PATIENT LEVEL INFORMATION AND COSTING SYSTEMS (PLICS): CURRENT PRACTICE AND FUTURE POTENTIAL IN THE NHS HEALTH ECONOMY

1. AIMS AND OBJECTIVES

The prime objective in implementing PLICS is to better understand cost drivers. Such understanding is fundamental to day-to-day management and enhancing the quality and cost-effectiveness of NHS services (DH, 2011a). However, PLICS also illuminates the patient pathway and offers the ability to undertake a sophisticated analysis of individual pathways both within Trusts (from referral to discharge) and across a 'year of care' (for chronic conditions which cross organizational boundaries). The Department of Health (DH) (2009) defines PLICS as follows, "*Clinical costing is often known by its other name of Patient Level Information and Costing or "PLICS". It relates to the primary functions of health providers, which are to diagnose and treat patients. Clinical costing is derived from tracing resources used by an individual patient in diagnosis and treatment and calculating the expenditure of those resources using the actual costs incurred by the organisation*". Under Payment by Results (PbR) PLICS would enable payments to be made for care pathways and year of care, thus promoting integration of care across services and settings. Overall it has been calculated that *if properly implemented* PLICS should result in efficiency savings of 6-10% which in acute care alone (on spending levels of around £50bn) could save £3bn to 5bn (HFMA, 2007).

We aim to analyse the potential of PLICS and secure best practice implementation in four areas:

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(a).Cost improvement through enhanced technical efficiency;

(b). Better allocative efficiency of resources and congruence with patient preferences within healthcare economies (first, within and between Trusts, second, between primary and secondary/tertiary care and, third, along care pathways and year of care);

(c). Understanding clinical variation in resource use and the relationships between cost and quality;

(d). Greater clinical engagement through more clinical ownership of costs and information systems

2. RESEARCH QUESTIONS

(a) How are NHS Trusts and commissioners using PLICS?

(b) How can PLICS be used to benefit the total health economy (focussing on cost improvement, resource allocation across services and settings, linking costs with quality and clinical engagement)?

3. BACKGROUND

3.1 *Fit with Commissioning Brief (11/1016) on 'Improving financial management in health care'*

As PLICS is a cost accounting framework, our research questions address primarily the fourth of the SDO indicated research questions, *'How can costing and accounting frameworks and budgetary arrangements be used to improve financial management?*' PLICS is currently being used in the acute Trusts within the context of service level management, however, we will also make a contribution to the second SDO question, '*How can the financial management of service delivery be improved through service line management*?'

3.2 *Fit with QIPP framework for delivering efficiency savings whilst maintaining or improving quality*

Dr Mahmood Adil, an advisor to the research team, has recently been named by the Department of Health as national Quality, Innovation, Productivity, Prevention (QIPP) advisor for clinical and financial

engagement. His remit is to build engagement within the NHS clinical and financial communities for QIPP plans. Dr Adil's QIPP role provides this research with a unique opportunity to link into the QIPP agenda (and associated clinical and managerial networks) both whilst the research is on-going and after it has reported.

It is already evident that there are considerable synergies and overlaps between this proposed research and QIPP initiatives. Current QIPP workstreams focus on three areas: commissioning and pathways, provider efficiency and system enablers (DH, 2011b). This PLICS research is directly relevant to first, commissioning and pathways and, second, provider efficiency. Work on PLICS will provide evidence which may be used to refine PbR through driving specific initiatives, as set out below.

3.2.1 Commissioning and pathways

Allocative efficiency is achieved when scarce resources are allocated in such a way that the maximum benefit is derived from their use. Integrating care along pathways (both within Trusts or across organisational boundaries) offers the best prospect of enhancing the quality of care for patients whilst making cost savings through better allocative efficiency (Curry & Ham, 2010; Ward, 2011a). Redesign of patient pathways can also improve patient satisfaction (cost-savings and patient satisfaction are not mutually exclusive). Patient pathways for chronic disease such as cancer, heart, renal, diabetes and asthma have been advocated for decades but have never fully emerged (Maynard, 2008). Within a Trust, PLICS records all the events, procedures and clinical interactions which underpin a patient's care from admission to discharge. For a year of care, PLICS does the same across organisational boundaries. All the direct and indirect costs associated with these events, procedures and clinical interactions are allocated to the individual patient. In this way, opportunities for care integration can be pinpointed and any associated cost savings identified. Once pathways are integrated, the DH or commissioners can use PLICS to develop tariff currencies or flexibilities to enable commissioning on the basis of care pathways and year of care. Pathway tariffs are seen as providing more appropriate financial incentives to providers. Such a tariff is already under development for 2012/13 in maternity services (PbR guidance 2011/12). This would incentivise the right intervention for the patient (for example, a community contact rather than a hospital visit) (Brown, 2011).Thus integrated care may also take account of patient preferences This research on PLICS would enable work on pathway tariffs to accelerate as they would be based on better cost information along the pathway. Pathway costs are also likely to provide a better basis for programme budgets than current HRG costs.

3.2.2. Provider efficiency

Provider technical efficiency can be defined as the ratio between inputs (for example, numbers of clinicians working in an orthopaedic clinic) and outputs (for example, numbers of patients seen in the clinic). In many areas, especially complex care which requires expert judgement there is acknowledged variability in inputs between different clinicians (or teams of clinicians) (HFMA, 2009). The NHS Institute calculated that £3bn could be saved if, in terms of clinical variation in resource use, every NHS organisation performed as well as the upper quartile in key areas (e.g. reducing length of stay, reducing pre-op bed days and managing variation in outpatient appointments and emergency admissions) (Adil, 2010). PLICS makes this variability transparent by focussing on clinicians' diagnosis and treatment of patients. For example, for hip replacement there could be variations in: day of surgery admittance rates; theatre time; type and cost of prosthesis; approach to surgery; risks of surgery; and post-operative complications. All of these variations have the potentiality to impact on quality and cost. However current practice under HRG costing masks variability at the consultant level (Moreea & Ronald, 2011). Having PLICS information provides a basis for dialogue about variations in clinical practice and, hence, improvements in provider technical efficiency, it may also be possible to improve patient satisfaction for the same or lower cost.

PLICS data can be linked to patient outcomes, in so doing PLICS links into the quality agenda and can form an evidence base for quality tariffs to encourage better and safer patient care. We also envisage that PLICS may have a far reaching impact on Patient Reported Outcome Measures (PROMs). It has been argued that PROMs on health-related quality of life have had little impact on clinical decision-making (Greenhalgh et al,2005). However, PROMs are seen as the way forward in the NHS. To enable patient-responsive commissioning, guidance has been issued on the routine

collection of PROMS for elective procedures (DH, 2009). Our findings on specific elective procedures (e.g. hip replacement) could be linked with PROMS, and thus enable their further development in conjunction with individual patient costing data.

It is also already evident that enhanced quality is possible within a financially constrained environment, Crump and Adil (2009) review several studies that reported reduced costs occurring as a 'by-product' of quality improvements. For example, Vincent et al (2005) calculated that preventable adverse events cost the NHS around £1bn a year in terms of additional bed days. PLICS is linked to all events and procedures along the patient pathway, so it can offer much more sophisticated data than is currently available to target where quality improvements can release cost savings.

3.3 *Current state of knowledge on PLICS*

In their current form, PLICS are a relatively recent innovation in the NHS. To our knowledge there are no published academic papers or reports presently available (the Chapman & Kern (2010) report for the Chartered Institute of Management Accountants, '*Costing in the NHS: from reporting to managing'* discusses PLICS and there are some professional publications which we cite). There are no current or ongoing NIHR projects on PLICS and only one on financial pressures. Therefore this project will create a pragmatic knowledge base for PLICS and highlight its potentially achievable benefits for the whole health economy.

3.4 *PLICS: Costing/pricing models and clinical engagement in financial management*

We will review research to highlight two themes: *Costing/pricing models* and *clinical engagement* in financial management. Our argument is that these two themes coalesce to determine the effectiveness of any financial management strategy, including PLICS. Costing/pricing models are, potentially, important drivers in obtaining more effective resource distribution in health economies (Ellwood, 2000; Llewellyn, 2001;Jones and Mellett, 2007). Since the 1970s, financial management policy in the NHS has tended to oscillate between cost benchmarking and market pricing. We argue that these are not mutually exclusive, PLICS could usefully inform both cost benchmarking and pricing. We briefly review three historical epochs in the development of costing/pricing and clinical engagement. Drawing on this review and incorporating the present UK government agenda, we then assess PLICS in terms of current practice and future potential in the context of costing/pricing models and clinical engagement.

