

# IntelliMax

Case Study no 2019/09/18

**How IntelliMax can be used for a  
review of the use of technology  
such as Radiology Equipment**

## **Equipment And Products Analysis**

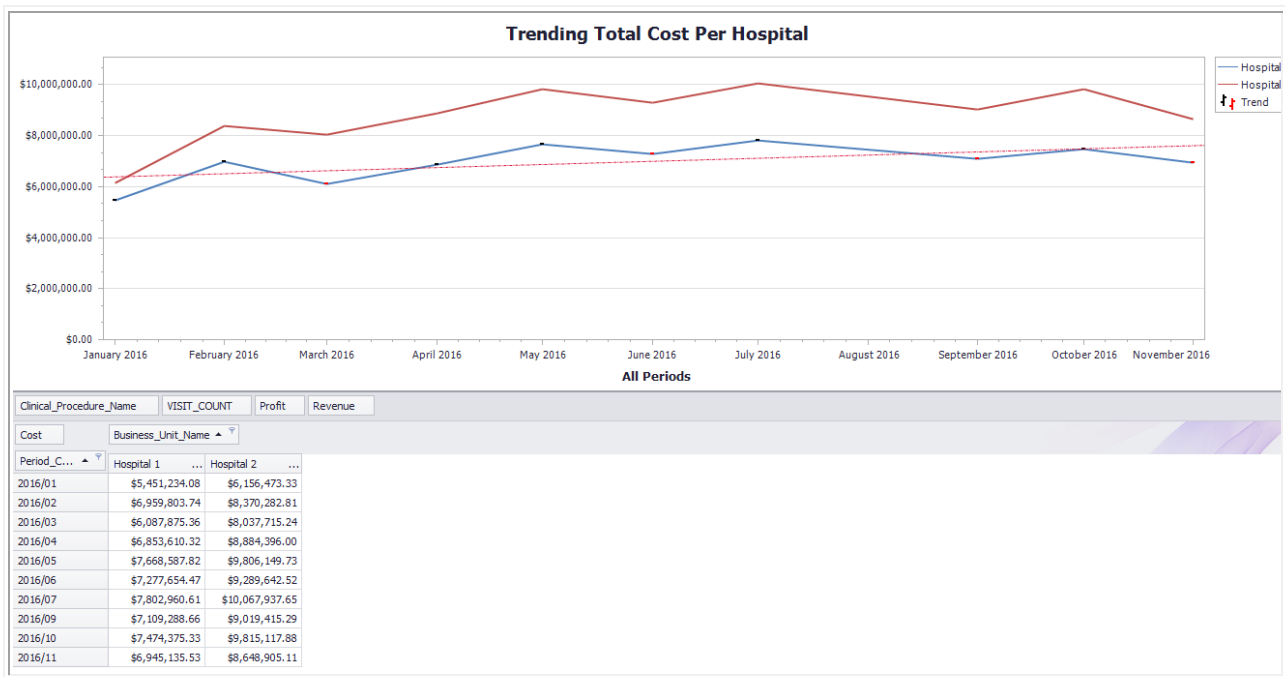
### **1. Introduction:**

Hospital equipment is very expensive and the efficiency of use is often difficult to determine. IntelliMax provides transparency and clarity about the investment, utilization and cost of the outputs delivered by such equipment.

In this case study we have a number of hospitals, and on reviewing the overall costs of equipment, there is clearly an upward trend as can be seen from one of the reports in the system

