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Building Healthcare Delivery Systems, Management, and Information Around the Human Facets

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Abstract There is increasing recognition of the importance of the electronic patient record as the central unit of information systems, and of the importance of the human interface of IT systems. There is also increasing recognition of the importance of developing record components and unambiguous nomenclature to record the human aspects of healthcare delivery requirements. However, though this fine detail of the human dimension is vital, there is now a danger of focusing solely upon this fine granularity at the expense of standing back to view the total grand plan. At the macro level it is equally important to see the human facets as the determinants (and principal components) of the units which build up the total healthcare delivery system, of the mechanisms for its management, and of the information which fuels the whole dynamic.

1. Introduction - Commonalities of Diverse National Models

The nations of Europe (however the latter is defined) display a richness and variety of structures and approaches to healthcare delivery, ranging from the state funded to the privately funded (the latter with varying degrees of health insurance involvement). A key feature of any service industry is the balance of demand and supply, but there are few totally free markets, and various mechanisms are used to manipulate both the demand and supply sides. Within healthcare the publicly funded models have planning and allocation mechanisms, whilst the consumer funded models have accreditation and other control mechanisms.

Thus in most national healthcare systems there are three market dimensions rather than two - namely demand, supply, and regulation. However, an interesting phenomenon is the adoption by each market type of features of the alternative system. In this way publicly funded models are introducing quasi-market concepts by moving towards purchaser organisations and an internal market. At the same time consumer funded models, which might be considered less amenable to regulation, are increasingly experiencing market control through legislative frameworks and through purchaser association standards.

Therefore most healthcare systems are generically similar in having three market forces - demand, supply and purchasing. Even in privately funded healthcare systems, the consumer seldom exercises unrestrained choice of supplier, but rather is guided by preferred purchasing policies of insurers, or through an agent in the form of a primary care organisation purchasing secondary care. The paper emphasises the importance of

building the information systems of each of the organisational components, and thus the whole system, upon human dimensions.

2. Traditional Characteristics of Organisational Information Systems

Whether in the public or private sector, healthcare organisational information systems have tended to mimic those in industry and commerce, which has resulted in a high profile being given to units of throughput and to financial monitoring. The throughput may be measured in the number of patients, in discharges and deaths, in occupied bed days, in clinician episodes, or in the activities of particular departments such as operating theatres or pathology laboratories. The financial focus has been upon matching goods and service inputs with income generated by invoicing purchasers using the healthcare activity units featured in the contracts. This has resulted in models which have increasingly been seen as insensitive to rewarding innovation and effectiveness, but more importantly in being inflexible to localised need as presented by different consumer circumstances.

More recently, therefore, there has been a focus upon building healthcare organisational information systems which draw from operational data as their main input. This has a number of benefits, ranging from better quality data because it is derived from clinical records which staff are motivated to keep accurate; minimal cost of capture of managerial data; and a flattening of the organisation as the managerial levels are brought much closer to the operational levels through sharing common information concepts. However, simply to view operational systems as a cheap means of providing management data will fail to achieve the vision of a consumer-focused organisation; it may also skew operational systems as insidiously they become forced to adopt information currencies which suit the traditional management approach. Rather, a more sensitive and human-focused yet visionary approach is needed.

3. A New Paradigm in Health Information Systems

The new paradigm would refocus the organisational system away from financial probity in the eyes of taxpayers or organisational owners, important though this can be, with the inherent tendency also to link to increasing volumes of activity without due recognition of cost effectiveness or long-term quality. Instead, it would recognise that human beings are the whole raison d'être of the healthcare system, and secondly that healthcare is very largely delivered by a dedicated workforce which itself displays the wide variety of human phenomena of strengths, weaknesses, and preferences. It would build upon operational information systems - and in turn enrich these - in a more fundamentally enlightened way. The potential for this is already being demonstrated through person-based systems which the authors are developing[1]. It would build the human values which have already been emphasised in that context[2], and work those through the system architecture. Thus by very definition the human values needed to represent demand and identify the alternative strengths and weaknesses of the supply side become the core values of the healthcare system, which on reflection is an ideological ideal but which is only now being made possible through information technology. The role of the purchaser becomes one of agent and arbiter, utilising an expertise drawn in

particular from the skills of epidemiology and of clinical education to cross-match the two sets of human values against economic criteria.

Demand

It is difficult to plan future healthcare demand at the person level; but comparatively predictable at the population level. This demand then manifests as individual patients presenting (or being referred) for the resolution of a health deficit. Whilst data on epidemiology is comparatively straightforward to produce, specific to community sectors, this does not represent demand for service or resource, a relationship as yet insufficiently researched. The principles of casemix may well represent demand for secondary healthcare resources to satisfy the needs of acute health episodes, but these techniques do not yet adequately reflect the demand for preventive services, support for long-term or chronic conditions, or even post-hospital discharge, where factors ranging from patient education to domestic and social circumstances will affect significantly the demand upon the healthcare resource - a theme which in Europe the EU Concerted Action on Resource Management (CAMIREMA) has identified[3]. However, for the purposes of this paper, the key information domains of significance representing the human aspects which determine demand can by hypothesised as - Health Problem; Knowledge; Preferences; Social Environment. The system now being piloted under the aegis of the authors makes some first attempts to include these in the core record[4], but further refinement of terminology, weighting, and relative utility for management purposes still needs to be undertaken.

