MATCH

Centre Vision Statement

Vision: To transform the medical devices[1] sector by researching, testing and making methods available to cut the time and cost from concept to continuous improvement in the market, in support of device users, the medical device industry, regulators and reimbursement agencies, and healthcare providers such as the NHS.

MATCH is a collaboration of five universities, jointly researching, training and engaging with industry towards this end. This statement presents the research environment, the achievements to date, and plans to 2013.

Lord Sainsbury and Prof Terry Young at the MATCH Launch April 2004

The context for MATCH:

The national needs that spawned this research programme have, if anything, become more acute during its first three years of operation. This bodes well for its future success and makes the link between research, industry and policy, symbolised by our logo more critical.

The Wanless Report[2] has made an impact on the NHS in two significant areas: the IT infrastructure is being renewed under the world's largest IT project (Connecting for Health); and there has been a wider and massive investment in the NHS. However, both are proving difficult to manage against a backdrop of fundamental reorganisation, and the NHS overspends in 2005/6 have put pressure on technology spending in search of short-term savings. These events are forging a new focus on value-for-money, and there is a consensus that the NHS and industry need much better methods to align their concepts of value and better ways to measure it.

Following the Health Industries Task Force (HITF)[3] report the Device Evaluation Service (DES) under the MHRA (Medicines and Health Regulatory Agency) became the Centre for Evidence-Based Procurement (CEP) under PaSA (NHS Purchasing and Supplies Agency); and the EPSRC's Medical Faraday Centre is now a Knowledge Transfer Network, jointly funded by the DTI. The Modernisation Agency (1998-2005), which was the flagship driver for process improvement in the NHS, has been replaced by the NHS Institute for Improvement and Innovation, supported by regional Innovation Hubs that were created three years ago. The role of safety continues to be promoted through the Health Care Commission and the National Patient Safety Agency (NPSA). Meanwhile, the National Institute for Health and Clinical Excellence (NICE) has consolidated its position as an internationally leading assessment agency, noted for its ability to handle evidence from a range of sources (e.g. from industry, and externally generated), its transparency, and the quality of its work in both technology appraisals and the review of new interventional procedures. Its main problems lie in the ever increasing volume of work, and the need for new methodologies for addressing the growing workload of devices and interventions.

Title & Leader in bold	Description
Project 1 Prof. Hywel Williams	Development of methods for assessing the value of healthcare technology
Project 2 Prof. Brian Meenan	Methodologies for optimised processes for device development
Project 3 Prof. Ian Robinson	Engagement with Users (methods and metrics)
Project 5 Dr. John Crowe & Dr. Steve Morgan	Applied research for Research Partners, including exemplars

Table 1: MATCH Project 1 - 3 and 5 Nov. '03 - June '06

[1] For 'Medical device,' we take a very broad view in line with the Medical Devices Directive (1993) (Date accessed August 4, 2006) http://europa.eu.int/eur-lex/en/consleg/pdf/1993/en_1993L0042_do_001.pdf pp 5-6.

[2] Wanless D (2002) Securing Our Future Health: Taking a Long-Term View http://www.hm-treasury.gov.uk/Consultations_and_Legislation/wanless/consult_wanless_final.cfm (Accessed June 10 2005)

[3] Healthcare Industries Task Force (2004) Better healthcare through partnership: a programme for action. http://www.advisorybodies.doh.gov.uk/hitf/index.htm. Department of Health. (Date accessed 19 November 2004).

In the last few years there has been an increasing rate of change in the way that innovative products are brought into the market. These changes are no longer purely product quality and the meeting of regulatory demands but are impacted by a number of different groups in government and the private sector each with a slightly different objective. The role of MATCH has been to bring together the range of stakeholders... through its Public Forum meetings and follow up activities. These meetings are probably the only time that all the government agencies, trade groups, patient support groups, Industry and academic researchers trying to find effective business models for the present day come together in a non-confrontational gathering.

