Bluebird

Window to the Ward

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Introduction

For more than 20 years South African doctors have trusted Bluebird to reliably manage their laboratory results. More than 70 private South African hospitals also put their trust in Bluebird's electronic laboratory service.

Doctors with patients in Bluebird enabled hospitals have an enhanced Bluebird service that facilitates:

1. Real time, remote access to their patient's **lab results** at any Bluebird enabled hospital.

2. Real time, remote access to their patient's **location** in any Bluebird enabled hospital. Over time this feature will be enhanced further to show summary data for those patients.

3. Real time, remote access to **infection control alerts** in any Bluebird enabled hospital. Over time this feature will be enhanced further to show a broader range of alerts, including those for abnormal labs.

4. Remote access to a list of that doctor's **patients discharged** from any Bluebird enabled hospital. Over time this feature will be enhanced further to show summary data about those discharged patients.

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Current Doctor's Bluebird Interface (without Hospital Access)

The overwhelming majority of the more than 4 000 South African doctor's that signed up for Bluebird, use Bluebird to access laboratory results (a minority use Bluebird to access radiology reports, referral requests and consultations). The screenshot below shows a list of patient reports in a physicians Bluebird **Inbox**.


Clicking any line item shows the full report as sent from the lab, radiologist or referring or consulting doctor. One can also create lab requisitions.

This "Window to the Ward" service gives Bluebird doctors remote access to their patients in any participating Bluebird enabled hospital!

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New Interface for Doctors with Patients in Bluebird enabled Hospitals

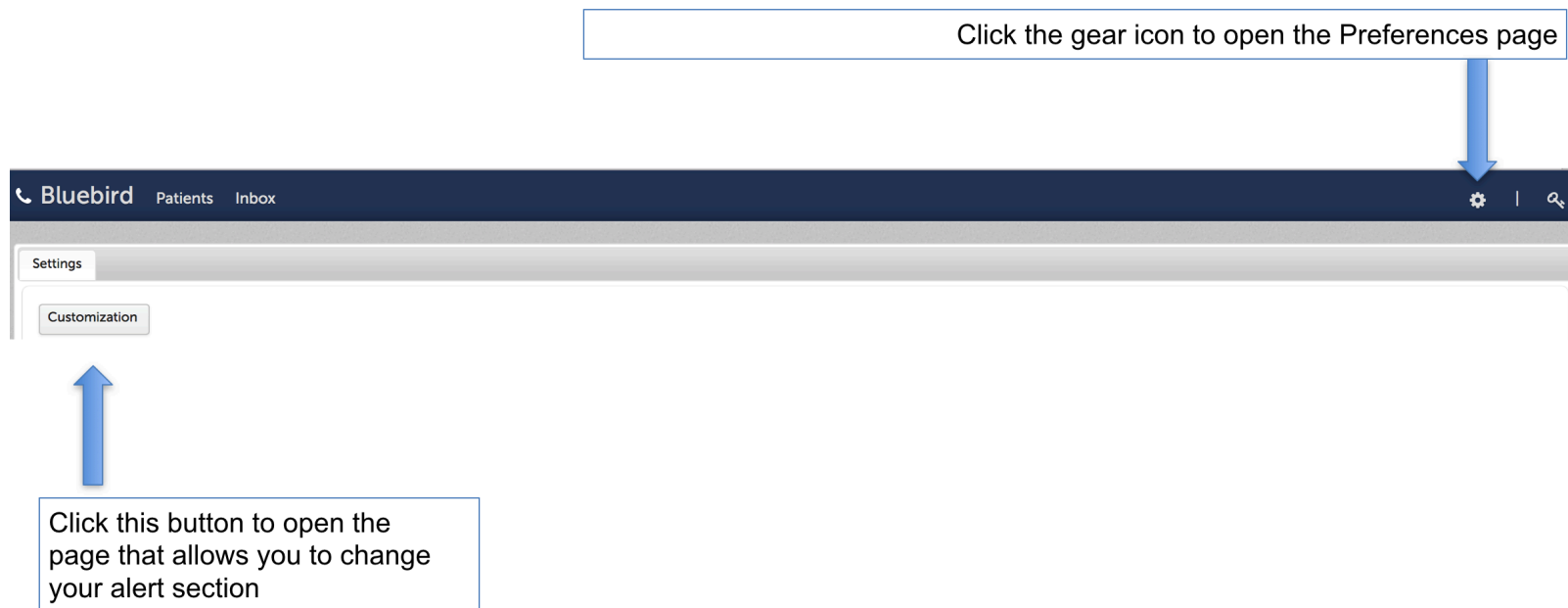In addition to the **Inbox** (blue arrow in the image below), there are **3 new tabs** (gold arrows), each of which is discussed separately below. The 3 new functions (Alerts, InPatient Remote Access and a list of Discharged Patients) make it dramatically easier for doctors working in Bluebird enabled hospitals to provide optimal care for their patients.

