Warwick CSI / NHS Institute for Innovation and Improvement

Clinical Systems Improvement

Curriculum

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Clinical Systems Improvement

Curriculum

Section 1: Introduction

One of the most important emergent directions in healthcare is Clinical Systems Improvement (CSI). This new field aims to provide better safer healthcare by improvement of processes, leadership, knowledge transfer and systems design, with a particular emphasis on lessons learnt from public and private sectors outside health. It focuses on the clinical processes at the heart of service delivery. CSI seeks to transform the patient experience, eliminate waits and waste, enhance clinical quality and efficiency in reducing variation and manage patient flow through the system. CSI is based on a well-proven body of knowledge from systems engineering, psychology and other traditions that have been utilised in the manufacturing and service sectors for more than 50 years. Its introduction to healthcare is much more recent.

Clinical Systems Improvement addresses key issues for the NHS

- Improving quality of care as a basis for all improvement, linking patient satisfaction, clinical outcome and patient safety
- Improving value, with particular emphasis on reducing waste and variation and improving reliability
- Improving timeliness of care

This document aims to provide a framework for establishing the future spread and transfer of clinical systems improvement knowledge. To do this it describes both content and delivery of knowledge, designed to enhance implementation, across the whole of the NHS. An appendix provides examples of learning interventions in the form of case studies which describe the delivery of elements of the curriculum.

The curriculum described here will require that all stakeholders work collaboratively to:

- Reduce the theory / practice gap
- Move beyond the conventional understanding of 'competence' towards a 'capability' framework for systems improvement
- Recognise appropriately the learning, both practical and theoretical, that emerges.

The definition of capability that underpins this approach is one that encourages learner self-direction, autonomy and reflective practice. Thus the mode of learning employed needs to emphasise the development of knowledge and understanding but also a number of behaviours including reflective engagement with learning and practice, self-efficacy and critical enquiry. The outcome of this approach is likely to be a healthcare employee who demonstrates confidence and capability with the philosophy and practice of systems improvement.

Note: The terms "service" and "systems" improvement are both commonly used, without clear definition or differentiation, and we have chosen to use "clinical systems improvement" throughout the curriculum which we have defined.

Section 2: Problems in Delivering a Systems Improvement Curriculum

Evidence suggests that the following issues and shortcomings need to be addressed if an SI curriculum is to successfully create changed mindsets in the service:

- There is a **lack of a theoretical base** for SI in healthcare. Although much has been written about interventions in other sectors, this is predominantly ad hoc and practice based, lacking academic rigour and sound evaluation and critique; very little of the evaluation has shown change across whole systems or demonstrated sustainability of change.
- There is a lack of **good case study examples** particularly describing interventions in healthcare settings. It is unclear what is meant by the evaluative term "good"- i.e. what constitutes appropriate measures and analysis, over what time period, and with what degree of generalisability and applicability to other areas
- There is a **lack of a receptive environment** for two major reasons
    - a lack of acceptance of the techniques and philosophy due to lack of familiarity and the contrast of approaches compared to the evidence based practice approach
    - the political and organisational context whereby short term targets and financial imperatives insist on rapid results, promoting a culture of direct action to achieve targets rather than an underlying improvement for the same result but with increased sustainability
- The problem of **how to integrate new curricular material** with what's already there has not as yet been addressed, and it is likely that there will be some lack of synergy when close examination is undertaken;
- There are issues in **deciding on fitness-for-purpose** and who should know what about systems improvement, although it is generally agreed that there are limits and boundaries about who should be involved in the practice (as opposed to a broad awareness and sponsorship of) systems improvement
- There is a **lack of expert staff to teach** the theory and practice of systems improvement as this relates to healthcare
- It is recognised that the **professional curriculum for healthcare students and staff is overcrowded** and it is unclear precisely where systems improvement should fit alongside the many other innovations that need to be generally disseminated
- **Time and opportunity cost for NHS staff** is limited and the problem of back-fill to free staff to engage with new learning defies resolution
- There are issues around the degree of **commitment from senior managers and clinicians** to embracing a systems based approach to working collaboratively for systems improvement
- **Organisational cultures** remain impervious to change and until they do so, new ways of working will not be sustainable.

Section 3: Systems Improvement Themes

A curriculum framework such as the one described here is underpinned by broad *themes* which form a progressive structure upon which the detail of learning interventions should be based. In this case the themes are:

- Awareness
- Engagement
- Implementation
- Expertise

Each theme has particular implications for patient care, with indicators to enable their measurement. The matrix below demonstrates the thinking which led to the development of the SI curriculum.

