

V2V Feature Walkthrough

V2V Feature Walkthrough: Tabs Overview



Home



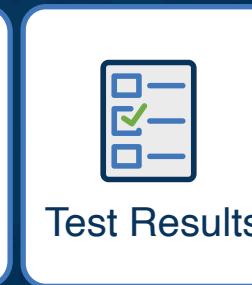
Donors



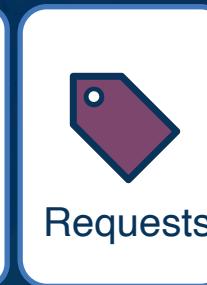
Collections



Products



Test Results



Requests



Usage



Reports



Admin



Tabs are in the order that the process was adopted at centers

Donors & Collections Tabs

Donors Tab

- ◆ **Add donor**
- ◆ **Find donors**
- ◆ **Defer donor**
 - ◆ Use donor history to prevent some unsuitable donors from donating.
Donation only when required.
- ◆ **Donor Panel**
 - ◆ Which district does the donor belong to?
- ◆ **Preferred contact method**
 - ◆ Encourage repeat donations



Collections Tab

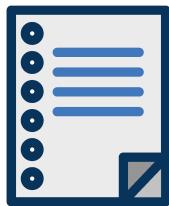
- ◆ Record new collection along with the bag type:
 - ◆ Single, triple, and pedi
- ◆ Preprinted blood bag labels used as collection number
 - ◆ Labels generally imported because **adhesive should be of high quality** so that label does not peel off when the blood bag is in the refrigerator
 - ◆ Option to have them **auto-generated**



Collections Tab



Group collections done on one side in a **collection batch**



Create a **testing worksheet for scheduling testing** of collections

- ◆ Print worksheets to record results manually



Collections

Collections Tab

- ◆ Find collections by **collection site, collection center, range of collection date**
- ◆ Find by **collection number**
- ◆ Option to **include only untested collections** in search results
- ◆ **Save search results** to a worksheet with a **batch id**:



Example: Create test worksheet for all collections done yesterday





Specify
worksheet type
when creating a
new worksheet

Example:
Blood Typing, TTI



Each worksheet
type has a **set of**
blood tests



Create a new
worksheet type,
select the tests
you need to add
to the worksheet

Customizable Worksheets

Products Tab

Products Tab

- ◆ Products include **Whole Blood, Red Blood Cells, Platelets, and Plasma**
- ◆ Find products by **collection number & type**
- ◆ **Filter by product status**
- ◆ **Create new product**
- ◆ Create new product **combinations**
 - ◆ **Usecase:** multiple products can be created simultaneously for a given collection
 - ◆ Multiple products of different product types can be created together
 - ◆ Product types comprising the product type combination are configurable





QUARANTINED

Default status



UNSAFE

If collection is TTI Unsafe



AVAILABLE

If collection is **TTI Safe** and
blood typing is complete



DISCARDED

Manually discard

Product Status

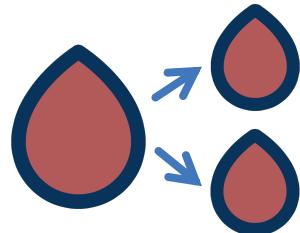


**TTI: Transfusion
Transmissible
Infection**



EXPIRED

If TTI Safe, Blood Typing done
but expiry date has passed



SPLIT

Split into pedi packs



ISSUED

Issued for a request



USED

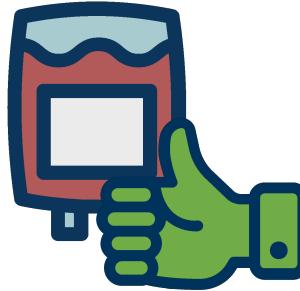


Pedi Pack

- ◆ Subdivided donation for **pediatric patients**
- ◆ Different **expiration**
- ◆ With V2V, a rule can be created to **alert staff** about expirations



Product status
automatically
updated when
collection or blood
tests updated



Only **AVAILABLE**
products can be
issued



When a product is
DISCARDED,
ISSUED, USED,
SPLIT then the status
is **not updated**
automatically due to a
change in the blood
test results

Product Status

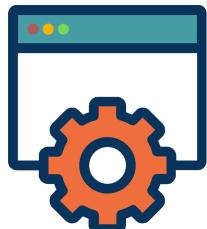
Products Tab



Product preparation can start even **before blood typing** and **TTI testing** are complete



Default product status is **QUARANTINED**



Product status is **controlled by algorithm**, which is **more reliable and preferred**.



