Economic Modelling and Early Intervention in Psychosis in England

Report from a second day seminar on research, policy and practice

20th December 2007

Attendees at the seminar

Louis Appleby	Department of Health
Michael Clark	Care Services Improvement Partnership
Clare Croft-White	Department of Health, Policy Research Programme
Carol Crotty	Care Services Improvement Partnership, East Midlands region
David Daniel	Department of Health
Helen Fisher	Institute of Psychiatry
Paul French	University of Manchester
Gyles Glover	Durham University and the North East Public Health Observatory
Martin Hember	Care Services Improvement Partnership, South West region
Kevin Jarman	Care Services Improvement Partnership
Judi Jeavons	Care Services Improvement Partnership, Eastern region
Lorraine Khan	Sainsbury Centre for Mental Health
Martin Knapp	London School of Economics
Clare Lamb	Care Services Improvement Partnership, Child and Adolescent Mental Health Services Programme
Simon Lawton-Smith	Kings Fund
Neil Lowther	Department for Work and Pensions
Paul McCrone	Institute of Psychiatry
Moggy McGowan	Care Services Improvement Partnership, Yorkshire & Humberside region
Ian McPherson	Care Services Improvement Partnership
Paddy Power	Lambeth Early Onset Psychosis Service
Rachel Race	Department of Health
Shahana Ramsden	Care Services Improvement Partnership, Delivering Race Equality Programme
Denise Razzouk	London School of Economics
Swaran Singh	University of Warwick
David Shiers	Care Services Improvement Partnership
Jo Smith (Chair)	Care Services Improvement Partnership
Alison Tingle	Department of Health, Policy Research Programme
Kathryn Tyson	Department of Health

Cover – The straight road ahead. Michael Clark

Introduction

The Care Services Improvement Partnership (CSIP) were delighted to welcome over 30 delegates to this, its second Early Intervention Service (EIS) research-policy-practice national seminar to hear about and discuss developments in important research into the cost impact of EIS.

In 2006 following the initial EIS research-policy-practice national seminar, the first economic model of EIS was developed to estimate the economic impact of EIS on local health economies. Since then the economic modelling work has progressed, both in terms of refining the first model and scoping areas in which to developing the model into new aspects of EIS. This second seminar was to update people on these developments and for a discussion about the implications and possibilities for further research work.

Jo Smith, joint lead on Early Intervention Services for CSIP, chairing, introduced the aims of the seminar. These were to have a better understanding of:

- Recent health economic modelling work with respect to EIS;
- What the new scoping work has identified as potential areas for future EIS modelling, and to decide on the priorities for this work;
- The relevance of the work to future EIS policy, practice and research development e.g. creating synergy between consumer view/clinical effectiveness/cost impact;
- Relevance of, and potential for the modelling work for mental health policy, practice and research in general

Context

Professor Louis Appleby placed the discussion into the broader context of changes in mental health care and the development of EIS.

Louis noted the dramatic change in mental health care accompanying the introduction of the National Service Framework (NSF) for Mental Health (1999) and its subsequent policy and practice development. Prompted by a widespread decline in confidence in 'community care', the singular community care service provided by the generic community mental health team, was seen as insufficient and it was felt that system redesign was required to develop specialist services able to attend to particular needs. Hence, Assertive Outreach Teams, Crisis Resolution Home Treatment (CRHT) Teams and Early Intervention Services became established.

To maintain the desired continuous quality improvement Louis felt it important that we continue to better understand the impact of these reforms; to answer the questions of what is working, in what ways, and what outcomes and benefits are being delivered.

Louis noted that the development of EIS was in many ways the most ambitious element of this reform. Initially, despite strong advocacy for EIS, and that it seemed the right thing to do (i.e. intervene early to achieve better outcomes), there was little evidence for the intervention even though lack of treatment for early psychosis was linked to poor outcomes.