“Trending Total Cost Per Hospital” under

->Financial Management->Reporting->High-Level Profitability



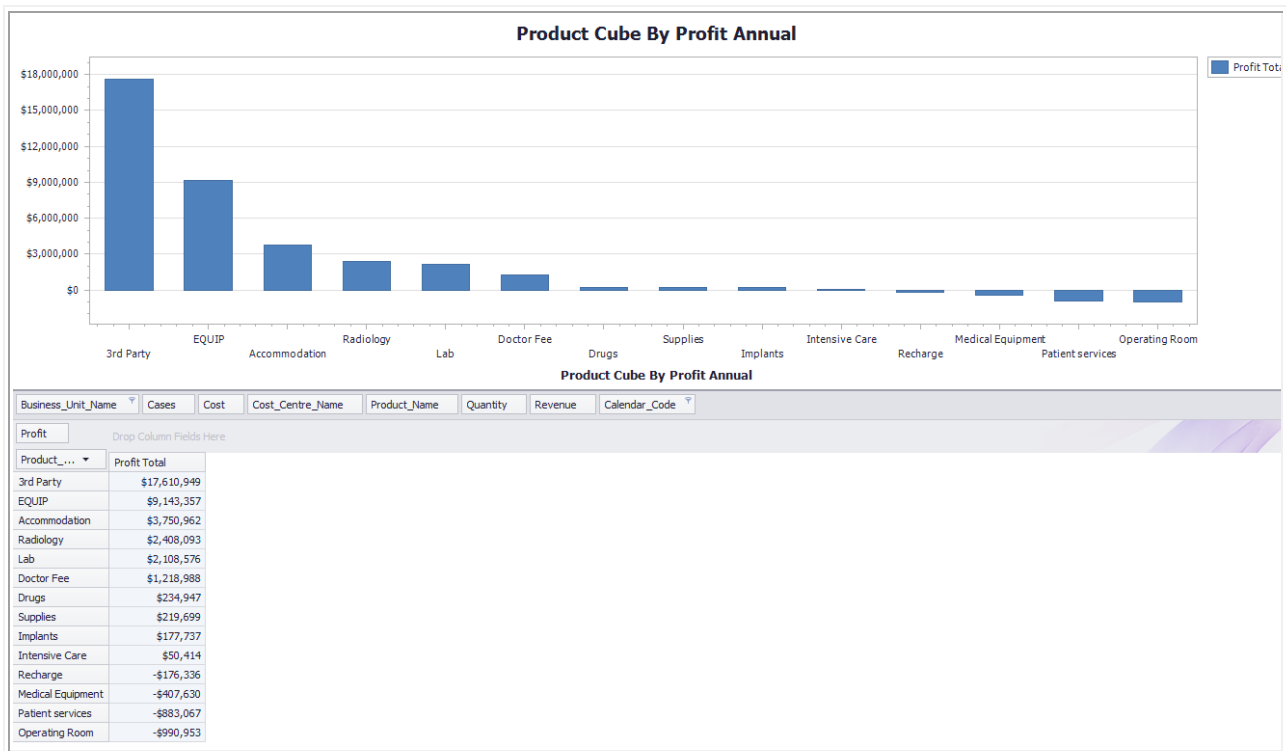
This study will not only show the cost of equipment but also review the profits generated by the equipment and how well it is utilized.

## 2. Background

In order to understand the profitability of the hospitals better, an analysis can be done of the main sources of profit (Analysed by Product Group, of which Equipment is one)

Below is the breakdown of profits for the group as a whole (Annual Totals – these figures are also available by Month):

“Product Cube By Profit” under  
->Technology->Reporting

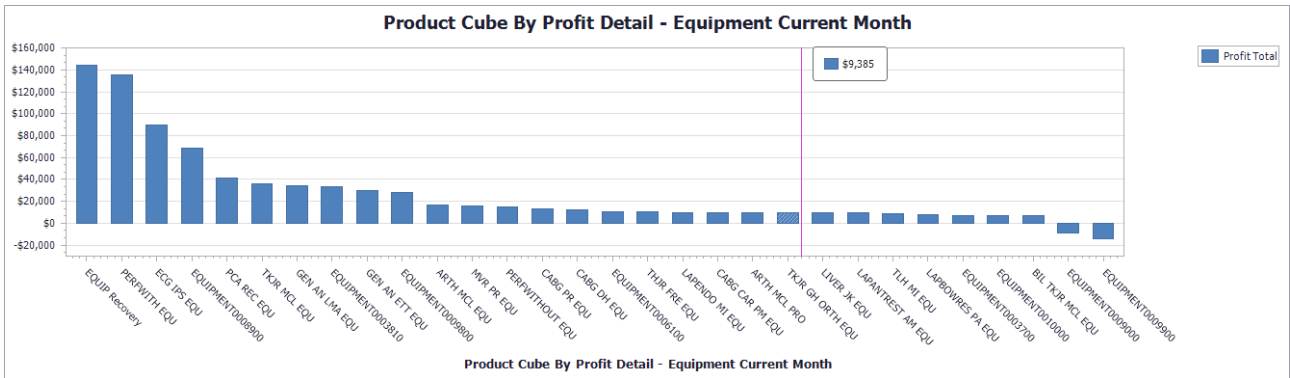


Some conclusions can be drawn from this data (which shows the main sources of profit across the group, grouped by the kind of product or service provided)

- The highest profits came from "3rd party" services. These are services provided by parties that are not managed by the hospital directly (fees charged by specialists and surgeons that are not directly employed by the group's hospitals, for example)
- The second-highest profits came from charges to the patient for the use of Equipment that is owned by hospitals in the group. This equipment includes a large number of devices for example:
  - devices to test liver function,
  - devices to assist with Coronary artery bypass grafting, and many more