Theme	**Implication –** what this means for patient care:	**Indicators**
Awareness	*Demonstrating an awareness of the significance of systematised thinking and working as approaches to efficiency and effectiveness in delivering healthcare*	- Recognises the importance of understanding of processes and systems from the patient perspective - recognises the significance and value of systems thinking - is familiar with the principles of systems philosophies and approaches - is committed to the concept of an individualised contribution to systems thinking and working - is willing to share ideas and suggestions for improving systems - aware of the role of every individual in the organisation and their relationship with peers and team members
Engagement	*Embracing, sharing and participating in formal and informal learning to extend personal understanding of systems theories and techniques*	All of the above and - - recognises and welcomes new ways of implementing process and flow - takes a reflective approach to own work practices - can differentiate between the improvement tools and techniques available - recognises the importance of measurement to demonstrate improvement - encourages the active participation of all staff in team approaches to systems - oriented working
Use / Implementation	*Continually seeking new and improved processes and techniques to balance the outcomes of safety; quality; throughput and cost*	All of the above and - - seeks and supports opportunities and initiatives designed to enhance service redesign - identifies and implements new processes and innovative ways of working - actively seeks information to illuminate understanding of process

		enhancement - able to measure and demonstrate improvements - demonstrates a capacity for lateral thinking - takes a collaborative approach to systems improvement - aware of the psychology of change management
Expertise	*Identifying types and sources of systems thinking; retrieving data and information; and using it effectively, whilst evaluating its relevance, accuracy and currency*	All of the above and - - takes initiative and leads others in implementing systems practices - uses knowledge, skills, experience to strengthen and enhance the understanding of user experiences and needs - uses technology creatively to work with people in other organisations who are concerned with systems improvement - maximises people potential and understands the prerequisites of change.

Section 4: The curriculum framework

Given the themes described in section 3, the matrix below provides a comprehensive response to the requirement to equip everybody working in healthcare with the knowledge, skills and behaviours they need to address systems improvement issues.

	Foundation	**Sponsor**	**Trainee/ practitioner**	**Expert**
Audience	All new staff; Existing staff at appraisal	Those wishing an introduction to SI at Board level for informed commitment	All pre-registration students. Employed staff who want to improve local services, eg senior support staff; mid-managerial staff	Those with a career level commitment to SI
Outcomes	Awareness of the business case and individual responsibility for systems approach	Engages with SI methodologies and prepared to endorse implementation	Can implement SI on a daily basis and can lead others in localised changes	Recognised expertise in the implementation of SI approaches; Adds to the body of knowledge on SI in healthcare
Process	Online and distance learning materials, contextualised at local level	Short courses Generally of 1 day in length	Undergraduate level modules equivalent to 20 - 30 CATS points In-house development opportunities	Masters level modules – can accumulate to a PGCert/Dip/Masters and includes a major project on SI work
Indicative content	Fundamentals of SI; Business case; Human dynamics of change;	Policy & practice of SI; Familiarity with SI philosophies; Promoting team working skills; Introductory techniques	Familiarity with a range of tools and techniques; Appropriate selection; Team leading;	Policy and practice of SI; Project management of SI; How to develop SI infrastructure in an organisation
Deliverer	In house via staff trained in SI techniques	Range of providers	HEIs Local / bought-in expertise	HEIs

Section 5: Indicative Cases

1. Foundation

Audience
All staff working in healthcare settings should be encouraged to take a systems based approach to thinking and working. An introductory, structured approach, need not be over-burdensome, and should aim merely to raise awareness and obtain buy-in to the relevance and necessity for effective patient care.

New staff could be offered a short learning intervention as part of their induction; existing staff could be offered this as a component of their appraisal / CPD activity. It should be linked to the KSF.

Process – study pattern
The underlying principle is that learning takes place at and through work and draws on examples from the everyday experience of the audience. Delivery is designed to happen amongst employees who are known to each other and familiar with the context within which systems improvement is presented.

Foundation learning interventions can be delivered in a very short time – frame ranging from 2 hrs to a full day.

Materials can be available from the NHS Institute for Innovation and Improvement site for down-load and use at local level, and should take advantage of the technological support for learning which is widely available. This should be contextualised via facilitated discussion at local level, using case studies and relevant examples of problem-based systems improvement initiatives. Such learning should be constantly reinforced by routine reflection and collaborative engagement in the workplace.

