

# RFID Journal Live! 2006

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Putting RFID to Work

May 2, 2006



# Using Mobile RFID to Prevent to Prevent Medication Errors

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Putting RFID to Work

May 2, 2006



# St. Clair Hospital



- A 331-bed, general, acute care hospital
- Servicing 300,000 residents in 20 communities in Pittsburgh, PA

# Presentation Goals & Objectives

- Prove there are thousands of medication errors occurring annually in every hospital
- Prove that systems to prevent these med errors are not burdensome on nursing staff
- Convey the strategy to prevent errors should be driven by process and workflow, not technology alone.
- Demonstrate that bar code and RFID identification systems are valuable tools in the process and can co-exist within an application

# RFID Experiences within the Context of Patient Safety Application

- Benefits of RFID within patient safety applications does not require Enterprise level RFID strategy
- Identify the application first, then apply technology
- Bedside Patient Safety: VeriScan – 5 Rights Meds Verification
- Evidence shows preventable med errors occur at alarming rates – a problem that needs to be addressed
- Despite debates between bar code and RFID, St. Clair made decision to deploy technology to resolve patient safety issue, sooner rather than later
  - IOM
  - FDA bar code mandate
  - JCAHO possible mandate
    - Barcode verification at the bedside
    - Barcode and RFID
      - Identification technologies can be interchangeable
      - Underlying application delivers outcomes

# RFID Experiences

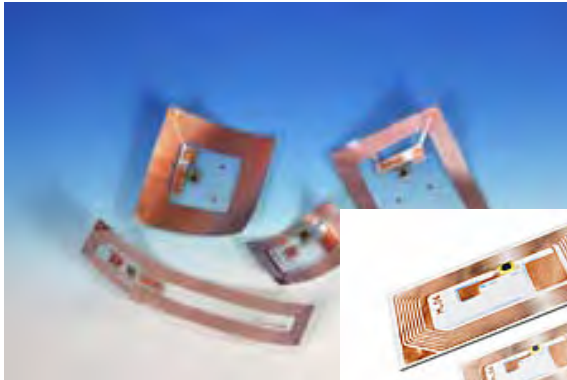


# Components of RFID System

RFID: Radio Frequency Identification – Uses radio waves to identify an objects or people

- Tags (Active or Passive)
- Media
- Label Printer / Tag Encoder
- Readers
- Software application

# Making it all Work



**TAG:** Manufacturers produce tags according to different standards. ISO and EPC are two broad standards. ISO 15693 is a popular standard that works with many of today's readers and operates in the 13.5mhz frequency. EPC class 1 v2 is an emerging standard that may achieve global use.

**MEDIA:** The tag is embedded into some sort of media, frequently a label. Many suppliers provide media preconfigured with the tag.



**PRINTER:** An RFID label printer can both encode the tag with the desired information, and print barcode and text on the surface of the media.



**READER:** Readers come in many shapes and sizes. Pocket PCs with a CF expansion slot can utilize the Socket RFID Reader-Scan Card dual mode reader for both barcode and RFID. The frequency of the reader must match the tag that is being read.



**APPLICATION:** The software application must be able to accept input from a scanned RFID or a scanned barcode and then act upon it. For 5 Rights applications it is important to be sure the application will support RFID even if is not currently being used.



# RFID Advantages Over Barcode

- RFID does not require direct contact or line-of-sight scanning.
- RF signals communicate through many materials including clothing
- RFID can store much more data than a typical barcode.
- RFID tags can both transmit and record data
- RFID tags are re-writable

# RFID – Barriers to Adoption

- With standards still evolving, there's concern over obsolescence and future incompatibility.
- Interoperability issues:
  - Various frequencies of readers
  - Various tag formats
  - Active vs. Passive
- However, barriers not present in some healthcare applications

# All RFID Technologies Under a Single Umbrella for Access

Retrieval  
from web  
server



Direct  
input from  
tag

## ACTIVE RFID APPLICATIONS

- Asset Tracking (loss prevention)
- Mobile Equipment Locate
- Patient Elopement Prevention
- Patient Abduction Prevention
- Bed Management
- Staff Tracking
- Patient Movement (for example in PeriOperative service areas)
- Inventory Management

## PASSIVE RFID APPLICATIONS

- PPID (positive patient ID)
- Caregiver ID
- Meds (future – as prices drop)
- IVs (mixtures, tubing, syringes)
- Lab Specimen ID
- Blood Transfusion ID
- Dietary Tray ID (food allergy appl.)
- Security / Access
- Meds Reconciliation

# RFID – Where it can help today

- Patient ID
  - Line of sight not needed, wrinkling avoided, rotation into scanning position unnecessary, two hands not needed
- Caregiver ID
  - Avoids tapping and typing on PDA keyboards
- IV Bag ID
  - Manufacturer barcodes are inadequate for most IV identification.
  - Bar codes on clear bags difficult to read by bar code scanners
  - Height of IV pole creates difficult bar code scanning angle
  - Linear bar codes have limited character length
  - RFID tags have sufficient capacity to identify the base solution and the medication additives

# Speed up the Process to Speed up Adoption

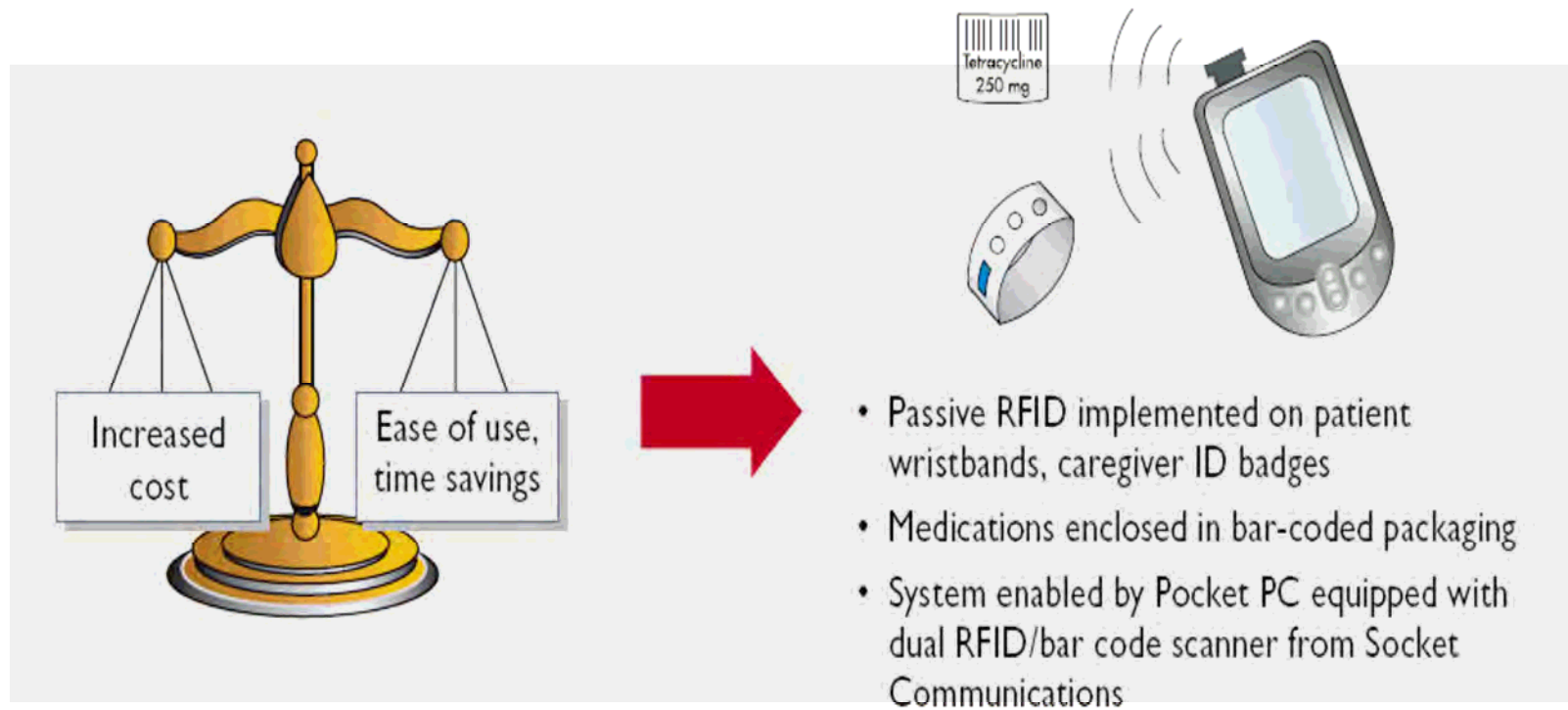
## Bar Code Process Checklist

- Uncover patient's wristband
- Rotate the wristband's bar code into view
- Ensure line-of-sight between scanner and barcode
- Aim the scanner
- If wristband is damaged or wrinkled or won't scan...



- Adding bar code scanning initially increased med administration by 3.5 seconds.
- Even after it became time neutral, some nurses perceive that it consumes time.

# RFID Cost / Benefit Equation



# Bar Code + RFID

## The Best of Both Worlds

RFID



### Caregiver Verification

Individual RFID tags difficult to duplicate, ensuring secure automatic clinician login, speeding process

Bar Code



### Medication Verification

Individual medication doses labeled with less expensive bar coding technology, allowing clinicians to correctly match medication and dosage with physician order

RFID



### Patient Verification

RFID wristbands scanned without line-of-sight, requiring fewer physical patient touches, speeding process and reducing chances of nosocomial infections

# Devices Tested

- Socket RFID Reader
- Socket Combination Dual Scan RFID/Barcode Reader
- Can read and write RFID tags
- Socket is the only vendor that provided a complete scanning solution.



# RFID Conclusions

- HP iPaq 4700 and Socket combo scanner provides a functional and practical configuration.
- First truly useful RFID configuration that we have tested.
- Speed and reliability issues of RFID were addressed
  - Previous configurations proved to read very slowly and reliably read on first scan less than 25% of the time.
- Configuration is in pilot on one nursing unit at St. Clair.
- Began pilot for user identification and migrated to patient identification.
- Future phase will include IV's.

# Futuristic RFID Wristband Lifecycle

1. Patient demographics added upon admission
2. Allergies encoded onto wristband
3. Advanced Directive encoded onto wristband
4. During stay, new allergy encoded to wristband
5. C.diff alert added to wristband.
6. Patient makes change to Advanced Directive. Saved to wristband.
7. Alert information displayed on handheld to any nurse
8. Patient is discharged. Discharge meds encoded to wristband.
9. Patient brings wristband to hospital to register.



# RFID Strategy

- Don't allow indecision on RFID to delay a patient safety initiative such as 5 Rights
- Deploy barcode, or a mixed barcode + RFID solution
- RFID standards are mature for patient and caregiver ID. Short range scanning appropriate for Pocket PC
- Don't assume that Pocket PC needs to scan multiple frequencies for other enterprise RFID applications
- Pocket PCs will become the hub of enterprise information via communication with enterprise RFID servers.
- In most cases the capital investment in Pocket PCs and RFID readers is preserved even as technology advances

# VeriScan Bar Code and RFID Application



# VeriScan - The 5 Rights Application

- Regardless of the scanning technology being used, the application must provide the following:
  - Check the 5 Rights
    - Patient, Drug, Dose, Route, Time
  - Chart the administration
  - Collect and chart the observations
    - BP, Temp, HR, Blood Glucose, Pain Scale

# What to avoid and why

- Any equipment that uses a wire
  - Wires that connect to the network
  - Wires that connect to a scanner
- Anything that's large and heavy to carry
- Anything that has to be wheeled to the bedside
  - Can be connected to a large screen if a cart is used
- Systems that require typing
- Systems that don't have automatic charting
- Systems that don't support RFID

# VeriScan Findings

- Documented outcomes
  - Management reports
  - Medication errors prevented
  - Process improvement achieved

# Exception Report

## 5 Rights Exception Unit:5E

Report Date: 8/8/2004 10:25

51845E

ANONYMOUS, JOHN

MR#: 123456 Acct#: 7654321

DOB: 02/18/1926 ADM: 8/3/04

Event Time	Status	5-Rights Violation Type (Med, Time, Dose, Route, Patient)
8/4 04:21	Wrong medication(Digoxin(Lanoxin)0.25MG, 1 Tab) scanned for this patient. User name : twallace	Med

***NOTE: The entry at 04:21 above is a legitimate catch or "near miss". The nurse prevented this medication error through the use of VeriScan. The medication is not ordered for this patient.***

# Exception Report

## 5 Rights Exception Unit:5E

Report Date: 8/8/2004 10:25

51615E

ANONYMOUS,JOHN

MR#: 123456 Acct#: 7654321

DOB: 06/18/1919 ADM: 8/2/04

Event Time	Status	5-Rights Violation Type (Med, Time, Dose, Route, Patient)
8/3 20:37 Wrong medication(Potassium Chloride Microencapsulated Crys CR Tab 20 mEq) scanned for this patient User name: twallace		Med

***NOTE: The entry at 20:37 above is a catch. The nurse prevented this medication error through the use of VeriScan. The physician had discontinued the medication for the patient 8 hours prior to the attempted administration. The paper copy of the Meds Due report, printed earlier in the shift, showed the med as valid. The med was also in the patient's bin. Through the use of VeriScan's wireless transmission of orders, the handheld automatically received more up to date information than what the paper report showed. This information prevented an unnecessary administration.***

# Exception Report

## 5 Rights Exception Unit:5E

Report Date: 8/8/2004 10:25

51755E

ANONYMOUS,JOHN

MR#: 123456 Acct#: 7654321

DOB: 11/01/1927 ADM: 8/3/04

Event Time	Status	5-Rights Violation Type (Med, Time, Dose, Route, Patient)
8/4 21:12	Wrong patient verified during wristband scan. Meds scanned for patient(1878618) and wristband was scanned for patient(1236123) User name : rtrudel	Patient

**NOTE:** The entry at 20:37 above is a case of a patient wearing the wrong wristband label. After preparing the meds, the nurse scanned the patient wristband and was alerted to the mismatch. After some investigation, it was discovered that the patient had been banded with another patient's wristband.