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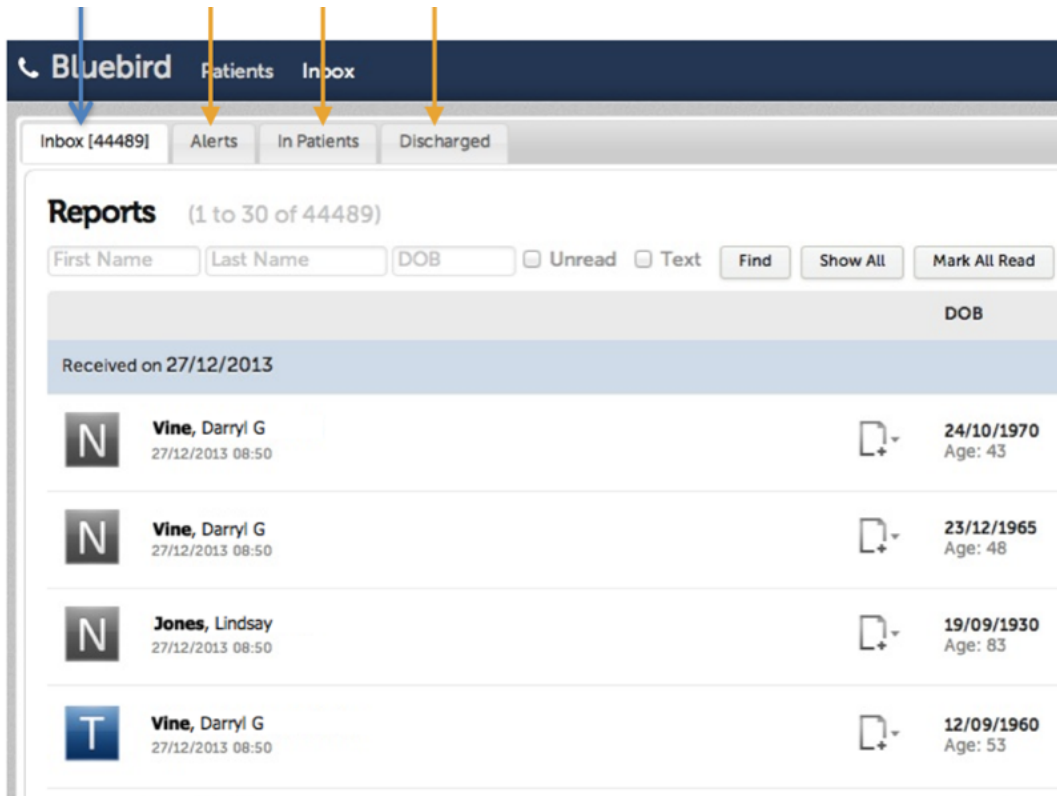
Alerts Tab

The alerts tab shows alerts sent to you about your inpatients. For example, if an inpatient has a multi drug resistant organism (MDRO) you can elect to receive a real time Bluebird alert.

You are able to modify the alerts you wish to receive for your hospital patients.