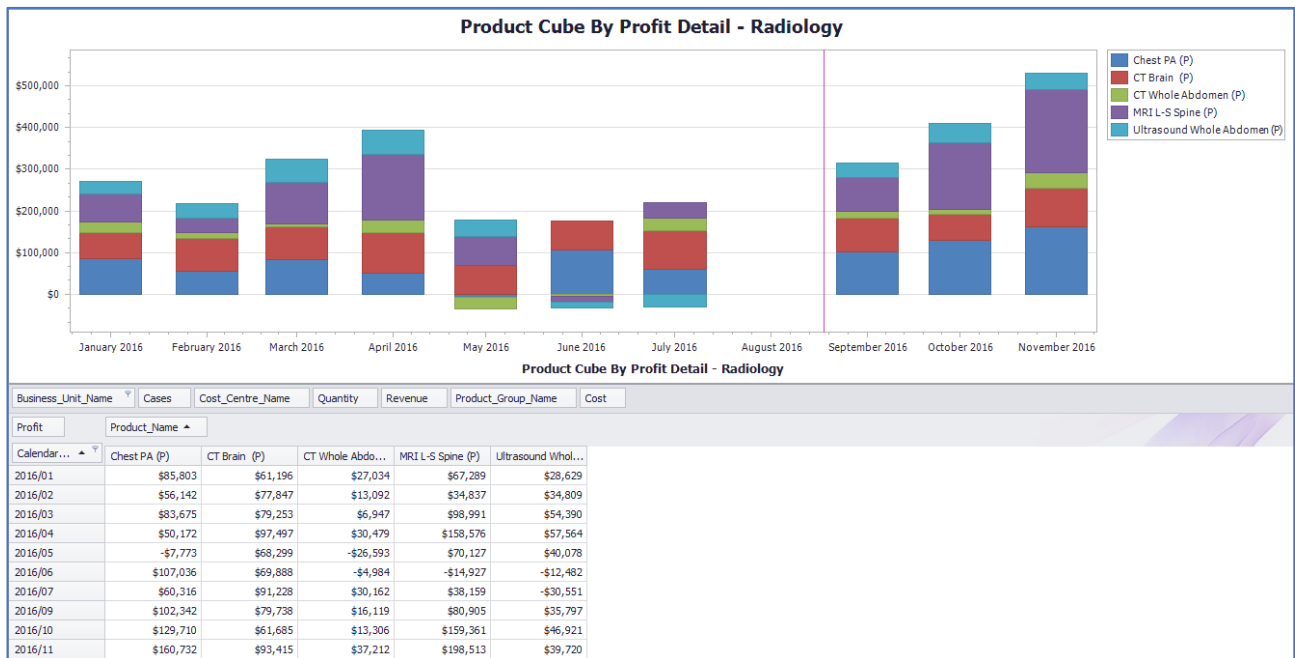
Below is the breakdown of the main equipment pieces with the highest profits for the current month:

“Product Cube By Profit Detail - Equipment Current Month” under  
->Technology->Reporting



As there are very many different kinds of equipment used across the hospital group, and as each of these can be used for various procedures and DRG's, the principle to be illustrated here can be better shown by concentrating only on equipment used by the Radiology department. The following report shows the profits from major equipment pieces in the 'Radiology' product group:

"Product Cube By Profit Detail - Radiology" under  
->Technology->Reporting

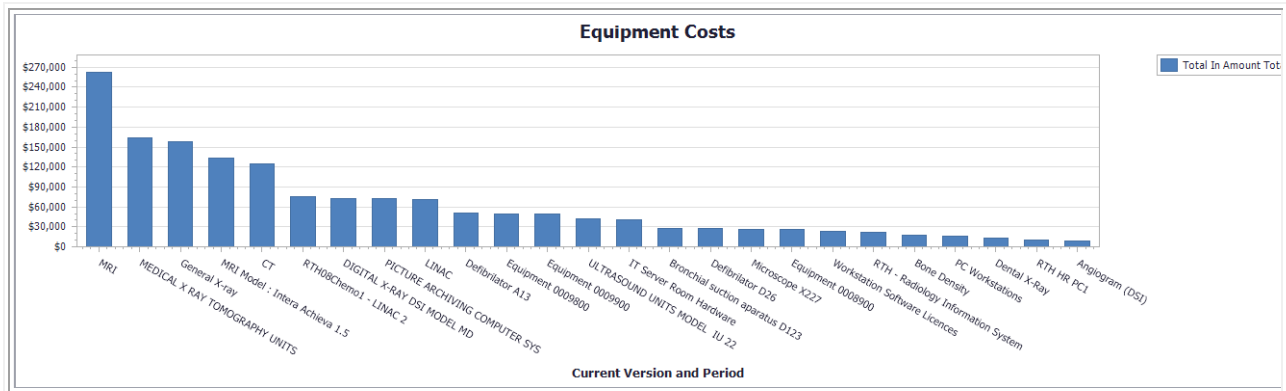


- Note that the MRI machine is one of the devices that produces a significant portion of the profits in the Radiology product group.

