

Clinical laboratory costing

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Objectives

- Explain the complexity of laboratory testing
- Understand the various components of laboratory testing and costing
- Understand the pitfalls encountered when costing laboratory testing

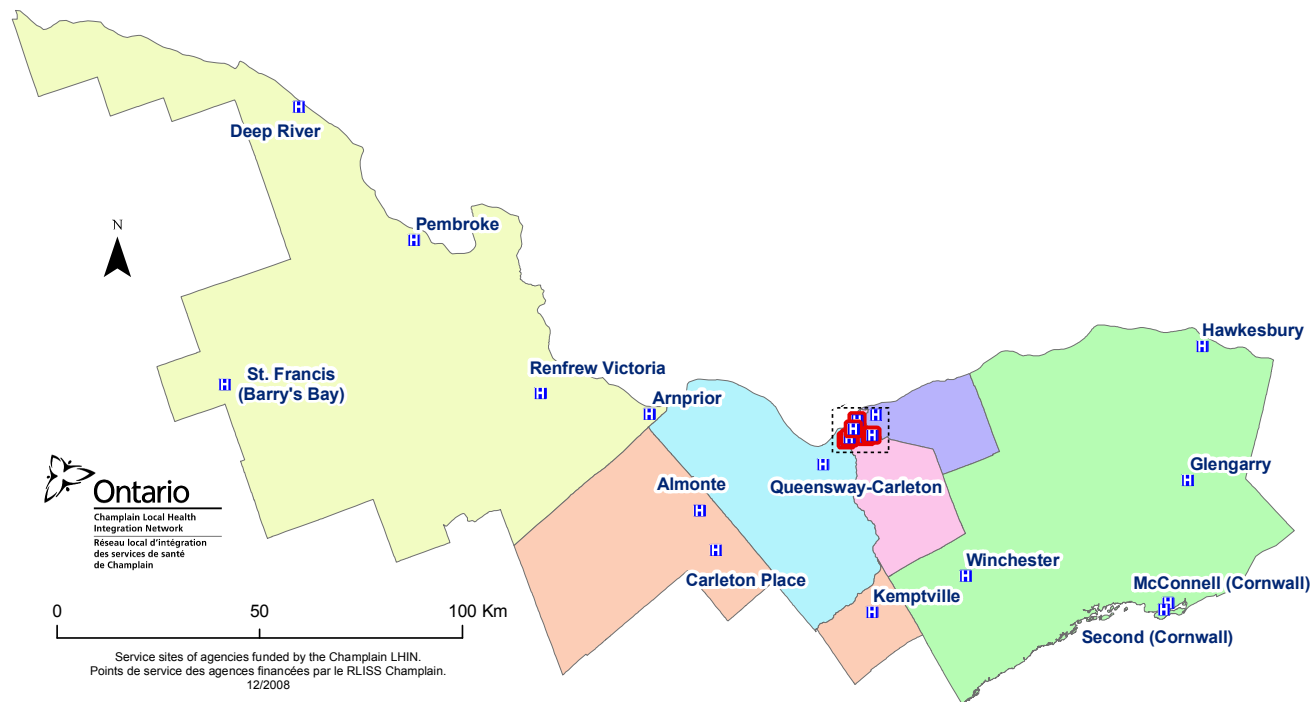


Background

The Ottawa Hospital is a large (~1200 bed) multi-site academic hospital.

TOH is the referral centre for 16 regional community hospitals

The EORLA (Eastern Ontario Regional Laboratory Association) reference laboratory serves as the referral site for 16 regional community hospitals as well as other regional and national hospitals.



Laboratory: excellent value for the money

Hospital laboratories operate on a 24h-7day basis.

