



## MedEye

### Optical Medication Checking at the Bedside.

“Can you see the error,  
MedEye can.....”

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## EXECUTIVE SUMMARY

### What?

The problem that MedEye is solving is **medication errors at the bedside**. MedEye is more than just a barcode logistics system. MedEye uses optical image recognition, barcoding and witnessing in ONE simple to use system integrated directly into your IT systems.

### Why?

**Medication errors can be found in up to 10% medication administrations**, potentially serious and harmful errors at the bedside can account for up to 1%

### How?

MedEye uses **machine learning optical scanning technology for oral solids, pens, infusions** as well as barcodes to create a “check list” for the nurse at the bedside. It is integrated into the eMAR.

### Outcome?

Medeye creates a **process driven “real closed loop”** solution for medication administrations as it deals with the final step of administration, at the bedside. By doing this health professionals can be sure that the patients are being medicated by the 5 rights.

## Four Pillars of our MedEye Strategy

### 1. Patient care and safety

- The most critical pillar is patient safety and stopping medication errors, especial ones that lead to patient harm at the final step — the bedside.

### 2. Nurse assistance, confidence and accuracy

- Nursing is a stressful with many interruptions that not only affect patient care but also affect nursing performance, satisfaction and confidence. Using optical machine learning, nurses get the tools that improve their performance without making their roles more complicated or time consuming.

### 3. Return on investment

- The competition for hospital and project funding is very high with many worthwhile result driven projects available. MedEye has a typical and conservative ROI of 6 to 8 months.

### 4. Reputation

- Health services reputation and public confidence, while not an easily quantifiable metric is certainly important. In addition MedEye uses a mobile patient enablement model to help a patient understand the medication experience.

## Background

Medication safety is crucial in day-to-day patient care. While optimising dispensing and introducing electronic prescription and administration systems have improved medication safety, research shows that medication verification at the bedside is the next step to improve medication safety<sup>1</sup>.

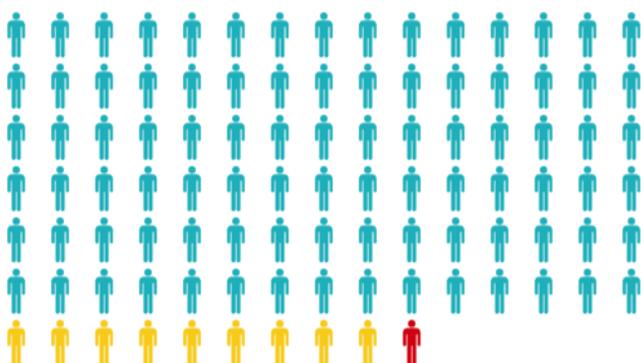
MedEye is especially designed to support nurses to verify medication at the bedside. With this project, Med ID will develop a proposal for the implementation of MedEye on its nursing wards.

With MedEye in place, the hospital will be in good shape for continuously improving medication safety and hospital accreditation.

<https://www.safetyandquality.gov.au/wp-content/uploads/2017/07/Barcoding-and-other-scanning-technologies-to-improve-medication-safety-in-hospitals.pdf>

## Medication Administration Errors and Adverse Drug Events.

In 2012 Brigham & Women's Hospital conducted a research study to determine how often medication administration errors with the potential to cause harm result in actual patient harm<sup>2</sup>.



**1 in 10** Medications are given in error.

Out of 14,041 medication administrations researchers reported 1271 (8.9%) errors. Of these medication errors 133 (10.5%) were considered potential serious or life-threatening potential ADEs. Of these potential ADE's 10 (7.5%) were found to cause serious patient harm.

A 600-bed tertiary hospital administering 1,182,600 medications per year typically experiences 829 harmful ADE's per annum.