However, increasingly that clinical evidence base has grown, increasing confidence. Louis stressed the importance of aligning the various forms of evidence (client voice, scientific clinical & service data, and economic data) to understand how EIS is working, and, crucially, what components make it work best.

Comparison with CRHT was made, where gaining a better understanding of the nature of the gatekeeping function has led to improved impact from these teams.

For the future development of EIS, Louis said we need to marshal the evidence to answer such questions as:

- Who are the people being supported by EIS now?
- Are they supporting the right people now?
- What interventions are being delivered?
- Are these the right ones and what are the most effective components?
- What service models work best to deliver these interventions?
- What benefits and outcomes are achieved and to what extent are they sustained?
- Does a better early experience with mental heath services lead to better engagement later in life and better outcomes for people?
- What is the value for money evidence?
- What variations in practice work best in different contexts, for instance urban/rural environments?
- Is there equality of service to all sections of society?
- Can the model be refined and improved as evidence develops to identify the key elements of EIS?

Research Presentations

Paul McCrone, Modelling the economic impact of Early Intervention Services

Paul described how the economic model was first developed, and its subsequent structural revision on the basis of new data since first reported in 2006.

Paul noted the economic perspective on health care is one of:

- a scarcity of resources compared to potential demand, requiring decisions on how best to allocate finite resources;
- which requires us to know the costs of EIS , how they compare to other possible uses of resource, and whether or not the costs of EIS are offset in other ways, such as in the care system or society;
- and, to know whether or not EIS is cost effective.

Although, for EIS, such answers might come from Randomised Controlled Trial or similar research, this would be costly and take several years to report. With good data already out there a suitable economic model can be developed to give answers we can have confidence in.

A section of the structure of the model is presented in figure 1. It is in the form of pathways which fork at various points, representing decisions in real life. The first fork is a decision between going on an EIS pathway or going to a model of standard care.

The model began as something more complex but became simplified on the basis of what data was available. As is usual in these modelling exercises, we were seeking a practical model of reality.

Once the pathway was agreed with experts working in EIS, data were sought for:

- the probability of a person taking any particular path at the decision points;
- the costs associated with each pathway.

These were collected from known service data, research evidence (e.g. the Lambeth Early Onset (LEO) trial) where possible,

The model includes mainly NHS costs, with some social care and some limited costs associated with loss of employment by the service users. (This latter area, employment costs, is preliminary costing and more work could be done on this aspect of the model. It includes consideration of those in education.)