3.4.1. Epoch 1: Specialty costing and clinical disengagement in the 1970/80s: *The genesis of patient level costing*

During the 1970s, work began on speciality costs (for example, Magee and Osmolski, 1980; Pugh, 1985), Although these costs were at a high level of aggregation (Bourn and Ezzamel, 1986) they do reflect a fundamental operating principle of hospitals- that consultants are organised into specialisms. Indeed, in the sense that PLICS is being used in the context of service line management within specialisms (service lines reflect specialties), this early work on costs and levels of activity in specialisms is highly relevant. Although specialty costing was developed as a planning tool which recognised the 'federal' nature of hospital organisation (Bourne & Ezzamel, 1986), it also initiated a culture of cross-hospital cost comparisons and benchmarking (Perrin,1978) and provided a basis for exploratory work on patient costing (Jones and Prowle, 1982). In an NHS commissioned report, Körner (1984) recommended the general adoption of speciality costing and associated patient costing, through an analysis of patient groups. Taylor (1984) confirmed the feasibility of patient costing and set a future agenda for PLICS.

The 1970/80s marked a period of transition from resource policies being subordinate to service issues to one where resources pressures came to drive service policies (Webb & Wistow, 1982:21). Unsurprisingly, clinicians did not tend to view this development favourably (Llewellyn,2001). Traditionally, clinicians had advocated for resources for their particular specialties. Rather than being seen as indicative of inefficiencies, budget overspends were cited as evidence that more money was needed (Brunsson,2000). Research conducted at the time clearly demonstrated that disseminating cost data to clinicians produced few changes in work patterns or expenditures (Wickings et al, 1983). Yet hospital costs are largely determined by the decisions of senior doctors (Hunter, 1992; Jones and Dewing, 1997). Hillman et al (1986) estimated that doctors' decision-making accounted for up to 70%

of hospital expenditure. Progress would only be made through finding a way to 'engage' clinicians in financial management (Wickings et al, 1983). Roy Griffiths' enquiry (see Griffiths, 1983) spearheaded the introduction of business principles into the NHS. Following the Griffiths Enquiry, four Management Budgeting pilot sites were set up in 1983 (DHSS 1985), these were largely unsuccessful in incorporating costs at patient level but were the forerunner of improved patient information through the 1986 Resource Management Initiative (Ellwood 1996a). Griffiths (1983:6) had recommended to '*...involve the clinicians more closely in the management process...Clinicians must participate fully in decisions about priorities in the use of resources.*' Management budgeting failed to engage clinicians and the later Resource Management Initiatives strove to collect data to engage clinicians before embarking on clinical costing (Buxton et al 1989). Again the need to engage clinicians in financial management was the goal.

During the 1970s and early 1980s the model was cost benchmarking, the cost object was the specialty and patient level costing was recommended. But costing had little impact on health expenditures as clinicians were 'disengaged'.

3.4.2 Epoch 2: The internal market, 'sophisticated' cost/price per patient negotiations and the rise of medical management in the 1990s

Margaret Thatcher was influenced by Enthoven's (1985) ideas on competitive markets. In 1991, through the *NHS and Community Care Act* (1990) an internal market was introduced to bring competition with, hopefully, enhanced cost effectiveness and better resource allocation into the NHS. Health Authorities and GP fund holders would act as purchasers of hospital services. The expectation was that contracts between purchasers and providers would become increasingly sophisticated, moving from block grants to cost and volume specifications through to cost per patient case negotiation (Ellwood, 1992). Cost per case negotiation was, of course, another early forerunner for PLICS. To underpin the internal market, hospitals had to set prices for their procedures, in theory these prices were intended to be cost-based as, under the internal market regime, it was not intended that hospitals make a profit (Ellwood 1996 a,b; Llewellyn, 1997). Prices should be cost-based only if the present mix of services is optimal as they do not offer any incentives for service reconfiguration (Street and Maynard, 2007b). Moreover, these cost-based prices were problematic, in three ways. First, hospitals' cost information was inadequate to set prices (see, also Bates and Brignall, 1993; Jones,1999). Second, price variations were often meaningless because the procedures to which they related were inadequately defined. And, third, prices did not consistently signal provider efficiency so, for example, lower/higher prices did not always reflect lower/higher cost (Ellwood, 1996 a,b).

Involving clinicians in decisions on resource allocation is unlikely to be conflict-free (Greener, 2005) as it brings clinicians' concerns over resource availability sharply up against managers' concerns for cost constraint (Pollitt et al, 1988; Walby and Greenwall, 1994). In previous 'clinical engagement' initiatives, instilling cost consciousness in all clinicians was taken to be over-ambitious; in the internal market the new position of clinical director became commonplace (Llewellyn, 2001, Kitchener, 2000). The logic was to give clinical directors the freedom to manage their specialties as 'directorates' (semi-autonomous, self-managed units), along with this freedom comes financial responsibility for the directorate budget (Ezzamel and Willmott, 1993). Research has indicated that this medical-manager model has been successful in imbuing key senior clinicians with cost awareness (Braithwaite & Westbrook, 2004; Llewellyn, 2001; Magnezi et al, 2010).

During the 1990s, the model was cost-based pricing. However, costing was not sufficiently robust to (a) produce prices that embedded useful purchaser information or (b) engender effective incentives for providers. Moreover, cost-based pricing provided no incentives to change the mix of services. The position improved on clinical engagement, however, as clinical directorates developed and matured.

3.4.3 Epoch 3: Payment by Results, service level management and commissioning, late 1990s to date: the emerging context for the introduction of PLICS

In 1997 the New Labour government announced a shift in policy away from the internal market and back to a cost benchmarking approach. However, this focus on cost benchmarking had new 'bite' as it was, first, mandatory and, second, intended to result in funding on the basis of national average costs, although providers were not, initially, aware of this proposed new funding arrangement (Llewellyn and Northcott, 2005). The 1997 White Paper stated "*We will tackle unacceptable variations in performance ...by sharing information and comparing performance not by financial competition. The publication of unit cost information is a central feature of this new approach and fulfils a key commitment in "The New NHS" to produce costs on a consistent basis and to publish these.*"" Although aspects of this shift away from the market were rhetorical, for example, the basic purchaser/provider split was retained with 'purchasing' becoming 'commissioning', negotiated prices were abandoned for a fixed tariff under Payment by Results (PbR) (Llewellyn and Northcott, 2005; Northcott and Llewellyn, 2003; Mannion et al, 2008; Street and Maynard, 2007a,b). This tariff is based on reference costs aggregated to Health Resource Groups (HRGs). Since 2003, PbR has been rolled out to fund activity on the basis of the average HRG cost. Under PbR there are powerful monetary inducements for increased activity, hospitals have incentives to cut costs and reduce length of stay to increase productivity (Mannion et al, 2008). Broadly speaking, if income under tariff exceeds costs hospitals make a 'profit' which they can retain (Street and Maynard, 2007a).Whether any profit is realised, however, depends on where the hospital is on its marginal cost curve for the particular HRG (Mannion et al, 2008). Under PbR, marginal revenue is almost always the full average cost (excepting, for example, the short stay A&E tariff which is 40% of full tariff). In consequence, as long as the hospital's marginal costs stays below marginal revenue the hospital (and speciality concerned) has a strong financial incentive to increase activity. Using reference costs the hospital (or speciality) is highly unlikely to be aware of its marginal costs (although this may change under PLICS as used in service line management) so the basic PbR driver is to expand activity or reduce costs below tariff levels.