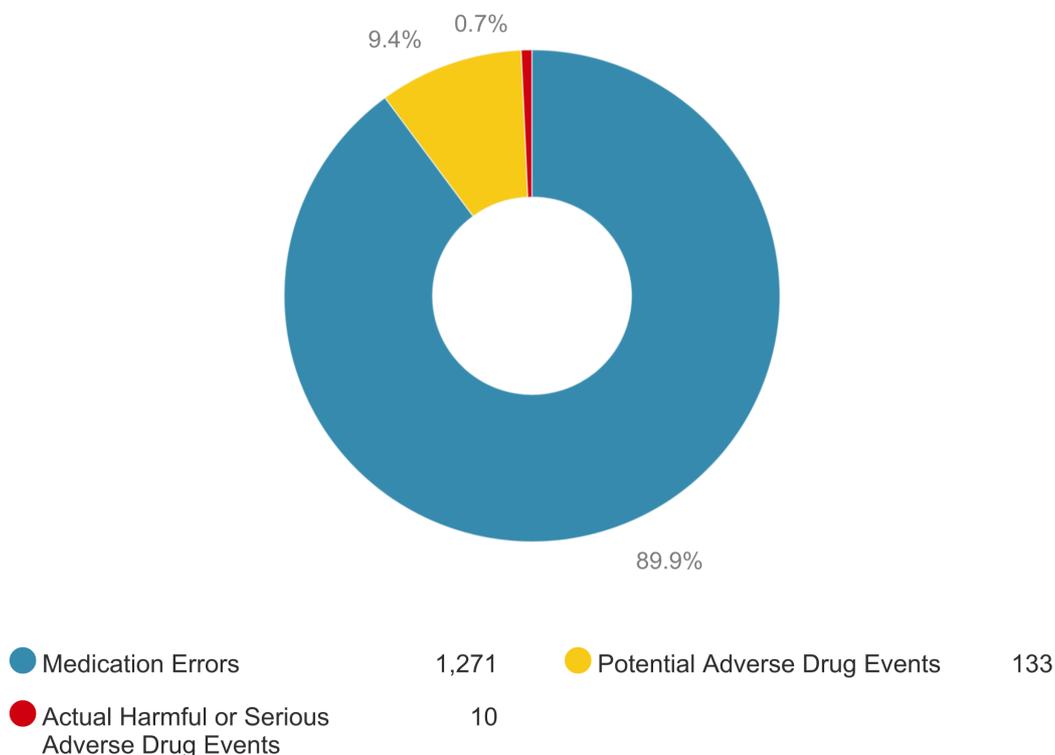
<https://www.ncbi.nlm.nih.gov/pubmed/22791691>

<sup>1</sup> Barcoding and other scanning technologies to improve medication safety in hospitals. Dr Mike Bainbridge and Dean Askew from ASE Health have prepared this report on behalf of the Australian Commission on Safety and Quality in Health Care July 2017.

<sup>2</sup> Kale A, Keohane CA, Maviglia S, Gandhi TK, Poon EG. Adverse drug events caused by serious medication administration errors. *BMJ Qual Saf.* 2012;21(11):933-8.

## Actual ADEs traced from 14041 administrations

2 Kale A, Keohane CA, Maviglia S, Gandhi TK, Poon EG. Adverse drug events caused by serious medication administration errors. *BMJ Qual Saf.* 2012;21(11):933-8. from 14041 administrations



### Bedside Medication Verification

MedEye is a mobile closed loop medication administration safety solution used by nursing and clinical staff at the patient bedside.

All oral medications are verified by means of image recognition technology. A small scanner compares the unique properties of tablets or capsules, including shape, colour, marks, break lines, diameter and thickness with the data in a drug database.

Infusions, syringe preparations and inhalers are recognised by the same image recognition technology. Verification is performed by the nurse showing the medications to the MedEye visual external camera. MedEye can also identify medications by barcode scanning.

The MedEye system is connected to the hospital information system and verifies the accuracy of the medication against the Five Rights of medication administration; the right patient, the right drug, the right time, the right dose, and the right route—all of which are regarded as the standard for safe medication practices.