### Cost Analysis

See also the following report, which shows that the monthly costs for the MRI machine are among the highest of any medical equipment in the hospital group:

“Equipment Costs” under  
->Technology->Reporting



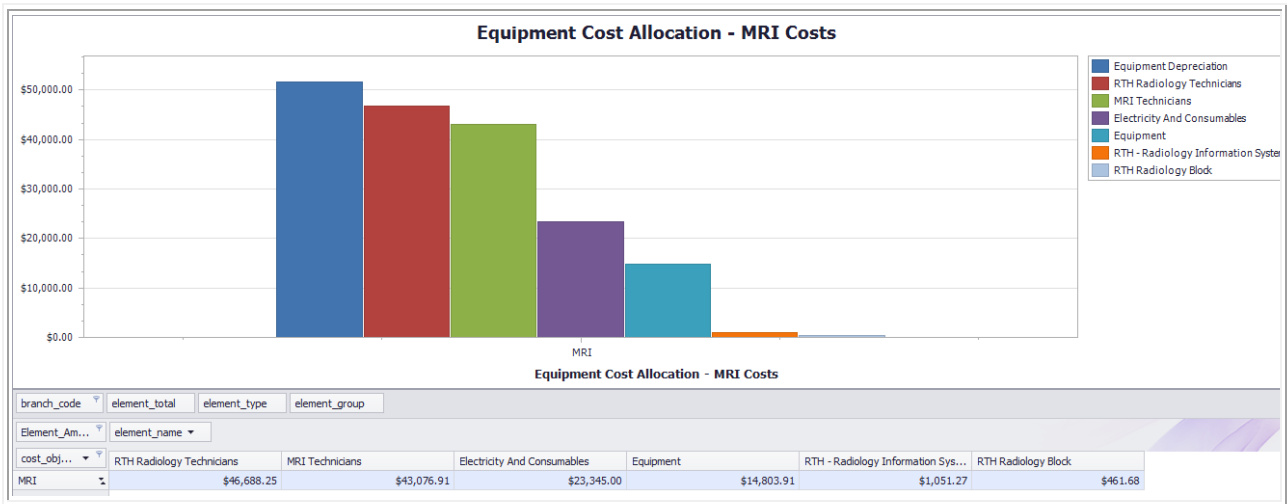
- The focus here will be on the MRI system.

### 3. Cost Breakdown:

IntelliMax is a sophisticated business intelligence system built for hospitals - and one of its major strengths is the fact that it has a fully integrated activity-based costing system that calculates the cost of any hospital object or process and allows this to be related to other performance parameters. The MRI equipment has been configured in the IntelliMax costing system, which allows us to see which costs this item attracts.

The following shows the main cost elements for the MRI equipment, for the current month:

“Equipment Cost Allocation - MRI Costs” under  
->Technology->Reporting



- Note that the MRI equipment has an integrated calculation for the cost of capital associated with all assets (Shown here as “Equipment”) - this reflects the opportunity cost of the capital required to purchase and sustain this (expensive) piece of equipment.

For more detail, IntelliMax provides reports such as the following, which shows exactly which costs are associated with configured entities such as the MRI equipment:

“Equipment Cost Detail” under  
Costing Tab, ->Primary Objects->Equipment->MRI

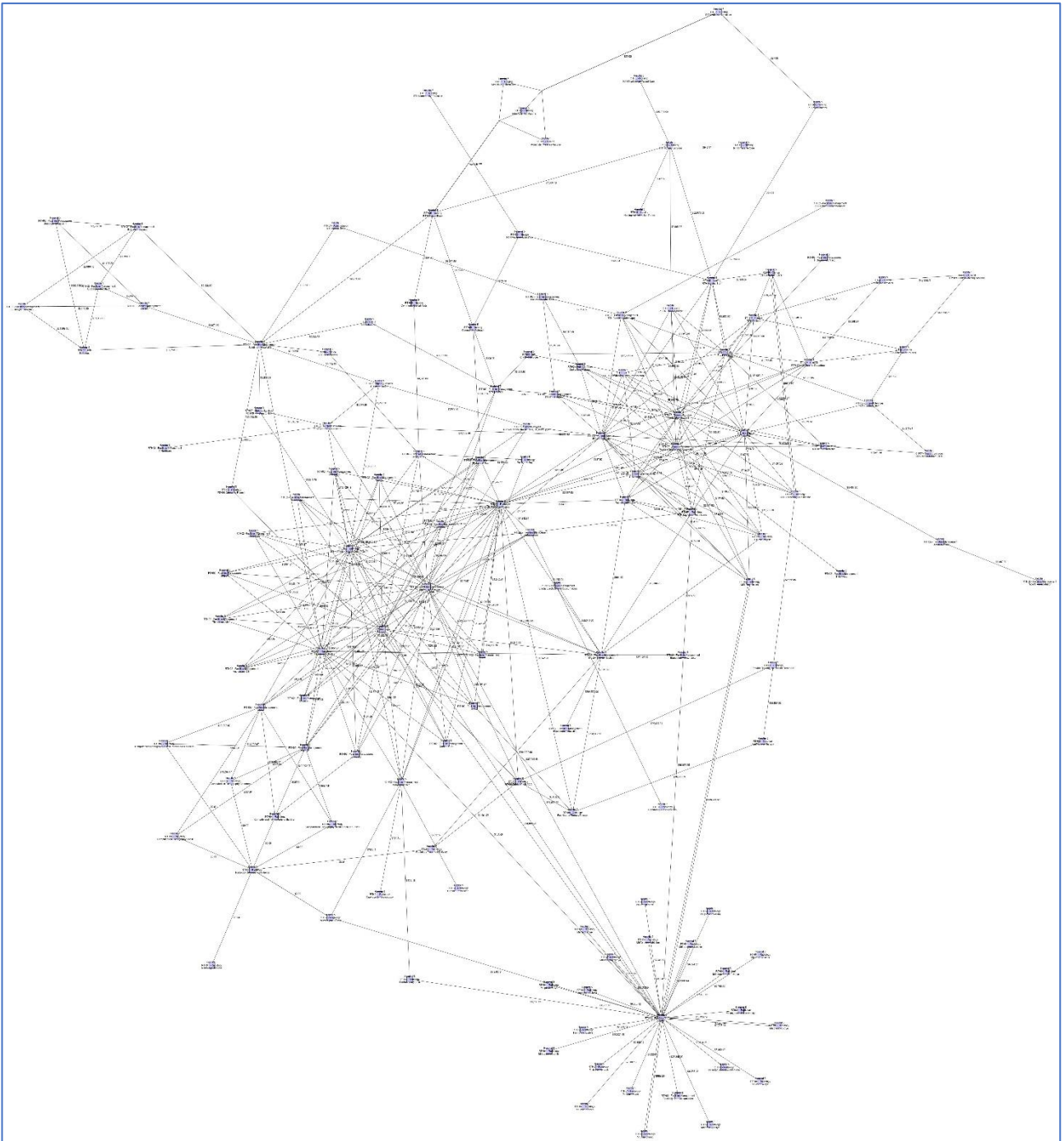
DEMO				Equipment Cost Detail				Version: Ac - Actual Period: 2016/11 - 2008 Nov		
BU	CC/Branch	Code	Name	U'OM	Quantity	WF	WQ	Rate	Amount	
Hospital 5	RTH02	MRI	MRI							
<b>COC:GL Accounts</b>					<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>\$14,803.91</b>	<b>\$14,803.91</b>	
Hospital 5	RTH03	Equipment	Equipment						14,803.91	
<b>GL Accounts</b>					<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>\$75,044.85</b>	<b>\$75,044.85</b>	
Hospital 5	RTH02	ElectricityConsumabl	Electricity And Consumables						23,345.00	
Hospital 5	RTH02	EquipmentDepreciatio	Equipment Depreciation						51,699.85	
<b>Transfer In</b>					<b>470.00</b>	<b>1.00</b>	<b>470.00</b>	<b>\$207.29</b>	<b>\$97,428.22</b>	
Hospital 5	RTH04	MRI Technicians	MRI Technicians	SVal	156.00	1.00	156.00	315.56	49,227.02	
Hospital 5	RTH04	RTH - RadioInfoSys	RTH - Radiology Information System	SVal	312.00	1.00	312.00	1,051.27	1,051.27	
Hospital 5	RTH04	RTHRadBlock	RTH Radiology Block	SVal	1.00	1.00	1.00	461.68	461.68	
Hospital 5	RTH04	RTHRadTechnicians	RTH Radiology Technicians	SVal	1.00	1.00	1.00	46,688.25	46,688.25	
<b>Total Input</b>									<b>\$187,276.98</b>	
<b>Transfer Out</b>					<b>SVal</b>	<b>7,427.00</b>	<b>1.29</b>	<b>9,552.08</b>	<b>-\$19.61</b>	<b>-\$187,276.98</b>
Hospital 5	RTH04	Contrast x-ray brain	Contrast x-ray brain	SVal	135.00	1.00	135.00	6,150.11	-6,150.11	
Hospital 5	RTH04	EncathelitisCheck	Encathelitis Check	SVal	732.00	1.10	805.20	6,150.11	-6,765.12	
Hospital 5	RTH04	Fmri brain by phys	Fmri brain by phys	SVal	324.00	1.22	395.28	6,150.11	-7,503.13	
Hospital 5	RTH04	Fmri brain by tech	Fmri brain by tech	SVal	112.00	1.12	125.44	6,150.11	-6,888.12	
Hospital 5	RTH04	Mri abdomen w/dye	Mri abdomen w/dye	SVal	234.00	1.33	311.22	6,150.11	-8,179.65	
Hospital 5	RTH04	Mri abdomen w/o dye	Mri abdomen w/o dye	SVal	435.00	1.30	565.50	6,150.11	-7,995.14	
Hospital 5	RTH04	Mri abdomen w/o/w/dye	Mri abdomen w/o & w/dye	SVal	333.00	1.22	406.26	6,150.11	-7,503.13	
Hospital 5	RTH04	Mri brain w/dye	Mri brain w/dye	SVal	233.00	1.50	349.50	6,150.11	-9,225.16	

- Note that technicians are a significant cost element for the MRI equipment.

