

Evaluation report

Urodynamic systems

CEP09038

December 2009



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The product

This evaluation report covers 26 urodynamic systems commercially available within the UK.

Field of use

Urodynamic systems are used to investigate bladder and urethral function by means of pressure and flow measurements. In the UK, urodynamic investigations are performed widely in secondary and tertiary level settings.

National guidance

The National Institute for Health and Clinical Excellence (NICE) has issued guidelines on urodynamic investigations in women. A joint statement on minimum standards for urodynamic practice in the UK was published in April 2009 by the UK Continence Society.

Methods

A representative sample of each manufacturer's models on the UK market was selected. The study covered most permutations of devices available, excluding the very top-end models of each range. Each machine was evaluated by five users who routinely carried out urodynamic studies but had differing levels of experience and backgrounds. Star ratings for usability were derived from a completed laboratory questionnaire.

Technical performance

All machines evaluated scored between three and five stars (out of five) for aspects of usability. Most scored four stars, rated as 'good'. Any purchase of equipment should also include comparative demonstrations and evaluations of different machines, since user personal preferences will significantly affect acceptability.

Operational considerations

CEP's buyers' guide describes general operational considerations in detail.

Economic considerations

A whole-life costing method and business case approach is described in CEP's buyers' guide. Whereas the range of costs of machines currently available (for which prices were given) is £9,000 to £40,000, the whole life estimated costs range from £65,000 to £103,000. Each manufacturer offers a selection of optional features that will affect product pricing significantly.

CEP verdict

With appropriate training and protocols, all the machines evaluated can deliver good quality urodynamic tests. The key for delivery of a good urodynamic service therefore lies in the training of staff operating the equipment and interpreting the tests.

This evaluation report presents the findings of a user evaluation of urodynamic systems available in the UK, together with comparative product specifications. It supplements CEP's buyers' guide to urodynamic systems [1], which offers more general advice on the technical, operational, and economic considerations to be taken into account when selecting an appropriate product.

Scope

This evaluation report presents a comprehensive overview of urodynamic equipment available in the UK. It provides comparative product specifications and user evaluation data on 26 systems. 'Stand-alone' flow meters, ambulatory urodynamic systems and non-invasive urodynamic systems are not included.

This evaluation report should be read in conjunction with CEP's buyers' guide to urodynamic systems [1].

National guidance

The National Institute for Health and Clinical Excellence (NICE) has issued guidelines on urodynamic investigations in women, and a joint statement on minimum standards for urodynamic practice in the UK was published in April 2009 by the UK Continence Society. These are discussed in more detail in CEP's buyers' guide [1].

Decision guidance table

Table 1 classifies all current models on the UK market according to two key features: their physical configuration, and their capacity for video urodynamics. Tables 1 - 7 are intended to help prospective purchasers to shortlist suitable products.

For the 19 hardware models on the UK market, there are six manufacturers based in Europe and two in North America. All distributors have UK-based service personnel.

Table 1. Decision guidance table

	Portable or pole-mounted systems	Trolley mounted systems
No option for video connection	Andromeda Helix Dantec Brenna Laborie Delphis / Delphis-IP Mediwatch Portable with Duet MMS Solar Blue	Laborie Delphis-KT
Option for video connection	Andromeda Ellipse / Helix-AUDACT Life-Tech Mercury / All-in-One Mediwatch Portable with Sensic	Albyn Phoenix Plus Andromeda Ellipse-AUDACT Dantec Kallan / Acquanetta Laborie Dorado KT / Triton / Aquarius Life-Tech Urolab Mediwatch Encompass / Duet Logic G2 / G3 Sensic / Clinic with Duet or Sensic MMS Solar Sedia SE6

Portable or pole-mounted systems

These systems are designed for mobile clinic use or for easy portability within a department. The units offering video connections run with laptop computers and wireless links. Two units (Mediwatch Portable and MMS Solar Blue) are designed for desktop use, whereas the other portable systems have small wheeled units. Three units (Laborie Delphis-IP, MMS Solar Blue and Life-Tech Mercury) can have the patient connections mounted on a standard IV pole.

