases staff productivity by automating the medication picking process.
— It increases pharmacy order throughput and capacity.
— It provides perpetual inventory management, for increased turns and a reduction in wasted and expired medications.

Cost Reduction
— It has an attractive ROI and relatively short payback period.
— It's built to deliver the reliability you expect from McKesson Automation Solutions.
— It's supported by McKesson service, education, and training.

Using PROmanager-Rx

PROmanager-Rx overview:

— The only automated system that directly exploits the benefits of manufacturer-packaged bar coded unit dose medications
— Unsurpassed medication safety and accuracy
— Minimizes pharmacist involvement in packaging and dispensing
— Goes where automation couldn't go before
— Efficiency and integration via Connect-Rx software

How does PROmanager-Rx work?

— Utilizes manufacturer oral solid packaging
— Restocking and returns through "restock trays" and "restock drawer"
— Dynamic medication assignment in storage carousels – 12,000 doses maximum
— Patient and medication identification via bar code scan
— Output to conveyor or front chute

Dispensing to the conveyor, step by step:

— Bar coded patient labels are printed at a workstation.
— Labels are placed on cassettes.
— Cassettes are placed on the conveyor.
— PROmanager-Rx reads each patient bar code,
   scans and selects every dose, and dispenses
   it to the correct cassette.
— The cassette exits the conveyor.

**You can use PROmanager-Rx for any patient-specific fill,
whether scheduled or a first dose order.**

Dispensing to the front chute, step by step:

— A patient label is printed and placed
on a bag or cassette.
— The technician initiates "Front Dispense."
— PROmanager-Rx reads the patient bar
code, scans and selects every dose, and
dispenses all of them.
— The patient label is scanned a second
time just prior to dispensing, further
assuring accuracy.

Restocking PROmanager-Rx, step by step:

— Bar coded medications are placed in restock trays.
— Via bar code scan, a technician assigns a default expiration date to trays.
— The expiration date is assigned from the medication bar code, if available.
— Trays are loaded into the restock drawer.

Up to 25 trays (500 doses) can be loaded to the restock drawer at a time.

Inventory management is easier with PROmanager-Rx.

— It tracks the expiration date associated
   with every medication.
— It uses true First-In, First-Out (FIFO)
   dispensing.
— You can use optional Dynamic
   Optimization based on actual usage,
   by medication.
— PROmanager-Rx can generate a wide
   array of inventory reports and functions.
— It can connect to Fulfill-Rx^{SM} software for
   automated order creation and receipt.

Business Realization
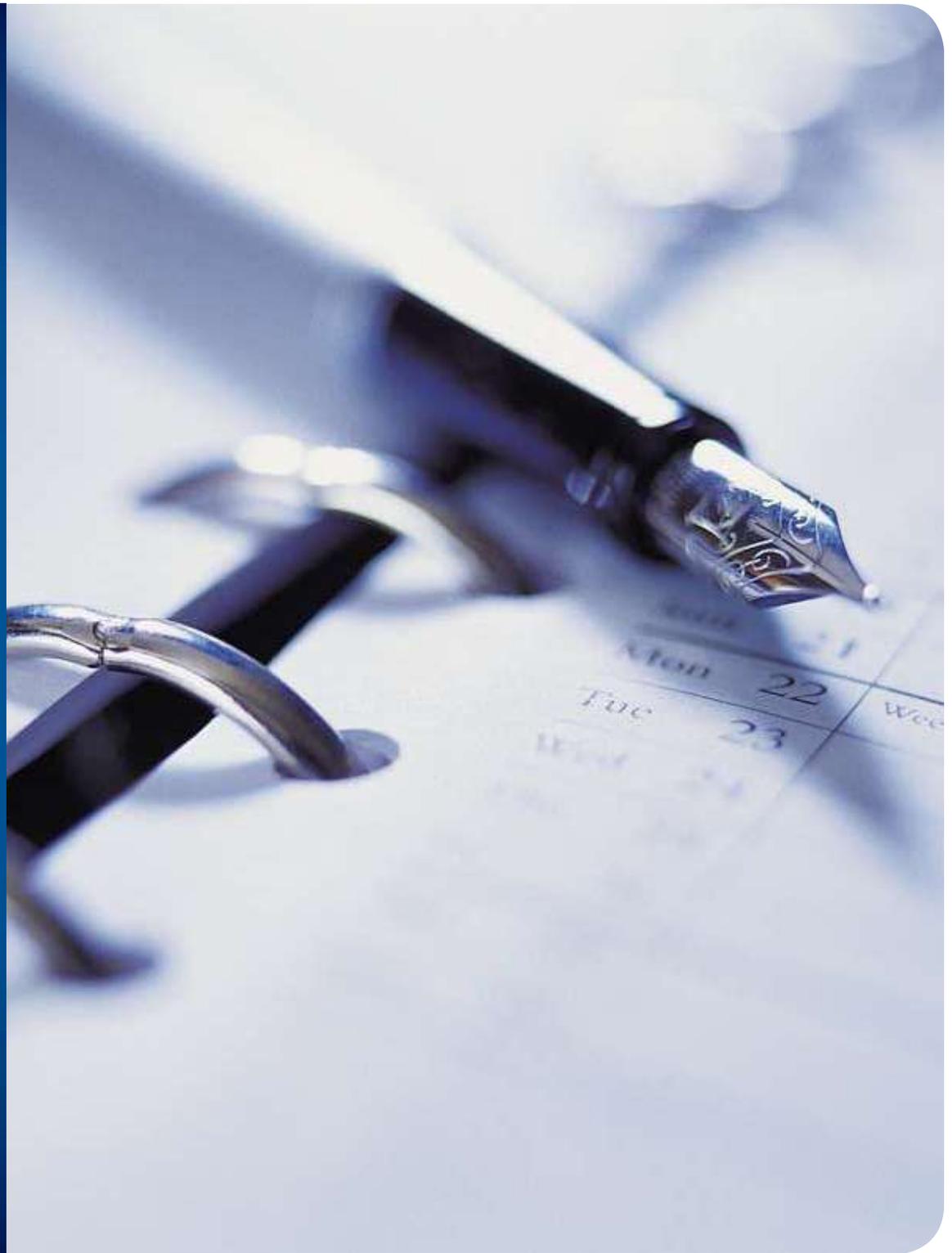
Business Realization