- Perform high volume low-complexity testing

- Perform low-volume high complexity testing

- Perform STAT testing when the clinical need arises (ED, ICU, OR, trauma etc)

Laboratory medicine is an often forgotten yet integral part of patient care

- 70% of medical decisions are by based on laboratory results

Sadly, laboratories have little control over testing requested

- Driven by physician ordering patterns



Laboratory Funding



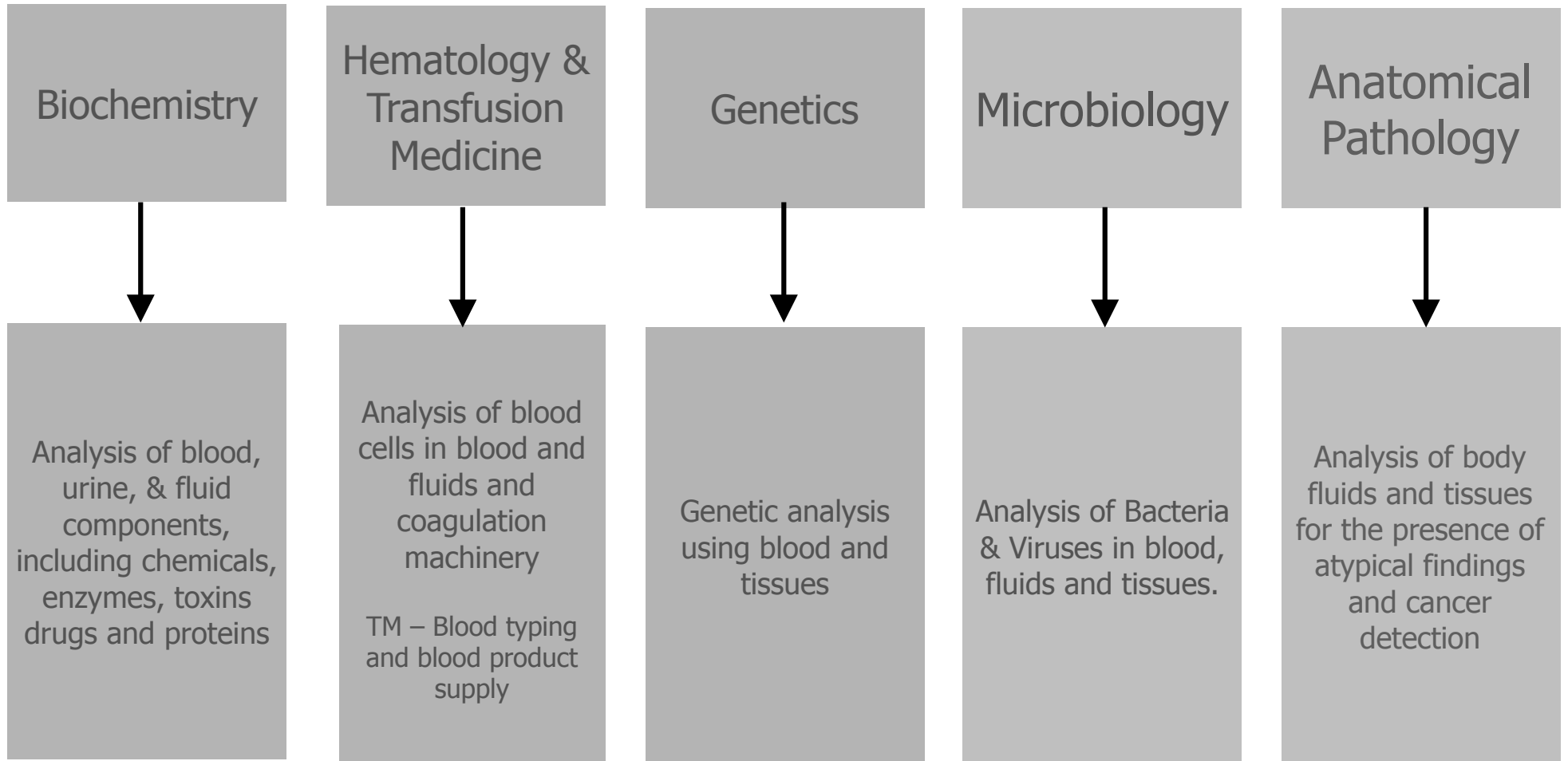
Findings

Among other findings...