Paul presented the actual data used for both probabilities and service costs in a model for 3 years of service support. The quality of the data is such that we can have
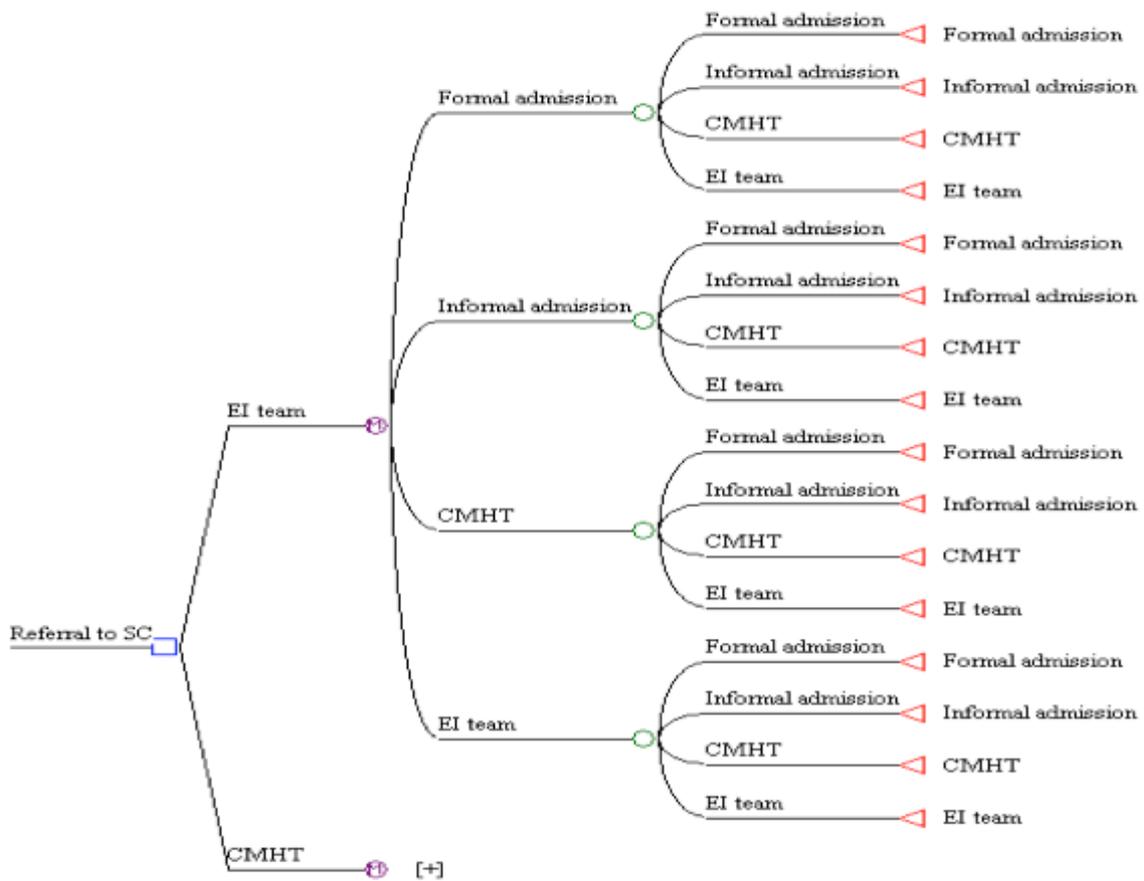

Figure 1: The EIS sub-tree of the pathway model

and supplemented by good quality service audit data (from Worcestershire and Northumberland Early Intervention Services). When these were not available, expert opinion was used.

high confidence in the output of the first year of the model, and good, but lower, confidence by the 3rd year.

Paul reminded us that any model is inevitably a simplified version of reality. For example, the model is run in cycles of two month intervals and assumes that a person has only one admission status during that time, when in reality it may be possible for someone to have more than one status. Research suggests the actual contact between people and the services on the non-EIS pathway may be a more complex mix of contact, non-contact, Did Not Attend and frustration, all involving costs, but which can't be represented in the model. Also, at present the model only records direct admission to inpatient care and does not include CRHT services as an acute care option.

Sensitivity analyses can assess the robustness of the model to reality from which we can generalise arguments. In this work two approaches were employed: increasing and deceasing key variables in the model by 50%; simultaneously varying all parameters in probabilistic or Monte Carlo analysis. **In all analyses the cost of EIS remained less than standard care, although the amount of the differences varied.** This tells us that the model and the conclusion about the savings with EIS are robust.

Running the model for a cycle of 12 months revealed savings for EIS compared to a standard model of care, derived in the main from reduced readmission in the EIS path. Thus the rate of readmissions is key to this model, and whilst there is good data for a one year period data for periods longer than that is of lesser quality.

The model suggests that over 12 months the EIS pathway for each individual is £5,000 cheaper than the standard care one. Over 3 years the saving is £14,500 for an EIS approach.

The model can be adapted over time and for different contexts as more data is made available. Clearly there need to be some

boundaries agreed on just how exhaustive our enquiry should be. The next session of the seminar begins to examine this in more detail. **As it stands, this model provides a robust, quick analysis of costs for a generic EIS in which we can have good confidence.**

Following consideration of the base case model, Paul proceeded to present preliminary work on a model specifically about those from *Black and Minority Ethnic* (BME) groups who might use EIS. The data for this have been drawn from the base case model, LEO data, and the Count Me In census. This gave admission rates for BME clients that were higher than the average used in the base case model. The same pathway model and costs were used.