Dr David Huckle,
Adams Business Associates

Many of these changes are still bedding in, but the fact that the need for value-based decision-making is being more widely and consistently articulated should create increasing demand for programmes such as MATCH. Finally, while the UK punches well above its weight in research terms, there are few fields where this lead converts into a comparable lead in public service delivery, industrial performance or some other wealth-creation measure. MATCH is particularly sensitive to this disconnect and part of its contribution lies in finding ways to overcome it.

So what is the central barrier to innovation, to introducing superior products, or to eliminating ineffective products? The barrier is an inability by critical stakeholders to make well-informed decisions about technologies, reflecting their full value to the communities on both the supply and demand sides. MATCH is engaging with supply, demand, and regulatory stakeholders to forge better decision-making at all stages of product development. This engagement will be taken forward and strengthened in the phases of MATCH that follow. It is a bold and stretching brief, and we commend it to you.

Phases of MATCH

Phase 1 Building the foundation (November 2003-May 2005)

The lifetime of a product, from concept to success in the market, can last a decade or more, and MATCH must at least operate over a similar span – 2003 to 2013. During the introductory phase, MATCH delivered against the schedule in the proposal, focusing on current theory and practice. The team of universities, having come together to form MATCH, rapidly set out to bridge the academic-industrial divide. Industry makes little use of academic outputs (e.g. Edwards et al.[4]), demanding short, direct, reports, instead. Therefore, to make the findings accessible, the team produced thumbnail sketches and executive summaries, employed outside writers, and opened its 8 internal conferences to industry. It also ran special events (e.g. seminar in Belfast for clinicians, service providers and academics, on February 22, 2006).

MATCH rose to the challenge of creating an effective dialogue between disciplines by investing strongly in developing the research base. This has been achieved on-the-job; by visiting companies; by short courses (especially Health Economics); and as staff have entered domains of research that were new to them. For instance, Dr. Scott arrived with an engineering PhD and has moved on to the National Centre for HTA as a Senior Health Economist. Many more in MATCH are publishing in new areas. All this represents a significant element of team and personal development.

Key achievements

- Producing a foundational set of 9 working papers in three critical fields – economic assessment, business processes, and user needs, i.e.:
  - Identifying the main new medical product development processes (Deliverables D5 & D9).
  - Identifying a spectrum of methods to engage with users, and performing an early analysis of uptake and adoption (Deliverables D6, D10 & D19).
  - Undertaking value-related research (Deliverable D4), for instance, on hip and knee replacement.
  - Surveying and providing overviews of critical areas such as regulatory environments and trials methodologies (Deliverables D2, D3 & D11).
- Promotion to industry through trade journals (e.g. Backing a Winner, Health Equipment & Supplies, 2004 and events (e.g. each MDT conference/exhibition in the past three years).
- Signing up more than 20 industrial partners.
- Running MATCH events, especially for SMEs. An example was the Nottingham outreach day, July 1, 2005.
- Applied research, from multi-disciplinary teams, against very practical requirements. An example would be the economic evaluation of a diagnostic for heart failure
- Engagement with stakeholders, such as ABHI (Association of British Healthcare Industries), HITF (Health Industries Task Force), the DoH's R&D, PaSA, NICE, MHRA, INI (Invest NI) and the NPSA (National Patient Safety Agency).

[4] Edwards T, et al. (2004) How can firms in the UK be encouraged to deliver more value? London Business School, London. ISBN 0-9546885-1-1

- Building a team of ~30 people (including 14 full-time research and 3 support staff) from 10 departments at 5 universities through joint research, team and personal development.
- Learning to manage and undertake genuinely cross-site, cross-disciplinary research on this scale, and running effective management, decision-making, financial and administrative processes.

Phase 2 Dissemination and engaging with industrial and public sector partners (June 2005-June 2006):

The main aim of this period was, firstly, to disseminate the foundational documents in a range of publications – from trade magazines to high ranking journals. For instance, there is a MATCH article on the economic evaluation of knee replacement in the August 2006 edition of the ABHI's Focus magazine. Taking the deliverables themselves out in a public event at the Institute of Directors in November 2005 supported this end.