PROmanager-Rx is ideal for a 100 to 400 bed hospital using a centralized or hybrid medication distribution model, where the majority of medications are dispensed for individual patients.

This section will help you assess the business case for PROmanager-Rx in terms of your specific facility.

Business Realization

Labor

— Compare "manual dispensing" throughput to PROmanager-Rx throughput.
— 100% technician labor is required for manual dispensing.
— 100% technician labor is required for packaging (if you're not already purchasing manufacturer-packaged unit dose oral solids).
— Consider operational impact and cost of package checking by pharmacists.
— PROmanager-Rx tech labor will include tray loading, assignment, use of conveyor or front chute.

Business Realization

In-House Packaging Assessment

— Average up-charge per dose to acquire package-ready oral solids
— Average cost to package in-house, including equipment, supplies, labor
— Potential increase in purchases of unit dose to support PROmanager-Rx
  and avoid packaging

Inventory Management

— Reduction in overall levels of inventory, increased turns
— Increase in annual medication expenditures
— Expired medication cost avoidance – based on established metrics, perpetual
  inventory capability of PROmanager-Rx

Business Realization

Adverse Drug Event Avoidance

— 2.43 ADEs per 100 admissions
— Average increase in Length of Stay = 1.74 days
— Average cost of increased LOS = $8,750*
— Percentage reduction in ADE costs attributed to PROmanager-Rx = 8%

* In 2006, the Institute of Medicine revised the cost of an ADE and adjusted for inflation to value the cost at $8,750.
Source: "Preventing Medication Errors," Institute Of Medicine, 2006, pp. 115-117

Business Realization

Consider the impact of using multiple automation products.

— Apply bar-code-driven processes to 100% of the workflow.
— Increase R.Ph. and technician productivity.
— Extend perpetual inventory to all medications.
— Overcome any shortcomings of individual solutions.
— Generate higher revenue and margins.
— Increase integration benefits.

Benefits of using PROmanager-Rx with other McKesson solutions:

— Fully integrated via Connect-Rx from order processing through fill modes, formulary management, R.Ph. checking
— Available with Fulfill-Rx for McKesson Health Systems customers
— Complements MedCarousel or IntelliShelf-Rx for bar-code-based dispensing of odd forms
— Complements ROBOT-Rx with compatible cassette handling

Benefits of using Sky Medications with PROmanager-Rx:

— cGMP quality
— Verified quality linear bar code
— Perforated cards relatively easy to separate
— Standard-size 2x5 card for all medications
— Guaranteed availability for MHS customers

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