Running the model with this new data for an individual from a BME community one could anticipate a saving of £7,900 for EIS over standard care over 1 year, and £24,000 over 3 years.

Paul then went on to describe early work on developing an *Early Detection in Psychosis* economic model. The data for this has been largely drawn from the OASIS service and research project, linked to the LEO project.

Because it deals with a different issue, a new pathway model was developed for this work (see figure 2).

The rationale for Early Detection work is that most people with psychosis had prior, prodomal symptoms allowing the potential detection of people with a so-called *at risk mental state*. Supporting and treating these people might prevent the development of psychosis, or at least reduce its impact to produce better outcomes than if the person was left to develop full psychosis before receiving any support. It is a relatively new area of EIS work with an evidence base which is
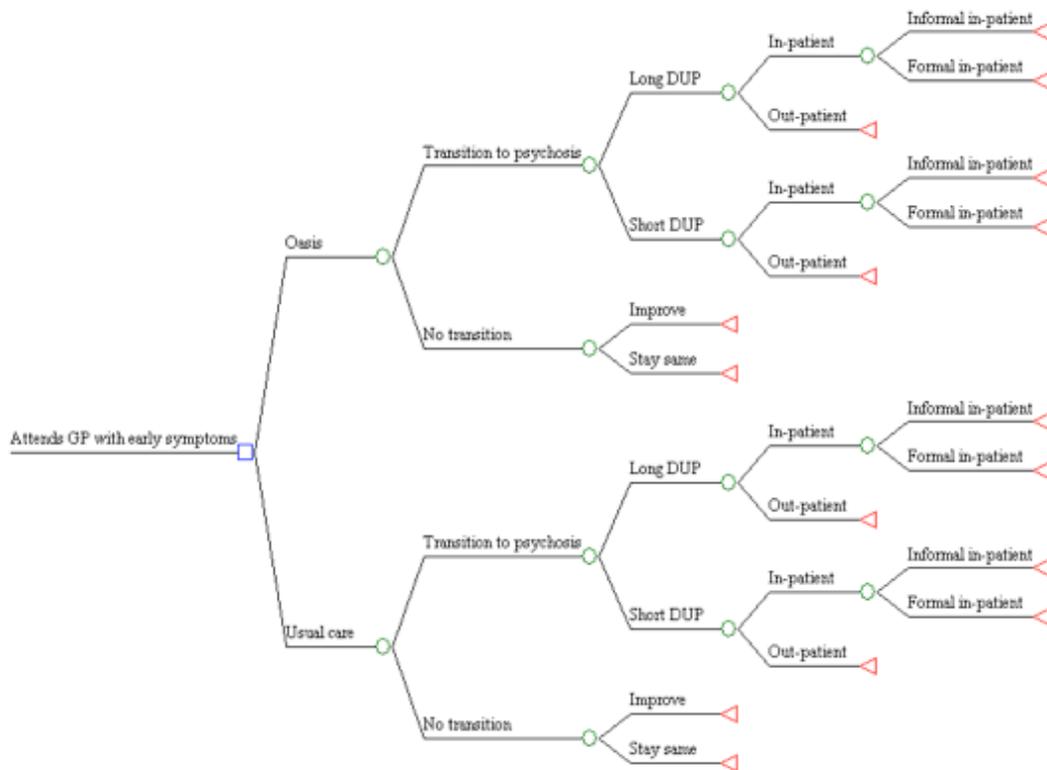
Figure 2: Draft pathway model for Early Detection

still developing. Small scale studies have so far shown some promising results, and larger projects are underway, e.g. EDIE 2.

Paul presented the probability and cost data he used in the model, together with a typical set of interventions used with a client of the OASIS team. Loss of employment data were also calculated and presented.