Click the gear icon to open the Preferences page

Click this button to open the page that allows you to change your alert section

Clicking "Customization" will bring up the alert selection tab shown on the next page.

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The list of the in patient alerts currently offered is shown to the right.

Deselect the inpatient alerts you do not want to see in Bluebird.

Over time you might wish us to provide additional alerts pertaining to your inpatients. Please discuss with your hospital manager.

Alerts

Hospital Group: Bluebird

Organism

- ☑ CDI(Clostridium difficile (CDI))
- ☑ MRSA(Methicillin-resistant staphylococcus aureus (MRSA))
- ☑ VRE(Vancomycin resistant Enterococcus spp (VRE))
- ☑ LRE(Linezolid resistant Enterococcus spp (LRE))
- ☑ CRKP(Carbapenem Resistant Klebsiella pneumoniae)
- ☑ CRE(Carbapenem-resistant Enterobacteriaceae)
- ☑ CephRK(Drug Resistant Klebsiella spp.)
- ☑ PDR(Pandrug Resistant - Resistant to all drugs tested)
- ☑ XDR(Extreme Drug Resistant)
- ☑ Enterobacteriaceae MDR(Enterobacteriaceae Resistant to one or more carbapenems and to cephalosporins)
- ☑ Acinetobacter MDR(Multi-drug resistant (MDR) Acinetobacter spp.)
- ☑ MDR(Multi-drug resistant organism)
- ☑ ESBL(ESBL Producing Organism)
- ☑ Pseudomonas XDR(XDR Pseudomonas aeruginosa)
- ☑ Acinetobacter XDR(XDR Acinetobacter baumannii)
- ☑ VRSA(Vancomycin-resistant staphylococcus aureus (VRSA))
- ☑ VISA(Vancomycin-intermediate staphylococcus aureus (VISA))
- ☑ Drug Resistant Isolate(Drug Resistant Isolate)
- ☑ CPO(Carbapenemase Producing Organism)
- ☑ PossibleCR(CRE)
- ☑ AmpC(Organism with AmpC)
- ☑ Inhibit-res betalactamase(Inhibitor-resistant beta-lactamase Producing Organism)
- ☑ Bloodstream infection(Bloodstream infection)
- ☑ CRAB(Carbapenem resistant Acinetobacter baumannii)
- ☑ CRPA(Carbapenem resistant Pseudomonas aeruginosa)
- ☑ C. auris(Candida auris)

Abn. Labs

- ☑ Abn. SI(Abnormal SI)
- ☑ Abn Renal, nephrotoxic abx(Abnormal Renal function with nephrotoxic drug)

Recommendation

- ☑ Pharmacist Abx(Pharmacist Abx Recommendation)

Save

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To review alerts, click the **Alerts Tab** (see screenshot below). This will open a split screen with the left pane showing a line list of alerts.

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Selecting any alert will show alert specific detail on the right pane:

Notes:

1. The selected alert turns blue.   **2.** Detail is shown on the R Pane   **3**. To close the alert, the "Close Alert" button must be selected.

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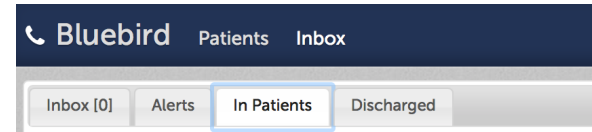
Inpatient Tab

The feature we are most excited about is the new **InPatients Tab**, a real time, "Window to the Ward"
which, when selected, shows a line list of your patients in any Bluebird enabled hospital (broken down by hospital and ward). Thumbnail information is shown for each patient:
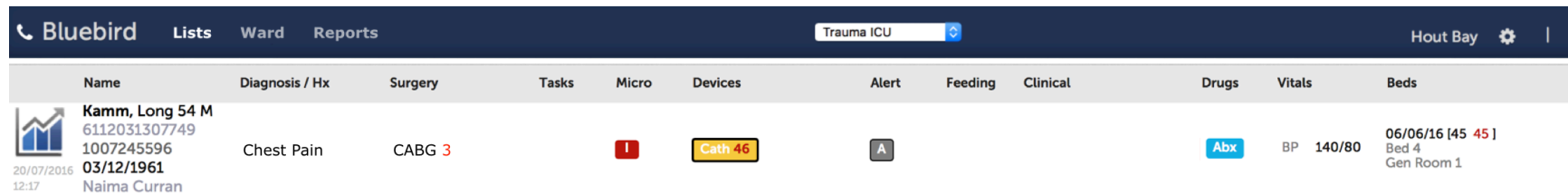
Clicking any section of the patient line will open a new (secondary) browser tab with detail about the section clicked. In the example below, these are the important things to note:

1. The header of a secondary browser tab is grey. These tabs are meant to be closed once you have reviewed that section.

2. The lab section (the one with the blue graph icon) of patient Long Kamm has been selected (the grey horizontal bar below the lab section tells you it has been selected) . Below the patient line on this secondary tab shows all the labs for Long Kamm during this admission.

3. Only one patient is shown on secondary browser tabs which should be closed once you are done with this subset of information. This is in contrast with the primary Blue header tab which remains open.

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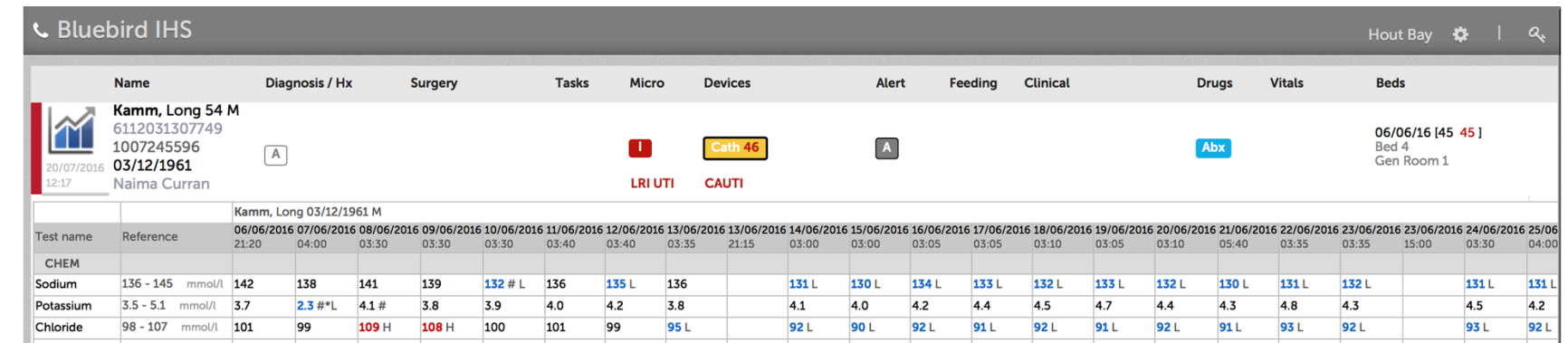
Initially, only a subset of all the clinical information shown above will be available. Hospitals plan to make progressively more information available on the **Inpatient Tab.** To begin with, you will get real time access to all labs done on your patients in any Bluebird enabled hospital. Access this function by clicking the lab section (first section) of the patient line. Note that the date and time of the last lab that has arrived for this patient is shown below the graph icon.

The next image shows what information, hospitals will, over time, make available for each patient.

In this example, this patient was admitted with chest pain, is post op day 3 following a CABG, has a multi drug resistant isolate (the isolate icon is red), has a foley catheter (x 46 days!), is on at least one antibiotic, has a BP of 140/80 and has been in the hospital (and this ward) for 45 days.

Clicking on any column will pop up more detail about that section, so, for example, clicking the first section (with the graph icon) will pop open a window that displays special investigations done on this patient during the current admission (see next page).

In the beginning Bluebird will not display the surgery, tasks, feeding, clinical or vitals columns, but, as your hospital finds ways to document that information in Bluebird in a timely manner, those columns will be unmasked (at the moment there is a delay in documenting some of that information and hospitals worry that if, for example, the operative procedure only gets documented by day 3, you won't see anything on day 1 and 2).