Hospital laboratories across Canada are globally funded by provincial and territorial governments, based on a budgeting process.



Department of Pathology and Laboratory Medicine



Example of laboratory staffing

Divisions & Other Areas	Procedures per year	Lab Staff	Medical/Scientific
Administration		8	1
Biochemistry	5,582,284	68	5
Hematopathology	1,014,281	46	6
Transfusion Med	540,437	44	
Pathology	1,919,498	90	25
Microbiology	1,883,621	52	4
Tissue Typing	68,834	6	1
Total	11,801,429	314	42
Phlebotomy and Specimen Receiving		116	



Laboratory testing: patient to result



Laboratory costing



The header features the Ontario logo on the left, followed by the text "Ontario" and "Ministry of Health and Long-Term Care". Below this is a search bar with a "SEARCH" button and a navigation menu with links for "home", "central site", "contact us", "site map", and "français". A dark blue navigation bar contains the following items: "Public Information", "Health Care Providers", "News Media", and "Text Only Version". Below this bar, the word "Section" is positioned above "Health Care Professionals".

Schedule of Laboratory Fees

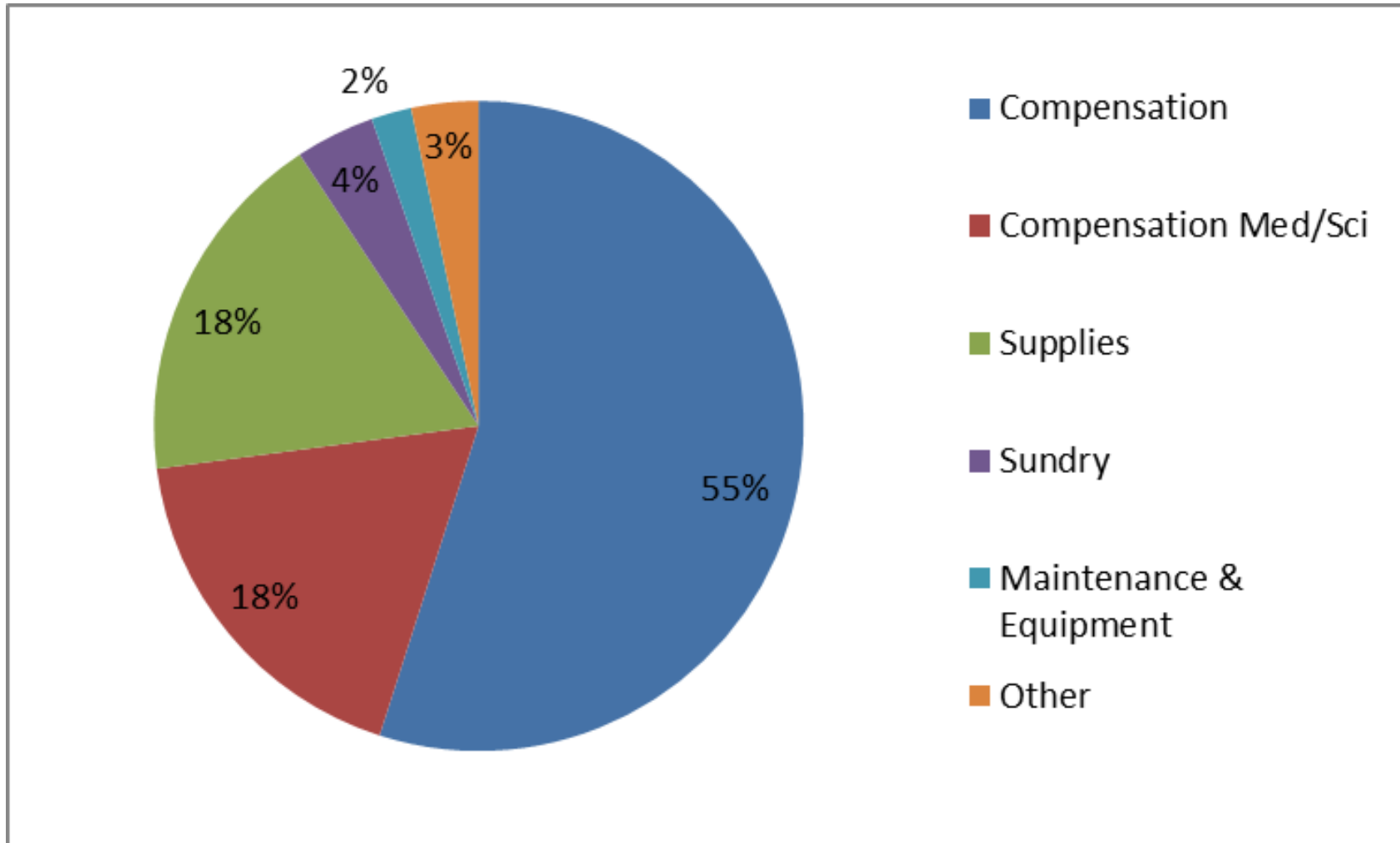
BIOCHEMISTRY

(Applicable to all specimens except as denoted by B-blood, U-urine, F-faeces, C-CSF, A-amniotic fluid).

L059	Acetaminophen	25
L001	Acetone, qualitative	3
L002	Acetone, quantitative	35