The government at the time intended PbR to be an equitable payment system, enabling fairness and transparency (DH, 2005). However one clear source of inequity is the impact of specialty on HRG cost (Jones, 2008;2009;2010). This is significant as for the 635 HRGs that involve elective overnight admissions only 7% have one specialty and over 50% have more than 10 specialties delivering the care that falls within the HRG (Jones, 2008). For example, for HRG SA13Z (single plasma exchange, leucophoresis or red cell exchange) the average specialty cost varied from £350 when delivered in Endocrinology to £2418 in Neurosurgery to £10,236 in Blood and Marrow Transplantation (Jones, 2008). In general, HRGs are not iso-resource, the cost of the HRG rises as the complexity of the specialty delivering the care for the HRG increases (Jones, 2009; 2010). In consequence, hospitals delivering many complex specialties (and specialist hospitals) will be disadvantaged under PbR as compared to generalist hospitals that work at the less expensive end of the specialism spectrum (Jones, 2009). Operationalised in 2009, HRG4 was intended *inter alia* to rectify this situation and make funding truly 'setting independent' (i.e rewarding the care that is delivered irrespective of where the care is carried out) (DH, 2008; HFMA Briefing, 2008). It can be argued that this objective ignores the issue that the 'same' care does have different costs dependent upon where is it delivered, for example, length of stay has a strong specialty-specific element. In any case, even with 'specialist top-ups' this 'setting independent' objective has not been realised, Jones (2009) concludes that the current HRG-based method of evaluating and funding remains flawed as it lacks a specialty-specific component.

PLICS is being developed from within the context of service line reporting (SLR) and service line management (SLM). Both are highly relevant within the context of PbR and the specialty issue. Service lines are built around specialties, they are basically a development of the clinical directorate model described above. Essentially, SLM develops clinical directorates into profit as well as cost centres. The concept behind SLR/M is to identify 10-20 (depending on the size of the Trust) 'natural' units that can be self-governing, where accountability can be assigned and where profit (or loss) can be calculated (HFMA, 2009). Once cost calculations within service lines become more sophisticated, PLICS should enable Trusts to negotiate for specialty-specific HRGs. The significance of SLM and PLICS goes beyond this particular issue, however. Monitor (the regulator for Foundation Trusts (FTs)) developed SLR/M in conjunction with McKinsey, the management consultancy (Bury et al, 2007). SLR/M is mandatory for FTs, Monitor (2008) describe SLR as '...measuring a Trust's profitability by

each of its service-lines, rather than just at an aggregated level'. The expectation is that SLR/M will have both financial and operational aspects, driving organisational structure, strategy, performance management and information management (Monitor, 2009) They also anticipate that SLM and PLICS will enable more clinical engagement in resource priorities, 'Through SLM, clinicians can play a far more influential role, driving performance and making better use of resources to improve quality and patient care' (Monitor, 2008). The specialty is the natural focus for the interest and allegiance of clinicians (Richman, 1987:139). There is also research that shows that incentives which promote quality of care are associated with clinicians' job satisfaction (Grumbach et al, 1998). Therefore, PLICS in the context of SLM is positioned to take advantage of these features in terms of incentivising clinicians to focus on quality, be more productive and cost conscious to boost the profitability of their specialism, as these profits can be retained within the service line. Demonstrated profitability also implies that the service line/specialty will be well positioned to make a business case for increased investment. One advantage of SLM underpinned by PLICS is said to be that it enables the Trust to review its portfolio of services on the basis of their relative size and contribution margin, unsurprisingly, research shows that the prime benefits of SLR from the point of view of both clinicians and managers are increased autonomy and access to the surplus/profit of the service line (Bury et al, 2007). In view of the limited success of policy initiatives to engage clinicians, especially doctors, with managers in resource prioritisation (Davies et al, 2007) SLR/M is welcome.

However, from the perspective of the whole health economy, one of the possible disadvantages of SLR/M is that the very success of the initiative relies on maximising income and minimising costs *for a service line.* This approach, of course, neglects what the maximising of income and the minimising of costs for a particular service line implies for other service lines within a Trust and for primary care. As argued above (Jones, 2008; 2009; 2010) service complexity increases cost, clearly all Trusts cannot choose to disinvest in for example blood and marrow transplantation to concentrate investment in the less complex areas of endocrinology or pain management. In addition, there may be a service line that is making profits but is doing this in part because some referrals from primary care are inappropriate (i.e. 'false positives' who are discharged after first appointment). One of the unfortunate consequences of PbR (which of course rewards activity rather than results) is that there are no incentives (from the point of view of the Trusts) to engage in demand or referral management (e.g. reduce false positives) or, indeed, to work with and educate primary care to minimise false negatives (i.e. patients who should have been referred but were not). SLR/M may well exacerbate the 'false positives' problem as it allows service lines to retain their own profits. This indicates that, alongside SLM, a wider health economy view is also essential.

Involvement in both SLR/M and a local economy group that brings secondary care providers into PLICS dialogue with commissioners and primary care clinicians about referral management and care pathways may offer a way forward. Research with a diabetes pathway showed that, currently, health organisations are struggling to identify full costs and pathways are also being developed without fully understanding the cost implications (ACCA/Audit Commission, 2011). But there are cases of positive cross boundary dialogue, for example, after a reorganisation of care pathways that placed more musculoskeletal patients in community clinics and, therefore reduced the number of new referrals to the Trust, a Trust clinical chief of finance remarked, '...*we faced the significant financial challenge of the lost outpatient activity that left a lot of embedded fixed costs...*[but] *hopefully the health economy will see the financial benefits*.' (Ward, 2011b). Over and above such successful local initiatives, commissioning is a fundamental structure which is intended to exercise governance over the whole NHS, ensuring a better allocation of resources between tertiary, secondary and primary providers in the health economy (DH, 2007). However, there is clear evidence that power imbalances impede such governance, Trusts (and GPs) hold superior information and, hence, enjoy bargaining advantage over Primary Care Trust (PCT) commissioners who lack meaningful data (Audit Commission, 2004; Audit Commission & Healthcare Commission, 2008).

3.4.4 The future context for PLICS? The NHS policy agenda under the current government

Rather than being 'world class', PCT commissioning has been widely seen as the weak link in health policy reform (House of Commons Health Select Committee, 2010). In this context it is unsurprising that the current government focussed on the commissioning issue in *Equity and Excellence*: *Liberating the NHS* (2010) and the current *Health and Social Care* Bill. A core plan was to abolish PCTs and Strategic Health Authorities (SHAs) replacing these with GP consortia which would assume control of 80% of the £104bn NHS budget by 2013. Also relevant to PLICS, were indications of an

enhanced role for the private sector under the political remit of 'any willing provider', a scenario for which Monitor would be the economic regulator. This seemed to signal a more market-based approach associated with price competition (Peedell, 2011), for which PLICS could supply the most sophisticated data. Although clinical coding and data quality are still issues in some settings, HRG costing has become increasingly robust and standardised under successive editions of the costing manual (NHS Costing Manual 2010/11, DH, 2011d). In consultation with the Healthcare Financial Management Association (HFMA) there is now a suite of documents available for PLICS users, including guidance on integrating reference cost and PLICS data (DH, 2011a).

Although the *Health and Social Care* Bill had completed its second reading and reached committee stage in the House of Commons by the end of March this year, increasing controversy halted its progress. A pause for a 'listening exercise' was announced, submissions were directed to the hastily convened NHS Future Forum. The result of this exercise is that the government have announced 'significant' amendments to the Bill, but these may be more rhetorical than real. The following points (summarised from *Government Response to NHS Future Forum Report, 2011*) appear to best signal the future context for PLICS:

- GP consortia will be termed 'clinical commissioning groups'. At least one Trust specialist doctor and one nurse will be appointed to them. Clinical commissioning groups will work to a more relaxed timetable; they will only assume full responsibilities when they have the capacity and capability to do so. A national NHS commissioning board will control budgets until then.
- Monitor's role to promote competition will be tempered through further requirements to also enable collaboration and care integration.
- New 'Clinical senates' will oversee the integration of care across organisational boundaries.
- The term 'any willing provider' has gone, now the phrase is 'any qualified provider'. There will be safeguards against private providers 'cherry picking' profitable services. The role of the private sector will not increase as an end in itself but only as a means to enhancing patient choice.