The next 2 pages show that happens when the lab (first) section of a patient line is selected.

Note that the secondary browser tab that opens with **cumulative lab results** for this patient is grey.

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Note the colour coding of numeric results. Blue indicating abnormally low, and red abnormally high values.

Clicking the numeric result shows the full original lab report.

☏ Bluebird   Hout Bay ⚙ | 🔍

Name	Diagnosis / Hx	Surgery	Tasks	Micro	Devices	Alert	Feeding	Clinical	Drugs	Vitals	Beds
Kamm, Long 54 M 6112031307749 1007245596 **03/12/1961** Naima Curran (20/07/2016 12:17)	A			**I** LRI UTI	**Cath 46** CAUTI	A			**Abx**		06/06/16 [45 45] Bed 4 Gen Room 1

Kamm, Long 03/12/1961 M

Test name	Reference	06/06/2016 21:20	07/06/2016 04:00	08/06/2016 03:30	09/06/2016 03:30	10/06/2016 03:30	11/06/2016 03:40	12/06/2016 03:40	13/06/2016 03:35	13/06/2016 21:15	14/06/2016 03:00	15/06/2016 03:00	16/06/2016 03:05	17/06/2016 03:05	18/06/2016 03:10	19/06/2016 03:05	20/06/2016 03:10	21/06/2016 05:40	22/06/2016 03:35	23/06/2016 03:35	23/06/2016 15:00	24/06/2016 03:30	25/06 04:00
CHEM																							
Sodium	136 - 145 mmol/l	142	138	141	139	132 # L	136	135 L	136		131 L	130 L	134 L	133 L	132 L	133 L	132 L	130 L	131 L	132 L		131 L	131 L
Potassium	3.5 - 5.1 mmol/l	3.7	2.3 #*L	4.1 #	3.8	3.9	4.0	4.2	3.8		4.1	4.0	4.2	4.4	4.5	4.7	4.4	4.3	4.8	4.3		4.5	4.2
Chloride	98 - 107 mmol/l	101	99	109 H	108 H	100	101	99	95 L		92 L	90 L	92 L	91 L	92 L	91 L	92 L	91 L	93 L	92 L		93 L	92 L
CO2	22 - 29 mmol/l	28	12 # L	25 #	23	22	24	25	27		27	26	27	28	26	28	28	27	27	27		27	26
Calcium	2.15 - 2.50 mmol/l				2.05 L				2.33 #				2.37				2.43			2.51 H			
Phosphate	0.78 - 1.42 mmol/l				0.40 L				0.55 # L				1.26 #				1.25			1.20			
Magnesium	0.66 - 1.07 mmol/l				0.76				0.77				1.06 #				0.89 #			0.85			
Anion Gap	8 - 20 mmol/l	17	29 H	11	12	14	15	15	18		16	18	19	18	19	19	16	16	16	17		16	17
Amylase	< 110 U/l	80																					
CRP	< 5 mg/l		12 H	208 #*H	306 #*H	324 *H	237 *H	169 #*H	97 # H		84 H	68 H	71 H	63 H	57 H	54 H	45 H	46 H	39 H	36 H		35 H	30 H