### **MedEye Is like a Medications Goalkeeper**

A simple analogy is that MedEye is the final check of all medications at the bedside right before administration. No matter what happens in the medication chain, MedEye can check validate and register medication administration at the final step.



## MedEye Unique Benefits

**Capability to eradicate Adverse Drug Events** with MedEye closed-loop medication administration safety provides. This means the right patient, the right drug, the right time, the right dose, and the right route.

**Verify multiple medications and document them** in an Electronic Healthcare Register (EHR) with a single scan.

**Identify medications regardless of the packaging** with image recognition, barcodes and RFID technology. There is no need to purchase expensive pharmacy repackaging equipment.

**Streamline the medication administration processes** and improve efficiency and accuracy when administering high-risk medication. Nursing workflows are simplified by only showing the medications that are due “now.”

**Nurses spend more time with patients and less time with computers.** MedEye automates verification and registration of all medications, on screen verification of medications assists with building clinical knowledge.

**No significant logistics or workflow changes** for the pharmacy, nursing or IT means ease of implementation.

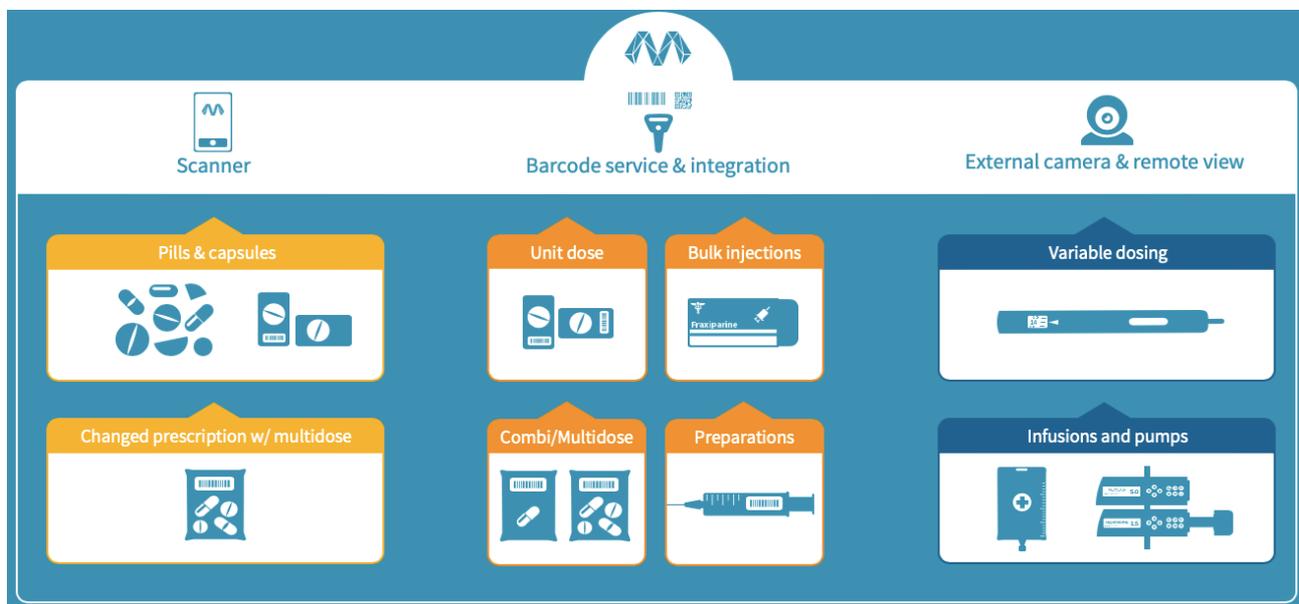
**Insights on medication administration, hospital wide.** The MedEye management analytics program provides This data is valuable in the process of continuous quality improvement, training and accreditation.

**Patients are immediately involved in their own therapy**, with the MedEye app, The MedEye app shows patients and loved ones what medication they’re taking, when they are taking them, and gives them more information about the medication.

A MedEye medication administration demonstration may be seen on the following link.