Costing information may now be sufficiently robust for PLICS to enhance cost benchmarking (of patients and specialties) whilst simultaneously enabling pricing flexibilities to incentivise complex treatments, service integration and cross-boundary care pathways. The intended policy balance between pricing and cost benchmarking will become evident as the complexion of the political landscape clarifies. If PLICS becomes solely encapsulated with SLR/M then cost improvement within service lines, pricing and clinical engagement with financial information may continue but, possibly, to the detriment of (a) enhanced allocative efficiency within and between Trusts, (b) future service integration and (c) the role of primary care. Much will depend on commissioners/ GPS /clinical senates also taking ownership of PLICS.

3.5 PLICS: Current practice and future potential for the NHS health economy

Based on lessons from the past financial management initiatives (summarised above) and the current NHS context policy, we expand upon how our research aims will be operationalised:

- **Cost improvement/resource allocation within Trusts.** Under PbR the issue that HRG costing does not adequately compensate for complexity within specialties remains. Back in 1984 Körner advocated speciality costing and associated patient costing. This lesson has not been learned, without further work to clarify the differentials between specialties PbR risks making unfair rewards as complex specialties are under-compensated and less complex over-compensated. This risk will be magnified if more private sector providers enter the health economy under the 'any qualified provider' remit as they will tend to work at this less complex end of the HRG spectrum. **PLICS would enable specialty-HRG resource calculations** as an analysis could be made between patients who have the same HRG coding but are cared for in different specialties and/or hospital settings. Higher rate specialty-HRGs could be used to incentivise providers to work with more complex cases and disincentivise 'cherry picking'.

- **Pricing flexibilities.** For providers, due to high levels of fixed costs, the average cost of inputs varies across output volumes. Yet, under PbR, whatever their level of activity the provider is compensated for all patients at the average HRG cost. PCTs have had no power to impose thresholds on hospitals' elective activity. A possible refinement to the tariff to introduce a threshold would be to fund providers on the basis of marginal costs over a certain volume level. As stated above, a variant of this already occurs in the two-part tariff for A&E. Such developments could draw on the evidence from the 'cost and volume' contracts in the internal market epoch and transfer pricing theory (Ellwood, 2009). **PLICS could assist here through enabling the calculation of marginal patient costs at different volume levels.**

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- **Better allocative efficiency between primary and secondary/tertiary care** is dependent upon the power of commissioners to (i) move care to lower cost settings where it is safe to do so and when quality can be maintained or enhanced and (ii) ensure that GP referrals are appropriate (avoiding the false positive and false negative issues discussed earlier). As discussed above, at present, the provider incentives under PbR do not address either of these. As outlined above, commissioning was already termed the 'weakest link' in healthcare reform, now the current commissioning landscape is even more complex and its future trajectory uncertain. PLICS will enable better cost information for reporting expenditure **in programme budgets** to inform strategic decisions. Wherever the responsibility falls (or is assumed), to address allocative efficiency between settings, **use of PLICS on cost of care pathways in different settings (and across organisational boundaries) will be essential to make informed decisions on where care should be provided.**

- **Costing care pathways.** At present there is reliance on the tariff being unbundled to enable pathways. As described earlier, the first funded .pathway- for maternity services- is currently under development in this mode. However, **both PLICS and PROMS are needed to underpin informed decision-making on the development of care pathways**. Costed care pathways can provide improved information for programme budgets that presently rely heavily on HRG costs. Commissioners should drive progress in pathway development. The uncertainty that attaches to the current commissioning landscape is pertinent here.

- **Clinical variation.** The level of sophistication inherent in **PLICS enables an in-depth understanding of clinical variation in resource use.** PLICS data on clinical variation in resource use is not used in isolation from clinical effectiveness and, clearly, in the longer term, it is sometimes cost effective to pay for higher quality. On the other hand, as argued earlier, there are PLICS initiatives which reveal that a focus on quality can result in cost savings.

- **Cost improvement/better resource allocation.** Under PbR and SLR/M, service lines do not (yet) set prices. However, **PLICS enables service lines to drill down to see where resource consumption on particular patients may be out of line**. If clinically appropriate, they can address this with a view to cost improvement or, if clinically justified, they could argue for an increased tariff. Also PLICS data on unavoidably high cost clinically complex patients could be used to indicate where specialist 'centres of excellence' may be appropriate.

- **Clinical engagement.** Clinicians' 'natural' allegiances are to service lines or specialties, the ability to retain profit and advocate for more investment on the basis of profitability is a powerful incentive to take more clinical ownership of cost and information systems. But, if specialties become fully fledged 'business units' with a keen eye for cost improvement and the 'bottom line', this could weigh against other key health policy objectives such as integrated services and more primary/community care. This is why **we do not limit our research on PLICS to the acute sector but seek to exploit the potential of PLICS for the NHS health economy.**

3.6 *How we will add to the body of knowledge with reference to current NHS policy and practice*

Overall our proposal will add to the current evidence base through providing:

(a) Lessons for the future use of PLICS as a costing/pricing model based on a full analysis of the advantages and disadvantages of successive NHS financial management initiatives;

(b) An actionable report for Trusts and commissioners on how to use PLICS to understand their economic and financial drivers to achieve the best cost effective care and assess the financial impact of different care pathways;

(c) Actionable recommendations on the potential of PLICS for the NHS health economy, including how tariff flexibilities and provider costs can be integrated to generate cash savings for redeployment across services and settings.

4. NEED

This research is particularly needed now because, in the future, NHS resources will be relatively constrained. In November 2010 the Departmental Spending limits for the next four years confirmed the relative protection being afforded to NHS spending, but also that the rate of growth would reduce from an average 4.5% over the period 2000-2010 to 0.4% for 2011-14. Flat real-terms funding is the reality for the short to medium term. So it is essential that any potential for either cost improvement, better NHS resource allocation, understanding the relationship between cost and quality and engaging clinicians in financial decisions is fully exploited. PLICS is currently seen as well placed to achieve such financial management objectives:

(a) 95 acute Trusts are either using or in the process of implementing PLICS;

(b) The way that the acute Trusts are using PLICS will reflect the Service Line Management agenda and their interests and incentives under the new more market oriented regime but it is important to also understand how PLICS can potentially benefit the NHS as a whole.

The Department of Health recently (2010) conducted a short survey of 412 NHS provider organisations to ascertain the extent of patient level information and costing systems (PLICS). Of the 169 acute Trusts 95 have either implemented or are in the process of implementing PLICS. (This survey shows a much greater take-up than a previous, smaller CIMA survey (CIMA, 2010)).The take up in the non-acute sector was much less (12 organisations have implemented or are in the process, mostly mental health organisations). This DH survey shows a high level of interest in PLICS in the acute sector but did not ask how PLICS is being used. There is, therefore, an urgent need for in-depth research.

PLICS offers considerable scope for achieving financial management objectives. In terms of cost improvement, PLICS is a form of 'bottom up' costing which uses the lowest possible level of detail to capture the costs of all events (e.g. consultations with clinicians and rehabilitation) and clinical interventions (treatments, theatre time, diagnostic tests, physiotherapy) along a patient pathway. This close link that PLICS forges between costs and patient care fosters better clinician engagement than other costing initiatives and should result in more financially informed clinicians (Adil, 2010). A focus on patients also bridges the interests of clinicians and managers. Through PLICS, variation in cost per patient is clearly evident. Such variation may be justifiable: high quality standards and superior outcomes; co-morbidities; chronic conditions; geriatric or paediatric cases; rare or 'not well understood' diseases/conditions; patients with both health and social care needs.

However, PLICS costs can be aggregated to examine variation between consultants, specialties, HRGs and Trusts. Where cost variation is unnecessary, action can be taken to reduce this. Better resource allocation will follow from allocating more resources to lower cost providers where their quality standards and outcomes are the equivalent or exceed those of higher cost providers. Currently, under PbR Trusts receive income based on the national tariff. As recommended in Darzi (2008) money has been top-sliced and paid according to quality since 2009 (ie CQUIN monies). In the future there will be increased payments for demonstrable quality and some tariffs may be relaxed to incorporate price competition (*Equity and Excellence: Liberating the NHS*, 2010).

Our objectives are broader than understanding how and why the acute Trusts are using PLICS. We aim also to analyse the potential of PLICS along the whole care pathway (using probably a 'year of

care' approach for chronic conditions). This places cost improvement, resource allocation, linking costs to quality and clinical engagement within a 'whole NHS' economy context. As shown under ‘Background’ some acute Trusts are participating in local health economy groups.