Aims and Outcomes
Aims

- To enable participants to understand the concept of systems improvement
- To enable participants to understand that everyone has a role in service improvement and all people have a voice
- To understand that the user should be at the centre of all improvements and it is their values that are paramount
- To recognise the importance of understanding user experiences and needs as a basis for improvement
- To become familiar with the broad aims of the most widely used approaches in healthcare
- To recognise the significance of systems and flows for improving quality of care and reducing patient harm
- To recognise the importance of working with others for maximum effect
- To perceive their role and responsibility for systems improvement

By the end of the intervention participants will have gained:

- An understanding of the history and relevance of the concepts that underpin systems improvement
- An understanding of the broad principles of systems improvement and their application in healthcare settings
- An understanding of the questions that can be asked about a service
- An appreciation of the concepts as they apply to themselves in their daily work
- A recognition of the relevance of systems improvement for patient care

Indicative content

- **Knowledge**
    - The personal case for service improvement (makes it better for me)
    - The patient case for improvement (makes it better for patients)

- The business case for systems improvement (makes it better for the Trust and the NHS)
- Introduction to the philosophies and most widely used tools and systems thinking techniques
- The relevance of the human dimension for systems improvement

- **Skills**
  - How to identify a problem that can be improved using systems tools or techniques
  - Team working skills as applied to systems improvement
  - Responding to change and communication skills

- **Behaviours**
  - Listening to others and sharing ideas
  - Taking a reflective approach to daily work
  - Anticipatory of issues that can be affected by systems thinking
  - Constructive challenging to stimulate improvement
  - Willingness to take action according to role, responsibility, and context

2. Sponsor

Audience
The "sponsoring" audience includes those who are responsible at senior level for the implementation of systems improvement and who take responsibility for the strategic management of systems improvement; including policy makers, and performance managers and strategists. They can be catered for by short, day-long interventions, which should be designed to achieve heightened awareness of SI imperatives with a particular emphasis on how senior managers can be responsive listeners and can support and facilitate change.

Process – study pattern
Short, focused interventions using examples obtained from case studies of everyday systems improvement interventions, building on the experiences of the senior managers involved, can be designed to encourage and enable sharing of knowledge and understanding in a "Master Class" environment. The sessions should be led by acknowledged Masters in the field of systems improvement and should emphasise the strategies that can be employed to embed SI at local level.

Aims and Outcomes
Aims
The aim of engaging Executive and other senior level sponsors is to significantly raise concern with changing the organisational approaches and culture; moving away from a target based approach, towards becoming more patient centred; giving staff more power; enabling staff to undertake service improvement; and realising that a senior responsibility is about co-ordinating improvement projects rather than managing/initiating/controlling them.

Short interventions designed to achieve this will aim to:

- enable participants to differentiate between varying approaches to systems improvement
- become familiar with the opportunities and constraints of engaging with an SI approach
- recognise the significance of taking a strategic approach to SI
- increase perception of the role and responsibility for systems improvement
- recognise the importance of sustainability
- understand the place of service improvement in achieving external targets and in performance management.

By the end of the intervention participants will have gained:
- An understanding of the relevance of SI methodologies for achieving a balance of quality, safety, throughput and cost
- An appreciation of the principles of systems improvement
- An understanding that all staff have a role in improvement and the empowerment they need to achieve this
- The ability to critique worked examples of the application of SI in healthcare settings
- A recognition of their personal role in promoting a culture of systems improvement thinking in healthcare

Indicative content
- **Knowledge**
    - The business case for systems improvement, including an understanding of the link between cost, timelines and quality
    - Basic systems improvement methodologies
    - Policy and strategies for SI
    - The relevance of the human dimension for systems improvement
    - Awareness of other sectors
- **Skills**
    - Negotiating an SI strategy
    - Enabling and resourcing SI
    - Critical assessment of SI approaches
    - User involvement

- **Behaviours**
  - Listening to others and sharing ideas
  - Taking a reflective approach to SI strategy
  - Empowering others to undertake improvement work

3. Trainee / practitioner

Audience
If systems improvement is to become accepted as the way to achieve the balanced outcomes of optimal quality, safety, throughput and cost, then it is necessary to build a culture of SI thinking and practice in all healthcare settings. Every health workplace must have a group of experienced practitioners, whose role is threefold; to undertake basic improvements; to lead in the application of systems improvement interventions; and to mentor and encourage others in the mindset change that is required to enable SI to become the norm. This activity should be closely linked with KSF, emphasising that everyone has a responsibility for improvement.

As well as these qualified staff, the needs of undergraduate and trainee staff should not be ignored and improvement knowledge and understanding should be embedded from the outset of a career. Accredited modules can be made available, and HE providers encouraged to offer them as part of an undergraduate degree. Structured activity during placements, for example, can lend themselves to SI project work. This recognises the different levels of expertise in this group and the two different routes to improvement development; during pre-registration education and training and during in-service development.

Process – study pattern
Learning happens *at and through* work; work is the curriculum; learning encompasses formal and informal elements; is collaborative and socially situated, and assessment of learning reflects the application of knowledge and understanding to inform practice. Learning and implementation are continuous processes and therefore all trainees and practitioners should regularly undertake improvement projects within their own workplace, sharing the findings with others and also assisting others in undertaking their projects.