[www.med-id.com.au](http://www.med-id.com.au)

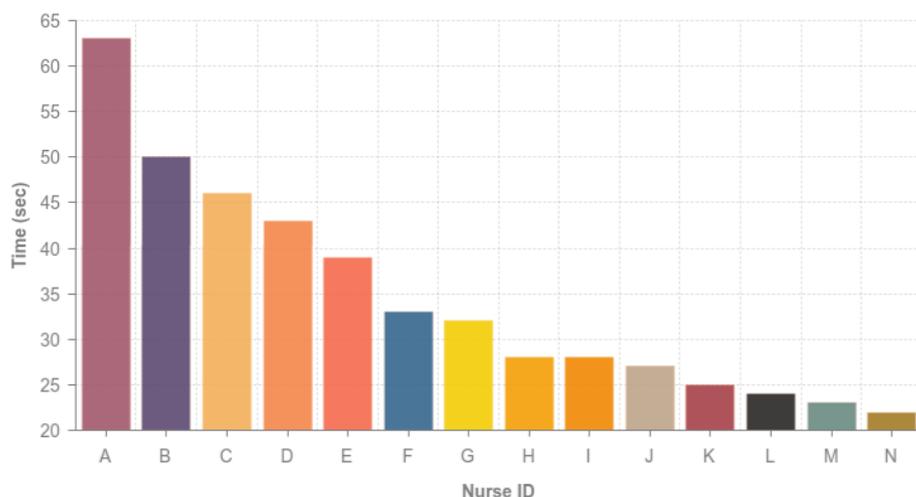
## All Medication Types



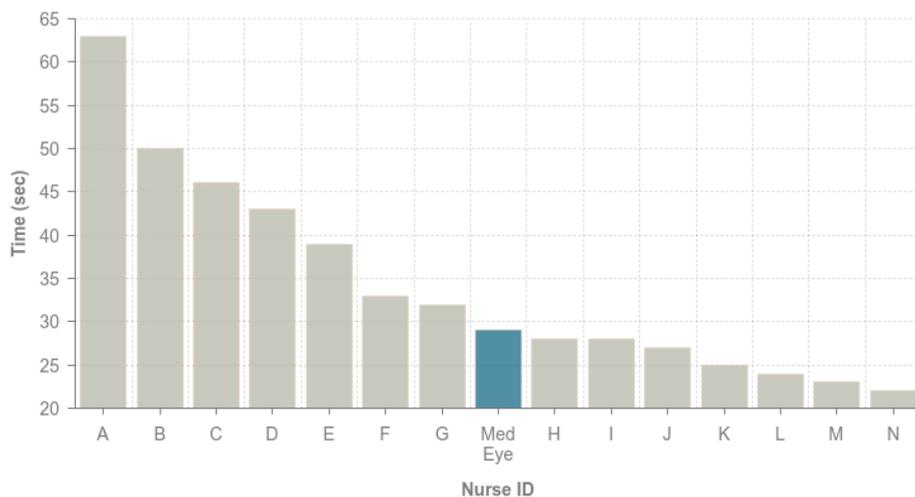
## Nurse Administration Workflow

From experience and testing MedEye has been found not to impact workflow in a disruptive manner. The follow observations have been made.

**Time To Administer - No MedEye**  
Anonymized Nurse Data



**MedEye Time To Administer**  
MedEye Anonymized Nurse Data



1. Workflow is maintained with the implementation of MedEye.

2. Medication administration before MedEye typically has a large variance of span, that is there is little consistency in the time taken to give medication regardless of experience.

3. By implementing a tight process medication administration times become far more consistent with less variability. Variability tends to cause errors due to lack of process.

4. Nurses have commented that MedEye gives far more confidence in medication administration as MedEye acts as the second and final check at the bedside.