Each of the cost elements that contribute to the MRI, have costs that contribute to them as well – so for example, a drill through can be made to the costs for the Radiology Technicians to show what their costs are made up of:

DEMO		Personnel Cost Detail						Version: Ac - Actual Period: 2016/11 - 2008 Nov	
BU	CC/Branch	Code	Name	UOM	Quantity	WF	WQ	Rate	Amount
Hospital 5	RTH04	RTHRadTechnicia	RTH Radiology Technicians						
<b>Bill of Activities In</b>				SVal	1.00	1.00	1.00	\$1,953.85	\$1,953.85
Hospital 5	RTH03	PayRTHStaff	Pay RTH Staff	SVal	1.00	1.00	1.00	1,953.85	1,953.85
<b>GL Accounts</b>					0.00	0.00	0.00	\$84,030.20	\$84,030.20
Hospital 5	RTH03	RTHPayroll	RTH Payroll						84,030.20
<b>Transfer In</b>					6.00	1.00	6.00	\$1,232.08	\$7,392.46
Hospital 5	RTH07	IT Manager	IT Manager	SVal	1.00	1.00	1.00	2,067.53	2,067.53
Hospital 5	RTH02	Mammogram	Mammogram	SVal	1.00	1.00	1.00	2,511.09	2,511.09
Hospital 5	RTH07	PC Workstations	PC Workstations	SVal	1.00	1.00	1.00	943.49	943.49
Hospital 5	RTH04	RadiologyManager	RadiologyManager	SVal	1.00	1.00	1.00	964.10	964.10
Hospital 5	RTH07	Workstation Licences	Workstation Software Licences	SVal	1.00	1.00	1.00	718.75	718.75
Hospital 5	RTH07	Workstation Support	Workstation Support	SVal	1.00	1.00	1.00	187.50	187.50
<b>Total Input</b>									\$93,376.50
<b>Transfer Out</b>				SVal	2.00	1.00	2.00	-\$46,688.25	-\$93,376.50
Hospital 5	RTH02	Brachy Therapy Syste	Brachy Therapy System	SVal	1.00	1.00	1.00	46,688.25	-46,688.25
Hospital 5	RTH02	MRI	MRI	SVal	1.00	1.00	1.00	46,688.25	-46,688.25
<b>Total Output</b>									-\$93,376.50
<b>Net Amount / Cost Per Unit</b>				SVal	2.00	1.00	2.00	\$46,688.25	\$0.00

- These costs, in turn, have their own drivers too. For the hospital in question, the network of different cost drivers is a complex network of cost tracings from the General Ledger until costs reach its ultimate destination such as a group of technicians, as is illustrated below with this hospital cost diagram:



- Note that the IntelliMax costing system allocates costs across the entire network of interrelated costs, which is used to determine the actual cost (as well as profit) of entities such as the MRI equipment.