Issues or problems that lend themselves to SI intervention can be the focus of workplace activity. Teams should ideally meet for short periods on a weekly basis, possibly with an SI facilitator, for the specific purpose of identifying, working through, and sharing the outcomes of SI projects.

The outcomes of this process can be captured in portfolio form and can be assessed against academic criteria, leading to an award at undergraduate level and competencies of the KSF.

It is likely that a small number of enthusiasts will emerge, and it is proposed that they are subsequently provided with mentorship / coaching to enable them to become SI trainers in their own workplace.

Aims and Outcomes
Aims

- To develop knowledgeable and informed practitioners of systems improvement within every healthcare organisation
- To recognise the importance of starting with an understanding of patient experiences and needs
- To focus on the implementation of systems improvement techniques
- To encourage the sharing of experience amongst systems improvement practitioners
- To recognise the importance of working with others for maximum effect
- To foster cultural change in healthcare organisations

By the end of the intervention trainees (pre-registration students) will have gained:

- A sense of responsibility with a willingness and ability to take action according to the scope of their role and work
- The ability to challenge in a non threatening way
- A willingness to be challenged in their own work
- The ability to engage and communicate with colleagues
- An understanding of the need to be objective in assessing the impact of improvement and review whilst avoiding a feeling of failure

Indicative content (trainee):

- **Knowledge**
  - Basic systems improvement methodologies
  - How to test improvement ideas before implementation for example by using Plan, Do, Study, Act (PDSA) cycles
  - Models of impact - small changes can result in big improvements
- **Skills**
  - Team working
  - Negotiation
  - Measuring and evaluating success
  - User engagement
- **Behaviours**
  - Collaborative (team) working
  - Reflective approach to working and practice
  - Pro-active approach to problem-solving

Indicative content (practitioner):

- **Knowledge**
  - In depth systems improvement methodologies
  - Data collection and health informatics, including knowledge of Statistical Process Control
  - Leadership and management
  - Health policy and strategy
- **Skills**
  - Team working
  - Negotiation
  - Coaching and mentoring
  - Project planning and evaluation
  - Measuring and evaluating success
  - User engagement
  - Critical appraisal of new theories and evidence
  - Involvement with other sectors
- **Behaviours**
  - Collaborative (team) working
  - Reflective approach to working and practice
  - Pro-active approach to problem solving
  - Sharing of improvement learning

By the end of the intervention trainees and practitioners will have gained:

- Knowledge of systems improvement methodologies
- The capacity to differentiate and apply appropriate SI techniques, including lean thinking, six sigma, theory of constraints
- Understanding of sustainability and spread
- Practical experience of using a variety of improvement tools
- A supportive network of systems improvement practitioners
- Knowledge of the human factors in service improvement and change
- Leadership and team working theory
- Credit that can be accumulated towards a national award

4 Expert

Audience
Whilst acknowledging the benefits of developing a large network of practitioners, it is nevertheless important that the field of systems improvement be advanced to allow for innovation and new applications. This will only happen if expertise in health-related systems improvement is developed. It is proposed therefore that the curriculum makes possible the education to Masters level of a number of practitioners. It is envisaged that every healthcare organisation will have 2- 3 "experts" in systems improvement. Such people will be graduates of Masters programmes and have sound practical experience of SI. Masters level study will enable the broadening and deepening of their understanding. These individuals will have undertaken a broad range of improvement projects including a wide variety of tools and techniques and have an in-depth understanding of improvement culture.

Process – study pattern
Many HEIs offer Masters programmes in allied fields such as Health Management, Leadership in Healthcare, and Masters in Public Administration. The majority of such programmes are modular, enabling participants to step off with a PG Certificate, a PG Diploma or a Masters qualification. Conventionally, such programmes have a large taught element, but they also require evidence of practice which takes the form of a significant project or dissertation.

Many such programmes contain content that is relevant to the study of systems improvement. It is proposed that dedicated systems improvement modules be developed which can be studied as options on appropriate Masters programmes offered in HEIs throughout the UK. Using a Credit Accumulation and Transfer arrangement, participants can study at a convenient location and construct their own learning pathway. This model is efficient and makes possible a flexible and tailored outcome. The benefit of such a model is that modules can be written and offered with minimal delay. There is no reason why, with the availability of sufficient modules, an HEI should not regulate to offer a Masters in Systems Improvement.