# Summary Data

- Various studies have claimed that medication errors are a big problem in hospitals
- The experience at St. Clair Hospital:

Types of Med Errors Prevented	Average number of errors prevented per week, per nursing unit		
	9/30/04	01/12/05	03/01/06
Nurse attempts to administer a med that is not ordered for the patient.	1.41	.69	.68
Nurse attempts to administer a med that has been discontinued by the physician.	.49	.25	.38
Nurse scans meds, then scans the wrong patient for those meds.	.30	.42	.39
Omissions: Missed medications	5.10	5.14	4.99
Under-reporting ratio	8:1	N/A	N/A

Note: The original timing studies conducted at St. Clair Hospital showed that VeriScan added only 3.5 seconds/med to the administration/charting process. Through nursing feedback and screen refinements the next timing study showed that adding the meds verification system was time neutral (it did not add time to the nurses' meds administration process).



# Raising Awareness & Reducing the Opportunity for Error

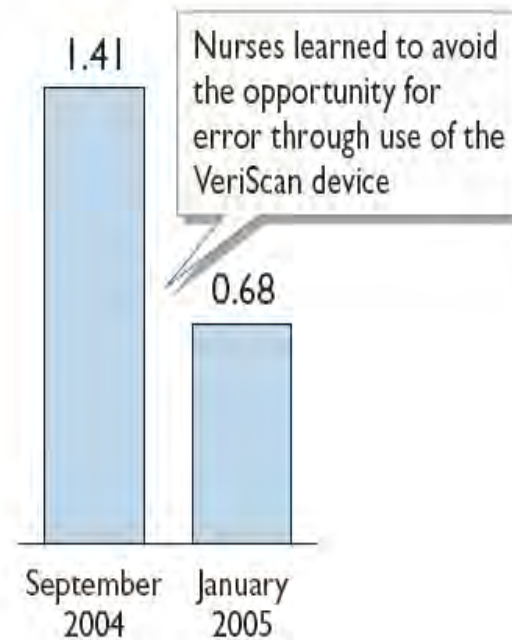
Medication Administration  
Errors Identified

*Annually*



Attempted Deliveries of  
Incorrect Medication

*Per Nursing Unit per Week*



# Return on Investment Equation

- $(\text{Annual Admissions}) \times (\text{PADE rate}) \times (\text{PADE cost}) = \text{Savings}$
- Where:
  - Annual Admissions at St. Clair Hospital\* = 15,646
  - PADE (Preventable Adverse Drug Events) Rate\*\* = .63 per 100 admissions
  - Cost of PADE\*\*\* = \$6,400
- Up to \$630k in annual savings

\* Fiscal Year Ended June 30, 2005

\*\* Journal of American Healthcare Association, vol. 277, number 4 (rate as high as 2.43)

\*\*\* Healthcare Quarterly, vol. 8, number 3

# The Handheld System at the Hub of Bedside Safety

Lab Specimen Labeling



Order Verification



Smart Pumps



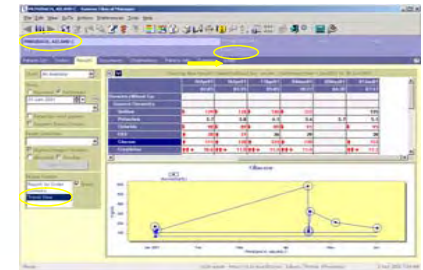
Blood Bank



RFID Console to Asset Tracking



Dietary Orders



# VeriScan Live Demonstration



- VeriScan Server on laptop
- HP iPaq h2200
- Note: HP iPaq hx4700 now being used at St. Clair
- Socket combo scanner in the CF slot
- Socket 802.11b in SDIO slot. Note: internal 802.11b also used in the iPaq hx4700
- Cables are used solely to enable us to display the screen image through the projector.
- Barcoded wristband labels and RFID wristbands produced via Netprint.
- Meds are in barcoded packaging

# Selected Screen Shots from VeriScan RFID Bar-code Application



# Welcome Screen - Sign On

VeriScan 1:14

**WELCOME TO VERISCAN!**

User ID

PIN

Unit

123 1 2 3 4 5 6 7 8 9 0 - = ←  
Tab q w e r t y u i o p [ ]  
CAP a s d f g h j k l ; '  
Shift z x c v b n m , . / ←  
Ctl áü ` \ ↓ ↑ ← →  
File Help


- There are three options for the nurse to sign on:
  - Type in their name using the keyboard
  - Scan the bar code on the back of their employee ID Badge
  - Scan the RFID tag on their ID Badge (requires RFID scanner on Pocket PC)

# My Patient List

VeriScan		1:15
Unit: 5F		
Patient	Room/Bed	
CHURCHILL, WINSTON	51335F	
WASHINGTON, GEORGE	51355F	
PASTEUR, LOUIS	51375F	
ADAMS, JOHN	51395F	

My Patients	All Patients	
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File Scan Lock 

- When the user logs on, they are first taken to the My Patient List
- The My Patient List allows each nurse to see only the patients to which they provide care.

# Creating My Patient List

VeriScan 1:15

A  Means "My Patient" Unit: 5F

Patient	Room/Bed
<input checked="" type="checkbox"/> WASHINGTON, GEOR...	51355F
<input type="checkbox"/> NEWTESTCONNECT, ...	51365F
<input checked="" type="checkbox"/> PASTEUR, LOUIS	51375F
<input type="checkbox"/> JEFFERSON, THOMAS	51385F
<input checked="" type="checkbox"/> ADAMS, JOHN	51395F
<input type="checkbox"/> LINCOLN, ABRAHAM	51405F
<input type="checkbox"/> TAYLOR, ZACHARY	51455F
<input type="checkbox"/> GRANT, ULYSSES S	51465F
<input type="checkbox"/> CLEVELAND, GROVER	51485F
<input type="checkbox"/> FIELD, FRANK J	51505F
<input type="checkbox"/> XA, INPATIENT	51525F

All

My Patients All Patients

File Scan Lock

- By tapping on the All Patients tab, the nurse can see every patient on their nursing unit.
- Tapping the box next to the patient name adds or removes the patient from the My Patient List.

# Creating My Patient List (cont.)

VeriScan 1:16

A  Means "My Patient" Unit: 5F

Patient	Room/Bed
<input checked="" type="checkbox"/> WASHINGTON, GEOR...	51355F
<input type="checkbox"/> NEWTESTCONNECT, ...	51365F
<input checked="" type="checkbox"/> PASTEUR, LOUIS	51375F
<input type="checkbox"/> JEFFERSON, THOMAS	51385F
<input checked="" type="checkbox"/> ADAMS, JOHN	51395F
<input type="checkbox"/> LINCOLN, ABRAHAM	51405F
<input type="checkbox"/> TAYLOR, ZACHARY	51455F
<input checked="" type="checkbox"/> GRANT, ULYSSES S	51465F
<input type="checkbox"/> CLEVELAND, GROVER	51485F
<input type="checkbox"/> FIELD, FRANK J	51505F
<input type="checkbox"/> XA, INPATIENT	51525F

All

My Patients All Patients

File Scan Lock

- The box next to Grant, Ulysses is tapped.
- User taps the Save button.

# Photo ID



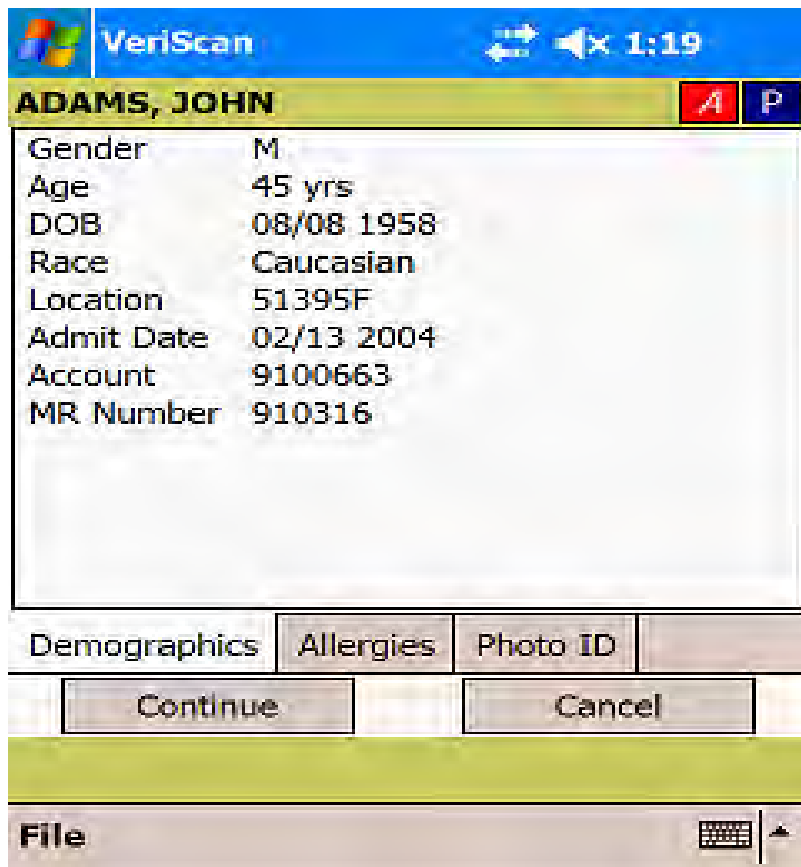
- On the previous screen, the nurse tapped on the name ADAMS, JOHN.
- Photo ID is presented if a photo is available.
- Allergies and demographics can be retrieved from this screen. They can also be automatically displayed as a configurable option.

# Allergies

The screenshot shows the VeriScan software interface. At the top, there is a blue header with the VeriScan logo and a status bar showing a refresh icon, a speaker icon, and the time 1:09. Below the header, a patient name 'ADAMS, JOHN' is displayed in a text box. Underneath, the 'Allergies' section is highlighted, listing 'HALDOL', 'XYLOCAIN', and 'MONTELUKAST'. At the bottom of the screen, there are two buttons: 'Get Meds List' and 'Back to Unit List'. The interface also includes a 'File' menu and a keyboard icon in the bottom right corner.

- On the previous screen, the nurse tapped on the name ADAMS, JOHN.
- Allergies are presented for review.
- Demographics can be retrieved from this screen.

# Patient Demographics



The screenshot shows the VeriScan software interface. At the top, the title bar reads "VeriScan" and the system tray shows "1:19". Below the title bar, the patient name "ADAMS, JOHN" is displayed in a yellow bar, with a red "A" and a blue "P" button to its right. The main area contains a list of patient demographics:

Gender	M
Age	45 yrs
DOB	08/08 1958
Race	Caucasian
Location	51395F
Admit Date	02/13 2004
Account	9100663
MR Number	910316

Below the list, there are three tabs: "Demographics" (selected), "Allergies", and "Photo ID". At the bottom of the main area, there are two buttons: "Continue" and "Cancel". The bottom of the screen shows a "File" menu and a keyboard icon.

- The demographics can be reviewed by the nurse if needed.
- Having the demographic information available enhances patient safety by acting as a contingency for Positive Patient ID when the patient is not wearing a wristband.
- Tapping the Get Meds List button will retrieve all orders on this patient.

# Due List

VeriScan  
ADAMS, JOHN  
Scan [ ]

Medication	Due At <sup>y</sup>
DIGOXIN (LANOXIN) 0.2...	07/17 1235
<input checked="" type="checkbox"/> AMOXICILLIN (AMOXIL,P...	07/17 1300
BETHANECHOL (URECH...	07/17 1300
LEVOTHYROXINE (SYNT...	07/17 1300

Due Missed PRN IV DC All  
ORDERS SCANNED CHARTING RES

File Lock Data

- All orders that are due within 60 minutes of the present time are displayed on the Due tab.
- The 60 minute window of time is configurable.
- From this screen the nurse has several options. The barcode on the med can be scanned, the order detail can be displayed, or the PRN, IV, Missed, or All meds lists can be viewed.
- Discontinued orders can be viewed on the DC tab.
- In this demo sequence, the med package is scanned.