#### 4. Profit breakdown for Radiology

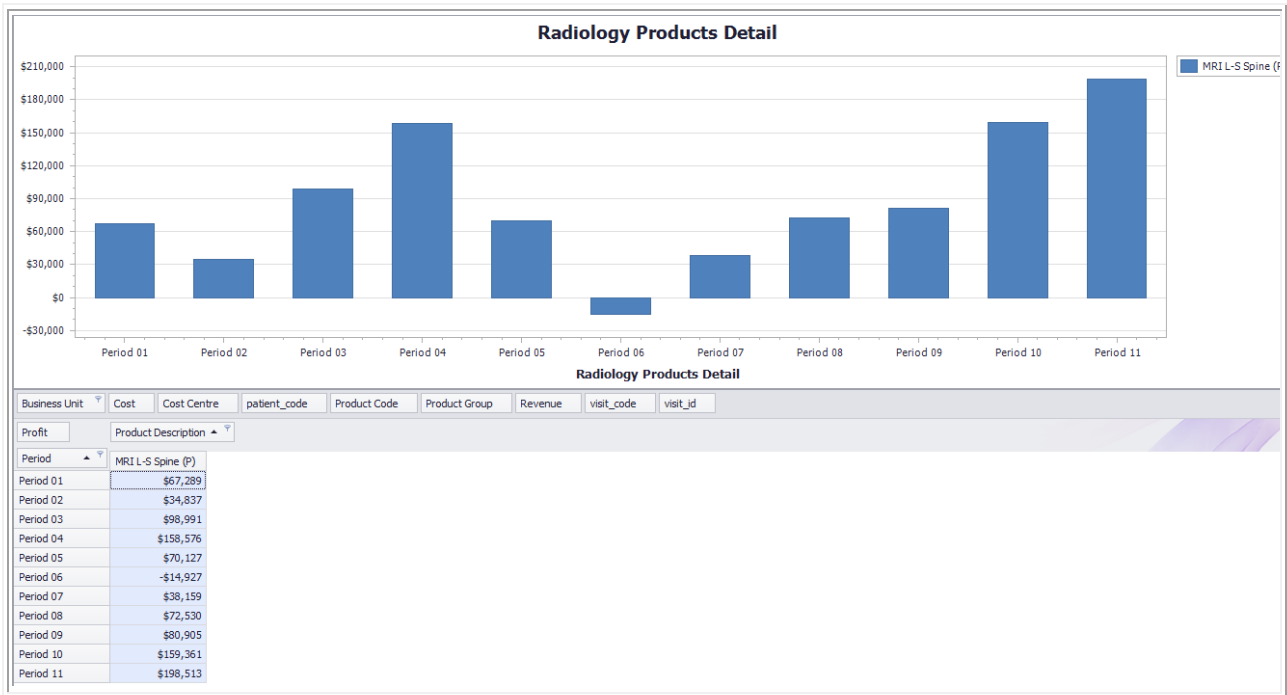
“Radiology Products Detail” under

->Technology->Reporting

Filter to show MRI products



Given the high costs for the MRI equipment, it's important to consider what this equipment item produces and its profitability. The following shows a breakdown of the profits from MRI-related services, over time:



- Note that profits were positive generally, but that losses were made for MRI's during Period 06

It would be interesting to see the details of the visit where these loss-making procedures occurred. To do this, the Radiology Products Detail report allows a user to drill through on a given service and period by double-clicking in the grid below the chart, which will show the details of the service and period (by Patient). The following is for Period 06 for the MRI service:

patient_code	visit_id	visit_code	Business Unit	Product Code	Product	Product Group	Cost Centre	Version_ID	Period	Cost	Revenue	Profit
FEA8192	26716	183811	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
HPU4568	26616	183580	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
DWX8745	26643	183623	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
GFR1554	26016	182470	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
SQH8781	26907	184028	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
RXC2121	26637	183611	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
NJS8738	26578	183494	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
BLH4473	26795	183870	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
MJV4735	26714	183807	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
FZQ3487	26928	184104	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
ECQ3470	26821	183933	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
HRX1114	26672	183722	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
FNL1091	26906	184026	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
TAW0188	26923	184095	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
LML2512	26667	183715	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
FDV1278	26792	183865	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
BQB9110	26724	183834	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
ECS8936	26642	183622	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
LFJ5947	26640	183615	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
PVC6384	26783	183850	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
BLL2752	26819	183927	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...
EAB4417	26626	183592	Hospital 1	4565X	MRI L-S Spine (P)	Radiology	Imaging Departm...	1	Period 06	1194.636363635	1120	-74.6363636349...

Double-clicking on any of the "Patient Code" cells will take the user to that Patient's full visit details (with the reference to that Patient's use of the MRI machine):

Single Patient - DEMO - (Ac 2016/11) - 4.0.4.25346 - admin											
Patient: HPU4568 - Patient 75297											
Visits: Episode of Care Patient Demographic Visit Details Measures OR Details Professionals ICD Procedure Contracts Day Of Stay											
Visit Code Product Group Service Cost Centre										Rows: 129	Menu
Product Group	Product	Service Date	Lin	Quantity	Cost Rate	Total Cost	Revenue	Discount	Profit		
Visit Code : 183580 (11 items)				1,253.5000	\$8,851.05	\$10,837.89	\$11,746.58	\$0.00	\$908		
Product Group : Accommodation (2 items)				26.0000	\$1,533.52	\$2,459.76	\$2,150.35	\$0.00	-\$309		
Product Group : Doctor Fee (1 item)				4.0000	\$202.60	\$202.60	\$340.00	\$0.00	\$137		
Product Group : Drugs (1 item)				16.0000	\$697.34	\$763.72	\$792.20	\$0.00	\$28		
Product Group : EQUIP (1 item)				2.0000	\$0.00	\$0.00	\$1,082.93	\$0.00	\$1,082		
Product Group : Implants (1 item)				3.0000	\$183.68	\$200.32	\$213.89	\$0.00	\$13		
Product Group : Lab (1 item)				8.0000	\$896.24	\$896.24	\$745.50	\$0.00	-\$150		
Product Group : Operating Room (1 item)				141.5000	\$103.29	\$762.80	\$981.56	\$0.00	\$218		
Product Group : Patient services (2 items)				2.0000	\$75.88	\$75.88	\$0.00	\$0.00	-\$75		
Product Group : Radiology (1 item)				5.0000	\$2,748.02	\$2,748.02	\$3,145.00	\$0.00	\$396		
Service Cost Centre : Imaging Department (5 items)				5.0000	\$2,748.02	\$2,748.02	\$3,145.00	\$0.00	\$396		
Radiology	MRI L-S Spine (P)	2016-03-27 00:00:00	Reve..	1.0000	\$1,194.64	\$1,194.64	\$1,120.00	\$0.00	-\$74		
Radiology	CT Brain (F)	2016-03-27 00:00:00	Reve..	1.0000	\$436.00	\$436.00	\$800.00	\$0.00	\$364		
Radiology	CT Whole Abdomen (F)	2016-03-27 00:00:00	Reve..	1.0000	\$436.00	\$436.00	\$422.00	\$0.00	-\$14		
Radiology	Ultrasound Whole Abdomen (P)	2016-03-27 00:00:00	Reve..	1.0000	\$442.46	\$442.46	\$350.00	\$0.00	-\$92		
Radiology	Chest PA (F)	2016-03-27 00:00:00	Reve..	1.0000	\$238.93	\$238.93	\$453.00	\$0.00	\$214		
Product Group : Recharge (1 item)				1.0000	\$0.00	\$0.00	\$0.00	\$0.00	\$0		
Product Group : Supplies (2 items)				1,045.0000	\$2,410.48	\$2,728.54	\$2,295.15	\$0.00	-\$433		
Visit Code : 187115 (9 items)				437.0000	\$2,680.99	\$3,623.43	\$4,350.60	\$0.00	\$727		