Aims and Outcomes
Aims
- To develop a growing expertise in systems improvement in healthcare settings
- To contribute to the field of knowledge in systems improvement
- To enable a culture of change and innovation throughout healthcare organisations and systems

By the end of the intervention participants will have gained:
- Research and development skills appropriate to the fostering of systems improvement
- SI philosophies and methodologies development skills
- An understanding of the benefits and constraints of SI as applied to a range of economic sectors

Indicative content
- **Knowledge**
  - Quality and operations management theories
  - Underlying theory and rationale behind improvement methodologies including lean thinking, six sigma, and theory of constraints.
  - Theories of risk management
  - Demand and capacity management
  - Theories of patient safety and harm reduction

- **Skills**
  - Critical appraisal of the relative merits and limitations of various methodologies in health settings
  - Advancing the use of tools and techniques on improvement in health

- Statistical analysis
- Project management
- Research skills
- Ability to incorporate differing philosophies in to their working
- User participation
- Engagement with other sectors for bidirectional learning and sharing of expertise

- **Behaviours**
  - Leadership for systems improvement, including Coaching and facilitation skills
  - Collaborative working
  - Change management
  - Influencing strategy and policy
  - Working to advance the science of improvement
  - Contributing to increasing evidence of improvement

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APPENDIX: CASE STUDIES

1. **Masterclasses**
2. **5-day courses**
3. **Undergraduate modules**
4. **Productive Ward programme**
5. **Osprey Course**
6. **Masters modules**
7. **Summary of key knowledge topics related to Systems Improvement**

Case Study – Masterclasses

A series of six Masterclasses was held at Warwick during the Spring of 2007, designed to raise awareness about Clinical Systems Improvement (CSI) as an appropriate approach to the development of good operations management practice in healthcare organisations. Recognising the need for CSI to engage with senior stakeholders, not only to champion, but also to engage in CSI activity, the series was targeted at the people who make strategic decisions that affect the patient and the staff experience. The series predominantly focused on the theme of "Strategy and Improvement", so that clinicians, senior managers and Non-Executive Directors could become fully engaged in championing sustainable continuous improvement.

Each Masterclass focused on a different aspect of the "Strategy and Improvement " theme, and was led by a well-known practitioner of CSI techniques, providing an opportunity to hear from experts in the varying range of techniques associated with CSI and to challenge them on the suitability and application of each for healthcare.

Topics included:

- **Value Stream Mapping**
  - Covering the principles and demonstrating how to achieve sustainable improvement in the service
- **A Systems Approach to Patient Safety**
  - Using systems design to improve the quality of care by reducing adverse events
- **CSI for Non-Executive Directors**
  - Engaging senior managers not only to champion but also to engage in CSI activity
- **Data or Information: Nonsense or Common Sense?**
  - Outlines a new approach to financial control and performance management
- **An Introduction to Improvement for Clinicians**
  - Centres on an evidence based approach to changing processes of work to improve quality including clinical outcomes and timeliness of care
- **Advanced Techniques Masterclass**
  - Specific improvement techniques and their relative merits in the healthcare setting

Aims of the programme
The aim of the series of Masterclasses was, over the six days, to address the following topics:

- To gain a clear and shared understanding of what improvement methods like "Lean Thinking" are and can achieve;
- To promote Trust strategies that can recognise and integrate improvement priorities;
- To articulate the necessary elements of an effective strategy to ensure successful performance improvement;
- To recognise the key strategic decisions that affect an organisation's ability to develop efficient operations;
- To suggest the necessary changes to Trust management style that will enable sustainable change.

Benefits of the programme
A Masterclass environment can allow a selected group of professionals, who already have a high level of understanding of a topic, to meet with, and to hear from, an expert practitioner about current and future developments in the field. Perhaps equally importantly, the day can enable people who would not normally meet, to have the time and mental space to discuss, debate, and develop their thinking.

Measuring the success of the programme
In keeping with the desire to continually improve, the Masterclasses were evaluated by attendees, and also in depth by invited specialists in both CSI and clinical management.

Comments from the expert practitioners included:

- There is a clear need for interventions on systems improvement demonstrated by the tone and enthusiasm witnessed during debate at the Masterclasses.
- There was a good geographic and organisational spread. Director level, clinicians and SI managers were well represented.
- There was a lot of experience of SI initiatives and approaches amongst participants.
- The seminars were all well received by participants, with only a small number of dissenters. It was very useful to have in-depth feedback from participants.
- The depth of theoretical input, and the level of understanding required to gain from each Masterclass, varied considerably – the first was introductory; others varied from introductory to challenging across the day; and some were very challenging to newcomers
- As is always the case with short events of this kind, it was difficult to envisage how participants would use the knowledge that they gained on the day; transfer into practice is the most challenging aspect of these events

Case Study – Programme of 5 – day courses

As part of a wide programme of activities to promote systems improvement in healthcare settings, Warwick CSI, in collaboration with the NHS Institute for Innovation and Improvement (NHS Institute) offered a series of courses during 2007, each of which was designed to focus on aspects of systems improvement. Each course consisted of 40 hours of structured learning activity, delivered as workshops over 5 (non-consecutive) days delivered over three months, with guided implementation of SI project(s) between each session.