A second element was to engage more with industry through the development of a tool for sifting early-stage concepts. Also, some very industrially-oriented research was initiated, that has generated some hard data on industrial practice. Some of this has already been published quickly in trade journals and other papers are progressing through peer review.

In April 2006, the Executive Committee, at one of its 'Away Days' to reflect on the first 2½ years, decided to implement a review the remainder of the project. The main findings were that the unusual strengths that MATCH possessed lay in being able to integrate both economic assessment and user needs analysis into the business development cycle, and being able to relate these insights back to governmental assessment (procurement and regulation). This initiated, with industrial support, a process that developed a set of new research projects in areas of maximum need, in order to advance the original research (as shown in Table 2).

The key achievements of this period were:

- Contributions to the literature – the pipeline is now on-stream and is growing rapidly. Around 40 articles and papers of all types have been published or accepted, with a journal pipeline of around 20 more.
- A number of prototype tools to be taken into industry (see Phase 3 below).
- Identifying that there are two major areas in which MATCH can make a critical contribution:
- By developing ways to help companies to integrate robust cost-benefit analysis into their new product development cycles from the earliest stages.
- By developing methods to help companies identify key user communities and their unmet needs, and then to furnish means of eliciting and validating those needs in ways that are appropriate, affordable and fit within the other constraints of the business process (e.g. time taken, fit and quality of findings).
- Identifying more clearly the contribution that MATCH can make to the NHS. The project must be able to recommend to the NHS a basis for the development of models and tool for 'value-based' healthcare procurement. This involves several dimensions of value-for-money in addition to pure cost minimisation, which currently dominates purchasing decision-making. MATCH must increase the understanding of Health Economic assessment techniques amongst purchasers. Since MATCH is already working with its industry partners to apply such techniques to their product development processes, this should help to provide a shared view of value between purchasers and industry that will benefit both parties.

Sir Keith O'Nions launches the Deliverables at the Institute of Directors, November 2005

Drs Nick Botterill, Hengjin Dong and Shirley Davey at the IMRC Review 2005

"The need for work in the area carved out by MATCH has never been so important."

John Wilkinson, Director General, ABHI

Working with the MATCH academics has challenged some of our assumptions and internal processes particularly on the early identification and validation of a product's value to payer and provider stakeholders.

Mick Borroff, De Puy International

Table 2 New MATCH Projects A-F, July 2006, Onwards.

Title	Description
A. Decision Frameworks and Tools for Industry **Prof. Richard Lilford**	An integrated program of work within MATCH and with industry to develop tools that are genuinely useful. This will include a general framework to assist investment decisions, a guide to tracker trials and a study on the 'level playing field' for device evaluation. **Example of early target: Workshop for SMEs on use of simplified evaluation tool (January 2007).**
B. Economics of safety **Prof. Martin Buxton**	Study the value of safety; elucidate alternative approaches; provide original data; apply approaches to one or more exemplars. Explore developing a 'toolkit', template, or simple approach for SMEs. **Example of early target: Review article on approaches to valuing safety characteristics (Mar 2007).**
C. Bayesian Framework research **Prof. Martin Buxton**	Demonstrate how Bayesian methods can be used to accumulate and integrate different forms/sources of evidence in a cost-effectiveness model, and to indicate the value of such a process. **Example of early target: Review of existing examples and methods (March 2007).** A second strand is to explore the value of 'Real Options' to supporting investment decision-making. **Example of early target: An example of Real Options applied to a medical device company (Dec 2006).**
D. User Requirements Studies **Dr. John Crowe**	This project aims to address three critical questions: • To what extent can existing knowledge be applied to real-world situations? • How can user–identified problems be turned into industry solutions? • What is the place and added value of proxy (surrogate) users' involvement? **Example of early target: A case study of user involvement in design of an imaging device (Feb 2006).**
E. Value Procurement in the NHS **Dr. Steve Morgan**	Development of a model for procurement on the basis of value rather than price within the NHS Early target: Report to PaSA on assessing the value of medical devices (Draft report submitted).
F. Assessment Methods for New and Emerging Healthcare Technologies **Dr. Dorian Dixon**	This project addresses the issue of where new or modified methods are required for the earliest possible assessment of value of a technology without unduly jeopardising its ongoing development. **Early example of a target: Cardiac point-of-care cardiac exemplar (June 2007).**