# Order Detail

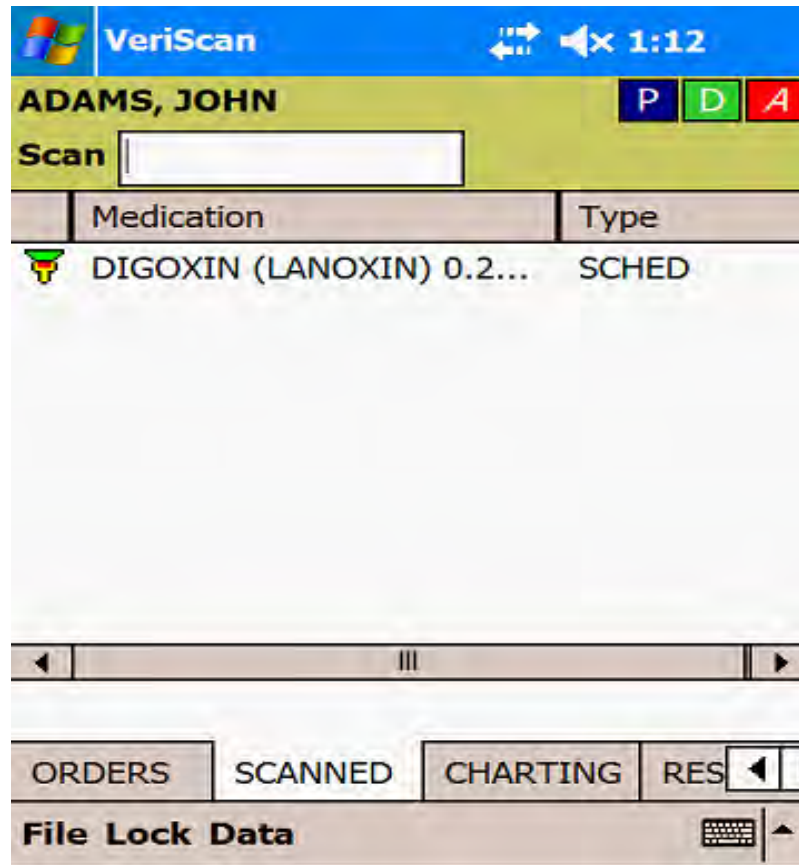
The screenshot shows the VeriScan application interface. At the top, the title bar reads "VeriScan" with a volume icon and "1:11". Below the title bar, the patient name "ADAMS, JOHN" is displayed in a green bar, followed by three colored buttons: a blue "P" button, a green "D" button, and a red "A" button. The medication name "DIGOXIN (LANOXIN) 0.25MG TAB," is shown in a white box. Below this, a table displays order details:

Current Status	Due Now @ 07/17 1235
Last Status	None
Order Type	SCHED
Order Dose	1 TABS
Order Route	PO

Below the table, the medication name and quantity are displayed: "147.00 DIGOXIN (LANOXIN) 0.25MG TAB, 1". Below this, the order text is shown: "TAB PO STARTING ON 07/17/04, 1235, (07/17/04 12:00-..), (0001) (VS#291862)". At the bottom, there are two buttons: "Cancel" and "Continue".

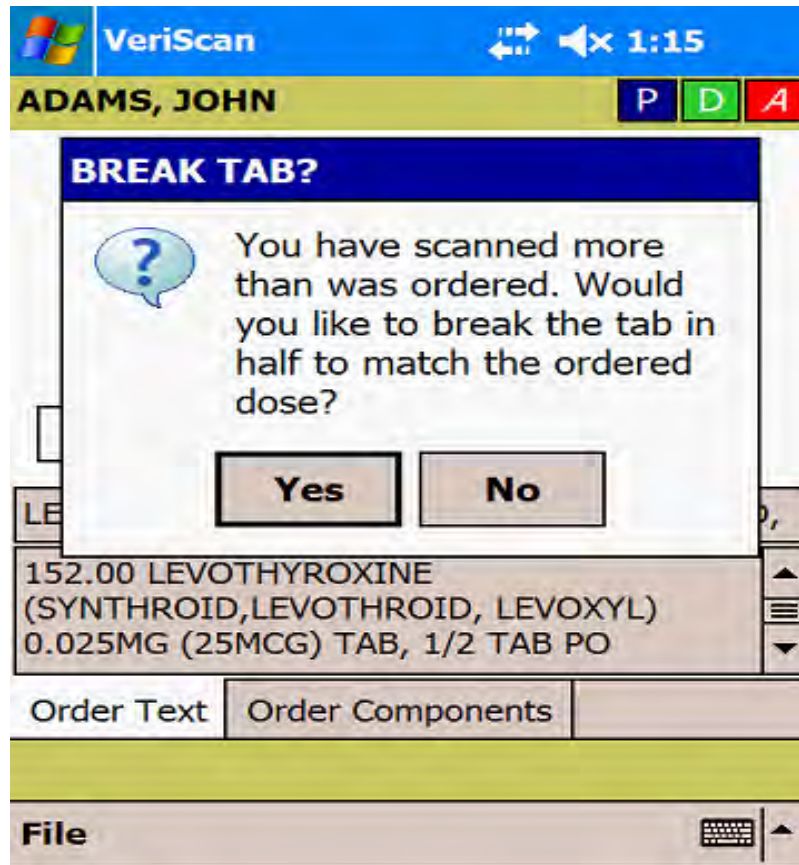
- Scanning this med was initiated on the previous screen.
- If there is a valid order for the med, the order detail is automatically displayed after the med has been scanned,
- If this is the med that the nurse wants to give to the patient, he/she will tap the Continue button.
- If this is not the med that the nurse intends to give, he/she would tap Cancel button.

# Medication Scanning



- On the previous screen, the nurse tapped the 'Continue' button.
- This screen shows that the med has been successfully scanned and matched to an order.
- The nurse can tap on the order to display the order detail and to verify which steps in the 5 Rights verification process have been completed.
- Additional meds can be scanned from this screen.

# Fractional Dose



- VeriScan recognizes orders that have a dose of half-tab.
- The user is alerted to the fractional dose and instructed to break the tab in half.
- Tapping Yes will select the appropriate dose for this order

# Order Detail

VeriScan 1:16

ADAMS, JOHN P D A

ASPIRIN 325MG (5GRAINS) TAB,

Current Status	Elg Now @ 07/17 1310
Last Status	None
Order Type	PRN
Order Dose	2 TABS
Order Route	PO

150.00 ASPIRIN 325MG (5GRAINS) TAB, 2 TABS PO Q6H PRN PAIN TEMPERATURE OF --100.0, <07/16/04 16:46-...>, (0001)

Order Text | Order Components

Cancel Continue

File

- Scanning this med was initiated on the previous screen.
- The orange background indicates that this is a PRN order.
- If there is a valid order for the med, the order detail is automatically displayed after the med has been scanned,
- If this is the med that the nurse wants to give to the patient, he/she will tap the Continue button.
- If this is not the med that the nurse intends to give, he/she would tap Cancel button.

# Lab Result – Out of Range

VeriScan 1:17

ADAMS, JOHN P D A

Test	Result	Result @
Protime INR	140	07/17 1230
Platelet Count	**105	07/17 1230

Lab results were found for the scanned order.  
Please review as necessary.

\*\* out of range lab result

Cancel Next

File

- The platelet count in this result is out of range.
- To view the detail, the nurse taps on the test name.

# Lab Result – Out of Range (cont.)

VeriScan 1:18

ADAMS, JOHN P D A

12345/2 Platelet Count

Collection Time 07/17 0900  
Result Time 07/17 1230  
Result Range 75-100

Result: 105 **\*\* OUT OF RANGE**

OK

File

- The expected range is 75-100.
- The result is 105.
- The nurse taps OK to continue.

# Lab Result – Out of Range (cont.)

VeriScan 1:19

ADAMS, JOHN P D A

Test	Result	Result @
Protine INR	140	07/17 1230
Platelet Count	**105	07/17 1230

Lab results were found for the scanned order.  
Please review as necessary.

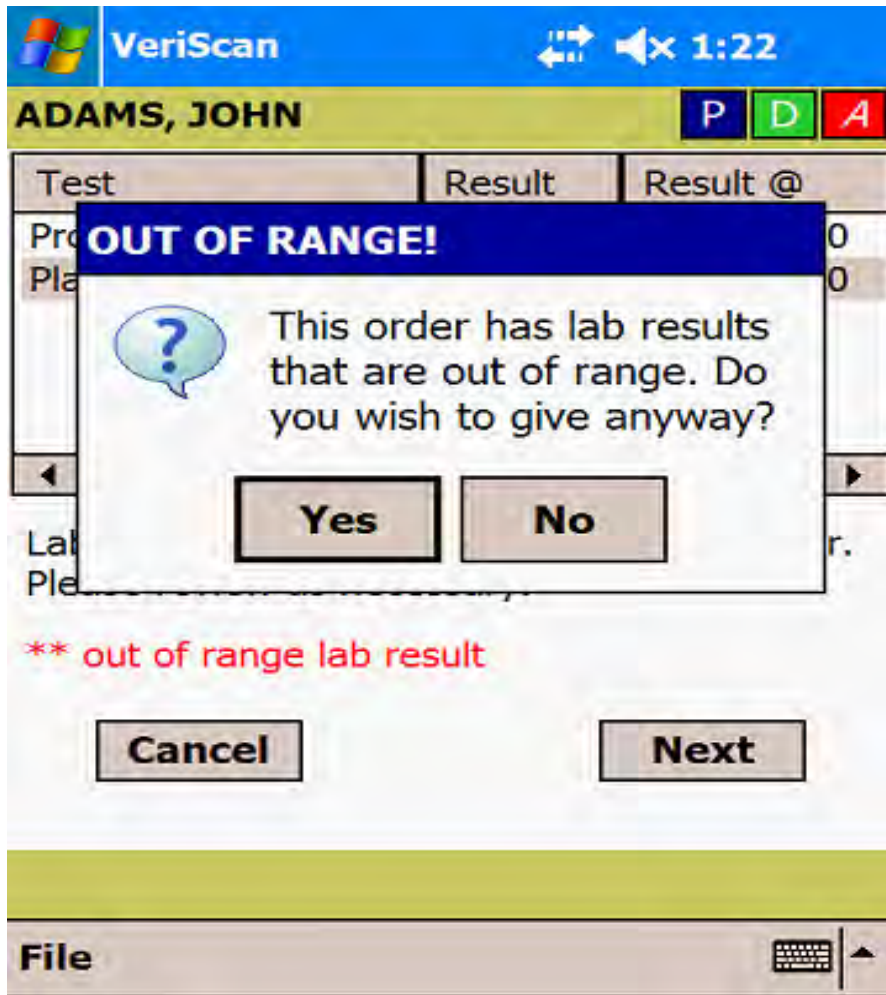
**\*\* out of range lab result**

Cancel Next

File

- The nurse is returned to the results screen.
- Tap Next to continue.

# Lab Result – Out of Range (cont.)



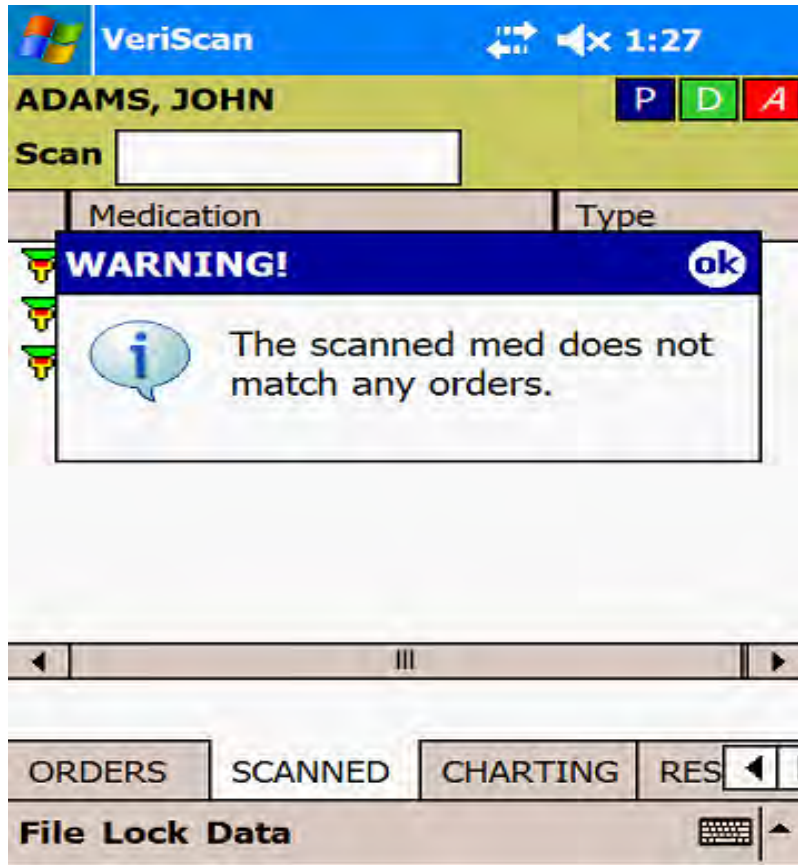
- The nurse is prompted that the result is out of range.
- Tap Yes to continue.