The model was run for 12 and 18 months, revealing negligible saving for EIS over standard care after 12 months, but by 18 months EIS saved £1,100.

The similarity in 12 month costs was based on the fact that although the EIS produced fewer costs in terms of lost employment to clients, it has higher service costs than standard care over that period. It needs to be stressed, though, that there is a paucity of data in this area

and more is needed, such as on what happens to people in their period of untreated of psychosis and the prodromal stages and the costs associated with each.

Paul noted that it is not always the case in these modelling exercises that the intervention or service of interest comes out as cheaper than standard care. Indeed, even when something comes out as more expensive, it can still be deemed as cost effective.

Discussion

During discussion about the work presented by Paul the following points were made:

- Several possible sources of further data for now and in the future were identified. For example, the

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AESOP study, the Trailblazer sites of the Delivering Race Equality Programme, National EDEN and PsyGrid.

- Swaran Singh has recently begun a national research project examining BME use of EIS in Birmingham and he offered to collaborate with the researchers to collect good data for the BME model.
- Some sources of audit data for the Early Detection work were mentioned and colleagues will liaise with Paul to see if these help the modelling.
- The models do not presently include carer costs. In theory, these could be included if the data exists.
- It was felt that this was very helpful information. The base case model had already been informative for supporting existing policy and encouraging practice developments. It has also been informative in research to help identify data that could be collected in other work to help refine this modelling.
- Paul and Martin were encouraged to continue to develop the BME model by collecting further data from the sources identified in discussion.
- The Early Detection work was also of interest to people, but it was recognised that the evidence to refine this may be limited at present. Having the model will be helpful to researchers in this area to consider what data they need to collect. Paul and Martin were encouraged to continue to seek data to refine this model and colleagues at the seminar offered to help.
- The issue of what happens to people during the time of untreated psychosis was seen to be crucial, particularly in terms of costs. Paul and Martin were encouraged to try

to develop this economic case to help influence commissioners of services and others.

Martin Knapp, Scoping further developments of the economic modelling for Early Intervention Services

Martin presented work on scoping the possibilities for further developing the EIS economic modelling work. They have been looking at economic modelling of the following issues in relation to EIS:

- BME
- Employment
- Child and Adolescent Mental Health Services (CAMHS)
- Offenders
- Rural/urban
- Suicide
- Homicide
- Substance use
- Quality of life

Martin gave a brief overview of some of the costs already known about in relation to schizophrenia in England, including:

- The average cost was £54,596 per person year in 2005;
- Unemployment accounted for 39% of the costs calculated at that time;
- Several areas of costs have not been calculated yet, such as those associated with the criminal justice system; indeed, only a small proportion of the costs have been calculated in detail, mainly those associated with NHS and social care.

A draft *CAMHS* pathway model was presented along with some of the assumptions underpinning it, such as the sources of referral. After referral the model contained three possible paths, one through an EIS, one through a model of standard care and a third with no follow up with the person referred.

Some of the cost dimensions needed for the model were detailed along with possible sources of research data.

Martin then presented a draft model for *offenders* and EIS. This began with considering the possible starting points in various statutory services a person with early psychosis may come from. For each of these, such as from police or from prisons services, the model details the possible care pathways, including to EIS, to forensic services, and to prison. This was a very preliminary model of the pathways presented for discussion at the seminar for information on the sense of the model and possible sources of data.

Similarly a model to compare *rural and urban services* was presented. This was essentially the same as the base model presented by Paul. The challenge with developing this is identifying the various data needed to run the model.

Martin proceeded to discuss the possibility of economic modelling for homicides by people with psychosis. There is known data on the numbers of homicides and the timing of them in a person's experience of psychosis. It may be difficult, though, to collect good quality cost data.