Trolley mounted systems

Most equipment mounted on a dedicated trolley has the pump, pressure transducers and desktop computer on the one unit. The Laborie Triton and Aquarius systems use a separate trolley for pump and transducers.

User evaluation

A representative sample of each manufacturer's models on the UK market was selected. The study covered most permutations of devices available, excluding the very top-end models of each range.

Each machine was evaluated by five users who routinely carried out urodynamic studies but had differing levels of experience and backgrounds. The team comprised one doctor, three nurses and one clinical engineer. Induction for each machine was given by the distributor's representative to available staff, the remainder being inducted later by the clinical engineer. A urodynamic simulator built at Southern General Hospital, Glasgow was used to generate pressures that replicate patient test recordings. Each machine evaluated using exactly the same set of patient data.










Tables 2 - 5 list the main specifications for each machine currently available on the UK market. Tables 2 and 4 summarise the features of trolley-mounted systems; tables 3 and 5 cover more portable devices. The tables group together some devices in a single column. The differences between these devices are in features that are not listed in the tables. In such cases, the picture shown is generally of the model which differs most significantly from the others in appearance. Otherwise, the picture is of the first model listed.

Those systems that were evaluated have 'star' ratings showing the assessment of usability. These star ratings are derived from completed laboratory questionnaires, using the median of the team's assessment for a given area of operation. The 37-point questionnaire used for assessment (included at appendix 2) was divided into three areas for this analysis. The star ratings are relative and subjective, but reflect the average assessment of a team of experienced users. Three stars means 'acceptable' and five stars 'very good'. Where stars are not given, it indicates that the particular model was not included in the evaluation but is available on the UK market.

The ECRI report on urodynamic measurement systems, published in 2007 [2] includes devices in this evaluation report, as well as those available only on the US market. Some of the devices covered in this report are not available in the US.





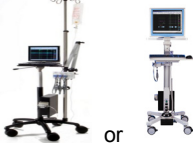
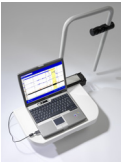

Technical performance

Table 2. Trolley mounted systems - specifications

Model	Albyn Phoenix Plus	Andromeda Ellipse – AUDACT	Dantec Kallan / Acquanetta	Laborie Dorado KT / Delphis- KT / Triton / Aquarius	Life-Tech Urolab	Mediwatch Duet Logic G2 / Clinic with Duet or Sensic / Encompass	MMS Solar	Sedia SE6	
Picture				 or 					
Specification	Normal Configuration	Trolley	Trolley	Trolley	Trolley	Various	Trolley	Trolley or pole mounted	Trolley
	Uroflowmeter type	Weight sensor	Weight sensor	Weight sensor	Weight sensor	Weight sensor	User choice	Weight sensor	Weight sensor
	Wireless flowmeter option	✓ (2010)		✓	✓	✓	✓ (Sensic)	✓	✓
	Profilometer option	✓	✓	✓	✓	✓	✓	✓	✓
	Max no. of pressure channels	9	8	8	8	8	4 (10 Encompass)	5 - 15	31
	Calibration by user	✓	✓	✓	✓	✓	✓	✓	✓
	EMG amplifier option	✓	✓	✓	✓	✓	✓	✓	✓
	Monitor size (cm)	Optional (up to 55)	15 and user choice (on PC)	48	Optional (up to 53)	User choice	38-43-53	48	42 or any
	Video Capture option	✓	✓	✓	✓	✓	✓	✓	✓
	Report formats	Word & PDF	PDF, Word	PDF, Word	Proprietary, PDF	Numerous	PDF, Word	PDF, JPG, proprietary	PDF & proprietary
Data export formats	Text, CSV, DICOM	Text, ICS	Text, ICS	Text, ICS	Text, ICS, Excel	Proprietary, ICS, CSV, HL7	ICS, ASCII, CSV, XML	Various	