# Dose Verification

The screenshot shows the VeriScan software interface. At the top, the title bar reads "VeriScan" with a Windows logo on the left and navigation icons and a timer "1:05" on the right. Below the title bar, a patient information bar displays "Patient : ADAMS, JOHN" with a red "A" icon. The main area contains the question "What order dose are you charting?". Below this, it shows "Ordered: 2 TABS" and "You are charting 2 TABS" with a text input field containing the number "2". There is a "(Scan More)" label and a "Done" button. A medication order is displayed: "ASPIRIN 325MG (5 GRAIN) TAB" followed by "150.00 ASPIRIN 325MG (5GRAINS) TAB, 2 TABS PO Q6H PRN PAIN TEMPERATURE OF --100.0, <07/16/04 16:46-..>, (0001)". Below the order is a table with columns "Order Text" and "Order Components". At the bottom, there is a "File" label and a keyboard icon.

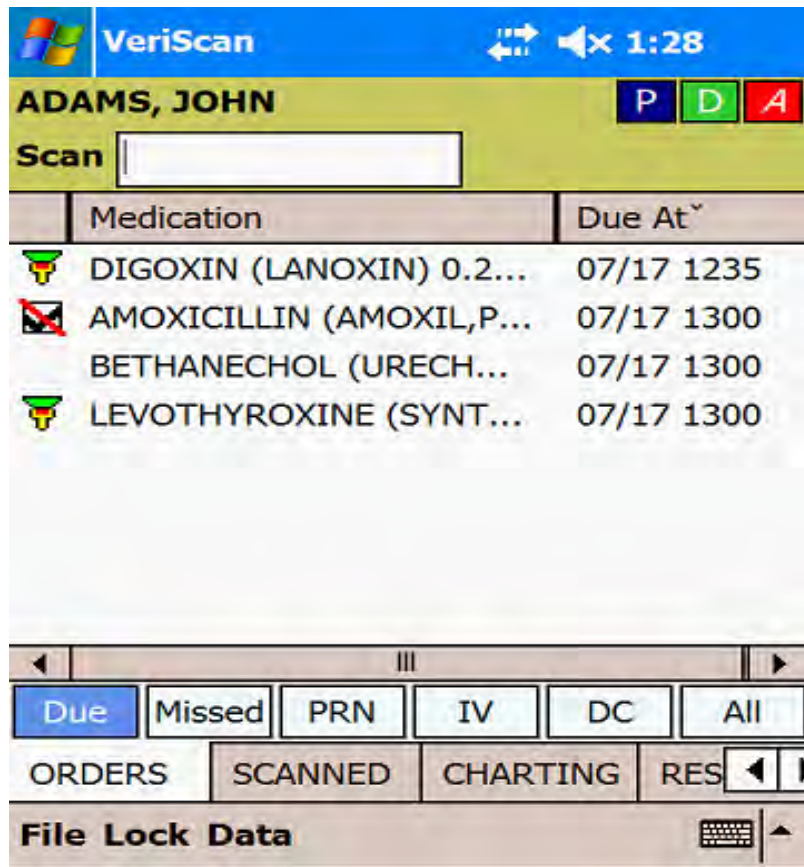
- A second tab was scanned and the dose was updated.
- Tap the 'Done' button to continue.

# Wrong Medication



- In this example, a med that was not ordered for this patient was scanned.
- The nurse is alerted via the pop up message shown.
- Tapping ok returns the nurse to the scan summary screen.

# The “DC” Tab



- The nurse may want to verify why no order displayed for the previous med. By tapping the ORDERS tab and then selecting “DC”, the display shows med orders that have been discontinued by the physician.
- In this example, the med had previously been delivered to the patient room and the nurse was not aware that the order has been discontinued.
- The DC tab allows the nurse to confirm that the med has indeed been discontinued and that is the reason why a valid order is not displayed when the med is scanned.

# Cannot Scan Med

VeriScan 1:31

ADAMS, JOHN P D A

BETHANECHOL (URECHOLINE) 25MG TAB,

Current Status	Due Now @ 07/17 1300
Last Status	None
Order Type	SCHED
Order Dose	1 TABS
Order Route	PO

148.00 BETHANECHOL (URECHOLINE) 25MG TAB, 1 TAB PO STARTING ON 07/16/04, 1300, 2300, (07/16/04 23:00-..), (0001)

Order Text	Components	Results	A/D Inter
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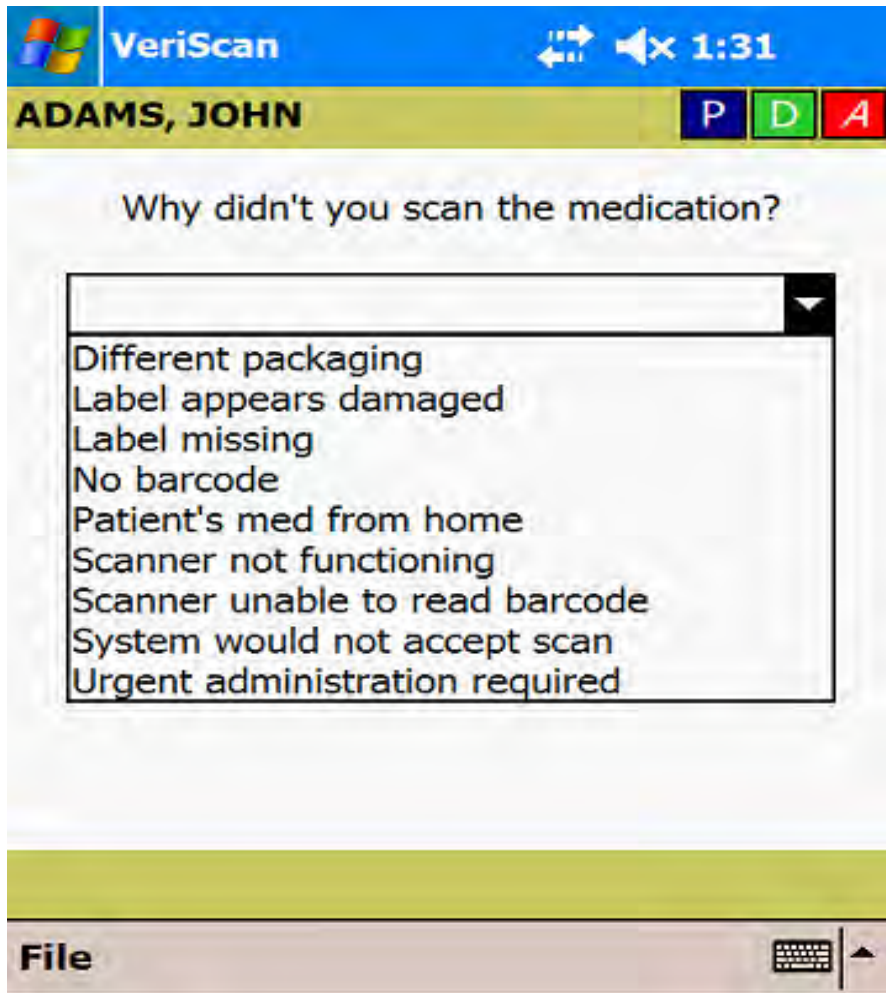
Scan OK

Cannot Scan Chart Not Given

File Lock Data

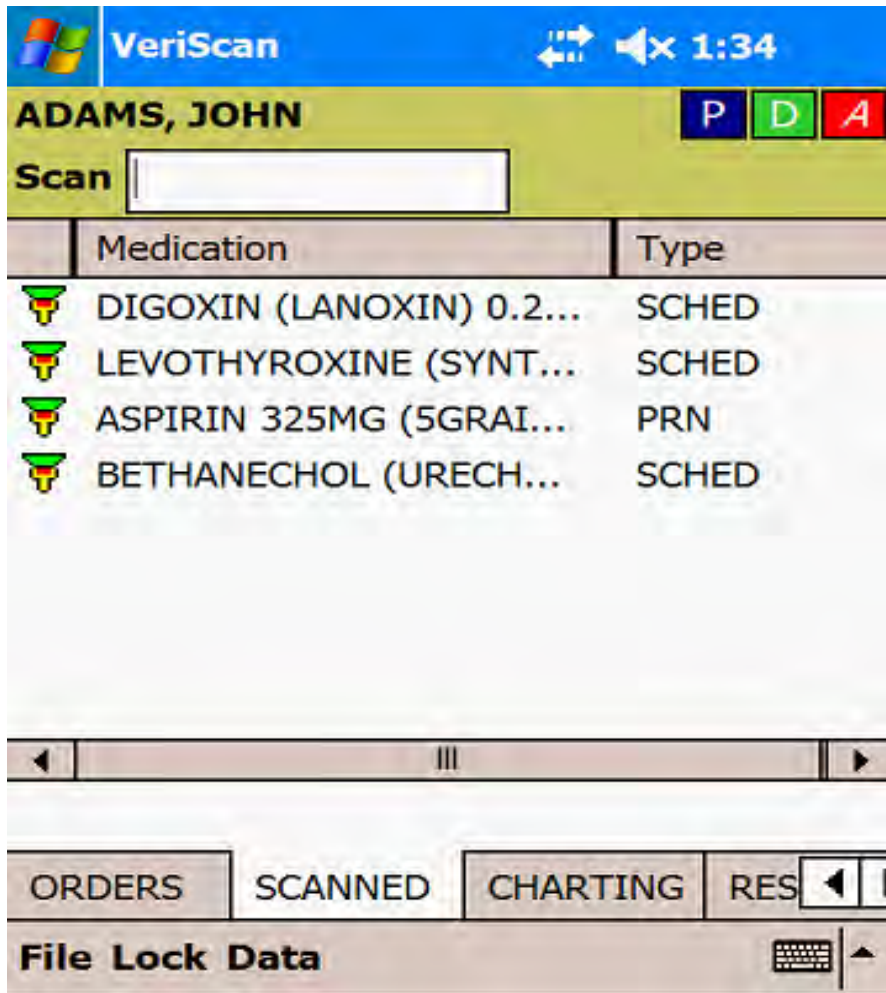
- Tapping a med on the previous screen provides the order detail.
- Tapping the 'Cannot Scan' button takes the nurse to the pathway to select a med that cannot be scanned.

# Cannot Scan (cont.)



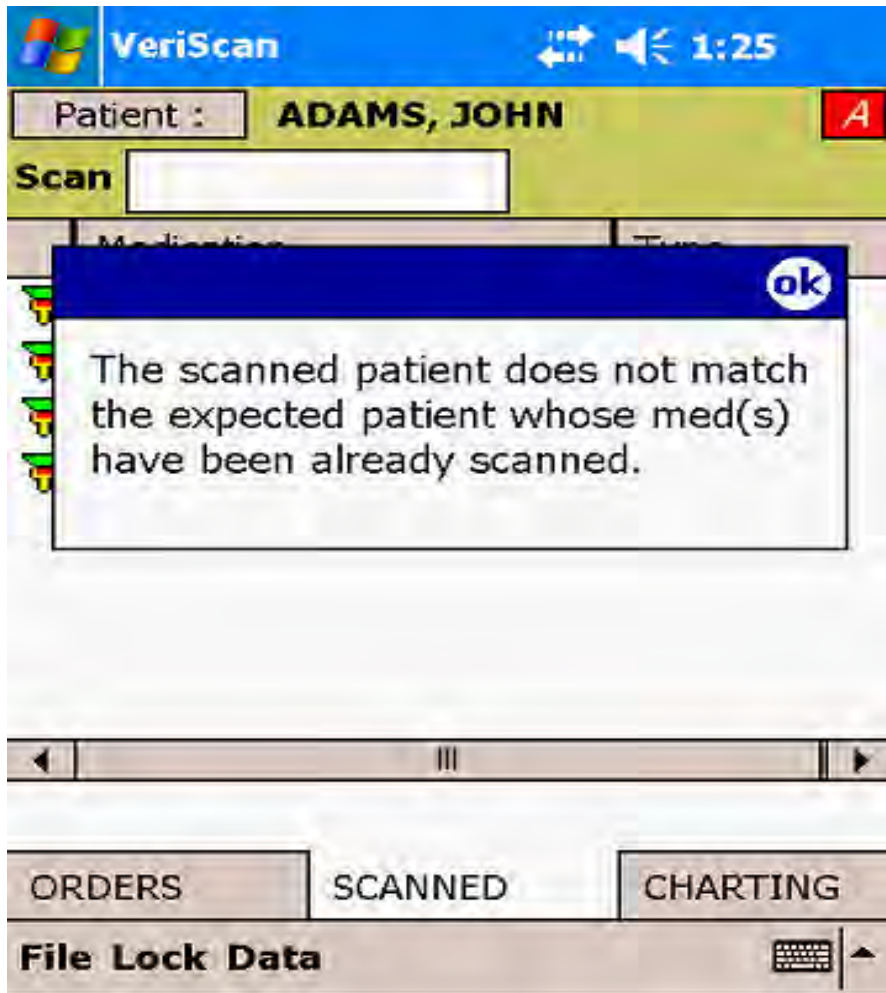
- The 'Cannot Scan' button presents the nurse with a screen that enables entering a reason why the med cannot be scanned.

# Scan Patient



- The nurse scans the patient on the screen.
- In the event that patient cannot be scanned, the nurse can select the 'Cannot Scan' function by tapping the 'Patient' button to the left of the patient name.