L003	Addis count -U	32
L004	Albumin, qualitative	3
L005	Albumin, quantitative (excluded if globulin and/or protein electrophoresis done)	5
L006	Alcohol, ethyl - quantitative	25
L008	Alcohols, fractionation and quantification	45
L009	Aldolase	30
L010	Aldosterone.	120
L011	Amino acids - one way chromatography - B.U.	15
L012	Amino acids - two way chromatography - U	30
L013	Amino acids, fractionation and quantitation	200
L014	Amino acid nitrogen	33
L044	Acid profile - organic (by GC-MS)	200

(Applicable to all specimens except as denoted by B-blood, U-urine, F-faeces, C-CSF, A-amniotic fluid).

Total cost breakdown

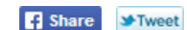


Determining labour component



- Types of Care
- Health System Performance
- Spending and Health Workforce
- Factors Influencing Health
- Quick Stats
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- Access Data
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MIS Standards



The Standards for Management Information Systems in Canadian Health Service Organizations ([MIS Standards](#)) is a set of national standards for gathering and processing data and for reporting financial and statistical data on the day-to-day operations of a health service organization.

Access the current [MIS Standards 2013](#) or preview the [MIS Standards 2016](#), which comes into effect April 1, 2016. [What's new in 2016?](#)