As stated above, we know of no current studies on PLICS, there are a few studies on SLR/SLM but these are mainly in the US (Byrne et al, 2004: Greenberg et al, 2003). The relevance of these studies to the UK is somewhat dubious. Overall, this research is needed because PLICS is becoming the resource management tool of choice in the acute Trusts, therefore the ways in which it is being used should be analysed, but even more importantly, recommendations made on the potential of PLICS for the patient pathway and whole NHS health economy.

5. METHODS

5.1 Theoretical/conceptual framework

As set out earlier, this research is informed by two strands of healthcare costing literature: 'clinicians into financial management' and 'healthcare costing/ pricing'. PLICS can be an 'entry point' for clinicians into costing discourses. Unlike other costing initiatives PLICS takes the patient as the cost object (i.e. all costs are related to patients, rather than diagnoses or medical interventions). As clinicians treat patients and are, therefore, focussed on them, calculating costs at the level of the patient has the potential to engender greater clinical engagement with finance staff. However, if this 'meeting of minds' (Adil, 2010) takes place solely within SLR/SLM, the potential to improve resource allocation across the NHS economy may be missed. Under SLM, clinicians argue the case for additional investment on the basis that their service is 'profitable', however the NHS as a whole may not benefit and opportunities to respond to patient preferences may be missed. PLICS can assist here to change financial flows by calculating costs along the whole patient pathway (e.g. a year of care) and using this information to develop pricing flexibilities (new tariff currencies and settings).

5.2 Research design

Healthcare is a complex open system. Therefore closed condition, controlled experimental approaches cannot be adopted. However, ‘natural’ experiments do arise in open systems (e.g. the differential approaches to PLICS described earlier (cost improvement in the context of financial challenge, to underpin a case for investment or reconfiguration of services, or as a better management tool (CIMA, 2008)).The research will capture these naturally occurring experiments in PLICS use though employing a mixed methods design (Bryman, 2006; Creswell,2003; Tashakkori & Teddie, 2003). The specific method will be ‘sequential explanatory design’ employing quantitative data collection and analysis before qualitative (Cresswell, 2003:209) as set out below:

QUAN		**QUAN**		**QUAL**		**QUAL**		
Data Collection	⟹	Data Analysis	⟹	Data Collection	⟹	Data Analysis	⟹	Interpretation of entire analysis

This design enables the qualitative stage to be informed by the quantitative analysis. In this study of our four case study sites, two are chosen already but the other two will be chosen on the basis of ‘fit’ with our tracer conditions. We will also design our semi-structured interview schedules to further explore the initial findings in the quantitative analysis.

5.3 *Research methods*

Workpackage 1 will survey (a) the 95 acute Trusts and the 12 other organisations (mostly mental health) that the Department of Health identified as using or in the process of implementing PLICS, (b) Commissioners (one from each of the new 52 PCT cluster groups and all of the pathfinder GP consortia). As the cluster groups are anticipated to give way to clinical commissioning groups and there will also be clinical senates, we will note new configurations when undertaking this workpackage.

We will seek input on the survey questions from our two FD team members (one at Salford Foundation Trust the other at the Greater Manchester cluster) and our senior clinician member. We will also discuss with cost accountants at Salford and the Greater Manchester PCT cluster.

Stage 1: Pilot study

We will pilot the questionnaire on-line in four Trusts before undertaking the main survey. The results of this will also inform the final survey methodology (e.g. on-line or paper based). If on-line we will follow the Sue and Ritter (2007) recommendations.

Stage 2: Main study

The provisional survey questions will focus on the ten hypotheses we have derived from the literature cited above about the current use of PLICS in the acute sector, the six ways we identified as advantageous for the whole health economy and the extent of PLICS dialogue between Trusts and commissioners.

Hypotheses about PLICS use in acute Trusts

In relation to research question 1 (How are NHS Trusts and commissioners using PLICS?) the survey will include questions on ten possible uses for PLICS under SLR/M:

(i) To identify how much a particular patient costs using direct and attributed costs;
(ii) To ascertain whether that cost was more or less than income received under tariff;
(iii) To identify resource variation and, hence, cost between consultants and specialisms;
(iv) To educate consultants as to how their decisions impact on cost;
(v) To reduce length of stay where that extends past the tariff trimpoint and encourage other practices that lower resource use and costs (increase day case rate, reduce pre-op bed days and manage variation in out-patient appointments);
(vi) To understand the relationship between cost and quality, including the costs of low quality (e.g. adverse events) along the patient pathway;
(vii) To explore the extent of under/over compensation in complex/less complex specialties;
(viii) To lobby for exemption from the tariff (or flexibilities under tariff) as costed care pathways could form the basis of negotiation with PCTs and GP consortia (PLICS could also underpin changes to tariffs e.g. unbundling or different currencies)
(ix) To prepare a business case for investment in the specialty
(x) Prepare for the newer more market orientated environment encompassing 'any qualified provider' within which the fixed tariffs under PbR may be relaxed to incorporate limited price competition.

From a NHS economy perspective, PLICS can inform clinician/management/commissioner decisions on service redesign and referral management. We have five hypotheses about the possible uses of PLICS in local health economies which will inform survey questions in this area:

(xi) Service redesign for integration including moving services to primary care where cost-effective and in line with patient preferences
(xii) Sharing services between acute Trusts to create centres of excellence;
(xiii) Reducing unnecessary admissions and referrals (false positives) to acute care:
(xiv) Reducing unnecessary diagnostics, interventions and treatments;
(xv) Reducing length of stay, only where appropriate, whilst maintaining high quality care

We will also ask about the extent that PLICS data is used in dialogue between acute Trusts and commissioners:

(xvi) Do you belong to a local health economy group?
(xvii) If yes, do you discuss and analyse PLICS data in this group?
(xviii) Have you redesigned services and estimated/calculated savings on the basis of PLICS data?
(ixx) Has service redesign incorporated patient preferences or been prompted by patient preferences?

Stage 3: Follow up telephone interviews After analysing the results of the main survey we will select the two further case studies on the basis of leading edge practice with PLICS in our four areas of interest (as stated below) in relation to our tracer groups (see below) To check on our selection we will conduct telephone interviews with the Finance Director or cost accountant at the two selected Trusts. We will also conduct telephone checks with the relevant commissioners for these two Trusts.

If, after our telephone checks, we are not satisfied that we have made the right choices we will revisit the survey analyses and make alternative selections.

- Cost improvement through enhanced technical efficiency;
- Better allocative efficiency of resources and responsiveness to patient preferences within healthcare economies (first, within and between Trusts, second, between primary and secondary/tertiary care and, third, along care pathways and year of care);
- Understanding clinical variation in resource use and the relationships between cost and quality;
- Greater clinical engagement through more clinical ownership of costs and information systems.

Risk assessment in relation to Workpackage 1

Our risk assessment is based on three strategies to reduce a potential poor response rate:

First, Dr Mahmood Adil (a research team member) is currently working at the Department of Health. He contributed to this year's (2011) 'DH Reference Cost Survey', which includes questions on PLICS. This will facilitate access to the email list of the Trusts who responded positively to this (and the similar 2010 DH survey) enabling us to use a targeted approach. It is evident from these two surveys that the response rate has increased (from 80% to 85%) among over 400 NHS organizations indicating a high level of interest in PLICS. Hence, we hope to achieve a comparable response level. We are seeking more sophisticated data than was gathered by the DH but we will use the same list to achieve high response as well as depth of information from the relevant individuals/organisations. In line with the affiliations of our practitioner team members, we will seek approval from the Healthcare Finance Management Association to badge our survey with their logo along with those of the Universities of Manchester and Bristol. We anticipate that this badging will increase interest and, hence, response.

Second, we have already selected two of the case study sites (as described below and in the original proposal) so we are not wholly reliant on the survey for case site selection. We will commence work on these two sites at the same time as we undertake the survey, thus employing an element of parallel working in our fundamentally sequential (quantitative followed by qualitative) research design. This will be enabled by the project manager working with the PI on the logistics of the survey whilst the research fellow and other team members work on the already selected case study sites.