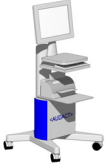







Technical performance

Table 3. Portable / pole mounted systems - specifications

Model	Andromeda Helix / Helix-AUDACT	Andromeda Ellipse	Dantec Brenna	Laborie Delphis / Delphis IP	Life-Tech Mercury / All-in-One	Mediwatch Portable with Sentic / Portable with Duet	MMS Solar Blue	
Picture								
Specification	Normal Configuration	Mini trolley	Mini trolley	Mini trolley	Mini trolley / pole (IP)	Portable	Portable	Portable or pole mounted
	Uroflowmeter type	Weight sensor	Weight sensor	Weight sensor	Weight sensor	Weight sensor	User choice	Weight sensor
	Wireless flowmeter option				✓	✓	✓ (Sentic)	✓
	Profilometer option	✓	✓	✓	✓	✓	✓	✓
	Max no. of pressure channels	3	8	5	4	8	4	4
	Calibration by user	✓	✓	✓	✓		✓	✓
	EMG amplifier option	✓	✓	✓	✓	✓	✓	✓
	Monitor size (cm)	15	15	user choice	User choice, up to 48	Laptop	38-43-53	Laptop
	Video Capture option	✓ (with AUDACT)	✓			✓	✓ (Sentic)	
	Report formats	PDF, Word (via laptop)	PDF, Word (via laptop)	PDF, Word	Proprietary, PDF	Numerous	PDF, Word	PDF, JPG, proprietary
	Data export formats	Text, ICS (via laptop)	Text, ICS (via laptop)	Text, ICS	Text, ICS	Text, ICS, Excel	Proprietary, ICS, CSV, HL7	ICS, ASCII, CSV, XML








Operational considerations

Table 4. Trolley mounted systems - usability

Model	Albyn Phoenix Plus	Andromeda Ellipse – AUDACT	Dantec Kallan / Acquanetta	Laborie Dorado KT / Delphis- KT / Triton / Aquarius	Life-Tech Urolab	Mediwatch Duet Logic G2 / Clinic with Duet or Sentic / Encompass	MMS Solar	Sedia SE6
Picture				 or 				
Usability	Physical setting-up and checking	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	Flow, UPP and Pressure/flow tests	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	Report, analysis & data management	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
	Summary of user comments	Screen and printout can be complex, but user interface is good. Solid and safe construction – monitor is fixed.	Portable version only evaluated (below) – trolley version has full PC and protocol capacity. Transducer mounting can be difficult.	Kallan evaluated. Both strong and easily movable. Touch screen helpful. Pump not easily accessible. Good requiring zeroing to start.	Dorado KT evaluated Laid out very tightly on single trolley. Software and data can be complex without careful setting up. Clear screen displays.	Large number of options may confuse if displayed unnecessarily by user. However, software is versatile and expandable – three levels to choose from.	Duet Logic G2 evaluated. Upgrade of former Medtronic Duet. Layout requires care with infection prevention. Pressure transducers are very close together.	Has many useful options, printouts can be busy as a result. Needs careful setting up. Good pump and infusion holder design. 'Silver' / 'gold' models available.
★= very poor ★★= poor ★★★= acceptable ★★★★= good ★★★★★= very good								