# Wrong Patient



- In this example, the nurse has scanned a patient wristband that does not match the selected orders.
- Click 'ok' to continue.

# Required Observation

The screenshot shows the VeriScan software interface. At the top, the title bar reads "VeriScan" and "ADAMS, JOHN". Below the title bar, there are three colored buttons: "P" (blue), "D" (green), and "A" (red). A dropdown menu is set to "Pulse", with "Reset" and "Next" buttons to its right. Below this, there is a "Pulse" label and an empty input field. Underneath the input field are two radio buttons labeled "Apical" and "Radial". Further down, there is an "Observation Time" dropdown menu and a "Heartbeat Count" input field with a "Calc" button to its right. At the bottom, a green header reads "Required Observation For:" followed by a text box containing "DIGOXIN (LANOXIN) 0.25MG TAB,". The interface also shows a "File" menu and a keyboard icon.

- With the correct patient scanned, VeriScan checks the scanned meds for required observations.
- Digoxin requires the pulse to be checked prior to administering the med.
- The Observation Time and Heartbeat Count is a calculator for the pulse.

# Give Meds Now

The screenshot shows the VeriScan software interface. At the top, the Windows logo and 'VeriScan' are visible, along with a volume icon and a timer set to 1:36. Below this, the patient's name 'ADAMS, JOHN' is displayed, followed by three colored buttons: 'P' (blue), 'D' (green), and 'A' (red). A prominent red banner reads 'PLEASE GIVE MEDS NOW'. Below the banner is a table with two columns: 'Medication' and 'Dose'. Each row in the table has a checked checkbox and a green 'G' icon to its left. The medications listed are DIGOXIN (LANOXIN) ... (1 TABS), LEVOTHYROXINE (SY... (\*\*0.5 TABS), ASPIRIN 325MG (5GR... (\*\*2 TABS), and BETHANECHOL (UREC... (1 TABS). At the bottom of the interface is a virtual keyboard and a 'File' button.

	Medication	Dose
<input checked="" type="checkbox"/>	<b>G</b> DIGOXIN (LANOXIN) ...	1 TABS
<input checked="" type="checkbox"/>	<b>G</b> LEVOTHYROXINE (SY...	**0.5 TABS
<input checked="" type="checkbox"/>	<b>G</b> ASPIRIN 325MG (5GR...	**2 TABS
<input checked="" type="checkbox"/>	<b>G</b> BETHANECHOL (UREC...	1 TABS

- At this point, the nurse administers each med to the patient.
- Un-checking the box to the left of each med enables charting as not-given.
- The green 'G' icon indicates that this med will be given. Unchecking the box to the left will change this icon to a turquoise 'N' for not given.

# Elective Observations

The screenshot shows the VeriScan software interface. At the top, the title bar reads 'VeriScan' with a Windows logo on the left and system icons (network, volume, and time 1:37) on the right. Below the title bar, the patient name 'ADAMS, JOHN' is displayed in a green bar, followed by three colored buttons: a blue 'P' button, a green 'D' button, and a red 'A' button. The 'Charting Status' section shows 'Sched @ 07/17 1310'. A table below lists medication details:

Med	ASPIRIN 325MG (5GRAINS) ...
Dose	2 TABS
Time	07/17 1310
Route	PO
Patient	ADAMS, JOHN

Below the table is a navigation bar with buttons for '5 Rights Sum', 'Obxs', 'Ord Text', and 'Ord Detail'. Underneath are three buttons: 'Edit Obxs', 'Edit Dose', and 'OK'. At the bottom of the interface is a virtual keyboard with a 'File' menu icon on the left and a keyboard icon on the right.

- To enter an elective observation, the nurse taps the name of the med that they would like charted with an observation and then tap the Edit Obxs button.

# Charting (cont.)

VeriScan 1:39

ADAMS, JOHN P D A

**PLEASE GIVE MEDS NOW**

	Medication	Dose
<input checked="" type="checkbox"/>	DIGOXIN (LANOXIN) ...	1 TABS
<input checked="" type="checkbox"/>	LEVOTHYROXINE (SY...	**0.5 TABS
<input checked="" type="checkbox"/>	ASPIRIN 325MG (5GR...	**2 TABS
<input type="checkbox"/>	BETHANECHOL (UREC...	1 TABS

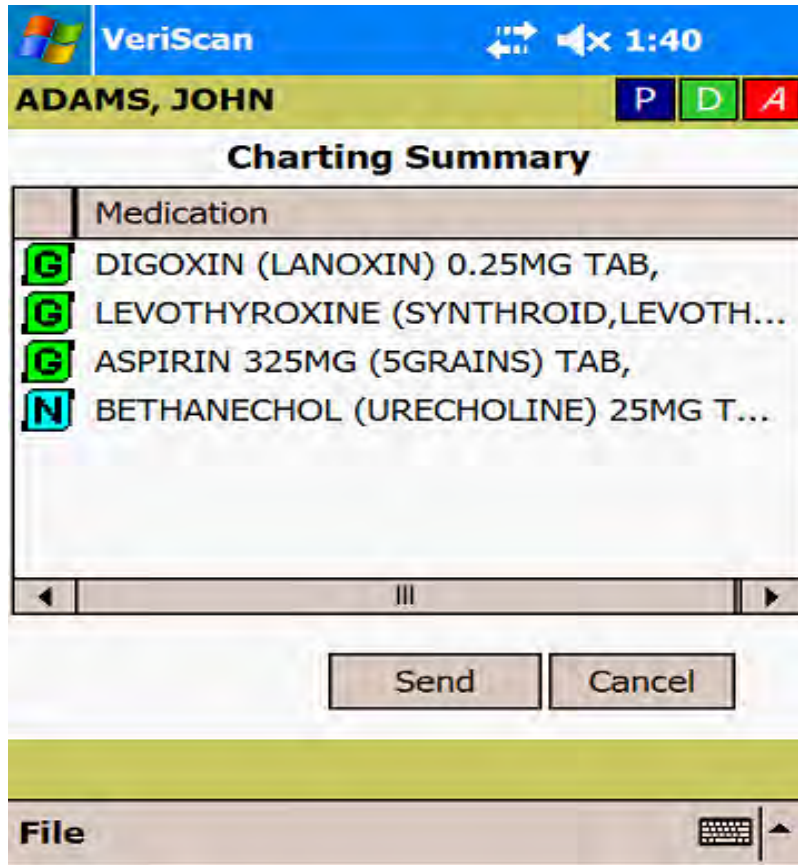
\*\* Verify the dose being administered is correct.

Next

File

- In this example, the patient refused one med so the nurse un-checks the box next to that med.
- Tapping the 'Next' button advances to the next screen.

# Confirmation



- A final confirmation screen is presented.
- If information is correct, the nurse taps the 'Send' button.
- The medication administrations are charted to the EMR.

# MAR

VeriScan 1:41

ADAMS, JOHN P D A

Scan

	Medication	Charted At^
G	LEVOTHYROXINE (SYNT...	07/17 1339
N	BETHANECHOL (URECH...	07/17 1339
G	DIGOXIN (LANOXIN) 0.2...	07/17 1339
G	ASPIRIN 325MG (5GRAI...	07/17 1339
M	AMOXICILLIN (AMOXIL,P...	07/17 1300

Last 24 Hrs | ALL | Next 12 Hrs

ORDERS | SCANNED | CHARTING | RES

File Lock Data

- The nurse is automatically taken to the MAR when the administrations are completed.
- The MAR is updated with the newly completed orders.
- Icons of the status of each order given are placed to the left of each order.

# MAR – Not Given

VeriScan 1:41

ADAMS, JOHN P D A

Scan

Medication	Charted At^
<b>N</b> BETHANECHOL (URECH...	07/17 1339

Navigation: Last 24 Hrs | NOTGIVEN only | Next 12 Hrs

ORDERS | SCANNED | CHARTING | RES

File Lock Data

- The 'Not Given only' tab displays all meds that were charted as not given in the last 24 hours.

# MAR - Missed

The screenshot shows the VeriScan software interface. At the top, the title bar reads "VeriScan" with a Windows logo on the left and a speaker icon and the time "2:29" on the right. Below the title bar, a patient information bar displays "Patient : ADAMS, JOHN" and a red square with the number "4". A "Scan" input field is present below the patient name. The main area is a table with two columns: "Medication" and "Charted At^". The table is currently empty. At the bottom of the interface, there is a navigation bar with three buttons: "Last 24 Hrs" (highlighted in blue), "MISSED only" (with a dropdown arrow), and "Next 12 Hrs". Below this are three more buttons: "ORDERS", "SCANNED", and "CHARTING". At the very bottom, there is a "File Lock Data" section with a keyboard icon and an upward-pointing arrow.

- The Missed tab displays all meds that were missed in the last 24 hours.

# Planner

The screenshot shows the VeriScan mobile application interface. At the top, the status bar displays the Windows logo, the text 'VeriScan', and a battery icon with '1:41'. Below this, the patient name 'ADAMS, JOHN' is displayed in a green header bar, along with three colored buttons: 'P' (blue), 'D' (green), and 'A' (red). A 'Scan' input field is present below the patient name. The main content area is a table with two columns: 'Medication' and 'Due/Elg At~'. The table lists three medication orders:

Medication	Due/Elg At~
AMOXICILLIN (AMOXIL,P...	07/17 1700
AMOXICILLIN (AMOXIL,P...	07/17 2100
BETHANECHOL (URECH...	07/17 2300

At the bottom of the screen, there is a navigation bar with several buttons: 'Last 24 Hrs', 'ALL' (with a dropdown arrow), 'Next 12 Hrs' (highlighted in blue), 'ORDERS', 'SCANNED', 'CHARTING', and 'RES'. Below the navigation bar, there is a 'File Lock Data' section with a keyboard icon and an upward arrow.

- Tapping the 'Next 12 Hrs' button will display the status of all orders that are due within the next 12 hours.
- Tapping the order will display the full order detail.

# Selected Screen Shots from RFID Demonstration of administering IV to patient

- Simple RFID read and display
- VeriScan sign-on with RFID
- IV med administration with RFID
- Patient identification with RFID wristband

# Welcome Screen

VeriScan 1:08

**WELCOME TO VERISCAN!**

User ID: RICH

PIN: [ ]

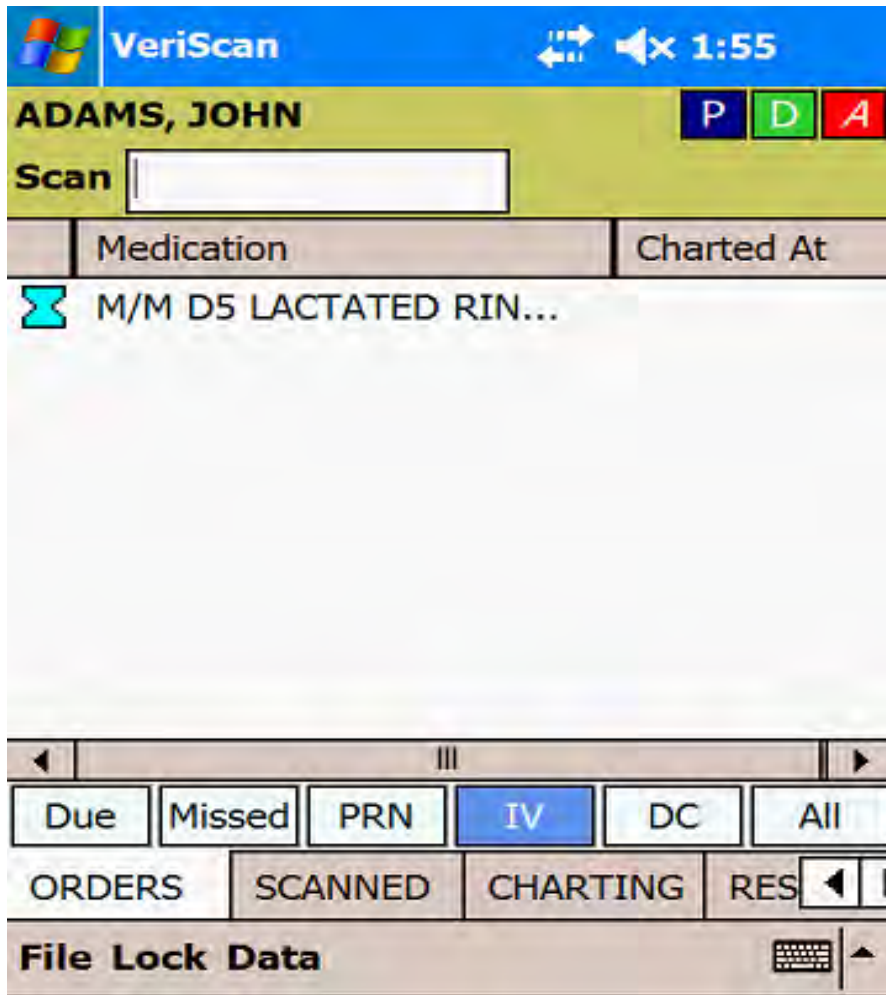
Unit: SF

Login

File Help

- Keyboard automatically pops up so that user can enter sign-on information.
- Caregiver is logged on via RFID scan of ID badge.

