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Building locally relevant models for universal health coverage and its implications for health information systems: some reflections from India

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The global health agenda is placing Universal Health Coverage (UHC) as a foundational element of future health reforms. However, a missing link in these discussions is the implications that UHC will have on the supporting Health Information Systems, and how can countries get ready with effective HIS. Also, as calls for country specific research on UHC gains prominence, it is important HIS related research gets integrated in this agenda. This paper speaks to this agenda, and describes an ongoing pilot study from the state of Punjab in India with a focus on the implications of UHC models on HIS. Five key implications on HIS are identified: Expanding basket of services; Population basing of services; Ensuring continuity of care; Resource allocation choices; Monitoring financial protection and costs of care

Keywords: UHC, HIS, India

1 Introduction

As the Millennium Development Goals (MDG's) [3] draws to a close, many believe it is still remains unfinished business especially related to issues of rights and equity. Efforts are ongoing to articulate or redefine a global agenda to which nations can anchor further public health strengthening efforts. The post MDGs agenda is rapidly moving towards Universal Health Coverage (UHC) as the principal step for most Low and Middle Income countries (LMICs) [2, 3]. This is reflected in the Dr. Margaret Chan, DG WHO's concluding address to the 2012 World Health Assembly, where she stated that "Universal Health Coverage is the single most powerful concept that public health has to offer."

The 1948 constitution of the World Health Organization (WHO) had declared health as a fundamental human right, and this was again reiterated in the "Health for All" agenda set out in the Alma-Ata declaration in 1978 [6]. The key development in the contemporary UHC discourse is the emphasis on access to effective health services without incurring financial hardships. This development comes figures, which indicate that more than 150 million people are facing catastrophic economic expenditure and impoverishment from paying out of pocket for necessary health services.

The UHC agenda can be traced to the resolution of the 2005 World Health Assembly, which called on governments to "develop their health systems, so that all people have access to services and do not suffer financial hardship paying for them." Another important milestone, was in December 2012, when the United Nations General Assembly called on governments to "urgently and significantly scale-up efforts to accelerate the transition towards universal access to affordable and quality healthcare services." Today, many LMICs are implementing programs that aim to advance the transition to UHC, and also conducting research to support this process.

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It has been recognized by global and national agencies that there are many paths towards UHC fulfilling the aims of improving health outcomes, including reducing the financial risks associated with ill health, and increasing health equity. Countries will have different health priorities, different trajectories of health systems development, different organizational and financial arrangements in place, and varying capacities to achieve the aims. In countries like India, this diversity will also be seen at the levels of states (provinces) and districts. Recognizing this diversity, the 2013 World Health Assembly has strongly argued for countries to carry out research through specific case studies to develop appropriate models and approaches to achieve it. Similarly, the World Bank launched the Universal Health Coverage Studies Series (UNICO Study Series) to develop case studies that analyze different issues related to the challenges of UHC policy implementation.

However, in these various discussions, case studies, and policy papers on UHC, a missing dimension remains the implications on the supporting Health Information Systems (HIS) these different UHC models involve. Traditionally, the National HIS in countries have focused on aggregate statistics, and that too largely of reproductive and child health services and from public providers. Even this data has suffered from challenges related to data quality and reliability as well as fragmentation, insufficient use of information and weak supporting human capacities [1]. UHC models will require supporting HIS that are significantly different from existing ones, with respect to recording a much larger package of service delivery, and supporting continuity of clinical care across public and private providers and across different levels of care, aggregating this information from multiple sources, and incorporating financial information, to support informational needs of multiple financial providers, including the state, private and community-based players.

After much deliberations, India has decided on a broad framework of how it intends to progress towards UHC which is expressed in the 12th Five Year Plan document, and by subsequent guidelines issued by the central ministry to the state departments. This framework broadly proposes an architecture where primary health care and a considerable part of secondary health care are provided by a strengthened public district health system. This is supplemented by purchase of health care using insurance mechanisms or contracting arrangements from the private sector- especially for a part of secondary care needs and much of tertiary care needs. The actual mix of public and private, and the content of the essential health package in primary, secondary and tertiary care would be based upon state specific situations.

Given this unexplored domain of UHC implications on HIS, this paper focuses on the following two research questions:

- a. Within the broad framework outlined above, how have specific states planned to progress towards UHC and what are the challenges they are facing?
- b. What implications does this model have on the supporting HIS and how have they been approaching this challenge?

In the next section, we first discuss the broad conceptual framework being proposed for UHC by the World Health Report 2010 [8] and the implications this has for measurement. Following this, we discuss how one Indian state is trying to develop a locally relevant model for UHC and the implications this has for HIS design. Finally, we discuss some challenges and also approaches that need to be engaged with in developing a robust HIS to achieve UHC goals.