Operational considerations

Table 5. Portable / pole mounted systems - usability

Model	Andromeda Helix / Helix-AUDACT	Andromeda Ellipse	Dantec Brenna	Laborie Delphis / Delphis IP	Life-Tech Mercury / All-in-One	Mediwatch Portable with Sentic / Portable with Duet	MMS Solar Blue
Picture							
Usability	Physical setting-up and checking	★★★★★	★★★★★		★★★★★	★★★★★	
	Flow, UPP and Pressure/flow tests	★★★★★	★★★★★		★★★★★	★★★★★	
	Report, analysis & data management	★★★★★	★★★★★		★★★★★	★★★★★	
	Summary of user comments	Helix evaluated. Compact and portable, but transducer height is not adjustable. PC used only for real time display and post-test analysis.	Transducer mounting can be difficult. PC used only for real time display and post-test analysis. Dealer needs to set up test protocol.	Not evaluated – new to UK market	Excellent portability and infection control features. Laptop and printer wirelessly connected. Also available on KT trolley.	Mercury evaluated. Very compact system. Many software options available, thus user experience needed for full utility. Three levels of software to choose from.	Portable with Sentic evaluated. Software is easy to use and quite fail-safe, with many automatic features. For full versatility it requires an extra software key.
★= very poor ★★= poor ★★★= acceptable ★★★★= good ★★★★★= very good							

Generic advice on considerations for hardware, consumables, software and training will be found in CEP's buyers' guide [1].

Instructions for use

Most devices evaluated provided user manuals on request in PDF electronic format. If paper copies are required, this should be specified at time of purchase. Many instruction leaflets include basic guidance on urodynamic practice. However, this content should be checked against current accepted best practice.

Connectivity

All devices evaluated offer the potential for connection to hospital computer networks. This feature is best specified at time of purchase if required. The department should consider whether a network cable to the computer will impede movement in the clinical environment and whether storage of test results in the electronic record system is a requirement.

Maintenance and servicing

All distributors of urodynamic equipment offer service contracts of different levels. A department's requirement will depend on the level of technical assistance available. It is possible for a technically proficient department to undertake its own calibration and basic servicing (with the exception of Life-Tech machines, which require the company to carry out calibration). However, electrical safety tests and repair work can only be carried out by competent technicians. An assessment of the accessibility of technical support will therefore need to be made before a decision is taken on the type of service contract required.

It is recommended that urodynamic machines have their calibration checked by staff at least every month. While the frequency of servicing necessarily depends on the amount of use, a service carried out every six months is normal across distributors.







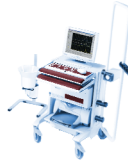


In tables 6 and 7, whole-life costs for the urodynamic systems are estimated using the guidelines provided in the *Economic considerations* section of CEP's buyers' guide [1], based on a throughput of 250 tests per year with consumable costs of £30 per test. The ranges of purchase list prices and maintenance contract prices reflect the various available hardware / software options and levels of maintenance cover. As these vary substantially, it is recommended that the specifying department consider carefully what features and support are essential for clinical service. The tender specification can then promote effective comparison between bidder prices.

It will be seen that the purchase costs for devices range from £9,000 (Mediwatch Portable) to £40,000 (Mediwatch Sensic Clinic with all features). Additionally, these two devices represented the widest range of whole-life costs. However, the Laborie price range was not available for this report.

Costs are naturally lower for more portable devices but functionality and usability are necessarily reduced by the alternative packaging. Suppliers have also commented on the insecurity due to theft of laptop computers in hospital environments, a factor which may make a trolley based system worth the sacrifice in mobility. However, all the portable devices evaluated gave acceptable quality of urodynamic tests and will represent good value for money where ease of portability is a key specification.