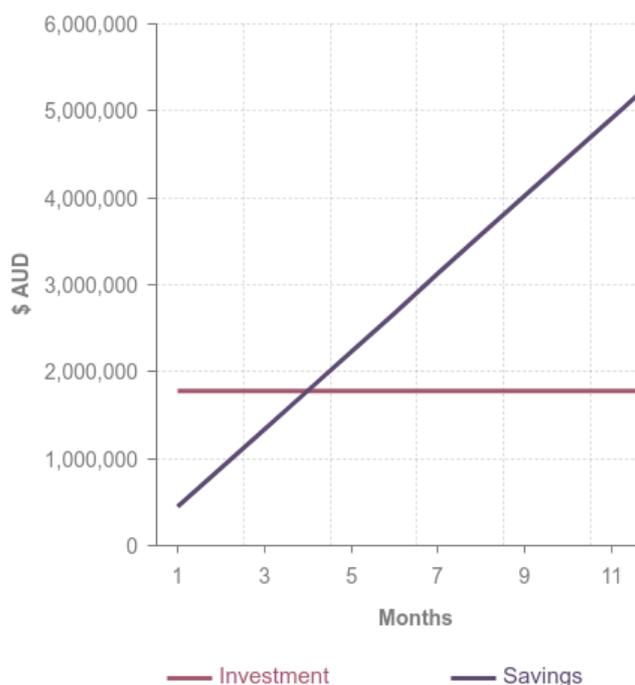
## MedEye Return on Investment (ROI)

Several studies have attempted to calculate the cost of an ADE, with the cost ranging from US\$ 4700 to US\$ 8700 per ADE<sup>3</sup>.

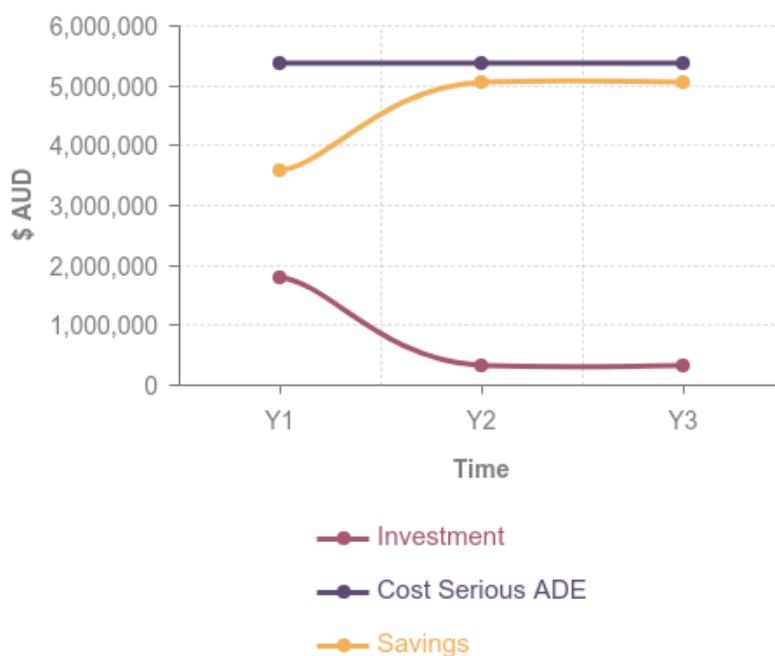
In a 600-bed tertiary hospital with 829 harmful ADE's, at A\$ 7,000 each, this equates to a cost of \$5.8 million dollars per annum.

The return on investment for a fully implemented MedEye solution is typically one year.

**MedEye**  
Typical ROI in Months



**MedEye Investment vs Savings**  
Typical 600 Bed Hospital



<sup>3</sup> Kale A, Keohane CA, Maviglia S, Gandhi TK, Poon EG. Adverse drug events caused by serious medication administration errors. BMJ Qual Saf. 2012;21(11):933-8.