Phase 3 Development of Research Strengths (July 2006 – October 2008)

With respect to both economic-based evaluation and user-needs-based methods, it was further decided that there is a need to turn the findings into tools and to take these tools into industry. However there is also a need for further development of methodologies.
A typical example of the former would be to produce the first, prototype Tracker Trial protocol for medical devices. An example of the second would be the development of new methods to articulate the value of medical devices based on their safety characteristics. At present safety is either mandated (in which case it does not matter how much of the budget is spent meeting the safety specification) or optional (in which case safer devices will lose out to their cheaper competitors). Robust value-of-safety methods would create a better environment for genuine concurrent engineering in medical device design.

A strong theme is to develop parallel methods for the healthcare procurement sector, and so we have:

- Engaged in a series of consultation meetings with key NHS bodies that are concerned with procurement, which has enabled us to discover the dimensions of value that need to be included.
- Undertaken, in collaboration with CRiSPS (Centre for Strategic Purchasing and Supply) at Bath, research to combine economics evaluation, as the basis for bringing patient quality-of-life considerations, with supply chain logistics, as part of the procurement process. We plan to draw on simplified health economic assessment techniques originally devised for our industry partners, to show how this could work in practice.
- Investigated multi-criteria decision-making aids for integrating evidence concerning value from different sources and have recommended three techniques that we think are worth pursuing.

The MATCH project team now has membership of the 'value sub-group' that is tasked with implementing the outcomes of the high-level governmental Health Industries Task Force (HITF), and since we are working directly with the top level body in the Department of Health, the Purchasing and Supplies Agency (PaSA) that is responsible for procurement in the NHS, we expect this project to have a high impact with policy makers. Since we started the project we have been invited to apply MATCH economic modelling techniques within 2 of 4 pilot projects of the NHS Centre for Evidence-based Procurement (the new name for the Device Evaluation Service) that evaluates medical devices for the NHS to inform purchasing decisions on a national basis. So as well as continuing the research work in the area of methods, we expect that the findings of these pilots will further inform our final recommendations to the NHS. The first draft of the report has already been delivered.

MATCH will also explore new routes to the SMEs, who are the natural customer constituency for many of the tools. The RDAs will be approached for assistance in creating forums to engage with SMEs and for assistance in preparing material of value to them in a business-friendly format.

"What I find… interesting however is that MATCH researchers have modelled our data and that from other industries and… shown that prices are following very predictable curves. This raises some interesting thoughts of course."

Chris Dufresne,
Boston Scientific Ireland Ltd

A wider view of design and Health Economics are tangible benefits from our participation with MATCH.

Dr Rodney Gush. Moor Instruments

Phase 4 Towards an Independent Research Organisation (2008-2013 and beyond)

One of the recommendations at the last review was that MATCH conduct a self-assessment. It has done so in two ways. First, during Phase 2, a strategy was developed with both industrial and public sector organisations. The second has been to commission, under independent funding, a review of MATCH and its potential in the future (see below). The strategy indicates how MATCH will make an impact in the research domain, that of industrial practice, and in terms of influencing policy (initially in the UK, ultimately internationally), over a period extending beyond the current timescales. While the three legs stretch the programme, all are needed, since the research will not be taken up in isolation by policy or industrial organisations. For instance, there will be little incentive for industry to improve certain practices if procurement policy does not reflect the latest thinking in terms of device value, quality, and fitness for purpose.