2 Materials and methods

Understanding the conceptual framework of Measuring Progress towards UHC.

Previous three World Health Reports (WHR) were dedicated to the UHC and a renewal of the Primary Health Care (PHC) system. While the WHR of 2008 emphasized the need to renew PHC services as a vehicle to achieve UHC, the 2010 report outlined financial strategies to achieve financial protection to citizens by reducing out of pocket expenditures. The report presented a conceptual framework to measure progress towards UHC across three dimensions. The first captures the range of services covered (service

coverage); the second measures the proportion of total costs covered through insurance or other risk pooling mechanisms (financial coverage); The third dimension measures the proportion of the population covered (population coverage), and reflects distribution of coverage across various population sub-groups. The figure below schematically depicts this model.

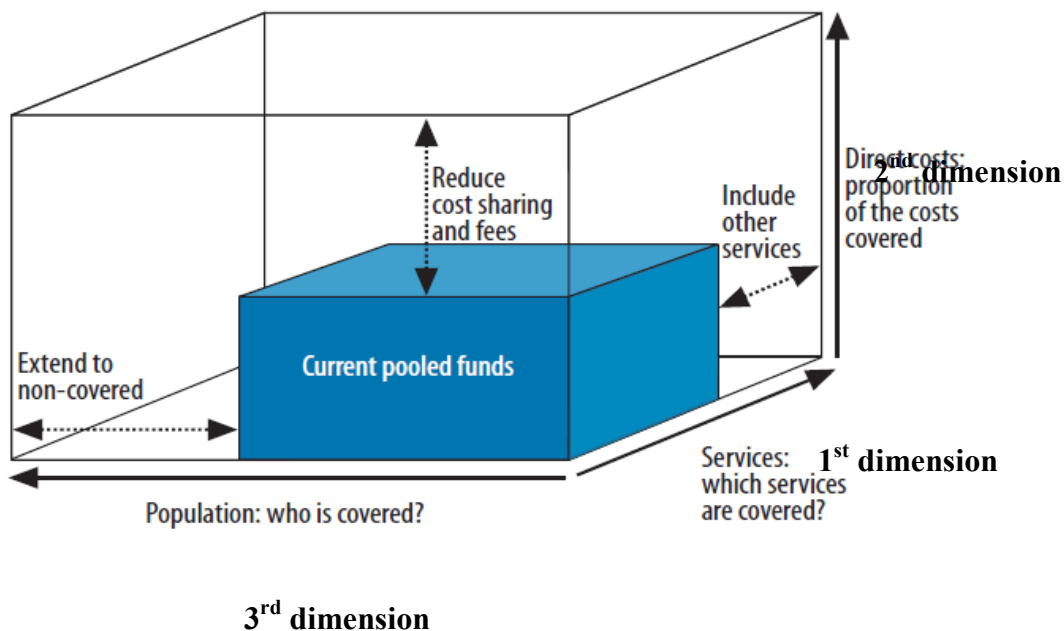
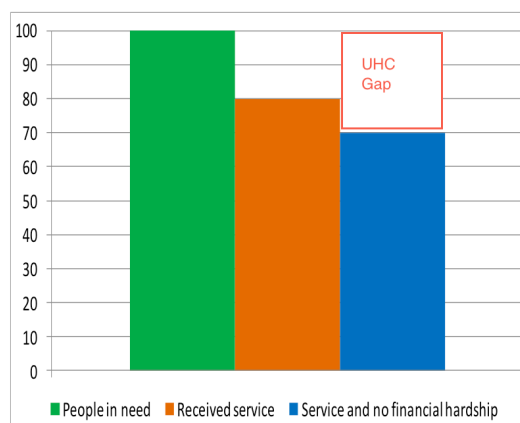


Figure 1. Three dimensions to consider when moving towards universal coverage (The World Health Report 2010)

Though visually attractive and conceptually clear this “UHC cube” presents considerable problems in measurement- especially in mixed systems where free care by public providers and insurance mechanisms are both forms of achieving financial protection and access. One problem is that both coverage and financial protection could vary widely depending on which service we are studying. For example, immunization services would have complete financial protection with complete population coverage, whereas less than 10% of diabetics may be able to access free care. In financial protection- the height of the cube- whereas out of pocket expenditure is easy to ascertain, the public expenditure on a specific service is not. In coverage- the breadth of the cube- the difference between nominal coverage, effective coverage and utilization poses problems for measurement. Thus the entire population is covered for immunization, but only 60% of children may have actually received it. Or the entire population may be covered by accident insurance, but only one thirds of trauma patients may have accessed free care. Conversely better utilization is not necessarily more effective coverage- as for example a situation where 50% of pregnant women utilize C-section services.