# IV Orders



- Tap IV tab to view IV orders
- The hour glass icon indicates that this IV has not been started.
- The IV bag is scanned from this screen.

# IV

The screenshot displays the VeriScan application interface. At the top, the title bar shows the VeriScan logo and system icons. Below the title bar, the patient name 'ADAMS, JOHN' is displayed, followed by three colored buttons: 'P' (blue), 'D' (green), and 'A' (red). The main content area is divided into several sections: a header for 'M/M D5 LACTATED RINGERS', a yellow background section labeled 'UNVERIFIED', a table of order details, a text box for order details, and a bottom section with 'Cancel' and 'Continue' buttons. The table of order details includes 'Current Status', 'Start @ 01/13 1613', 'Order Type MISC', and 'Flow Rate 275 ML/HR'. The text box contains the order description: '127.00 IV ... M/M D5 LACTATED RINGERS, 275ML/HR, X 1 BAG, <1/17/04-...>, (0159) (VS#291873)'. The bottom section has a yellow background with 'Cancel' and 'Continue' buttons. The bottom of the screen shows a 'File' menu and a keyboard icon.

Current Status	Start @ 01/13 1613
Order Type	MISC
Flow Rate	275 ML/HR

127.00 IV ... M/M D5 LACTATED RINGERS, 275ML/HR, X 1 BAG, <1/17/04-...>, (0159) (VS#291873)

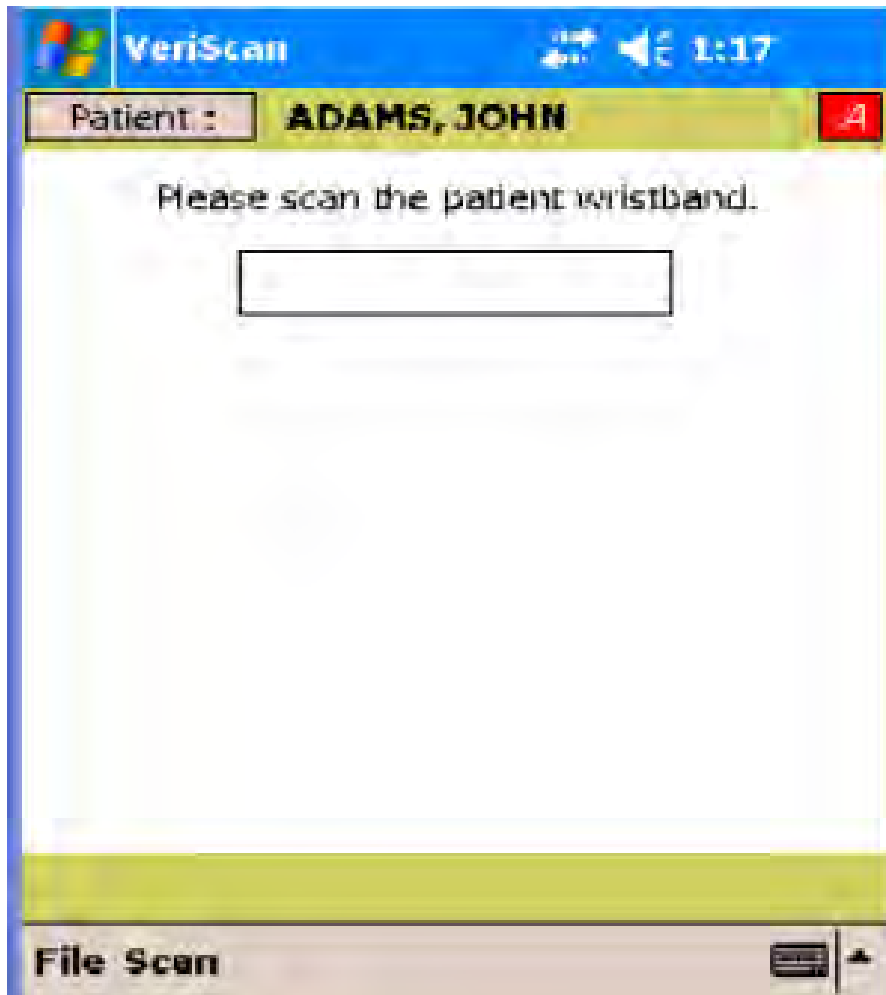
Order Text | Order Components

Cancel | Continue

File

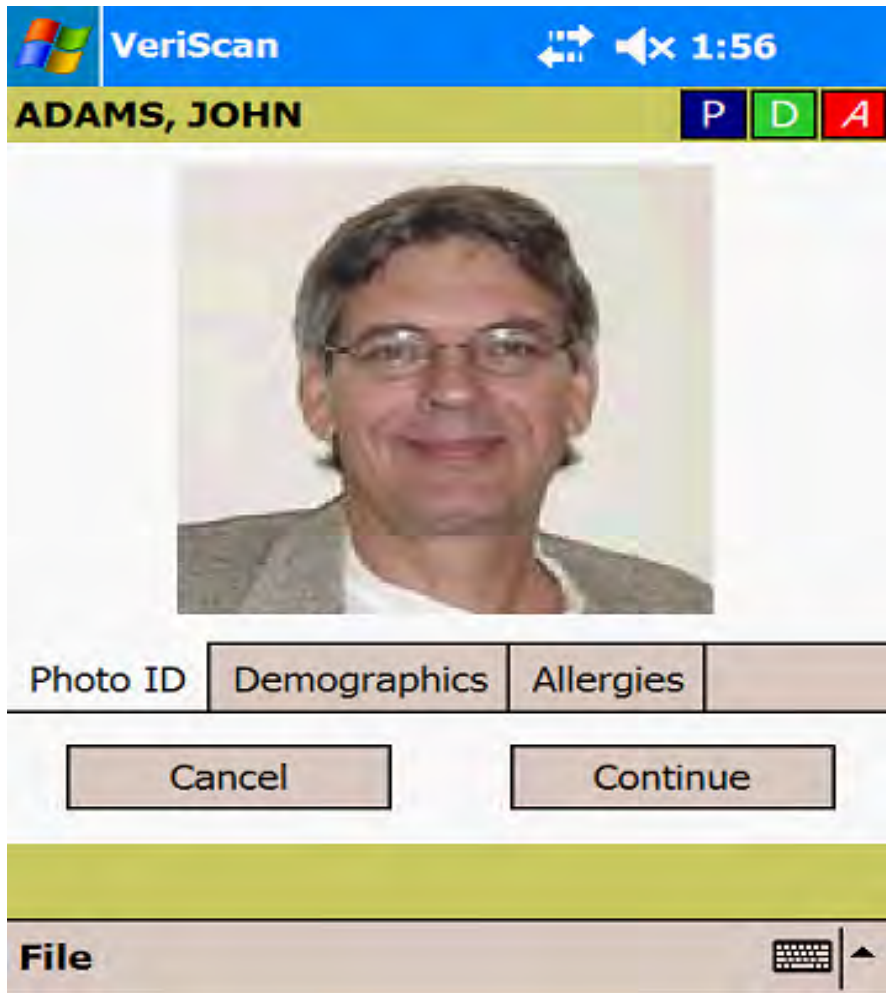
- Scan matches eligible order.
- Nurse is presented with order detail.
- Yellow background is used for all IV orders.
- Tap Continue to advance to next screen.

# IV – Scan Patient



- IV orders ask the nurse to scan patient after the IV is scanned.
- The RFID tag on the patient wristband is scanned.

## IV – Scan Patient (cont.)



- Demographics are automatically displayed.
- Tap 'Continue' to advance to the next screen.

# IV

The screenshot shows the VeriScan application interface. At the top, there is a blue header with the VeriScan logo and a status bar showing a signal strength icon, a speaker icon, and the time 1:56. Below the header, a yellow bar displays the patient name "ADAMS, JOHN" and three colored buttons labeled "P", "D", and "A". The main content area is white and contains the text "Please choose the charting action." followed by a list of eight radio button options: "IV Fluid Start", "IV Fluid Piggyback", "IV Fluid Rate Change", "IV Fluid Stop", "IV Fluid Complete", "IV Cath Insert", "IV Cath Remove", and "IV Site Observations". A "Next" button is positioned to the right of the "IV Fluid Stop" option. At the bottom of the screen, there is a green bar with the word "File" and a keyboard icon.

- IV Charting Action
- Many options for charting IV admin details are offered.
- In this example, tap IV Fluid Start.
- Tap Next to continue.

# IV Rate

VeriScan 1:57

ADAMS, JOHN P D A

IV Rate [Dropdown] [Reset] [Next]

Rate [Dropdown]

Other

Select One

Verified

PTT

BS

500 ML/HR

400 ML/HR

275 ML/HR

250 ML/HR

200 ML/HR

175 ML/HR

150 ML/HR

125 ML/HR

120 ML/HR

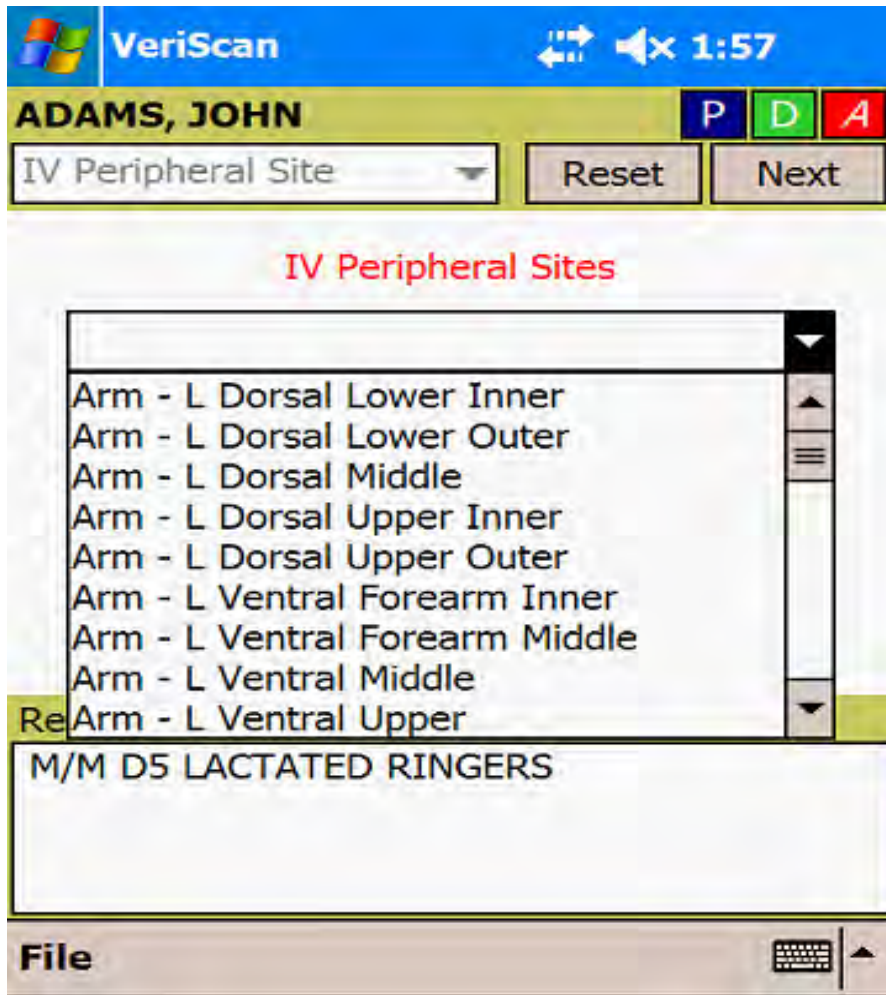
Required Observation For:

M/M D5 LACTATED RINGERS

File [Keyboard Icon] [Arrow Icon]

- This screen is used to enter the IV Rate.
- A drop down list is provided.
- Select the rate and then tap Next to continue.

# IV Site



- A drop down list is provided for IV peripheral sites.
- Select Arm – L Ventral Upper.
- Tap Next to continue.

# IV Summary

The screenshot shows the VeriScan application interface. At the top, the title bar displays the VeriScan logo, a signal strength icon, a speaker icon, and a timer set to 1:58. Below the title bar, the patient name 'ADAMS, JOHN' is displayed in a yellow bar, followed by three colored buttons: a blue 'P' button, a green 'D' button, and a red 'A' button. The main content area is titled 'Charting Status Fluid Start'. Below this, a table displays the medication and patient information:

Med	M/M D5 LACTATED RINGERS
Patient	ADAMS, JOHN

Below the table, there are two tabs: 'IV Summary' (which is selected) and 'Observations'. Under the 'IV Summary' tab, there are three buttons: 'Edit Obxs', 'Send', and 'Cancel'. At the bottom of the screen, there is a 'File' menu and a keyboard icon.

- A summary of selected items is provided on the IV Summary and Observations tabs.
- Tap Observations to view additional detail.