PCT	0.00 - 0.05 ng/ml					5.69 *H	3.03 #*H																
Haematology																							
Hemoglobin	14.3 - 18.3 g/dl	15.8	15.4	11.8 L	11.1 L	11.1 L	11.0 L	10.7 L	11.2 L	10.2 L	10.2 L	11.3 L	12.0 L	12.6 L	12.8 L	12.6 L	11.7 L	11.4 L	12.1 L	12.2 L		11.8 L	11.7 L
Hct	43.0 - 55.0 %	44.2	44.0	34.7 # L	33.1 L	32.1 L	31.4 L	30.8 L	32.4 L		29.2 L	32.2 # L	34.6 L	36.4 L	37.3 L	37.6 L	34.4 L	33.8 L	35.3 L	36.1 L		35.1 L	34.9 L
RBC	4.89 - 6.11 10^12/l	4.98	4.94	3.85 L	3.60 L	3.56 L	3.52 L	3.44 L	3.63 L		3.28 L	3.63 L	3.87 L	4.05 L	4.13 L	4.12 L	3.77 L	3.71 L	3.91 L	4.00 L		3.83 L	3.81 L
MCV	79.1 - 98.9 fl	88.8	89.1	90.1	91.9	90.2	89.2	89.5	89.3		89.0	88.7	89.4	89.9	90.3	91.3	91.2	91.1	90.3	90.3		91.6	91.6
MCH	27.0 - 32.0 pg	31.7	31.2	30.6	30.8	31.2	31.3	31.1	30.9		31.1	31.1	31.0	31.1	31.0	30.6	31.0	30.7	30.9	30.5		30.8	30.7
MCHC	31.0 - 37.0 g/dl	35.7	35.0	34.0	33.5	34.6	35.0	34.7	34.6		34.9	35.1	34.7	34.6	34.3	33.5	34.0	33.7	34.3	33.8		33.6	33.5
Platelets	150 - 450 10^9/l	206	278	95 # L	85 L	89 L	99 L	111 L	175 #		209	253	318	343	383	415	393	416	482 H	477 H		479 H	459 H
RDW	10.0 - 16.3 %	13.8	13.8	14.0	14.3	13.6	13.1	13.2	13.4		13.4	13.5	13.7	13.5	13.9	13.5	13.3	12.8	13.1	13.4		13.4	13.4
WBC	3.92 - 9.88 10^9/l	9.87	14.19 H	7.03 #	8.29	7.88	6.64	7.47	11.91 # H		12.50 H	14.55 H	17.84 H	18.54 H	17.56 H	14.08 H	10.36 H	7.23	8.24	10.52 H		8.46	9.38
Neutrophils %	%	68.3	77.2	78.0	83.8	81.6	73.3	81.1	64.7		67.0	78.5	86.2	85.1	83.0	79.7	74.3	66.4	70.3	74.3		68.5	72.9
Neutrophils Abs	2.00 - 7.50 10^9/l	6.74	10.96 # H	5.48	6.95	6.43	4.87	6.06	7.71 H		8.36 H	11.42 H	15.36 H	15.77 H	14.58 H	11.22 H	7.70 H	4.80	5.79	7.82 H		5.80	6.84
Eosinophils %	%	0.5	0.0	0.6	2.1	2.3	1.8	0.4	0.6		1.0	1.0	0.7	0.6	0.9	1.1	1.5	2.8	1.5	0.9		1.3	1.8
Eosinophils Abs	0.00 - 0.45 10^9/l	0.05	0.00	0.04	0.17	0.18	0.12	0.03	0.07		0.13	0.14	0.13	0.12	0.16	0.16	0.16	0.20	0.12	0.09		0.11	0.17
Basophils %	%	0.3	0.1	0.0	0.1	0.0	0.2	0.1	0.7		1.1	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.7	0.2		0.4	0.3
Basophils Abs	0.00 - 0.20 10^9/l	0.03	0.01	0.00	0.01	0.00	0.01	0.01	0.08		0.14	0.06	0.04	0.04	0.03	0.03	0.02	0.05	0.02	0.03		0.03	0.03