Third, we will be guided by the pilot in terms of the impact of the number of questions (i.e. we will reduce the number of questions if this proves to be an impediment). We will also follow up rapidly on any non-responding Trusts, using if necessary the Trust finance and accounting contacts of Dr Adil and Mr Whitfield (another team member, FD at Salford and leading PLICS practitioner).

Workpackage 2

Drawing on data from Workpackage 1, Workpackage 2 will further analyse the potential of PLICS in the four key areas above.

Case study research is well developed in the study of organisations (e.g. Yin, 1991) and in the context of costing research (Llewellyn, 1992).To carry out this PLICS analysis, we will select sites purposefully (Cresswell, 2003:178) i.e. we will identify 4 case study sites on the basis of their leading edge practice with PLICS and integrated care pathways in the 4 areas above. Two of these (Salford Royal Foundation Trust and South Warwickshire) are already secured through team contacts. As stated above, the remaining two will be selected from the survey results. At each case study site we will engage with and report on PLICS systems (there are four different software systems currently in use, to ensure comparability of data we will choose, as far as possible, sites with the same software). To build up a pragmatic PLICS data base at each site we will conduct semi-structured interviews and documentary analysis. All key informants (FDs, cost accountants, service line managers and clinicians) on PLICS at each site will be invited for interview. We anticipate interviewing ten informants at each (totalling forty in all).

Case study site settings and tracer conditions

CIMA (2008) reported that locally-specific PLICS practices had developed, albeit within the constraints of the costing manual. We anticipate that there will be varying progress with PLICS in relation to specific conditions. Hence, apart from work on the frailty pathway at South Warwickshire (already agreed) and the stroke pathway at Salford (chosen already in consultation with the Salford PPI group through the North West Research Design Service) we will chose our six PLICS tracer conditions in consultation with patients within the parameters below:

For cost improvement we will select two high volume/high cost tracer conditions, one from unscheduled care (e.g. acute stroke, heart attack and obstetric services) and one from scheduled care (e.g. hip or knee replacement and cataract)

For better resource allocation in healthcare economies we will select two tracer conditions which commissioners have already identified for either referral management (e.g. orthopaedics, ophthalmology, ENT, diabetes) or more care co-ordination (frailty)

For the relationship between cost and quality we will select a tracer condition which already has NICE quality standards (e.g. stroke, dementia, VTE prevention, specialist neo-natal care, chronic kidney disease)

For greater clinical engagement we will select a tracer condition where there is substantive clinical variation in cost for the same quality/outcomes (using the NHS Atlas of Variation in Healthcare).

At each case study site we will work with one (or two, dependent upon how advanced) tracer conditions.

5.3 Data collection

The main survey follows the DH (2010 and 2011) short surveys. Dr Adil currently works as National QIPP advisor at the DH, his involvement will enable the research to access the DH database to facilitate data collection from the same organisations. As PLICS (within the context of SLR/SLM and current commissioning strategies) is new there is no extant data collection instrument we can utilise. As described above, we will seek professional financial manager input into our questionnaire to enhance content validity. We will undertake a pilot to refine our instrument. The survey is our main data collection technique to answer research question 1: *How are NHS Trusts and commissioners using PLICS?* The survey findings will also provide a baseline for developing the protocol for the semi-structured interviews- to be conducted as follow-ups to the survey and in the four case studies.

In the qualitative semi-structured interviews and case studies we follow a 'critical realist' approach (Archer, 2000; Bhaskar,1979) that delineates the extent to which individuals and groups can be studied in the same way as natural systems and where it is accepted that the nature of the object determines the form of its science (Bhaskar, 1979:3). Drawing on participants views, we will pay attend to 'what works' with PLICS, specifically in which contexts and with which mechanisms, thus conforming to critical realist research guidelines for social science research (Danermark et al, 2002; Pawson and Tilley, 2004; Sayer, 2000). We have estimated the number of interviews in the light of our previous experience in similar studies as to when 'data saturation' occurs. Interviews will be audiotaped and transcribed.

In addition to the interviews, at each of the four case study sites we will collect the following data (where this data is available):

For cost improvement we will collect data on (i) any specialty-HRG resource calculations that have been enabled as a result of PLICS (ii) any commissioner initiatives based on PLICS data to fund providers on the basis of marginal costs over a certain volume level.

For resource allocation across services and settings we will collect data on (i) any examples of PLICS data being used to move care to lower cost settings where it is safe to do so and when quality can be maintained or enhanced (ii) any commissioner data on changes in GP referrals to avoid false positive

and false negative issues. For example, the South Warwickshire frailty project seeks to reduce readmissions (currently 5.8%) to A&E and the Medical Assessment Unit through a comprehensive geriatric service. We will also show how unbundling the tariff for price setting could use transfer pricing principles to achieve appropriate incentives for efficiency savings across the health economy

For linking costs with quality we will collect data on (i) examples of how PLICS data informs calculations on clinical variation in resource use. Clearly, in the longer term, it is sometimes cost effective to pay for higher quality. We will note any impact on quality thresholds or 'gates' if lower cost profile treatments are adopted. On the other hand, there are already PLICS initiatives which reveal that a focus on quality can result in cost savings (ii) any use of PLICS data on high cost clinically complex patients which has been used to indicate where specialist 'centres of excellence' may be appropriate

For clinical engagement we will collect data on (i) the extent to which costing data is clinician-credible (ii) the extent to which, under SLR/M, specialties are becoming fully fledged 'business units' with a keen eye for the 'bottom line', we note that although this may lead to cost improvement (see above) it could weigh against other key health policy objectives such as integrated services and more primary/community care. Over and above patient-level, our criteria for judging 'clinician-credible' will be understandability and relevance to decision-making. Our criteria for judging 'fully fledged business units' will be profit as well as a cost focus.

The qualitative semi-structured interviews and the data collection outlined above are the main techniques to answer research question 2: *How can PLICS be used to benefit the total health economy (focussing on cost improvement, resource allocation across services and settings, linking costs with quality and clinical engagement)?*

5.4 Data Analysis

Workpackage 1

The main survey will produce quantitative, comparative, cross sectional evidence on how PLICS is being used in all Trusts and commissioning bodies within which it is operationalised at the time of the study i.e. this is a census rather than a sampling study. Response bias will be checked through respondent/nonrespondent analysis (Cresswell, 2003). Dependent upon the pilot results, the survey will ask respondents to rank the hypothesised possible uses of PLICS in terms of value to their operations on a five point Likert scale. Control variables will be piloted but are likely to include for example, organisational (Trust) size, specialty, financial status at Trust and specialty level; and length of time using PLICS. Analysis will proceed through descriptive statistics using SPSS (e.g. crosstabs, correlations, simple associations) to produce a comprehensive numerical database on how acute Trusts, mental health Trusts and commissioners are using PLICS and associations with significant control variables. Of particular interest will be any association between the use of PLICS and the profitability of the service line (in cases where PLICS has been in use for some time).

Workpackage 2

The transcribed interviews will be analysed into themes that bring meaning to their content through organisation into segments (see, for example, Rossman and Rallis, 1998). Theme codes will be developed on the basis of the emerging information from the transcripts. Initially all theme codes will be triangulated on the basis of at least two researchers reading the transcripts (i.e. hand coding) but as themes are validated, rigor will be added to the analysis through the use of qualitative software packages (e.g. QSR NVivo, http:/www.qsrinternational.com). The coding reliability procedures recommended by Gibbs (2007) will be employed: transcript check for errors; checking for coding drift; regular cross-check on codes by comparing results that are independently derived. A coherent justification for all transcript themes will be developed through triangulation with documentary and observation sources (i.e. real time observation and engagement with PLICS systems).

In terms of analysis for the data collection on cost improvement, resource allocation and linking costs with quality, we anticipate that these issues may yield sufficient material for statistical techniques to be applied. If so, we will follow the methods we outline in relation to the survey: descriptive statistics using SPSS (e.g. crosstabs, correlations, simple associations) to produce numerical databases. For

clinical engagement (and if sufficient material is not forthcoming for quantitative approaches) we will mobilise our qualitative theme-based analyses (described above).