# IV Observations

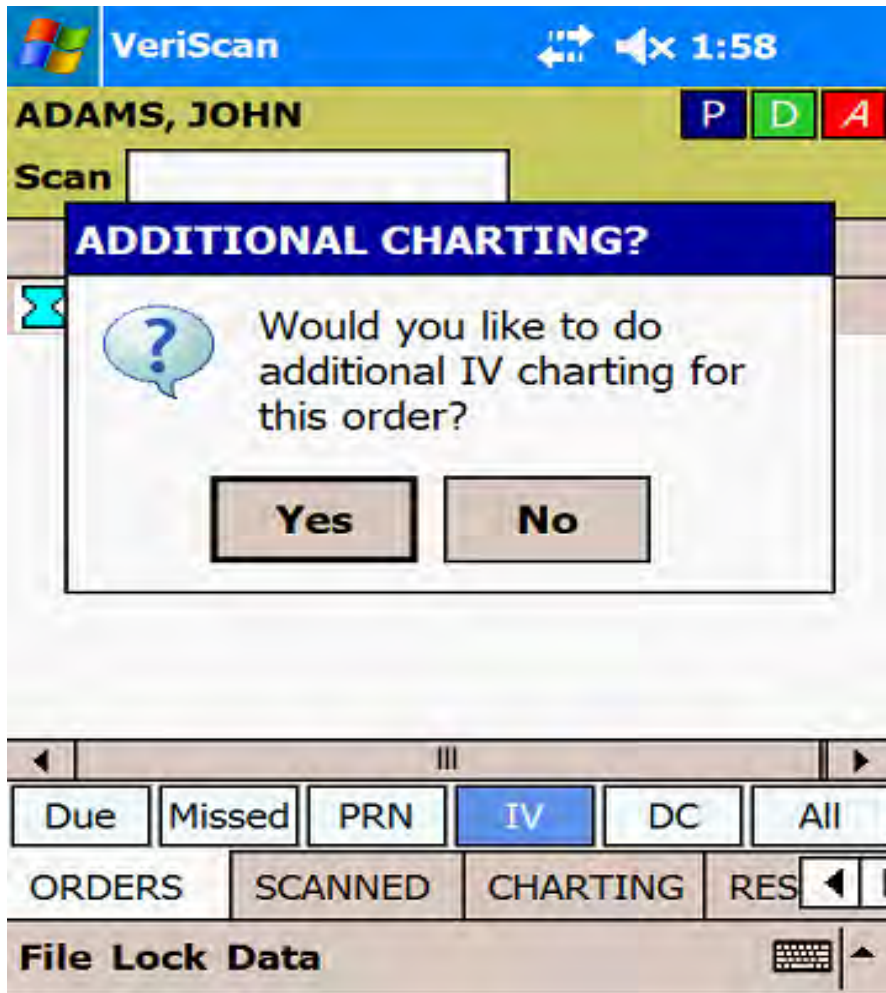
The screenshot shows the VeriScan application interface. At the top, the title bar displays the VeriScan logo, a signal strength indicator, a speaker icon, and the time 1:58. Below the title bar, the patient name "ADAMS, JOHN" is displayed in a yellow bar, followed by three colored buttons: a blue "P" button, a green "D" button, and a red "A" button. The main content area is titled "Charting Status" and shows "Fluid Start". Below this, a table lists the following IV observations:

IV Volume	200 ML
IV Rate	250 ML/HR
IV Peripheral Site	Arm - L Ventral Upper

At the bottom of the main content area, there are three tabs: "IV Summary", "Observations" (which is selected), and an unlabeled tab. Below the tabs, there are three buttons: "Edit Obxs", "Send", and "Cancel". At the very bottom of the screen, there is a "File" menu and a keyboard icon.

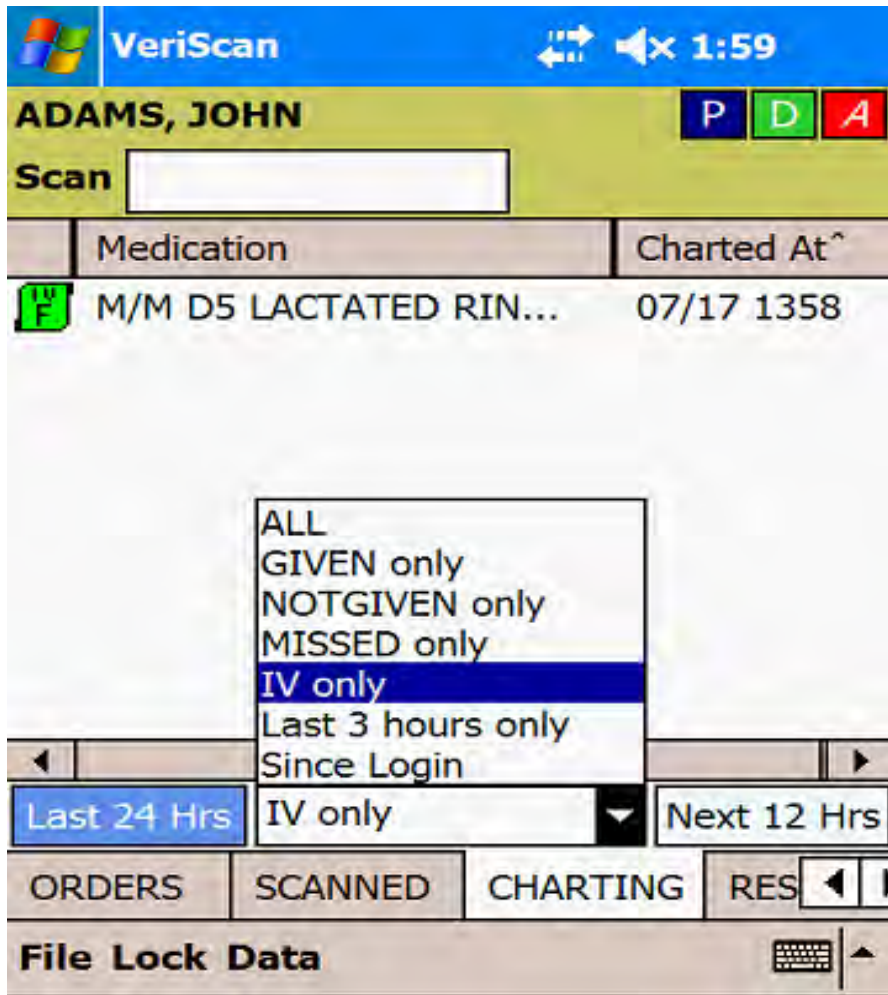
- Volume, Rate, and Site are listed.
- Tap Send to continue.

# IV – Additional Charting



- This pop-up provides the nurse the option to chart additional details if needed.
- Tap No to continue.

# MAR



- The nurse is taken to the MAR.
- An IV only filter is provided.

# Selected Screen Shots from Demo of Lab Specimen Labeling

- Runs on the same PDA as VeriScan Meds.
- Receives collection orders in real-time from lab information system.
- Provides status of orders as pending, collected, and received.
- Prints labels at the bedside after patient is scanned.
- Utilizes portable Zebra label printer for bedside printing.
- Printer can communicate with VeriScan Lab via 802.11b network or Bluetooth.
- Utilizes same ADT feed as VeriScan meds.

# Lab - Login

VSLabDemo 1:06

WELCOME TO VERISCAN LAB!

User ID : Jim

PIN : \*\*\*

Usage : Nursing Unit

Unit :

- Phlebotomist A
- Phlebotomist B
- Phlebotomist C
- Nursing Unit

demo

File Help

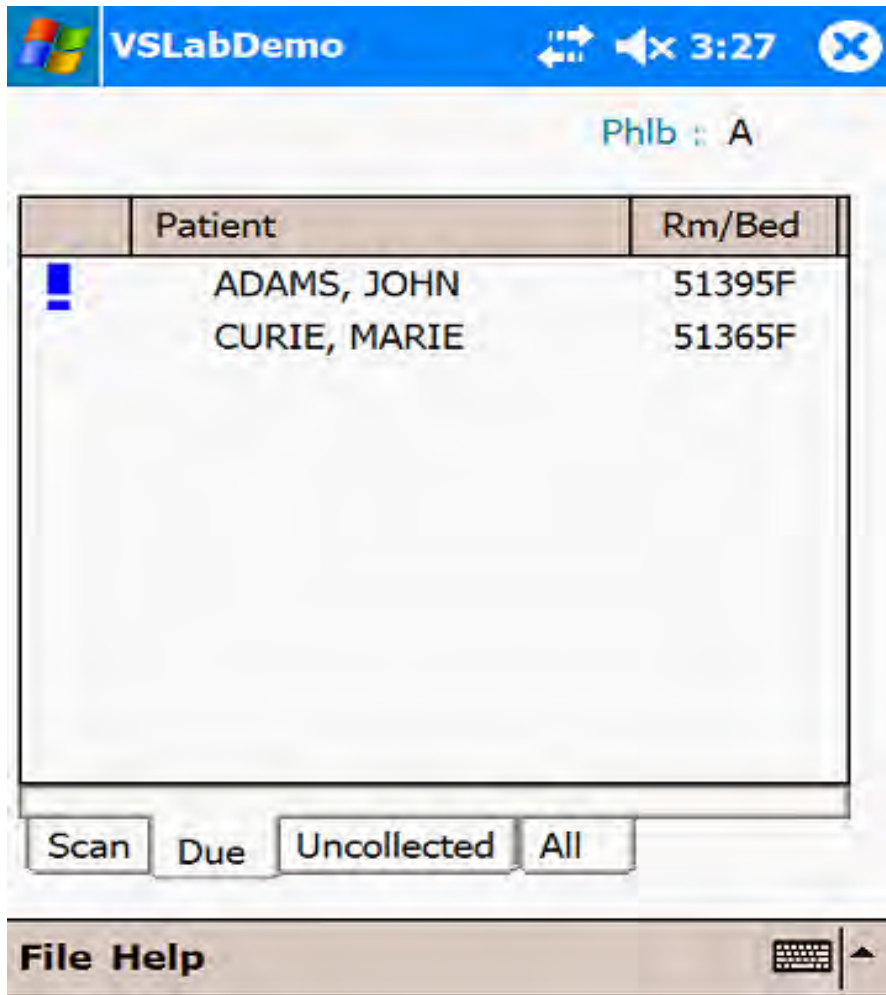
- Same username/PIN as VeriScan Rx.
- User can select role under which they want to login.
- Nurse is assigned to one unit.
- Phlebotomists are assigned to multiple units.

# Lab – Patient List

Patient	Rm/Bed
GRANT, ULYSSES	54545G
LINCOLN, ABE	52635E
ADAMS, JOHN	51395F
CURIE, MARIE	51365F
WASHINGTON, GEO...	51335F
CHURCHILL, WINST...	51335F

- Phlebotomists are logged into the All tab.
- The blue exclamation point indicates that the patient has a precaution such as a latex allergy or a drug resistant organism (DRO).
- The red exclamation point is a stat draw.

# Due Tab



- The My Due tab shows all patients assigned to this user with new orders for specimens to be collected.
- The My Due tab is created from the All tab. This is the same as in VeriScan Rx.
- The user initiates the draw by tapping the patient name.

# Select Patient

VSLabDemo 3:28 ok

Patient : ADAMS, JOHN

Gender M Age 45 yrs DOB 04/01 1960

Location 51395F Race Caucasian

MRN 910316

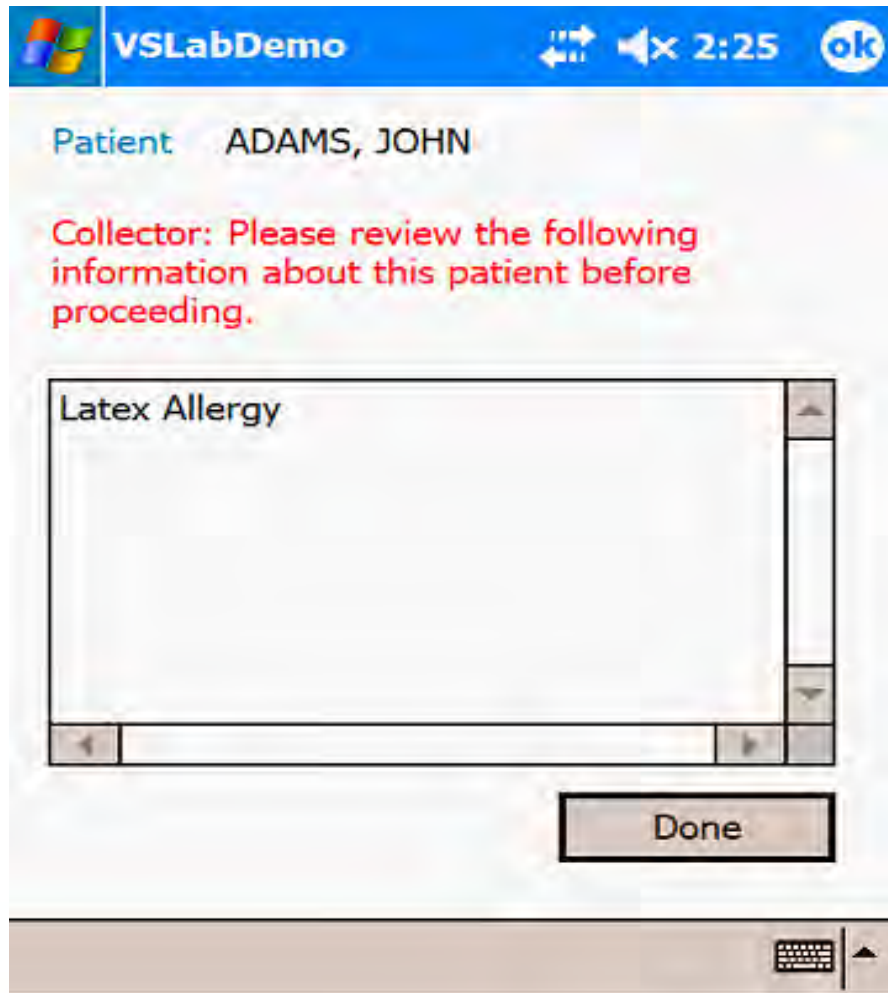
To collect specimens without scanning the patient, tap the Draw Specimens button below.