The approach required that teams of 3 – 4 practitioners work as a collaborative group, focused around a particular issue located in their healthcare unit. It was hoped that, from this group, a small number of enthusiasts could be enabled to develop skills that would result in the development of wider enthusiasm back at their Trust, so that SI philosophy, methodology and practice could be cascaded throughout healthcare organisations.

A significant element of the six-weekly workshops was that teams spent part of the day presenting to their fellow-participants and receiving feedback from peers and the course team. This was frequently cited as the most beneficial part of the day, because the sharing of experience and options for progress enabled innovative and practical possibilities to be aired. Further support was offered via the CSI website which contained resources and a discussion forum so that participants could share their experience. Additional support came from:

- Guided reading materials
- Improvement Leaders Guides
- Planning and Improvement charts.

The approach avoided starting with identified “Service Improvement Managers” (although many were part of each group); rather it was intended that teams be drawn from the range of professions that conventionally make up the healthcare delivery team. And rather than start with the general view of *what SI is about*, the courses started with a problem / issue that “keeps the team awake at night” and, while focusing on the obtaining of a solution, it developed broad understanding *in the workplace* of the potential for SI.

Aims of the programme
The aim of each course was to:

- develop knowledgeable and informed practitioners of systems improvement;
- focus on the implementation of systems improvement techniques;
- encourage the sharing of experience amongst systems improvement practitioners.

Benefits of the programme
The courses were designed to focus on the reality of day-to-day issues and problems that lend themselves to the application of SI techniques. The focus therefore was on the development of a work-based project that could be used as a basis for the development of greater understanding of improvement processes. By the end of each course it was anticipated that teams would have gained knowledge of systems improvement methodologies and the capacity to differentiate and apply appropriate SI techniques. Working together they would benefit from a supportive network of systems improvement practitioners whilst gaining practical experience of undertaking an improvement project**.**

Measuring the success of the programme
A significant element of the programme involved evaluation of activities undertaken to enable lessons to be learned and transferred to similar situations. The purpose of the evaluation was to establish the impact of the programme, and so it was designed to reveal the extent to which SI methodologies had become established in Trusts following the Warwick CSI learning intervention. Baseline data was collected on all attendees. They were asked to complete questions about their role and their experience of SI approaches. Questions also sought to establish the level of interest and activity within the Trust itself. Evidence from this initial questionnaire assisted the CSI Course team to adapt the course content to meet the ongoing needs of participants.

Further questionnaires were completed at the close of the course. It is intended to circulate a third questionnaire after an interval of three months (c. April 2008). The data will be collated and analysed, and will provide evidence that will inform future iterations of the course.

Case Study – input into the undergraduate curriculum

In 2006 the NHS Institute for Innovation and Improvement commissioned three universities to each develop and pilot short courses designed to enable students undertaking their initial clinical training to develop an understanding and practical knowledge of service improvement before taking up their roles in the NHS.

The courses were delivered at the Universities of Warwick and Coventry, at York St John University, and at the University of Teesside. Each HEI had in addition a partner NHS Trust, with whom the courses were developed. Although marginally different in their design and delivery each approach included an introduction to the four equally important fundamentals of improvement as described by Clark et al 2004[1] and Penny 2002[2]:

- Public and patient involvement
- Personal and organisational development
- Process and systems thinking
- Initiating, delivering and sustaining improvement and innovation

[1] Clark C, Reed J, Wainwright D, McClelland S, Swallow V, Harden J, Walton g, Walsh A (2004) The Discipline of Improvement: something old, something new. Journal of Nursing Management vol 12(p 85-96)
[2] Penny J (2002) Building the Discipline of Improvement for Health and Social Care: Next Steps for NHS Improvement, the early vision and the way forward MA Management Board November.

Each institution developed a one-day introductory course and a longer (3 or 4 day equivalent) accredited module. These were skills based and utilised interactive teaching strategies with a focus on work-based learning. The introductory day was designed to be delivered either in an education setting or a workplace, with materials to promote engagement from students, and, where possible, dialogue with patient representatives

Aims of the programme
The aim of the undergraduate modules was to help student practitioners to learn how they themselves and their teams can act in ways that transform services and improve the patient experience.

Benefits of the programme
Learning materials were designed to encourage the student to experiment, reflect and work out for themselves what actions and behaviours are helpful and enhancing to practice. This approach supports action and enables students to reflect on their professional delivery, developing their understanding of themselves as a professional and as a practitioner with responsibility for the patient experience

Measuring the success of the programme
The initial phase of this programme was externally evaluated and lessons learned were fed into phase two. Feedback for students highlighted the benefits of *"taking time to consider each client as an individual"* and *"listening rather than just hearing".* It was evident that the experience of the course significantly impacted on the sense of responsibility of students. In particular, the opportunity for dialogue with patient users was valued.