Test Results Tab

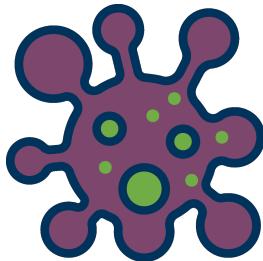
Test Results Tab



Two types of tests:



Blood Typing



TTI



Find all test results for a given collection number



Test Results

- ◆ Involves determining **Blood ABO, Blood Rh**
- ◆ Requires **performing a set of tests** which imply the actual ABO, Rh outcomes
 - ◆ Record **only outcomes** (Blood ABO, Blood Rh)
 - ◆ Record **actual test results** and infer outcomes automatically (Preferred)
- ◆ Another choice is to use **worksheets** or **ELISA plate layout** for recording test results
 - ◆ An **ELISA plate** is a standard layout (e.g., an 8 x 12 matrix). **Blood Typing on an ELISA plate** would use at most 8 tests done on a maximum of 12 collections at a time.



[Find Test Results](#)[Blood Typing](#)[TTI Results](#)

Enter worksheet results

	1	2	3	4	5	6	7	8	9	10	11	12
A	+	-	-	+	+	-	+	-	-	+	+	
B	-	+	+	+	-	+	+	-	-	-	+	
C	+	+	+	+	+	+	+	-	+	+	+	
D	-	+	-	-	-	-	-	+	+	-	-	
E	+	-	+	-	+	-	-	+	-	+	-	
F	+	+	+	+	-	+	-	+	+	+	+	
G												
H												

[Save](#)[Change collections](#)[Clear form](#)**List of collection numbers by column in titer plate**

Column number	Collection Number in Column
1	C0313000020
2	C0313000021
3	C0313000022
4	C0313000023
5	C0313000024
6	C0313000025
7	C0313000026
8	C0313000027
9	C0313000028
10	C0313000029
11	C0313000030
12	C0313000031

Elisa Layout

Worksheet Number: W0513000000



W0513000000

Collection Number	Anti-A	Anti-B	Anti-A,B	A1 Cells	B Cells	Anti-D
C0513000000						
C0513000002						
C0513000004						
C0513000005						
C0513000006						
C0513000007						

Customizable Worksheet

Sample Blood Typing Rules

	Anti-A	Anti-B	Anti-A,B	A	B	Anti-D	Du	AHG Du	DAT	AHG DAT	Immune Anti-A	Blood ABO	Blood Rh	Extra Information
1	+	-	+	-	+							A		
2	-	+	+	+	-							B		
3	+	+	+	-	-							AB		
4	-	-	-	+	+							O		
5						+							+	
6						-								
7						-	-							
8						-	+						+	
9						-	+			-				DAT Neg
10						-	+		+					DAT Pos
11	-	-	+	-	+									
12	-	-	+	-	+						+	A		wkA
13	-	-	+	-	+									wkAB
14	-	-	+	-	+						-	AB		wkAB



Transfusion Transmitted Infections (TTI)



Record + or - for every test result



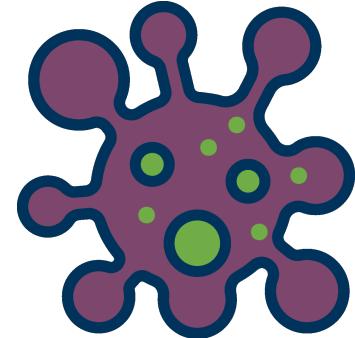
HIV, HBV, HCV, Syphilis



Confirmatory Tests required if positive test result



Record on **ELISA plate** or on **worksheets**





Recording TTI on ELISA plate is different from recording Blood Typing results on ELISA plate!