Supply

Even in the publicly funded models of healthcare, provider organisations are increasingly being seen as in competition. That is the negative viewpoint, the more positive view being that provider organisations can then be selected which best match the demand requirement. Again, it should not be economics in the crudest sense which determine choice (namely lowest cash cost regardless of the longer term value), but rather the matching of supply characteristics to need characteristics using richer values. Not only does this imply greater consumer satisfaction, but such matching is also likely to maximise health gain for given resource configurations. Above all, it maximises the human values not only of the consumer, but also of the work force within the provider organisation if they are working at their optimum skill level.

A competent provider organisation will thus not sit back and wait for demand to present at the doorstep, but will profile its resource attributes and match them to the demand it wishes to attract, through the medium of a business plan with both organisational development and marketing components. These components again help us to identify the human aspects which should be part of the organisational information base. Key information items could be: Presented Problems to be addressed; Planned Volume; Protocols (indicating intended treatment); Resource Mix.

These are all human aspect items. The manifesto of presented problems to be treated will be groupings of the Health Problems which individual patients will present, whilst the planned volume will indicate the number of patients who can be treated effectively and caringly. Protocols will indicate the knowledge base harnessed by the organisation, translated into a style of treatment and philosophy of care as well as having the normal

attributes of care planning as manifest in collaborative care protocols[5]. Finally, the Resource Mix will major largely upon the human resource - including qualifications, additional formal skills and competencies, and informal attributes - as well as on physical resources. Most of these information components exist, but are not necessarily brought together in a compatible way at the present time for the organisational purpose indicated.

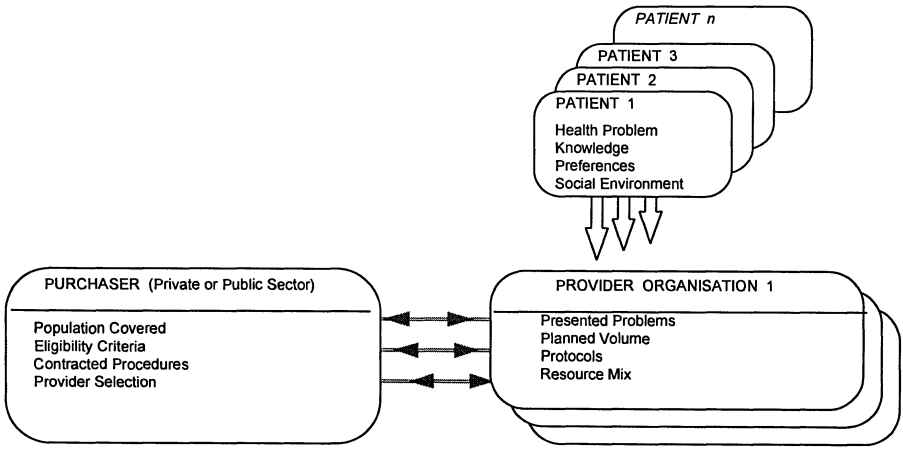
Purchasing Regulation

Finally, the purchasing, regulation, or market control dynamic must be considered. Though at first sight this is most firmly fixed upon applying a defined cash budget to control and cover an expanding health demand, nevertheless it too is most effectively discharged when considered as a product of human aspects. Whether public sector with a geographically defined population, or insurance-based with a commercial clientele, the purchaser acts for a given population, and ensures provision of satisfactory services for defined ranges of conditions or health needs. This requires an understanding of the population characteristics. Maximisation of health gain within resources is achieved by a good knowledge of the alternative provider options and of the prevailing scientific knowledge base for health care. This means that the purchaser information requirements can be summarised as: Population Covered; Eligibility Criteria; Contracted Procedures; Provider Selection.

Whilst this information may not, to the same degree, be obtained from operational systems, nevertheless it is human-based information either directly in that it involves data about the client population, or indirectly in that it draws upon knowledge base or outcome data sets which themselves are derived from person-based research. The attributes of these resultant study populations are then matched to the attributes of the population for which the purchaser is responsible.

The Overall Model

The outcome of this hypothesis is that a model can be postulated in which supply, demand, and regulation are based upon human aspect data items, drawn directly or indirectly from operational data sets. This model is shown in the diagram below.



It will be seen that this model has twelve core data clusters, all based on human aspects themes. However, when aggregated these data form a powerful organisational management information set. The significance is that these have not been derived from the organisational and self interested viewpoint, but by derivation from health-related information of the individuals in need in the population served.

Further Refinements

Inevitably, this model is a foundation model of core principles. Some further refinements can well be argued. One is the role of the purchaser or regulator in modifying demand, and this is primarily through the function of Health Promotion. Secondly, any service delivery model must be fuelled by finance. In this case that is through the mechanism of patients paying the purchaser - through taxation or insurance premiums. Of course, some item of service fees may be paid direct, but these are normally a minority of the overall transactions. Government or employers may also supplement patient contributions, but in these cases the supplement is still normally person-related.

4. Conclusion

It would therefore seem feasible, as well as desirable, for complete information systems to be based upon person attributes, which is significantly more profound than the simpler statements that information will be person-based. Many of the data concepts and data definitions required already exist, and mechanisms are being devised to permit the distillation of aggregate data without infringement of personal confidentiality. However, in some other areas further research and refinement is needed. The development of electronic person-based records as the foundation for record keeping and service delivery opens new horizons for more fundamental consideration of the data items of an integrated healthcare information system.

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