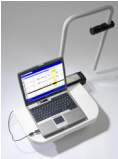

Economic considerations

Table 6. Trolley mounted systems – purchasing information

Model	Albyn Phoenix Plus	Andromeda Ellipse – AUDACT	Dantec Kallan / Acquanetta	Laborie Dorado KT / Delphis-KT / Triton / Aquarius	Life-Tech Urolab	Mediwatch Duet Logic G2 / Clinic with Duet or Sentic / Encompass	MMS Solar	Sedia SE6	
Picture				 or 					
Purchasing information	Supplier name	Albyn Medical	Mediplus	Dantec Dynamics	Laborie	Genesis Medical	Mediwatch	Lewis Medical	Digitimer
	List price range, £	15k to 28k	15k to 20k	18k to 20k	n/a	15k to 34k	10k to 40k	14k to 25k	From 19.9k
	Warranty period, years	2	2	2	2	1	2	2	1
	Year first sold	2001	1996	2008 in UK	2004	Early 1980s	2003	2001	2004
	Number sold to date in UK (up to 2008)	>75	1	2	28	N/A	52	40+	63
	Maintenance contract price (£/yr)	1500 to 2500	500 to 1500	650 to 1700	n/a	850 to 2400	600 to 2500	1000 to 2500	1648 (min)
	Lifecycle cost (£)	75k to 93k	70k to 80k	74k to 81k	n/a	72k to 99k	66k to 103k	72k to 90k	from 81k

Economic considerations

Table 7. Portable /pole mounted systems – purchasing information

Model	Andromeda Helix / Helix-AUDACT	Andromeda Ellipse	Dantec Brenna	Laborie Delphis / Delphis IP	Life-Tech Mercury / All-in-One	Mediwatch Portable with Sensic / Portable with Duet	MMS Solar Blue	
Picture								
Purchasing information	Supplier name	Mediplus	Mediplus	Dantec Dynamics	Laborie	Genesis Medical	Mediwatch	Lewis Medical
	List price range, £	12k to 17k	15k to 20k	c12K	n/a	15k to 34k	9k to 14k	11k to 13k
	Warranty period, years	2	2	2	2	1	2	1
	Year first sold	2006	1996	2008 in UK	2002	2007 (Mercury)	2009	2009
	Number sold to date in UK (up to 2008)	3	1	0	17	N/A	0	0
	Maintenance contract price (£/yr)	500 to 1500	500 to 1500	650 to 1700	n/a	850 to 2400	600 to 1700	1000 to 2500
	Lifecycle cost (£)	67k to 77k	70k to 80k	68k to 73k	n/a	72k to 99k	65k to 75k	69k to 78k

Generic advice on procurement options, the procurement panel, sustainability and business cases can be found in CEP's buyers' guide [1].

Purchasing procedures

The Trust Operational Purchasing Procedures Manual provides details of the procurement process [3].

European Union procurement rules apply to public bodies, including the NHS, for all contracts worth more than £90,319 (from January 1st 2008) [4], an amount that is well in excess of the cost of a single urodynamic machine. The purpose of these rules is to open up the public procurement market and ensure the free movement of goods and services within the EU. In the majority of cases, a competition is required and decisions should be based on best value.

NHS Supply Chain (www.supplychain.nhs.uk), a ten year contract operated by DHL on behalf of the NHS Business Services Authority, offers OJEU compliant national contracts or framework agreements for a range of products, goods and services. Use of these agreements is not compulsory and NHS organisations may opt to follow local procedures.

Warranty

Urodynamic machines in the UK are supplied with a warranty of either one or two years.

Sustainable procurement

The UK Government launched its current strategy for sustainable development, *Securing the Future* [5] in March 2005. The strategy describes four priorities in progressing sustainable development:

- sustainable production and consumption – working towards achieving more with less
- natural resource protection and environmental enhancement – protecting the natural resources and habitats upon which we depend
- sustainable communities – creating places where people want to live and work, now and in the future
- climate change and energy – confronting a significant global threat.

The strategy highlights the key role of public procurement in delivering sustainability.

End-of-life disposal

Consideration should be given to the likely financial and environmental costs of disposal at the end of the product's life. Where appropriate, suppliers of equipment placed on the market after the 13th August 2005 should be able to demonstrate compliance with the UK Waste Electrical and Electronic Equipment (WEEE) regulations (2006) [6]. The WEEE regulations place responsibility for financing the cost of collection and disposal on the producer. Electrical and electronic equipment is exempt from the WEEE regulations where it is deemed to be contaminated at the point at which the equipment is scheduled for disposal by the final user. However, if it is subsequently decontaminated such that it no longer poses an infection risk, it is again covered by the WEEE regulations, and there may be potential to dispose of the unit through the normal WEEE recovery channels.