6. CONTRIBUTION TO THE COLLECTIVE RESEARCH EFFORT AND RESEARCH UTILISATION

The collective research endeavour of the NHS and NIHR includes patients, commissioners, provider Trusts, clinicians and managers. We outline how all these stakeholders will be engaged in (and benefit from) our proposed research below:

6.1 *Benefit and use to patients*
Patients will benefit from better resource allocation in the NHS, for example, where PLICS indicates that resources would be better used in primary rather than secondary/tertiary care patients benefit in terms of access and the security of obtaining care from known and trusted providers who are close to their homes. PLICS may also facilitate service redesign in a cost-effective manner to meet patient choices or preferences. Where PLICS shows that services would be better shared between Trusts to create centres of excellence, there will be an evidence base to explain to patients why it is necessary to travel to receive expert care which meets high safety standards. If there is further implementation of personal health budgets for patients, PLICS can be used to make informed judgements on budget allocations.

6.2 *Benefit and use to commissioners*

Commissioners (PCTs and, in future, clinical commissioning groups) will benefit as PLICS creates a cost/quality information base. One of the stumbling blocks to effective commissioning is information asymmetry between providers and commissioners. Where commissioners lack knowledge on costs and quality (and the relationship between them) they are unable to exert appropriate pressure on providers. Having information on costs and quality along the patient pathway (or for chronic care 'a year of care') would give more knowledge and, therefore, power to commissioners. We have a Finance Director from Greater Manchester PCT cluster (Claire Yarwood) on the research team. This will enable us to directly incorporate the commissioning agenda as the research develops and give the team a means to disseminate the research to commissioners, PCT clusters and emerging clinical commissioning groups.

Moreover, Claire Yarwood and Tony Whitfield (at the corresponding Acute Trust) have a good commissioner-provider working relationship, consequently there is a high potential for investigating changes in tariff structures and how any cash savings generated through the use of PLICS can be redeployed across services and settings. (We recognise that the commissioning of primary care is to be re-located with local offices of the commissioning board. So we will seek to develop links with appropriate personnel when available).

6.3 *Benefit and use to Acute Trust providers (clinicians and managers)*

Workpackage 1- the survey of acute Trusts- will create information to enable Trusts to benchmark their use of PLICS against best practice. Currently, providers' use of PLICS is driven by the requirements of SLR/SLM. Some acute Trusts embarked on PLICS in situations of financial challenge and aim for cost improvement, others use PLICS to underpin a case for investment or reconfiguration of services, or still others hope that PLICS will be a better management tool (CIMA, 2008). So, to take an example, a particular specialism may show a £1 million surplus of income (under tariff) over costs and, hence, be profitable but PLICS data may reveal that some patients' costs exceed the tariff. Thus PLICS data may prompt investigations, for example, over the length of stay (LOS) of these patients and whether the consultant's decision over LOS was appropriate. Such investigations should prevent a waste of resources but, currently the use of PLICS is tied to SLM. For example, Monitor declared *'At the heart of the passion and commitment shown by clinicians towards the service line programme, is the knowledge that by improving performance they can retain agreed levels of profit–a huge motivator...this retained profit is variously being invested in new kit, more people or team bonus payments as the business unit leaders see fit.'* (CIMA, 2008). If a specialism is 'profitable' this may be an appropriate case for further investment or team bonus payments but it could indicate that quality

could be enhanced or that the tariff needs to be revised and resources released. The research team includes the Finance Director (Tony Whitfield) of Salford Foundation Trust. The Trust is 'leading edge' on PLICS and has been recognised over the past two years by the HCC in the award of “Double Excellent”. Tony Whitfield’s involvement will ensure on-going engagement with up-to-date provider knowledge.

6.4 Benefit in terms of greater clinician-manager engagement

Notwithstanding the provisos mentioned above, there is research indicating that PLICS can engender greater clinical engagement (Adil, 2010; Llewellyn, 2001; CIMA, 2008) thereby creating an environment where clinicians and managers can work together on questions of cost improvement, resource allocation and integrating cost and quality data. Clinicians make the decisions that commit, and therefore, allocate resources in the NHS. To prevent these decisions being myopic, in the sense of driven solely by professional interests, clinical decision-making requires management input. Workpackage 2 will provide a database that should better inform joint clinician-manager decision-making. In terms of the clinician-manager interface, we will be guided throughout the project by research team member Dr Mahmood Adil who is a clinician with expertise in cost/quality issues, public health and health informatics. He is uniquely qualified to take a NHS 'system-wide' perspective. Dr Adil has also recently been appointed by the Department of Health as national Quality, Innovation, Productivity, Prevention (QIPP) advisor for clinical and finance engagement. This role offers this research a unique opportunity to incorporate the QIPP agenda.

6.5 Knowledge mobilisation and improvement in practice and service delivery in the NHS

As detailed above, the research team includes a provider Foundation Trust Finance Director, a PCT cluster Finance Director and a senior clinician. These members will act as a natural informal conduit for dissemination into the NHS as the research progresses. They will also help to set the agenda, shape, advise and ‘sense check’ as the study proceeds. In terms of more formal dissemination from within academe, at the end of the second year of the research we will run an 'Action Learning Forum' that brings together clinicians and finance managers across primary, secondary and tertiary care to discuss emerging findings on PLICS and input into the on-going research at the case sites (see methodology). We will host a joint academic/practitioner workshop towards the end of the project to present findings and gain feedback. Formal dissemination will also be through the normal academic routes of conference presentations and publications in public policy/public management accounting and finance journals (e.g. Public Money and Management, the British Medical Journal and the more practitioner focussed Health Service Journal)

In addition we will engage in knowledge mobilization through the following policy and practitioner-led portals:

1. The Healthcare Finance Management Association (HFMA). HFMA is the representative body for finance staff in healthcare (nearly 4,000 members and over 10,000 e-learners) it sets and promotes the highest standards in financial management and governance in healthcare. One of our team members (Tony Whitfield) is Chair of the HFMA costing group (the group receives sponsorship from the DH) and Vice President of the HFMA. Mahmood Adil (another of our team members) is also a member of the HFMA costing group. This positioning gives us the opportunity to disseminate our findings throughout the research and beyond to the HFMA.

   The HFMA runs a national conference each year at which there are ‘Learning Lab workshops’. We will put in a proposal to present a Learning Lab workshop at the 2013 and 2014 conferences. The HFMA also has a monthly professional journal: Health Finance. We will also seek to publish in this, planning an initial short article to explain our research and invite comment, followed by annual updates on our findings (leads will be Sue Llewellyn and Tony Whitfield).

2. The Department of Health Payment by Result (PbR) Team: We will work with the PbR Team to disseminate our findings through their policy routes to all the relevant NHS organisations (leads will be Sue Llewellyn and Mahmood Adil)

3. Monitor: By the time this research is completed, Monitor will have formal responsibility to develop pricing (assuming the Health Bill is passed).This research will be very relevant

throughout this transition period. Monitor is already promoting Service Line Management and this use of PLICS. Therefore we will use their networks to mobilise our PLICS relevant findings in these areas to frontline staff and also at Board level through the Non-Executive Director development programme run by MBS for Monitor (leads will be Naomi Chambers and Mahmood Adil)

4. NICE QIPP Evidence Portal: This special web portal has been established to disseminate knowledge that could improve quality and efficiency in the NHS. We will submit our findings and report to this portal, which is used a great deal by NHS staff. Dr Adil is a member of the NICE Evidence Working Group and will be able to facilitate this accordingly (leads will be Sheila Ellwood and Clare Yarwood).

5. Institute of Healthcare Improvement (Boston): This world renowned quality improvement organisation engages in cross fertilisation of knowledge pools. The Institute is keen to work with the NHS in generating and disseminating information which could lead to high quality health care at potentially lower cost. Dr Adil is an Institute fellow, so we would be able to use this route to reach international audiences (leads will be Mahmood Adil and Naomi Chambers).

7. PLAN OF INVESTIGATION AND TIMETABLE

Prior to commencing the study we will recruit the Research Fellow and Project Manager and check on NHS ethics approval (our current understanding, as detailed below, is that management projects, such as this one, are exempted from 1st September 2011).

See separately attached Gantt chart showing the timetable for all research activities including knowledge mobilization and outputs during the life of the project, now amended for SDO consideration to 36 months.