## MedEye Return on Investment (ROI) - Success Modelling

### Assessment for MedEye Closed-loop Bedside Drug Verification Solution

Data Collection		
What are the number of available hospital beds?	420	
What is the hospital bed utilization? (non day stay)	90%	
How many beds per ward are in your hospital?	30	
What is the average patient to nurse ratio?	6	
How many medications per bed per day are administered?	6	
What is the percentage of MAE's?	8.9%	<sup>1</sup> Kale et. BMJ Qual Saf. 2012;21(11):933-8.
What percentage of MAE's are potential ADE's?	10.5%	<sup>1</sup> Kale et. BMJ Qual Saf. 2012;21(11):933-8.
What percentage of potential ADE's cause patient harm?	7.5%	<sup>1</sup> Kale et. BMJ Qual Saf. 2012;21(11):933-8.
What is the cost of potential (less harmful) ADE's per patient in your hospital?	\$ -	
What is the cost of harmful ADE's in your hospital?	\$ 9,000	<sup>1</sup> Average cost of Serious ADE US\$4700-\$8700.
Integration licences		
EDP/EPS Integration	1	
Pouch Machine Interface	0	
Barcode API Integration	1	
Patient Beds per Medeye Scanner	6	
Hospital Profile		
Total number of available beds.	37800%	
Number of available wards.	13	
Medication administrations per annum.	827,820	
Medication administration errors per year.	73,676	
Number of potential (less harmful) ADE's per annum.	7,736	
Number of harmful ADE's per annum.	580	
Cost of potential ADE's per annum.	\$ -	
Cost of harmful ADE's per annum.	\$5,221,785	<sup>1</sup> \$25M estimate for all ADE's at 600 bed tertiary hospital.
<b>Total cost of all ADE's per annum</b>	<b>\$5,221,785</b>	

<sup>1</sup> Kale A, Keohane CA, Maviglia S, Gandhi TK, Poon EG. Adverse drug events caused by serious medication administration errors. BMJ Qual Saf. 2012;21(11):933-8 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4454622/>

## Whole of hospital implementation with estimated Return on Investment

Financial Cost of Patient Harm	Units	
Cost of harmful ADE's per annum		\$ 5,221,785
Legal counsel		\$ 80,000
Management costs		\$ 60,000
Settlement costs		\$0
<b>Organisational Costs</b>		
Inventory at bedside - one off cashflow impact		\$0
Inventory shrinkage due to unmarked medications		\$0
Hospital acquired complication - funding loss		\$0
Additional nurse for second verification		\$0
<b>Total cost per annum</b>		<b>\$ 5,361,785</b>
<b>MedEye Bedside Drug Verification</b>		
Year 1: Starter Kit	3	\$ 98,000
Year 1: Additional Units for whole of hospital	60	\$ 1,680,000
<b>Year 1 Cost Total</b>		<b>\$ 1,778,000</b>
Year 2 Cost		\$ 320,040
Year 3 Cost		\$ 320,040
Year 4 Cost		\$ 320,040
Year 5 Cost		\$ 320,040
<b>Total cost of ownership over 5 years</b>		<b>\$ 3,058,160</b>
<b>Return On Investment</b>		
Year 1 Saving	ADE Cost minus MedEye Inve	\$ 3,583,785
Year 2 Saving	ADE Cost minus MedEye Ser	\$ 5,041,745
Year 3 Saving	ADE Cost minus MedEye Ser	\$ 5,041,745
Year 4 Saving	ADE Cost minus MedEye Ser	\$ 5,041,745
Year 5 Saving	ADE Cost minus MedEye Ser	\$ 5,041,745
<b>Total Savings</b>		<b>\$ 23,750,765</b>
<p>Whilst all care and research has been conducted in good faith, this tool is an estimate and is intended as an indication only and should not be used as a solely total business case. Neither MedEye NL or Med-ID Pty Ltd can be held liable for calculations and assumptions made from this information. The customer must conduct all due diligence themselves. In additional cost of finance has not been allowed for.</p>		
<b>Savings per bed per annum</b>		
Year 1 Saving		\$ 9,480.91
Year 2 Saving		\$ 13,337.95
Year 3 Saving		\$ 13,337.95
Year 4 Saving		\$ 13,337.95
Year 5 Saving		\$ 13,337.95

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