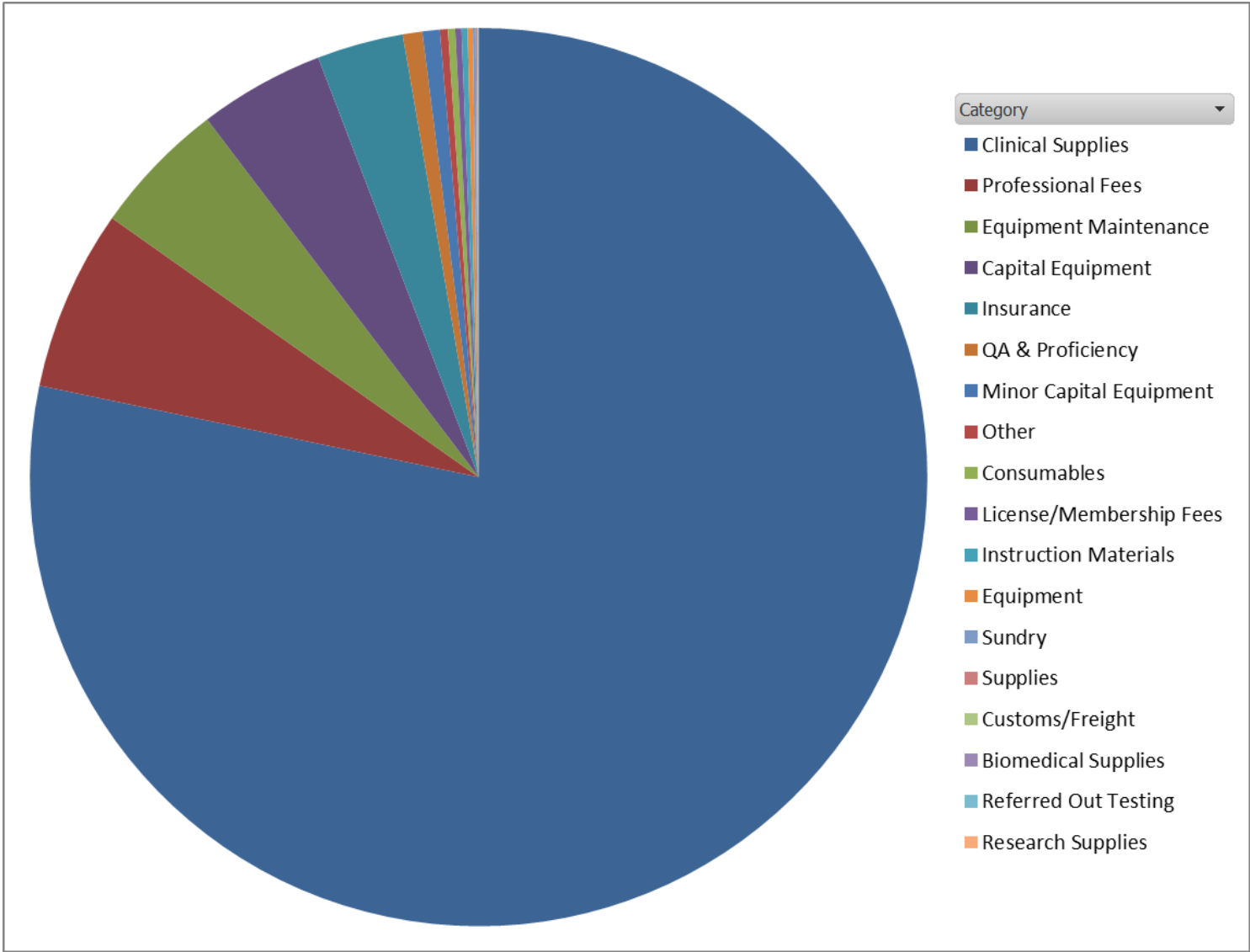
These national standards help to improve the effectiveness and efficiency of Canada's hospitals and long-term care and residential care, home care, community health, primary care and public health organizations. Ministries of health report detailed financial and statistical data, generated with the MIS Standards, to CIHI's [Canadian MIS Database](#).

We welcome your feedback and questions

- Contact our MIS section at fsi@cihi.ca.

Code	Laboratory	Unit Value
Specimen Procurement		
10000	Specimen procurement – basic Includes: order review, preparation of materials, greeting, identifying and instructing the service recipient, specimen labelling, post procurement service recipient care (includes instructions related to glucose tolerance testing). Includes: all types of biological material (e.g. blood, urine, stool),	1.2

Non-compensation costs



Cost confusion

- Direct Labour Costs

 - Laboratory Staff**

 - Phlebotomists
 - clerks
 - technicians
 - registered technologists
 - Medical/Scientific staff