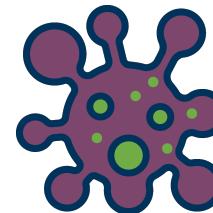


Blood Typing on ELISA Plate:

Each column has samples from the same collection

Each row corresponds to a different antigen/antibody

There may not be blank wells, negative or positive controls



TTI Tests on ELISA Plate:

Each well has a unique collection sample

All wells are used to test collections for the same TTI test

Typically, there are blank wells, negative and positive controls

Test Results Worksheet

- ◆ Find worksheets in the system which were previously printed
- ◆ Transfer data from paper to V2V
- ◆ Simple interface
- ◆ Collections appear in the same order as on worksheets
- ◆ Use either worksheets or ELISA plate layout



Worksheet Number: W0513000001

Show 5 entries

Collection Number	HIV	HBV	HCV	Syphilis
C0513000000	<input checked="" type="radio"/> + Blood ABO: O Blood Rh: +	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>
C0513000002	<input checked="" type="radio"/> + Blood ABO: AB Blood Rh: +	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>
C0513000004	<input checked="" type="radio"/> + Blood ABO: B Blood Rh: +	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>
C0513000005	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>
C0513000006	<input checked="" type="radio"/> + Blood ABO: B Blood Rh: -	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>	<input checked="" type="radio"/> + <input type="radio"/>

[Save](#)[Undo changes on this page](#)

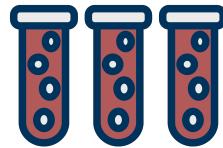
Showing 1 to 5 of 54 entries

First Previous 1 2 3 4 5 Next Last

Customizable Worksheet

Interpret Blood Test Rules

Labs can choose different blood tests



Configurability is Key!



Rules may necessitate more blood tests



Labs can create tests & rules per their requirement



Provide default configuration



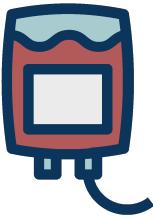
Requests, Usage, & Reports Tabs

Requests Tab

- ◆ **Sites** (eg. Hospital Blood Bank) can **request** blood from **Collection Center**
- ◆ **Standard size units** requested
- ◆ Sometimes **pedi packs**
- ◆ **Patient Sample** may be provided
- ◆ **Crossmatch testing** between patient sample and actual product
 - ◆ **Optional, Mandatory** - can be configured
- ◆ **Only AVAILABLE products** can be issued
- ◆ Products which are **about to expire** are listed at the top in **order of age**



Usage Tab



Usage of issued products



Tracks whether the product **is used
for the right purpose**



Reports Tab



Real time inventory status



Discarded products over time, site



Issued products over time, site



Request Pattern over time, site



Collections by site, time



Configuration

Configuration

- ◆ Configuration can be **changed by admin**
- ◆ **List of product types:** Whole Blood, Red Cell Concentrate, Platelets, Fresh Frozen Plasma
- ◆ **Expiry date** of product types
- ◆ **List of centers, sites** different for each country
- ◆ **List of donor types:** Voluntary, Family
- ◆ **List of Blood Bag types** in use: Single, Triple
- ◆ **List of request types, crossmatch types**



Lusaka	Center	<input checked="" type="checkbox"/>	Collection Site	<input type="checkbox"/>	Request/Usage Site	<input type="checkbox"/>
Ndola	Center	<input checked="" type="checkbox"/>	Collection Site	<input checked="" type="checkbox"/>	Request/Usage Site	<input checked="" type="checkbox"/>
Livingstone	Center	<input checked="" type="checkbox"/>	Collection Site	<input checked="" type="checkbox"/>	Request/Usage Site	<input checked="" type="checkbox"/>
Luanshya	Center	<input checked="" type="checkbox"/>	Collection Site	<input type="checkbox"/>	Request/Usage Site	<input type="checkbox"/>
Kasama	Center	<input checked="" type="checkbox"/>	Collection Site	<input checked="" type="checkbox"/>	Request/Usage Site	<input checked="" type="checkbox"/>
Chipata	Center	<input checked="" type="checkbox"/>	Collection Site	<input type="checkbox"/>	Request/Usage Site	<input type="checkbox"/>
Chingola	Center	<input checked="" type="checkbox"/>	Collection Site	<input checked="" type="checkbox"/>	Request/Usage Site	<input checked="" type="checkbox"/>

[Add new Center/Site](#)

[Save](#)

[Cancel](#)

Example

Field Configuration

- ◆ **Display name** of form fields
- ◆ Is the field a **required field**?
- ◆ Is the **value of the field auto-generated**?
- ◆ **Hide certain fields** if they are not relevant for a lab
- ◆ **Default value** for a field
 - ◆ **For example:** Voluntary donation type for collections



Hide this field?