- Note that, for the visit in question, the cost of the MRI scan was \$1194.64, while the revenue was \$1120.00 (and so a loss was recorded). The next month, the revenue for the procedure remained the same, but the cost declined – and so in subsequent months, profits were recorded for this procedure:

Single Patient - DEMO - (Ac 2016/11) - 4.0.4.25346 - admin											
Patient: BWJ1351 - Patient 19352											
Visits: Episode of Care Patient Demographic Visit Details Measures OR Details Professionals ICD Procedure Contracts Day Of Stay											
Visit Code Product Group Service Cost Centre										Rows: 111	Menu
Product Group	Product	Service Date	Lin	Quantity	Cost Rate	Total Cost	Revenue	Discount	Profit		
Visit Code : 185758 (9 items)				4,691.5000	\$11,640.07	\$14,862.94	\$17,248.63	\$0.00	\$2,385.70		
Product Group : Accommodation (2 items)				242.0000	\$1,848.30	\$2,719.50	\$4,375.46	\$0.00	\$1,655.96		
Product Group : Doctor Fee (1 item)				3.0000	\$175.61	\$175.61	\$255.00	\$0.00	\$79.39		
Product Group : Drugs (2 items)				25.0000	\$910.31	\$1,176.61	\$1,220.82	\$0.00	\$44.21		
Product Group : EQUIP (1 item)				4.0000	\$0.00	\$0.00	\$2,065.44	\$0.00	\$2,065.44		
Product Group : Lab (1 item)				8.0000	\$1,293.29	\$1,293.29	\$749.00	\$0.00	-\$544.29		
Product Group : Operating Room (2 items)				318.5000	\$147.61	\$1,764.94	\$1,552.73	\$0.00	-\$212.20		
Product Group : Patient services (3 items)				3.0000	\$91.85	\$91.85	\$0.00	\$0.00	-\$91.85		
Product Group : Radiology (1 item)				5.0000	\$2,486.64	\$2,486.64	\$3,145.00	\$0.00	\$658.36		
Service Cost Centre : Imaging Department (5 items)				5.0000	\$2,486.64	\$2,486.64	\$3,145.00	\$0.00	\$658.36		
Radiology	MRI L-S Spine (P)	2016-05-20 00:00:00	Reve..	1.0000	\$905.62	\$905.62	\$1,120.00	\$0.00	\$214.38		
Radiology	Chest PA (F)	2016-05-20 00:00:00	Reve..	1.0000	\$329.65	\$329.65	\$453.00	\$0.00	\$123.35		
Radiology	CT Brain (F)	2016-05-20 00:00:00	Reve..	1.0000	\$343.86	\$343.86	\$800.00	\$0.00	\$456.14		
Radiology	Ultrasound Whole Abdomen (F)	2016-05-20 00:00:00	Reve..	1.0000	\$563.64	\$563.64	\$350.00	\$0.00	-\$213.64		
Radiology	CT Whole Abdomen (F)	2016-05-20 00:00:00	Reve..	1.0000	\$343.86	\$343.86	\$422.00	\$0.00	\$78.14		
Product Group : Supplies (2 items)				4,083.0000	\$4,686.47	\$4,686.47	\$5,154.51	\$3,885.18	\$0.00	-\$1,269.33	

## 5. Conclusion

IntelliMax allows a user to drill down from a very broad financial overview, to specific procedures that took place during a particular patient's visit. In this case study, this was done by concentrating on Radiological Equipment, by investigating an expensive piece of Equipment that was making a loss for a specific procedure in a specific period – but similar studies can be done for other procedures or periods if required.