- Indirect Labour Costs

 - Administrative staff**

 - Management staff**

 - Laboratory Staff**

 - Supervisory technical staff
 - Medical/Scientific Staff

- Direct Material Costs

 - Collection needles
 - Collection tube/bottles
 - Aliquot tubes
 - Pipettes
 - Reagents (juice)
 - testing cuvettes
 - Quality control material
 - Calibrator material

 - Resulting costs**

 - Paper
 - Ink
 - Envelopes
 - Mailing costs

- Indirect Material Costs

 - Service contracts
 - Analyzer cost
 - Facilities cost
 - External Quality Assessment
 - Instrument amortization
 - Gloves
 - Other consumables



Laboratory costing system based on number and type of test: its association with the Welcan workload measurement system

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Repeat testing
 Trouble shooting
 Quality control
 Phoning critical results

Table 2 Example cost profiles highlighting direct and indirect cost elements

Test Procedure	Materials costs (£)			Labour costs (£)			Total direct labour (£)	Total labour cost (£)	Total cost (£)
	Direct	Indirect	Total materials cost (£)	Direct		Indirect			
				Analytical	Other				
Electrolyte profile (AU5000)	0.495	0.502	0.997	0.188	0.865	1.402	1.053	2.455	3.452
Bone profile (AU5000)	0.235	0.335	0.570	0.101	0.577	0.934	0.677	1.612	2.182
Liver profile (AU5000)	0.267	0.418	0.685	0.142	0.721	1.168	0.863	2.031	2.716
Electrolyte profile (Synchron CX3)	0.541	0.502	1.043	0.353	0.865	1.402	1.218	2.620	3.663
CK	0.284	0.084	0.368	0.193	0.144	0.234	0.337	0.571	0.939
Glucose	0.213	0.084	0.297	0.164	0.144	0.234	0.308	0.542	0.839
Cholesterol	0.174	0.084	0.258	0.152	0.144	0.234	0.296	0.530	0.788
Blood gases	0.493	0.251	0.744	0.617	0.433	0.701	1.050	1.751	2.495
TSH	1.498	0.084	1.582	0.216	0.144	0.234	0.360	0.594	2.176
T4	0.712	0.084	0.796	0.304	0.144	0.234	0.448	0.682	1.478
Urine catecholamines	0.827	0.251	1.078	1.232	0.433	0.701	1.665	2.366	3.444