Required field?

Display name

Default value

Maximum length

Autogenerate field?

[Save](#) [Cancel](#)

Example

Blood Test Configuration



Create new Blood Tests



Create new Blood Typing Rules



TTI Rules automatically created
when TTI Test created



[+ New blood test](#)[Print](#)[Show / hide columns](#)

Search:

Blood test #	Blood test name	Category	Status
1	Anti-A	Blood typing	ENABLED
2	Anti-B	Blood typing	ENABLED
3	Anti-A,B	Blood typing	ENABLED
4	A1 Cells	Blood typing	ENABLED
5	B Cells	Blood typing	ENABLED
6	Anti-D	Blood typing	ENABLED
7	AbScr	Blood typing	ENABLED
8	Haemolysin	Blood typing	ENABLED
9	Du	Blood typing	ENABLED
10	AHG Control (Du)	Blood typing	ENABLED
11	DAT if Du Pos	Blood typing	ENABLED
12	AHG Control (DAT)	Blood typing	ENABLED
13	Immune anti-A	Blood typing	ENABLED
17	HIV	TTI	ENABLED

Example

+ New blood typing rule

Show / hide columns

Rule #	Anti-A	Anti-B	Anti-A,B	A1 Cells	B Cells	Anti-D	Antibody Screen	Haemolysin	Du	AHG Control (Du)		Result
1	-	-	-	+	+							Blood ABO O
2	+	-	+	-	+							Blood ABO A
3	-	+	+	+	-							Blood ABO B
4	+	+	+	-	-							Blood ABO AB
5					+							Blood Rh +
6					-							
7					-			-	+	+		Blood Rh -
8					-			+	-	-		Blood Rh +
9					-			+			Extra Info	DAT Pos

Example

Backup Database & Privacy Controls

Backup Database



MySQL Server



Database backup
using MySQLdump from
Web Interface

Privacy Controls

Three types of users:



Admin
can see all data



Donor Lab
cannot see test results
for a collection, can see
donor information

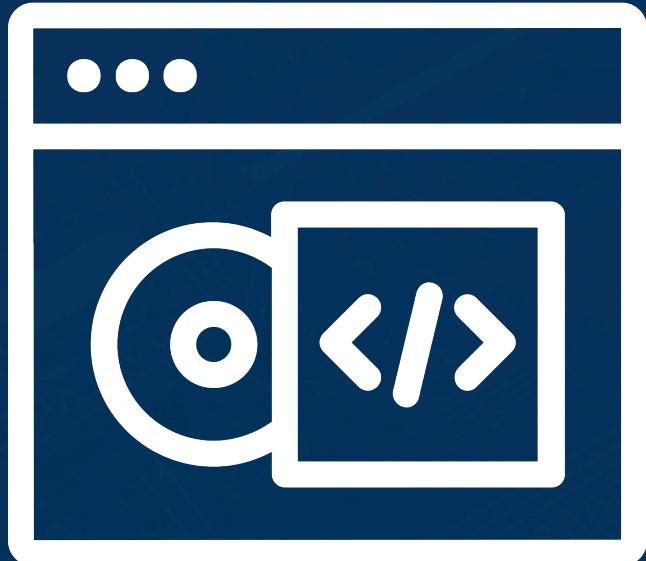


Testing Lab
cannot see donor
information, can see
test results only

References, Software, & Plug-ins

Software Used:

- ◆ Java
- ◆ Spring
 - ◆ Spring MVC
 - ◆ Spring Security
- ◆ JSP Templating
- ◆ MySQL Database
- ◆ Hibernate
- ◆ jQuery, JavaScript: AJAX based single page webapp



jQuery

- ◆ Fast, cross browser support, efficient, large userbase
- ◆ Easy to create event handlers, AJAX requests



jQuery UI

- ◆ Tabbed UI
- ◆ To get a nicer looking UI theme
- ◆ Datepicker, timepicker, dialog box modules

jQuery Datatables

- ◆ Provides a lot of boilerplate code for rendering tables
- ◆ Highly customizable

jQuery multiselect

- ◆ Multiple selections in a select menu with checkboxes

JavaScript Plugins Used

Jquery sliding message

- ◆ Notifications

Highcharts

- ◆ Chart rendering library

Other small plugins



It's important to include version #s of all plugins in app documentation in case updating becomes an urgent issue.