Preview Orders Scan :

Draw Specimens Back to Patient List

- The patient demographics are displayed.
- The patient wristband is scanned from this screen.

# Allergy Display



- Patient allergies are displayed prior to collecting the specimen.

# Specimen Orders

The screenshot shows a software interface for managing specimen orders. At the top, the title bar reads 'VSLabDemo' with system icons for network, volume, and time (3:32). Below the title bar, the patient information is displayed: 'Patient ADAMS, JOHN' and 'Unit: A'. The main area contains a table of orders:

Due At	Order
<input type="checkbox"/> 09:00	ANA, CPK, RA, SR
<input type="checkbox"/> 09:00	BUN, Creatinine, HGBHCT, L
<input type="checkbox"/> 09:00	Basic Metabolism Panel - Fa

Below the table, there are filter buttons: 'Due Now', 'Uncollected', and 'All Orders'. At the bottom, there are action buttons: 'Print', 'Collect', 'Back to Patients', and 'Not Coll.'. The interface also includes a 'File Help' menu and a keyboard icon.

- Orders are displayed chronologically.
- To print labels, tap the box to the left of the order, then tap the 'Print' button.

# Specimen Orders

The screenshot shows the VSLabDemo application interface. At the top, the title bar reads "VSLabDemo" with system icons for network, volume, and time (2:15). Below the title bar, the patient information is displayed: "Patient ADAMS, JOHN" and "Unit: A". The main area contains a table of specimen orders:

Due At	Order
<input type="checkbox"/> 09:00	ANA, CPK, RA, SR
<input type="checkbox"/> 09:00	BUN, Creatinine, HGBHCT, Lyte
<input type="checkbox"/> 09:00	Basic Metabolism Panel - Fastin

Below the table, there are filter buttons: "Due Now", "Uncollected", and "All Orders". At the bottom, there are action buttons: "Print", "Collect", "Back to Patients", and "Not Coll.". The bottom-most bar contains "File Help" and a keyboard icon.

- A document icon appears next to each order that has a label printed.
- If a label needs to be reprinted, tap the order.

# Reprinting Labels

The screenshot shows the VSLabDemo application interface. At the top, there is a blue header bar with the Windows logo, the text 'VSLabDemo', and icons for network, volume, and a timer set to 3:34. Below the header, the patient information is displayed: 'Pat. : ADAMS, JOHN'. The order information is 'Order ANA, CPK, RA, SR'. The details section shows 'Location: 51395F', 'Status: Placed', and 'Collect at: 09:00'. There are two vertical scroll bars on the right side of the details section. Below the details is a table with two columns: 'Qty' and 'Tube'. The table contains three rows: '1 RED-SER', '1 PST-C', and '1 LAV-H'. To the right of the table is a text box that says 'Click on a tube to reprint that specific tube.' Below the table are four buttons: 'Print all labels', 'Order comments', 'Chart as Collected', and 'Cancel'. At the bottom right of the interface, there is a keyboard icon and a mouse cursor icon.

Qty	Tube
1	RED-SER
1	PST-C
1	LAV-H

- Tap the tube description to print an individual label.

# Reprinting Labels

The screenshot shows a mobile application window titled "VSLabDemo". The interface displays patient information: "Patient : ADAMS, JOHN" and "Accession #: T1237". Below this, it shows "Ordered Qty: 1" and "Tube Type : RED-SER". At the bottom, there is a "Reprint" label next to a text input field containing the number "1". To the right of the input field are two buttons: "Print" and "Cancel". The top status bar includes a signal strength indicator, a speaker icon with a volume level of "3:37", and an "ok" button. The bottom of the screen features a navigation bar with a keyboard icon and a directional pad.

- Tap 'Print' to reprint the label.

# Label Printing (cont.)

VSLabDemo 3:34 ok

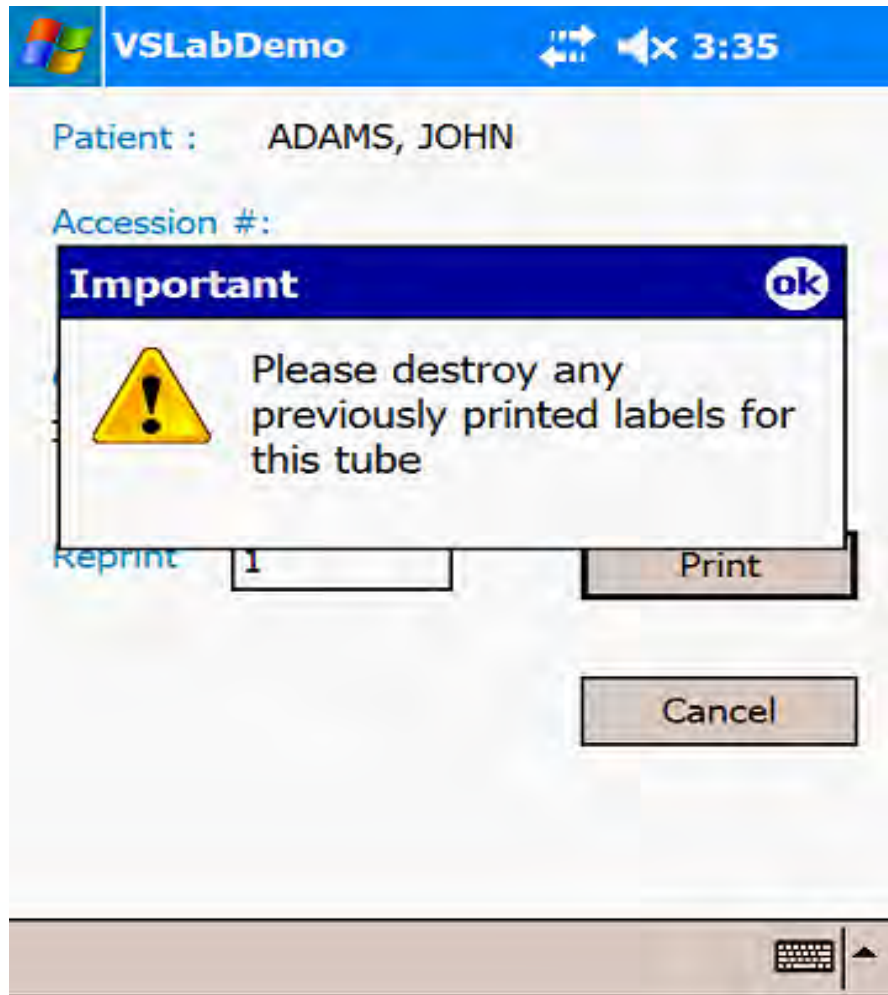
You are re-printing a label that should already have printed out. Please indicate the reason for this below.

- Damaged Label
- Extra Tube Required
- Incomplete Draw
- Other (fill in text field below)
- Printer Jammed

Done

- VeriScan Lab can be configured to ask the user for a reason why additional labels are being printed.

# Label Printing (cont.)



- A reminder to destroy previously printed labels is presented.

# Charting as Collected

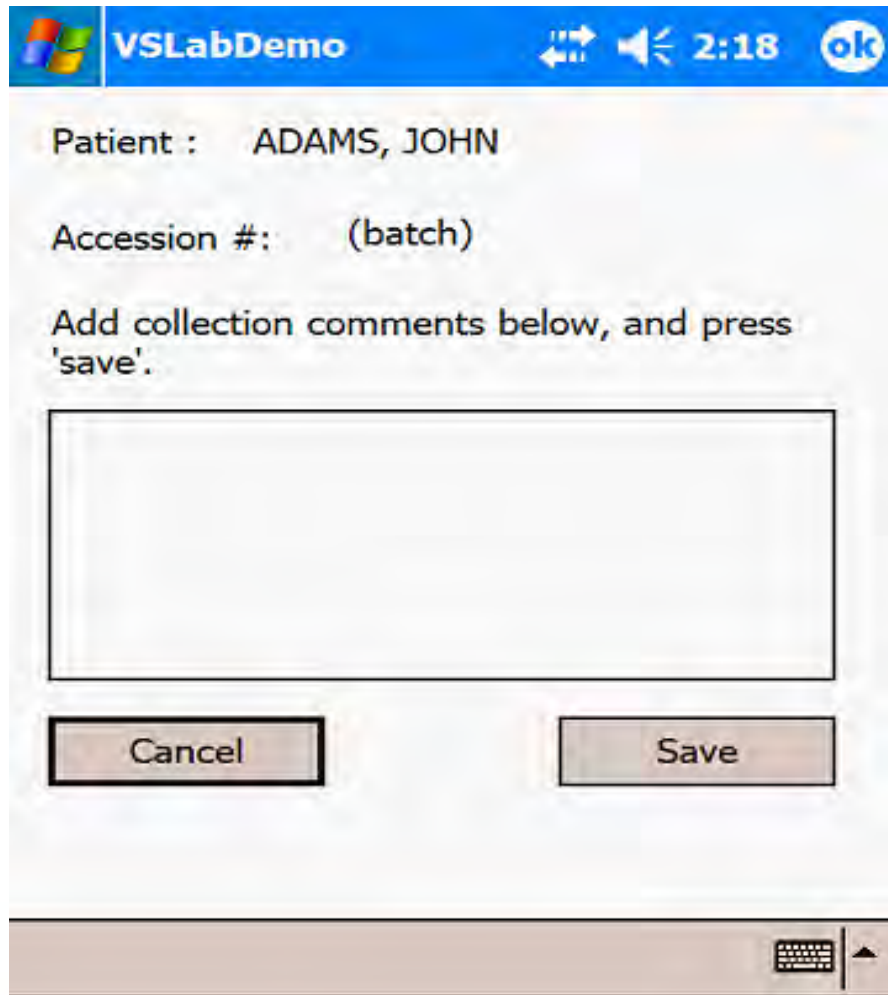
The screenshot shows the VSLabDemo application interface. At the top, the title bar reads "VSLabDemo" with a Windows logo on the left and system icons (network, volume, time 2:17, and close) on the right. Below the title bar, the patient information is displayed: "Patient ADAMS, JOHN" and "Unit: A". The main area contains a table of lab orders:

Due At	Order
<input type="checkbox"/> 09:00	ANA, CPK, RA, SR
<input type="checkbox"/> 09:00	BUN, Creatinine, HGBHCT, Lyte
<input type="checkbox"/> 09:00	Basic Metabolism Panel - Fastin

Below the table, there are filter buttons: "Due Now", "Uncollected", and "All Orders". At the bottom, there are action buttons: "Print", "Collect", "Back to Patients", and "Not Coll.". The bottom-most bar contains "File Help" and a keyboard icon.

- To chart an order as collected, tap the box next to the order and then tap the Collect button.
- Uncollected orders can be charted by tapping the Not Coll. button.

# Charting as Collected (cont.)



The screenshot shows a software window titled "VSLabDemo" with a blue header bar. The header bar contains a Windows logo, the text "VSLabDemo", and icons for window management (maximize, minimize, close) and a timer showing "2:18". Below the header, the patient information is displayed: "Patient : ADAMS, JOHN" and "Accession #: (batch)". A text prompt reads "Add collection comments below, and press 'save'." Below this prompt is a large, empty rectangular text input field. At the bottom of the form area are two buttons: "Cancel" on the left and "Save" on the right. A status bar at the bottom of the window shows a keyboard icon and a mouse cursor icon.

- The user has an opportunity to enter comments on the specimens.

# Updated Due List

VSLabDemo 2:22

Patient ADAMS, JOHN Unit: A

Due At	Order
--------	-------

Due Now Uncollected All Orders

Print Collect Back to Patients Not Coll.

File Help

- The Due list is updated with the most recently charted collections.

# Updated Due List

VSLabDemo 2:21

Patient ADAMS, JOHN Unit: A

Due At	Order
09:00	ANA, CPK, RA, SR
09:00	BUN, Creatinine, HGBHCT, Lyte
09:00	Basic Metabolism Panel - Fastin

Due Now Uncollected All Orders

Print Collect Back to Patients Not Coll.

File Help

- The green check mark next to each order on the All Orders tab indicates that the specimen has been collected..

# Implementation and Support Effort

- Activation
  - 2 Nursing Units every 2 weeks
  - During week #1 each unit has a dedicated IT support person on the floor
  - During week #2 a single support rep covers both units
  - Support pool of 15 team members
- Training
  - Conducted in IT classroom not on the floor
  - Classes offered once per day at various times
  - Nurses are prepared to use VeriScan after a single 90 minute class
  - One instructor per 8 nurses

# Q & A

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Putting RFID to Work

May 2, 2006