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If one clicks the **Test Name**, the results are shown in a graphic format.
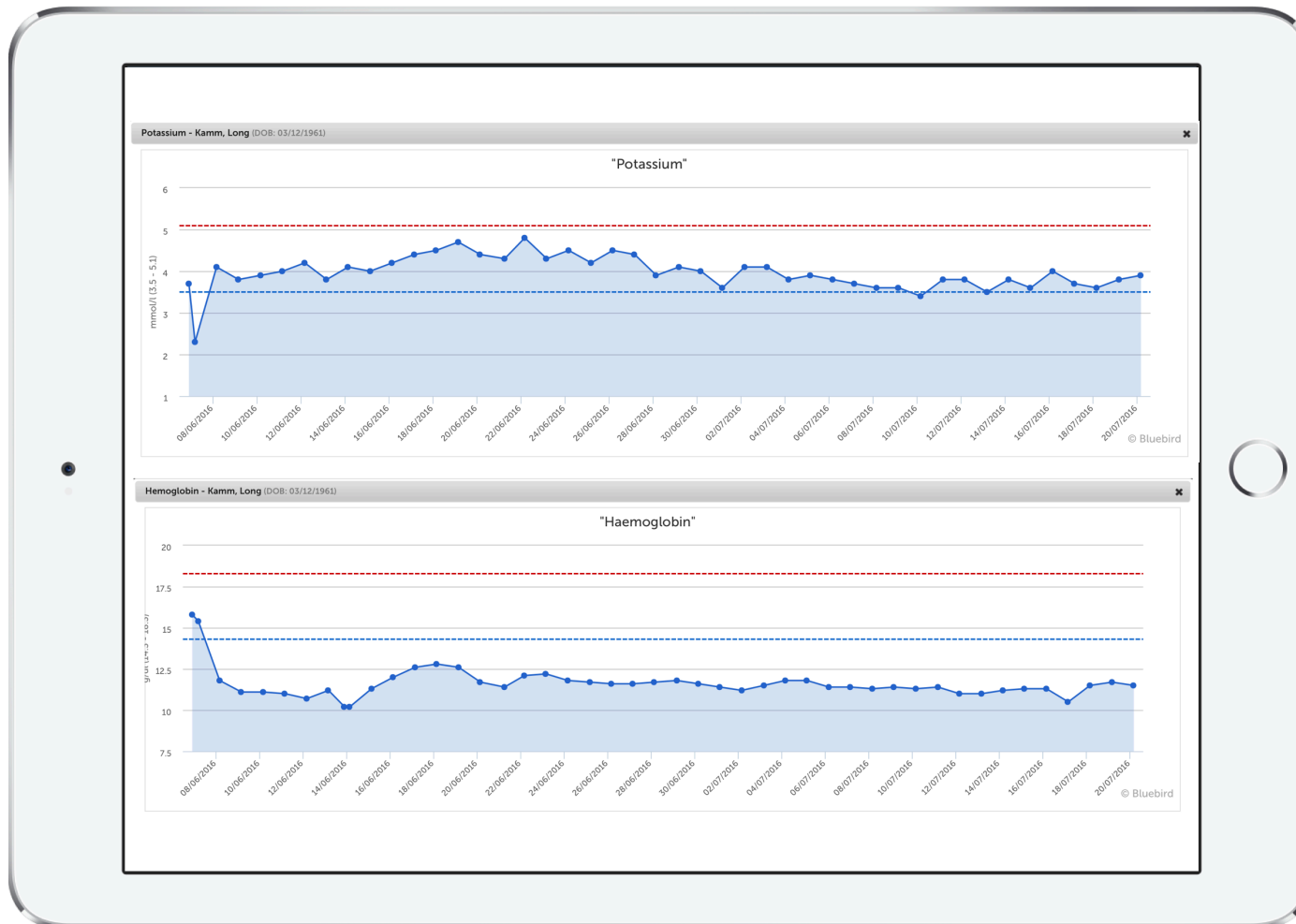
Hovering over any point on the graph brings up a tool tip showing more information.

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The **Infective Section** of the patient line shows the micro results during this admission. Note the grey bar under the **Infective** heading.

The left pane is a line list of all micro returned. Clicking any item in that list will show detail about that isolate (including the work done by the hospital infection control to classify that isolate).

Note that MDR high risk isolates (typically the ESKAPE isolates) are colour coded red. MDR isolates that usually don't require isolation are coloured orange and non MDROs are blue.