Martin noted that in the base model of EIS economic modelling it was mainly the use of resources provided by statutory services that was costed. In principle a model could be built to calculate costs associated with certain outcomes, but Martin sought guidance on what outcomes to seek to cost. Examples of outcomes for consideration might include symptom free days, social inclusion issues, citizenship, and family impacts.

Finally, Martin listed the data sources they have used and thought to use for further work, including EIS research projects, survey data, and routine data (the mental health minimum data set). He concluded that better data on offenders, CAMHS, BME models, and employment/occupation would be most welcome.

Discussion

In discussion about the work presented by Martin the following points were made.

With regard to the *CAMHS* modelling:
- The complexity and variation in service models and pathways was seen to be huge across the country.
- It was not certain that a core or base model for CAMHS could be developed as a result of this variation.
- Would age cohort related models be more useful than a generic CAMHS model.
- Swaran is working on a project on transitions between CAMHS and adult services, due to complete in about 7 months, and offered to liaise on the data with Martin and Paul.
- Some links to services for good quality data were mentioned and people offered to liaise with Paul and Martin to discuss this further.
- The rationale for further refining the pathways to inform data collection in future projects was seen as sensible and helpful.

In relation to the *offenders* modelling:
- It was felt that having better financial models in this under-researched area would be a very powerful argument for supporting improvements in it.
- Whilst the work would be of interest and use, there was concern that the complexity of pathways meant robust modelling might need more effort than the returns could justify.
- If the previous point was the case, Martin and Paul were encouraged to see if it would be easier to include an element of offender costs in the original model.

In relation to the *urban/rural* modelling:
- Developing a flexible model that could be used in different contexts would be useful.
- It was felt there might soon be helpful data from the National EDEN study of EIS.

In relation to the *homicides* modelling:
- This was thought to be a potentially useful development and some possible data sources were mentioned.

In relation to the *outcomes* modelling:
- This was thought to be a powerful development. It could significantly add to cost-effectiveness arguments and ought to be linked to commissioners of care service and the governments Public Service Agreements.
- The concepts of occupation and participation were thought to be helpful ones to consider for outcomes. Martin and Paul were encouraged to see what existing data exists on these.

Other points raised were:
- Whilst these models are helpful, we have to remember they are based on data from leading edge services and there is a need to manage expectations. The figures should be used as indicative and not rigidly for performance monitoring of services. People should still get the care they need.
- Can the models be integrated with Peter Jones' work modelling incidence of mental illness in different areas?
- Other helpful data sources were mentioned, such as the First Episode Research Network (FERN). Representatives from FERN agreed to check with their network what data they collect already that could be useful for this

work, and what helpful data they might collect in the future.

- A challenge was raised to see how the perspectives of service users and carer can be included in the modelling.
- Would it be possible to develop models for different EIS configurations, such as one which was fully compliant with the Policy Implementation Guide compared with one which was not? This would be difficult as without good quality data, a fully compliant, well resourced team might misleadingly appear more expensive. To be useful some notion of comparing costs to outcomes would be needed.
- Following this, the idea of developing a simplified model that services could themselves use and benchmark against other services and the base model was suggested as potentially helpful.
- A briefing paper on possible data sources was thought to be a useful outcome to the seminar to share with others and add further sources to. It was agreed that this would be written and circulated.
- It would be very helpful for this work, and other mental health work, if 'identifiable team' working with the client were put in as a field in the minimum data set, just as 'GP' is for each service user. The data could then be linked to the mapping data for better analysis.

Conclusion

There was strong approval for this work to inform continuing policy development and implementation. It provides a helpful perspective on understanding the impact of EIS and better understanding of what the key dimensions are to making it work well.

There was a strong endorsement for Martin and Paul to continue to develop the base model further as more data becomes available, and to focus on developing the BME and Early Detection models as priorities. Robust models in the other areas discussed would be helpful in time, particularly something linked to CAHMS and younger people. Agreement was reached on how to support them to do this work. Watch this space!

Jo thanked everyone for their support at the seminar.