7.1 Knowledge mobilization and research outputs

We list in this section our knowledge mobilization activities and associated research outputs in chronological order :

a) The first of our outputs, a short paper for Health Finance (HFMA 1A in the Gantt chart) introducing our research, (see knowledge mobilization activity 1 above) will be submitted at the end of month 6 after we have piloted the survey, commenced the first two case studies and done initial work on the literature review.

b) Having completed the analysis of the survey (at the end of month 14) we will be in a position to write a tailored report in month 16 for the PbR team (knowledge mobilization activity 2 above). This report will present an analysis of the results of the survey (see hypothesised questions i – ixx above). In the light of this analysis, we will assess the potential for pricing flexibilities under PbR (as described in 3.5, above). Currently, whatever their level of activity the provider is compensated for all patients at the average HRG cost. PCTs have had no power to impose thresholds on hospitals' elective activity. A possible refinement to the tariff, therefore, would be to introduce a threshold level of activity, above which providers would be funded on the basis of marginal costs.We will be able to indicate the feasibility of this through gathering data on the Trusts' use of PLICS to calculate marginal patient costs at different volume levels.

c) The survey results and associated analyses (as set out in (a)) will also form the basis of two further practitioner-led outputs: the Learning Lab at the 2013 HFMA conference (HFMA 1B in the Gantt chart) and the second of our articles for Health Finance (HFMA 2A in the Gantt chart) (knowledge mobilization activity 1 above). At the end of the second year we will run our Action Learning Forum. Once we have

received feedback we will begin to prepare a paper for the British Medical Journal. We anticipate that this will be ready for submission at the end of month 30.

d) We are now including a parallel element in our fundamentally sequential research design (ie we will commence the two already selected case study sites after we have piloted the survey at the end of month 4). Interim results on these two case studies will now be available at the end of month 16. Thus we will be in a position to produce an interim report for the NICE QUIPP evidence portal (knowledge mobilization activity 4 above) based on the survey results and the first two case studies by month 22. Currently QUIPP workstreams focus on :commissioning and pathways, provider efficiency and system enablers (see 3.2). Analysis of the survey results and findings from the first two case studies will enable us to report *inter alia* on: the feasibility of further pathways tariffs; the development of PROMS (based on stroke and frailty pathways) in conjunction with PLICS; initial experiences of commissioning on the basis of PROMS; technical provider efficiency as revealed through clinical variation in resource use: and the potential for cost savings through a reduction in adverse events (e.g. falls).

e) The second of our Learning Labs (HFMA 2B in the Gantt chart) at the HFMA conference in 2014 (see knowledge activity 1 above) will focus on our findings with respect to the QUIPP agenda (see (c) above) along with feedback from the NICE QUIPP evidence portal.

f) We anticipate that Monitor will not have assumed formal responsibility for pricing until our research is complete in month 36, we will commence our report for Monitor (knowledge mobilisation activity 3 above) in month 30. In line with Monitor's interest in Service Line Management, our report will focus in on PLICS developments in this area. This work will also form the basis for our paper for Public Money and Management.In month 34 we will run our academic/practitioner workshop.

g) Given the current turbulence in the NHS, we think that it will be prudent to wait until all our research findings are available before we identify the sustainable changes that will enable us to identify the internationally relevant messages from our research. Accordingly we will produce our report for the Institute of Health Improvement (Boston) (knowledge mobilisation activity 5) at the end of the research in month 36.We will commence this report in month 30.

h) The third of our reports for Health Finance (HFMA 3 in the Gantt chart) (knowledge mobilization activity 1) and will also focus on these internationally relevant messages. Once we have feedback from Boston we start to work on the third of our academic papers (for Health Services Journal).

8 APPROVAL BY ETHICS COMMITTEES

NHS Research Ethics process is changing from 1 Sep 2011, see http://www.nres.npsa.nhs.uk/news-and-publications/news/governance-arrangements-for-research-ethics-committees/ for the details. NHS service and delivery projects such as this one (focussing on management and the interviewing of NHS staff) will no longer require research ethics approval, see section 2.3.2 of the governance arrangements document at http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_126614.pdf).Hence, unless there are further unexpected developments this project will not require approval by ethics committees. If awarded the grant, we will, of course, check the latest information on ethics approval and comply with any new and extant regulations.

9 PROJECT MANAGEMENT

The research team come from a diversity of backgrounds: academic, NHS financial management and NHS clinical. Geographically we are also dispersed between Manchester, Bristol and London. This team has been specifically chosen to ensure different perspectives on PLICS and should deliver creative research synergies and pragmatic, actionable outputs. However, to successfully co-ordinate activities we will focus on four project management parameters: people, time, cost and scope. Overall project management responsibility will be shared between Sue Llewellyn as PI and the to-be appointed Project Manager.. If possible, we will seek to appoint two half time posts: a Research Fellow with professional or academic accounting qualification and an experienced Project Manager. The PI and Project Manager will agree two documents at the initiation of the project: a communications plan and a project risk management plan and confirm membership of the Project Advisory Board. During the life of the project the PI and project manager will meet weekly to ensure effective project management.

Communications plan

- This will set out the normal communication channels for all participants: email, mobile phone number and institutional contact if the team member is temporarily unavailable. Along with an agreed time for a weekly conference call, if necessary.
- Monthly project meetings will take place to ensure time lines, direct face-to-face communication, discussion of all on-going activities, and resolution of any problems.

Risk management plan

Possible risks include:

- Misunderstandings about the scope of the project (i.e. different academic and practitioner expectations about the nature of the research).
- Unclear roles and responsibilities.
- Time constraints and on-going non-research work pressures, particularly for the non-academic members.

Project Advisory Board

A Project Advisory Board will be formed from the research team, invited cost accountants from the four case studies, the two PPI members (one patient and one public governor) and two external academics. The Board will meet quarterly.

10 PATIENT AND PUBLIC INVOLVEMENT

Our approach to patient and public involvement is threefold. First, we will engage patients in choosing our six tracer conditions (the possible tracer conditions are set out in 'Methods'). In these choices we will be particularly guided first, by patients' experiences along care pathways, in particular where these pathways cross organisational boundaries. We will also seek patients' views on relevant sections of the final research report and incorporate their comments. Finally, we will disseminate our findings through the PPI forum associated with the North West Research Design Service (NWRD). We have already contacted this service and confirmed the feasibility of our approach with them. They will advise us as to the numbers of patients we should involve and how to contact them. Through NWRD we may be able to access specific PPI groups at Salford Royal and South Warwickshire Trusts (sites we have already selected and obtained approval from) as case study sites. Our study should have added relevance for those NWRD PPI representatives already engaged with specific care pathways and their networks. We expect to benefit from this engagement in terms of disseminating this research. Second, we have obtained a list of the public governors at Salford Royal and South Warwickshire Trusts. If funded we will immediately contact four of these governors (through our Trust contacts at the two sites) and invite them to comment on the relevance of PLICS from the perspective of Trust governance. We will incorporate these comments in our research findings and seek to disseminate our report to Trust governors. Third, we will invite one patient representation and one public governor to sit on our Project Advisory Board so their views will guide us throughout the study. These PPI representatives will also be invited to draw on their existing experience to identify potential additional stakeholders among local service providers. The study aims to engage 'active involvement' with public and patient representatives in the following areas:

- *Choosing the methods used to carry out the study*: By recruiting representatives from several patient pathways associated with our tracer groups– PPI will guide specific locales for research activity according to experience of individuals recruited.
- *Recruiting people into the study*: Once initial collaboration is made potential service user 'champions' will be encouraged to access their own networks and co-facilitate small focus group discussion and data analysis.
- *Understanding what the research findings mean for patients*: By commenting on convergences and divergences with their own care pathways, PPI will provide a key mechanism for pertinent analysis and follow up strategies.

The North West Research Design Service (NW RDS) funds a PPI forum. This will act as initial liaison between the study team and patient groups to recruit individuals. (Based from information from NW RDS, costs for PPI involvement are included in this bid).

The process will include the production of a job role/person specification and recruitment of network members according to interests, skills and experiences. This will be facilitated and supported by the project manager and PPI forum coordinator. All procedures will be undertaken in line with guidance supplied by INVOLVE on active patient involvement (see: http://www.twocanassociates.co.uk/perch/resources/files/INVOLVE_NRESfinalStatement310309.pdf)

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