We should like to thank the following for their contribution to this evaluation report.

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Debbie Delgado, Urodynamics Nurse, Southmead Hospital, Bristol.

Julie Ellis-Jones, Urodynamics Nurse, Southmead Hospital, Bristol.

Aled Evans, Medical Physics Department, Southern General Hospital, Glasgow.

Roger Lewis, Managing Director, Lewis Medical Ltd

Carl Loveluck, Clinical Applications Specialist, Dantec Dynamics Ltd

Jon McFarlane, Consultant Urologist, Royal United Hospital, Bath.

Paul Scarborough, Sales Manager, Digitimer Ltd

Doug Small, Medical Physics Department, Southern General Hospital, Glasgow.

Adrian Smart, Customer Support, Laborie Medical Technologies Europe Ltd

Donald Smith, Medical Physics Department, Southern General Hospital, Glasgow.

Stuart Taylor, Product Manager, Albyn Medical Ltd

James Urie, Sales & Marketing Director, Mediplus Ltd

Tim Ward, Operations Manager, Mediplus Ltd

Jo Wilkinson, Product Specialist, Genesis Medical Ltd

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- [1] Centre for Evidence-based Purchasing. Buyers' guide: Urodynamic systems. London: NHS Purchasing and Supply Agency;2009. CEP09037.
 - [2] ECRI Product Comparison Urodynamic Measurement Systems. ECRI (USA) 2007 Available from: URL: www.ecri.org
 - [3] <http://nww.pasa.nhs.uk/PASAWeb/Guidance/TOPPM/LandingPage.htm>
(NHS intranet only)
 - [4] http://www.ogc.gov.uk/procurement_policy_and_application_of_eu_rules_eu_procurement_thresholds_.asp
 - [5] UK Government Strategy for Sustainable Development; Securing the Future <http://www.defra.gov.uk/sustainable/government/publications/index.htm>
 - [6] EC Directive on Waste Electrical and Electronic Equipment <http://www.berr.gov.uk/files/file35992.pdf>

UK Supplier	Address	Telephone / Fax / Website	Manufacturer
Albyn	Bridgend Road Industrial Estate Dingwall Ross-shire IV15 9QF Scotland, UK	01349 862388 01349 864146 www.albynmedical.com	Albyn www.albynmedical.com
Dantec	Garonor Way Royal Portbury Bristol BS20 7XE	01275 375333 01275 375336 www.dantecdynamics.com	Dantec www.dantecdynamics.com
Digitimer	37 Hydeway Welwyn Garden City AL7 3BE	01707 328347 01707 373153 www.digitimer.com	Sedia www.sedia.ch
Genesis Medical	7 Trojan Business Park Cobbold Road London NW10 9ST	0208 451 4100 020 8451 4115 www.genmedhealth.com	Life-Tech www.life-tech.com
Laborie Europe	Unit 5, Garonor Way, Royal Portbury, Bristol BS20 7XE	01275 372332 01275 375145 www.laborie.com	Laborie www.laborie.com
Lewis Medical	826 Green Lanes London N21 2RT	0208 360 7273 0208 360 9176 www.lewismedical.uk.com	MMS www.mmsinternational.com
Mediplus	Unit 7, The Gateway Centre, Cressex Business Park Coronation Road High Wycombe HP12 3SU	01494 551200 01494 536333 www.mediplus.co.uk	Andromeda www.andromeda-ms.de
Mediwatch	Swift House Cosford Lane Rugby CV21 1QN	01788 547888 01788 536434 www.mediwatch.com	Mediwatch www.mediwatch.com