HEIs drew attention to the manner in which relationships between themselves, the partnering NHS organisations, and the students, was strengthened. This built on important preparatory work done with Trusts so that improvement knowledge, once understood, was welcomed by the NHS workplace where it would be utilised.

Future plans
During 2007-08 the NHS Institute for Innovation and Improvement is continuing to work with the three original partner universities and has recruited six new consortia, each comprising a university and one or more NHS partners who will roll out these short courses within their pre-registration programmes. The aim is to test further the feasibility and effectiveness of incorporating SI into an HEI curriculum for undergraduate training.

A full report of the Warwick project is available at
http://www2.warwick.ac.uk/fac/med/research/hsri/emergencycare/research/sdo/csi2/projects/bsh-_june06abbrev.pdf

Case Study – Productive Ward Programme

The NHS Institute has established that ward nurses in acute settings spend an average of 18 -40% of their time on direct patient care, which seems to offer a challenge to systems improvers. There are an infinite number of sites for small scale systems improvement activity at local level. The NHS Institute / Warwick CSI Productive Ward programme uses improvement methodologies to enable ward teams to redesign their processes and so to release more time to provide effective, safer, more patient-centred care. Pilot activity has been undertaken to demonstrate what can be done, and lessons have been learned to ensure that continual improvement is built into further development.

A structured programme has been trialled, with participants drawn from teams working together in various settings. The programme consists of 4 days of face-to-face workshops,

based around specially commissioned written "modules" describing exemplar activities; work-based projects centred on the modules, and distance learning and support offered via a dedicated website. The sessions include an introduction to lean principles, understanding waste and value, process mapping, measurement for improvement, visual management, improvement for safety, project management and managing teams

The basis of the Productive Ward is a "productive approach to working", which offers a core approach to the behavioural changes related to the application of the concept of productivity. By inference the model can be applied to any unit within a healthcare setting (thus we can have the productive X-Ray department; the productive Theatre; productive Out-patients; productive GP practice etc.).

Aims of the programme
The aim of the programme is to enable greater productivity, leading to increased time for direct clinical care, at local level by developing team understanding of how to increase the proportion of time spent in direct patient care; how to provide safer and more reliable care, and more generally, how to improve the experience of patients and staff.

Benefits of the programme
The attraction of the approach is that the processes employed are intuitively understandable, directly applicable, and transparent in making improvements at ward level.

During the Productive Ward programme participants are enabled to achieve the following:

- A knowledge of an appropriate range of systems improvement methodologies
- The capacity to differentiate and apply appropriate SI techniques at ward level
- Understanding of the need for, and how to achieve, sustainability and spread
- A supportive network of systems improvement practitioners from other wards and healthcare settings
- Awareness of the significance of the human dimension of service improvement and change
- Leadership and team working experience at ward level

Measuring the success of the programme
Pilot programmes have been delivered to early adopters of the productive ward principles, and these have been evaluated to provide lessons for further roll-out of the programme. It has been demonstrated that significant improvements have taken place on wards taking part in the pilots, and there is huge interest in both continuing to use the approaches advocated on the programme, but also to spread the model across host organisations.

Future plans
During 2008-2009 it is planned to instigate a significant programme of activity under the auspices of the Productive Ward programme, which will be supported and enhanced by the development of a membership programme to enable the sharing of good practice.

Details of the productive ward programme are available at
http://www.institute.nhs.uk/quality_and_value/productivity_series/productive_ward.html

Case Study – The Osprey Programme

The new and developing role of the Clinical Systems Engineer (CSE) brings together medicine, engineering and the human dynamics of change. Incumbents in the role help clinical staff to see the whole systems in which they work and then redesign processes that result in continual improvement. The same principles also apply at the strategic level of organisations in capacity planning, financial planning, and performance management. In this way the science of quality improvement underpins the strategy for a whole organisation to improve the timeliness, cost, and quality of patient care.

The Osprey Programme, running continually since its initiation in 2004, is a 2 year programme where CSE trainees are expected to devote a minimum of 3 days per week (12 days per month) on CSE related work. Of these, 3 days per month is spent attending training days, while the CSE's remaining time is spent with local teams, applying and sharing their learning to deliver measureable improvements in patient services. By the second year the trainee is working alongside senior clinicians and directors at strategic level using the same skills to help improve commissioning, capacity planning, finance and performance management processes. Trainees are supported using a mix of face-to-face meetings and distance learning.

Aims of the programme
The aim of the programme is to train clinicians in the use of appropriate statistical tools and techniques as they apply to locally agreed projects and to help to improve the understanding of complex healthcare systems that enable stakeholders to identify priorities for systems improvement.

Benefits of the programme
Beneficiaries of the programme include both the CSE and his/her employing organisation. CSEs are supported in their conduct of pilot activity to test out new approaches and to identify opportunities for further innovation that will make a real difference to patients. They provide leadership and influence at all levels of the local health economy, particularly to executive teams within the host organisation. They act as a facilitator, teacher and coach for the host organisation, influencing the continuous development of high quality safe services for patients.