If MATCH can reach a level of autonomous, largely self-sustaining, operation by the end of its first decade in 2013, this will be a major achievement. It will also enhance the value of the current investment of public funds. We note, however, that while there will be scope for exploitation of the IP in the form of tools and methodologies that industry will be prepared to buy, there will still be considerable need for fundamental research, and the programme will need to fund this underpinning development, doubtlessly by attracting grants from a variety of sources, which may need to include the Research Councils. MATCH costs £700-800k p.a. to run, and without new funds, it will decline markedly over Phase 3. This level of funding has only been sustainable to date because MATCH has raised over £700k of additional grant monies and around £400k in cash from industry to date.

The opportunity here is to build a vital block of research and knowledge-based support services to the medical devices industry that will lead the world and build upon the international assessment position being established by NICE. While there are many Health Technology Assessment (HTA) organisations around the world, we are not aware of anyone trying to stitch all aspects of evaluation and assessment into robust business processes, and to make that available to companies of all sizes. However, the global medical device market is worth about £120 Bn per annum, and it will take a critical mass to be credible as a purveyor of such knowledge and then to manage the process of disseminating and embedding that knowledge into care delivery.

This vision, therefore, is to build a funding umbrella, perhaps by establishing a foundation, over the five years from November 2008 that will expand MATCH to a critical size, and support a range of value-related initiatives from further research, through collaborative development with industrial and other partners, to the support of a MATCH-branded set of processes, probably disseminated through independent consultants using a franchise model. Pulling this vision together will be difficult, and Brunel has funded a (non-MATCH) project with the consultancy, YTKO, to explore how best to achieve this. It is clear that this will require establishing a range of revenue streams (including further grants). Generating a legal and financial framework in which the original collaborators, together with other selected universities in the UK and abroad can work in this close-knit manner across the academic-commercial divide still requires thought. The main findings of the study are that there are few models of this type of sustainable self-funding research. Moreover, SMEs are unlikely to offer us a lot of funding gain, although there is considerable potential of support from public sector agencies, such as PaSA and its successor. Finally, MATCH will need to develop further its international profile. In truth, many of the industrial funding decisions are already being made outside of the UK, and this has required the Principal Investigator (PI) to be flown at company expense to, for instance, New York and also to Zurich to discuss MATCH investment.

"YTKO report - this struck me as a REALLY important document… It is a fresh and objective evaluation of MATCH and more importantly how MATCH might develop into the next phase of working. It is timely as we need a serious discussion about scenarios."

Prof. H Williams, Uni of Nottingham

I have greatly enjoyed working with colleagues from other disciplines – particularly Engineering and Ergonomics.

Prof. E. Murphy, Uni of Nottingham

In terms of subject material, YTKO proposes that MATCH should focus on Health Economics as its major strength, where there seems to be a need for simpler, pragmatic, tools, as recommended by HITF. Given the go-ahead for an additional five years, MATCH will be well placed to create a new type of entity, offering a portfolio of research, development and consultancy services to a major sector of industry. This support in winning a growing share of a very substantial market is outlined in the report.

Q&A – Below are some questions from a UK PLC perspective together with our answers

How has the IMRC grant affected the work of the centre?

Without the grant there would be no centre! Moreover, it has already achieved two unique goals: Firstly, it has brought a range of new parties, including sociologists, engineers, business modellers and ergonomists to a field traditionally associated with health technology specialists. Secondly, it has created a 'neutral space' in which regulators, NHS service providers, and technology suppliers can work constructively, rather than adversarially.

How can the work of the centre be said to contributing to changing the face of UK industry?

Financially, MATCH has already attracted £1.9M of additional support and commitment, against a spend to date on the grant of £2.4M. Almost 75% of which has been in cash, in the form of funding from the NPSA, Invest Northern Ireland, as well as industrial monies. At the end of the day, this is a major achievement and evidence of significant interest.

Secondly, over the entire three years, MATCH has averaged more than one engagement per week with an industrial or public sector organisation. These might range from a workshop – e.g. the PaSA workshop held on July 24 2006 in Skipton House, to discuss how MATCH methodologies might be used by NHS organisation – to a one-to-one-meeting such as that undertaken by the PI in meeting the MD of Qinetiq Healthcare at Farnborough, May 6 2004. Moreover, public sector engagement, initiated from the Public Interest Forum, has resulted in a specific project to seek a means of integrating MATCH-type methods with supply-chain developments to improve NHS procurement.