Example: JQuery vulnerability discovered by IBM and others: <https://www.ibm.com/support/pages/security-bulletin-jquery-vulnerabilities-affect-ibm-emptoris-sourcing-cve-2020-11023-cve-2020-11022>

JavaScript Plugins Used

Making Safe Blood Available in Africa

- ◆ Dr Neelam Dhingra Coordinator, Blood Transfusion Safety, WHO
- ◆ <http://www.who.int/bloodsafety/makingsafebloodavailableinafricastatement.pdf>

WHO Aide Memoire : Blood Safety

- ◆ http://www.who.int/bloodsafety/publications/who_bct_02_03/en/index.html

Design and Deployment of a Blood Safety Monitoring Tool

- ◆ S. Thomas, A. Osuntogun, J. Pitman, B. Mulenga and S. Vempala
- ◆ Proc. of ICTD 2009
- ◆ <https://www.cc.gatech.edu/~vempala/papers/ICTD09.pdf>

WHO Blood Safety Factsheets (2011, 2006)

- ◆ http://www.who.int/worldblooddonorday/media/who_blood_safety_factsheet_2011.pdf
- ◆ http://www.who.int/bloodsafety/en/Blood_Transfusion_Safety.pdf

References

Page Structure & Installer Design

Top Level Tab

Left Panel Tab

Left Panel

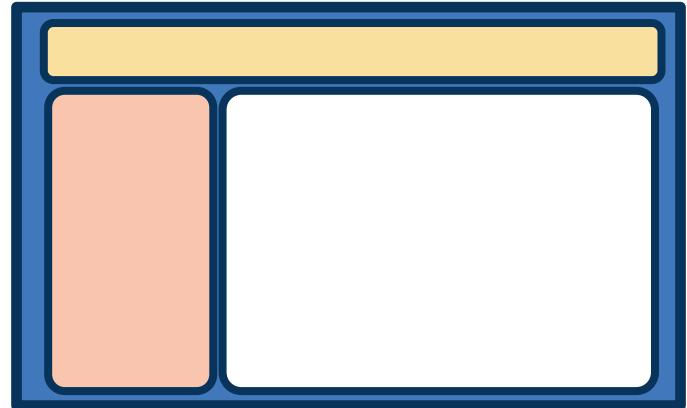
Tab Content

Main Content

Child Content (Hidden)

Page Structure

- ◆ **Tab Content is recursive**
- ◆ **Child content can be Tab Content and so on; a deep hierarchy can be formed**
- ◆ **Very useful to get back to the last state from current state**



- ◆ This is a **single page webapp**
- ◆ Presently we **never refresh** the page
- ◆ All **page interactions** with **messages & event handlers** between tab contents

Installer Design

- ◆ Single click installer
- ◆ Nullsoft Scriptable Install System
- ◆ Commercial installers built using framework
- ◆ Scripting language
- ◆ Primitives based on common operations required by installers:
 - ◆ Check user permissions
 - ◆ Copy files
 - ◆ Write to registry
 - ◆ Execute scripts (Windows batch files)
 - ◆ Choose install directory
 - ◆ Open README



Installer Design

- ◆ Trimmed down version of XAMPP
 - ◆ **XAMPP:** Cross Platform, Apache, MySQL, PHP, Perl
 - ◆ **Removed some unneeded packages** to bring down installer size
- ◆ **FirefoxPortable v18.0** packaged in installer
- ◆ **Shortcut created on desktop** called V2V
- ◆ Creating **windows registry key** called Vein-to-Vein in registry with version number, install directory. **This will make updates easier.**