Measuring the success of the programme
A full evaluation of the programme was undertaken in 2005 and the conclusion was that the programme was successful on several fronts. For example it had:

- Introduced a new and innovative approach to systems improvement in the healthcare system
- Made a real difference to the time, cost and quality of healthcare with identified cost savings in the first year of £9.4m
- Been able to translate systems improvement into healthcare and more importantly show how improvements can make a difference
- Developed a robust training programme that has been evaluated and modified to meet healthcare requirements
- Enthused many individuals, teams and organisations through its logic and simplicity and use of data
- Enabled clinicians to integrate more fully with the structure and culture of healthcare organisations
- Developed and trialled the new role of CSE

Future plans
The Osprey programme continues to adapt and evolve in response to changes in the NHS climate and the discovery of new niches to occupy. Most interesting is the evidence of benefits of clinical systems engineering techniques being applied to improve flow across whole hospitals rather than at specialty level. There is evidence that improving flow improves income / cost and reduces mortality rates. Next steps are to train whole health communities: clinical directors and their managers in primary and secondary care.

Case Study – Masters level Modules

As enthusiasm grows for the science of systems improvement it is expected that individuals aspiring to develop a career in the field will want to undertake accredited training as part of their career development. To this end, Warwick Medical School has been early in developing Masters level modules that can be studied individually or can be linked with complementary modules offered at a number of HEIs, resulting in the attainment of a Masters degree.

As part of a wide programme of activities to promote systems improvement in healthcare settings, the University of Warwick is offering two modules that focus on aspects of systems improvement. Each module consists of 40 hours of structured learning activity, as workshops over 5 days, with guided implementation of SI project(s) in conjunction with each session.

It is anticipated that a range of modules will be developed; initially modules on *"Systems Improvement"* and "*A Systems Approach to Patient Safety"* are offered.

Aims of the programme
The aim of the *Systems Improvement* module is to develop in the student a growing expertise in systems improvement in healthcare settings; to contribute to the field of knowledge, and thus to enable a culture of change and innovation throughout healthcare organisations. The module encourages the taking of a critical approach to new and emerging literature so that the student can assess new developments and include them in future practice.

The *Patient Safety* module offers the student a theoretical framework that goes beyond individual human errors, and that emphasises the integrated consideration of human, technical and organisational factors necessary for achieving safe healthcare services. This integrated systems perspective is used to analyse adverse events in healthcare, and to introduce methods that target the underlying contributing human, technical and organisational factors.

Benefits of the programme
Together or singly the modules offer students the knowledge and skills to develop a career path in systems improvement by enabling:

- Understanding that any productive process relies on human, technical and organisational resources
- The skills to evaluate the usability and utility of technology within a given setting
- Identification and evaluation of the underlying organisational factors that may produce dysfunctional processes or adverse events
- Application of the principles of clinical risk management to the identification, assessment and mitigation of hazards in their own work environment
- An awareness of common adverse events in healthcare settings and of a selection of typical mitigation means
- Comparison and contrasting across discipline borders and to learn from other specialities and contexts

Measuring the success of the programme
The modules have been developed in collaboration with service users and are thus assured of direct applicability into service environments. They also conform to the requirements of HEI Quality Assurance Guidelines as well as those of the GMC and Royal Colleges.

It is anticipated that the modules will offer educational and career progression to clinicians and managers with a demonstrable interest in systems work.

Future plans

The modules are synergistic with a range of modules offered by Warwick, and can contribute to a Masters in Medical Management and a Masters in Clinical Leadership. Because the modules have been developed within the UK CATS framework, credit from the modules can be transferred into Masters programmes offered by other UK Universities.

Summary - key knowledge topics for systems improvement

- Models for Improvement
- Thinking differently, systems improvement combined with evidence based practice
- Managing Improvement Projects (including A3 methodology)
- Identifying waste & defining value
- Process Mapping
- Understanding Flow
- Supply chains
- Capacity and Demand
- User involvement & CSI
- Watch & Listen exercises
- Activity Follow and analysis
- Workplace organisation
- Introduction to problem solving
- Data
    - Measurement for Improvement
    - Visual Display
    - Statistical Process Control
- Visual management

- Safety and Systems
    - Ultra-safe healthcare and Mistake proofing
    - Standardisation vs. personalisation of care
    - Leadership for safety
    - Safety Culture

- Strategy and policy deployment
- Managing change & sustainability
- Human Dimensions of Change
- Leadership & Teams

- Quality tools
    - Business Process Re-engineering
    - Lean
    - Six Sigma
    - Theory of Constraints
    - Total Quality management