However, the research undertaken collaboratively with industrial Research partners has made a wider contribution to a series of developments, pressures and achievements that have supported them in migrating towards better evidence-based promotion of their products. This is clearly the case with the Total Knee Replacement modelling, which has cross-connected research interests within the sponsoring company and has attracted a number of other partners to MATCH. Orthopaedic companies are increasingly recognising that this type of modelling will have to inform their submissions to reimbursement agencies.

Informal evaluation of the tools emerging from MATCH with, for instance, the ABHI, indicate enormous potential. The challenge is to embed them in company practice. This is more difficult than it appears, because there are lots of other tools that address subsets of the problem, but which are more accessible, familiar, or better marketed. The big challenge lies in supporting the SMEs, most of whom lack the framework and staff to focus on sophisticated methods for identifying and articulating the value of their products. Most do not want to read user guides, and so we are designing short-course material to take out into industry, along with research studies to assess the impact of this knowledge transfer on the companies.

Researcher's working on economic assessment methods

The core value areas are the development of new approaches to understanding value in healthcare and the development of tools to support early decision making around product innovation and the likelihood of success.

Andrew Dyckhoff, Olympus Optical Co.

Neil Stainton (Smith & Nephew) discusses MATCH with Jim Dawton (Pearson Matthews) at the internal conference, Sept 2005. Chris Dufresne (Boston Scientific) is on the left in the background

What major initiatives or collaborations has the centre been able to initiate or support?

An obvious example has been the collaboration between MATCH and CRiSPS under the aegis of PaSA and, specifically, the Centre of Evidence-based Procurement (CEP) to develop new methods for value-based decision-making in procurement. The field is especially turbulent at present with the privatisation of some aspects of PaSA's remit under DHL with Novation. It is hoped that this will turn into a new and independently funded research theme under MATCH.

How does the centre see itself developing as one of a portfolio of co-operating IMRCs?

MATCH has already been a multi-centre, highly cross-disciplinary cooperative and predates the first IMRC collaborations under the Grand Challenge initiative of 2004. Three MATCH universities are partners in the REMEDI (Regenerative Medicine) project, and one of those has also used its MATCH position to enter STEPS (Systems Approach to Tissue Engineering Products and Processes), a European collaborative on tissue engineering. Two MATCH partners have bid for the RIGHT Proposal with the (EDC) IMRC at Cambridge. Because MATCH already involves 10 departments and five universities, it has the flexibility to furnish appropriate partners into a wide range of IMRC initiatives.

As noted, Brunel and Ulster are both collaborators in a new healthcare responsive mode grant, RIGHT. Like MATCH, this is a large (£1.4M), multi-university initiative (with Cambridge and Southampton), but its focus lies in developing a framework simulation tool, to make simulation and modelling more accessible to service providers.

What is the centre's planned research priorities?

The current portfolio of research is shown in Table 2. In terms of general themes, these are: -

- To continue to develop methods of economic evaluation and to find appropriate means of making them available to industrial and healthcare partners.
- To continue to develop user-needs tools and methods and to make those available to industrial and healthcare partners.
- To engage more fully with industry and the NHS – especially with the new NHS commissioning bodies.

What other sources of funding will support the future development of the centre?

We are convinced that demand for integrated methods to evaluate devices and make critical decisions in producing and procuring medical devices will only increase in the present environment. We therefore believe that this type of research not only has an important future, but will attract funding from a variety of sources. At one end of the spectrum, this is likely to include grant funding from research councils for further methodological development. At the other end, it should be possible to exploit the IP generated in terms of tools, protocols and ratified methods through licensing. In between, a variety of industrial and public sector organisations are likely to need bespoke development of methods into tools for immediate use.

The challenge is to integrate this potential into a sustainable stream of funding. The YTKO report was commissioned to this end, and its findings are currently being considered.

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