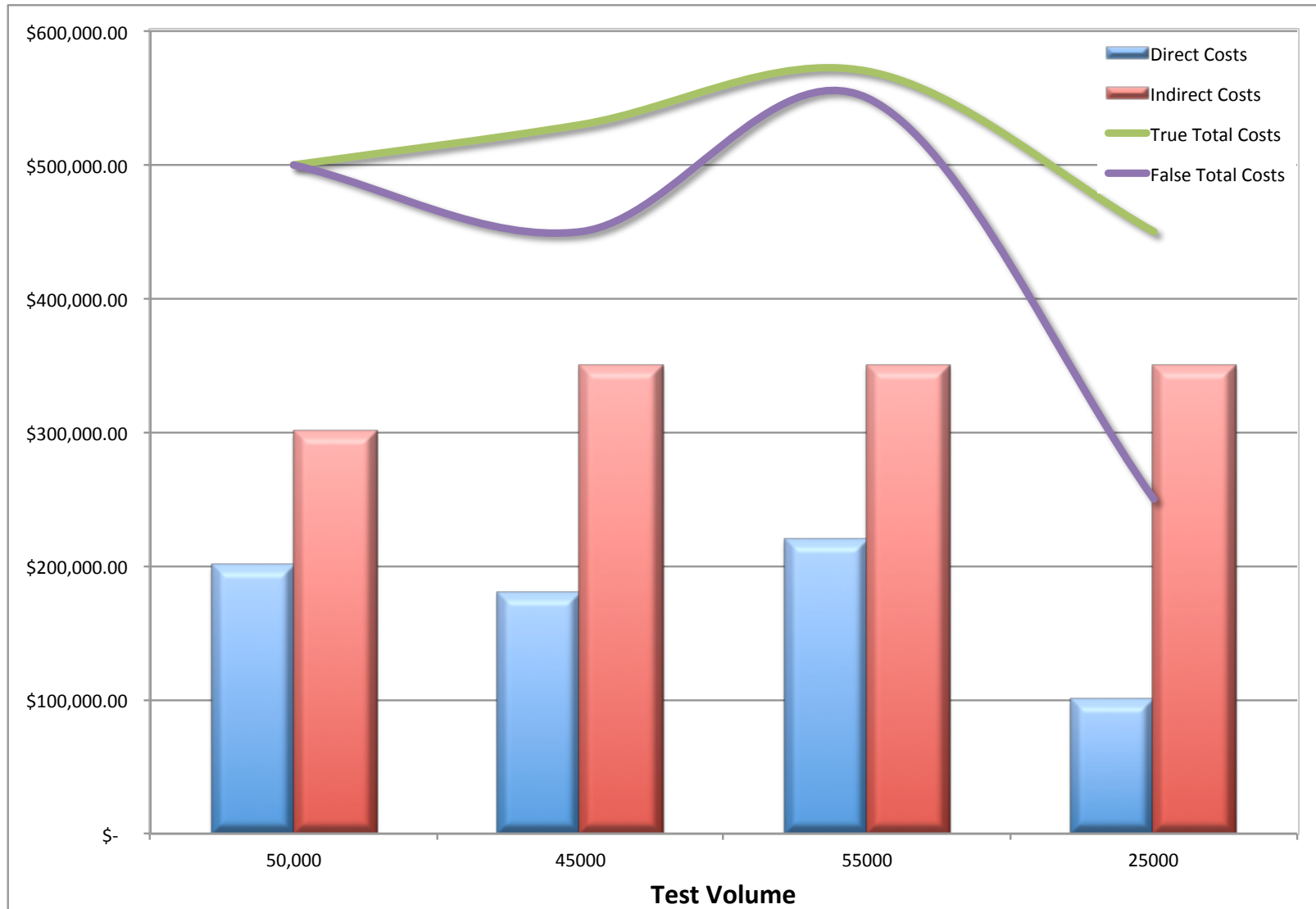


Forgotten costs - analyzer replacement

Table 3 Example test amortisation changes based on optional methods of capital investment recovery

<i>Test (analyser)</i>	<i>Method (1) Universal test charge (£)</i>	<i>Method (2) Charge targeted at tests using particular analyser</i>	
		<i>(a) Universal charge (£)</i>	<i>(b) Weighted to reflect workload on instrument (£)</i>
Plasma sodium (AU5000)	0.098	0.071	0.075
Plasma calcium (AU5000)	0.098	0.071	0.062
Plasma cholesterol (Cobas Mira)	0.098	0.323	0.439
Plasma urate (Cobas Mira)	0.098	0.323	0.227
Serum CK (Cobas Bio)	0.098	0.318	0.410
Plasma glucose (Cobas Bio)	0.098	0.318	0.304

Total cost pitfalls



Laboratory type

The type of laboratory can influence the cost of testing

High-volume low complexity testing

greater “testing efficiency”

lower cost per test

STAT analysis usually not required

limited medical/scientific staff

e.g. private laboratories

Low-volume mixed complexity testing

lower “testing efficiency”

mid cost per test

STAT testing required

limited medical/scientific staff

e.g. community hospitals

High-volume high-complexity testing

mid “testing efficiency”

mid cost per test, but can be high for some tests

STAT testing required

esoteric testing performed

greater numbers of medical/scientific staff

e.g. academic health science centres



Laboratory cost model

What is the best model?

Cost buckets

Individual test costs

Separate direct and indirect costs

Separate labour from testing costs