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For now, the **Drugs section** only shows antimicrobials. Other drug categories might be shown in the future. When the **Drug** section is clicked the following screen opens:

One is quickly able to see the organisms that have been isolated, the antimicrobials prescribed during this admission (green) and those antimicrobials that have been tested against each isolate in the lab. In this case, one is quickly able to see that gentamicin would cover all these organisms!

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Discharged Tab

The **Discharge Tab** is a line list of your patients that have been discharged from Bluebird enabled hospitals. Initially this will only show the Date of Admission and Date of Discharge.

Later, it is planned that more detailed information will be available and will be accessed by clicking any patient on that list - watch this space.

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Bluebird enabled hospitals can, of course, only provide information that has been *reliably* captured electronically. For the moment that is the organisms isolated in the hospital

Bluebird		Discharge List		
Discharged Patients (1 to 12 of 12)				
Patient	Date of Birth	Admission Date	Discharge Date	Discharge Diagnosis
Jones, Lindsay 610626150173 1004003434	20/08/1956 Age: 57	20/01/2014 08:02	22/01/2014 08:02	
Vine, Darryl G 610626150173 1003989339	12/11/1958 Age: 55	15/01/2014 23:14	21/01/2014 11:40	
Phillips, Susan 610626150173 1003988159	21/05/1967 Age: 46	15/01/2014 15:16	21/01/2014 11:39	
Peters, Daniel 610626150173 1003990732	11/05/1934 Age: 79	16/01/2014 10:18	21/01/2014 09:00	
Jones, Lindsay 610626150173 1003979658	16/07/2000 Age: 13	13/01/2014 17:43	20/01/2014 14:02	
Bret, David G 610626150173 1004009017	11/12/1944 Age: 69	20/01/2014 09:45	20/01/2014 09:45	
Michaels, Susan 610626150173 1004009017	11/12/1944 Age: 69	21/01/2014 09:26	20/01/2014 09:45	
Munchin, Daniel 610626150173 1003978477	02/01/1970 Age: 44	13/01/2014 14:00	18/01/2014 11:40	
Halliday, Daniel 610626150173 1003976995	20/01/1974 Age: 40	13/01/2014 10:18	17/01/2014 10:35	

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and any antibiotics dispensed during this admission.

Bluebird — Infection Control Detail

Special Investigation

Microbiology

-Hide

Organism	Infection Type	Start Date	End Date	Ward	HAI
Negative		15/01/2014 21:35	15/01/2014 21:35	gcsec9	
Negative		15/01/2014 21:35	15/01/2014 21:35	gcsec9	
Candida species		15/01/2014 21:35		gcsec9	
Mixed growth contaminants		15/01/2014 21:35		gcsec9	
Candida species		15/01/2014 21:35		gcsec9	
Mixed growth contaminants		15/01/2014 21:35		gcsec9	
Negative		15/01/2014 16:15	15/01/2014 16:15	gcsec9	
Negative		15/01/2014 16:15	15/01/2014 16:15	gcsec9	

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Bluebird — Antibiotic Detail

Recorded Antibiotics

Documented Allergies: None Recorded

Drug	Indication	Ordered	Started	Stopped	Route	Dose	Frequency	Duration
Ciprofloxacin	Conjunctivitis Acute	13/01/2014 20:08	15/01/2014 08:28		Oral		Not Specified	
Ceftriaxone	Rheumatic Fever	14/01/2014 08:27	14/01/2014 08:56		IV	400mg	2 hourly	3 days

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Over time, hospitals plans to make more information available electronically, and, as that happens, more detail will be available in the discharge summary:

Vine, Darryl G
1004003434   610626150173
Discharged

20/08/1956
Age: 57 Gender: F

+Patient Information
Diagnosis/s during this admission

Discharge diagnosis *

Admission Date   20/01/2014 08:02   Discharge Date

Recorded Devices
                      No procedures were added for this patient during the visit.

Theatre Procedures
                      No surgeries were added for this patient during the visit.

Other procedures

Condition

Recorded Antibiotics
                      No antibiotics were added for this patient during the visit.

Other Drugs

Destination

Plan

Anticipated problems

Outstanding issues

Other Findings