Area of evaluation / Task	Very poor	Less than acceptable	Acceptable	Good	Very good	Any comments?
Training						
<i>1. Initial induction</i> Rate the ease of first learning during induction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Physical						
<i>2. The arrangement of transducers</i> Rate the ease of access in a clinical setting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>3. The layout of computer and printer</i> Rate the ease of handling and use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>4. Portability</i> Rate the ease of movement about the room	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>5. Wires and cables</i> Rate the safety of wire arrangement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>6. Infection control / cleaning</i> Rate the ease of cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Setting up						
<i>7. Mount transducer domes</i> Rate the ease of mounting domes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>8. Access for flushing transducers.</i> Rate the ease of access for the flushing procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>9. Flush transducers</i> Rate the style of dome for ease of flushing out air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>10. Load bag & pump, draining fluid into free jug</i> Rate the ease of loading bag and giving set	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>11. Adjust height of transducers.</i> Rate the ease of adjusting transducer height	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Accuracy checking and zeroing						
<i>12. Checking of flow reading</i> Rate the ease of checking flow rate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>13. Checking of pressure reading</i> Rate the ease of checking both pressure lines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<i>14. Zeroing transducers to atmosphere</i> Rate the ease of zeroing transducers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Area of evaluation / Task	Very poor	Less than acceptable	Acceptable	Good	Very good	Any comments?
Data entry and flow test						
15. <i>Enter patient data (use machine name and your initials)</i> Rate the ease of patient data entry, noting any unique features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
16. <i>Record a flow test using constant flow bottle</i> Rate the ease of recording the flow test, noting any automatic features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
UPP test						
17. <i>Record the UPP test</i> Rate the ease of carrying out the UPP test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
18. <i>UPP analysis</i> Rate the ease of analysing the trace, noting any automatic features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Dummy test (using urodynamic simulator)						
19. <i>Starting software for test run</i> Rate ease of starting to record the urodynamic test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
20. <i>Attempt real time annotation</i> Rate the ease of making annotations during the test	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
21. <i>Change pump speed up and down</i> Rate the ease of changing pump speed, noting any helpful features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
22. <i>Video frame acquisition</i> Rate the ease of capturing video images from the camera, noting positive and negative features	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
23. <i>EMG signal acquisition</i> Holding all of the electrodes in one hand, rate the ease of EMG signal display and volume control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
24. <i>Change infusion bag</i> Rate ability of software to adjust volume during change of bag	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
25. <i>Display of signals</i> Rate the clarity of display on the pressure lines of cough, detrusor overactivity and tube movements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
26. <i>Screen layout and quality</i> Rate the clarity of displays and layout of screens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
27. <i>Flush lines.</i> Rate the response of the software to the flush	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Area of evaluation / Task	Very poor	Less than acceptable	Acceptable	Good	Very good	Any comments?
Report printing and analysis						
28. <i>Print out the whole test</i> Rate ease of setting up print out of single and multiple tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
29. <i>Quality of printout</i> Rate quality of trace printout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
30. <i>Review the numeric data of the test screen</i> Rate ease of reading off figures from screen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
31. <i>Review the numeric data of the test printout</i> Rate clarity of printed out figures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
32. <i>Summarised data printout</i> Rate usefulness of summarised data printout, note any automated analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
33. <i>Play back the filling and voiding test on the screen</i> Rate ease of test playback / review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Data management						
34. <i>Review some old traces on the machine and edit the test just carried out</i> Rate ease of retrieval of previous tests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
35. <i>Data storage system</i> Rate clarity of data storage system, noting any features that assist data management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
36. <i>Data saving process</i> Rate clarity of data saving process, noting any potential errors for overwriting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
37. <i>Exit the software and power down the urodynamic PC</i> Rate the ease of shutdown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Additional comments						
38. <i>Note here any other general comments and impressions concerning the machine</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
39. <i>Note any features which should be added (or removed) to improve the performance and/or ease of use of the system</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Evaluation report: Urodynamic systems

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