There is therefore an recognition that a simpler way to express measurement of progress could be to measure the proportion of persons in need of health care who are able to access the requisite services which are effective and do so without facing financial hardship. This could be expressed as a simple bar chart- and by aggregating across bar charts made for each service we are interested in, to arrive at a more action-oriented measurement of progress.



Simple sample surveys conducted with a given periodicity could easily capture the above information at the level of the nation or state. But HIS should also be able to generate this information from data available in the form of routine recording of service delivery, from the use of information required to enhance patient care, and to support monitoring and financial allocations. Whereas at the policy level the priority is to measure overall progress on the three axis- for the service provider and programme manager, the priorities are keeping track of services delivered, ensuring continuity of care, and better financial allocations and supportive supervision. The HIS architecture to support UHC, needs all of this, and more, in place.

Experimenting with appropriate UHC models: Reflections from an Indian state

One of the states that has begun working towards UHC is the state of Punjab, located in India's northern region. To understand the challenges better it has identified a median performing district called Nawashahar and developed a district plan that could provide direction to this effort. This pilot district programme is led by its district health society which has the head of the district administration in the chair and the chief district health officer as its member secretary. Providing technical assistance are two public health institutions (school of public health, PGIMER, Chandigarh, National Health Systems Resource Center), and two health informatics agencies- the not for profit Health Information Systems Project,(HISP) India, and Reliance-Jio. The state leadership and its state health resource center are also fully involved.

The primary care in the state is largely provided by a network of public primary care facilities- health sub-centers, primary health centers, supported at the community level by community health workers called ASHAs and village health committees. It is networked with and provided with referrals support above with the district and sub-district hospitals. As of today, this network provides a population based coverage for care in pregnancy and child immunization. For other morbidities, there is no population based care, but those who need care can approach the public or private health care facilities. At the peripheral public facility most care available for non RCH conditions is basic and often of a symptomatic nature, but at the district and sub-district hospital the full range of primary and a substantial part of secondary care is available. Private insurance and publicly financed insurance covers a minority of the population and this provides cover for some types of hospitalization.

Given this context, progress towards UHC meant five reform measures. These are listed below:

The first and foremost element of moving towards UHC meant expanding the basket of services that are available at the primary care level to include the most important causes of morbidity in the area. This would mean a substantial addition of care directed at common non-communicable diseases and mental health into the primary care agenda. Diseases that were prioritized in this district were hypertension, diabetes, asthma and chronic respiratory disease, epilepsy, depression, substance abuse, and oral, cervical and breast cancers and blindness. This is in addition to the traditional concerns of reproductive and child health, and the two main chronic communicable diseases of this area- tuberculosis and HIV.

The second element of this approach to UHC, would imply that care would not be merely responsive to care seekers – but a population based preventive, promotive and curative effort which measures success by a reduction of rates of these NCDs and the costs of care and complications in these patients. This means the need to know population rates for these diseases and population rates for utilizations of services and service outcomes.

The third element of this approach is the continuity of care. Most of these diseases require a specialist consultation and secondary care diagnostics. Primary care is more as early detection, ensuring continuity in medication and follow up with counseling and periodic testing and support. The primary, secondary and tertiary provider needs to be electronically and institutionally bridged so that they act as a single provider entity- which could be challenging if some providers are private and insurance paid, and others are public and salaried. Continuity of care also needs a commonly agreed upon standard treatment guidelines and standard operating procedures.

The fourth element of this approach is financial allocation made within the district which is responsive to caseloads and the actual package of care provided. This would include contracting in arrangements as well as to public facilities handling very widely different case- loads.

And finally there is the challenge of ensuring that care provided is really without out of pocket expenditure on drugs and that there are no financial or social barriers leading to exclusion or under-utilization by any section of the population. Needless to say we also need to add, that free care by government providers or purchase through insurance is so governed and managed that there is value for money and that public expenditure is not wasteful and inefficiently organized.

3 Results

Implications of UHC on HIS

Based on this understanding of the approach to UHC, an exercise was undertaken to design the design features and technical specifications of a health information systems that would be able to support this. In each situation we have to build upon what is current practice and what are the capacities available on the ground.

1. Expanding basket of services: Implications for HIS:

The HIS would need to store information about services provided for a much larger range of services. Currently information on care in pregnancy and immunization and contraceptive services are captured in a set of registers manually, and these are then taken to the block headquarters where they are fed into computers which then prints out the aggregate data and the follow up on services needed. In addition some key daily activities of the health worker are provided on mobiles to the state level as a method of monitoring their work. The aggregate data is also fed into a web-portal for state and national level analysis. The process of capturing the information on paper, entering it into computers on a distant site, and then getting the analysed actionable information a week or two later is inefficient and error prone. Clearly if the data recorded in an electronic format, leads to generation of locally actionable information then and there, efficiency and reliability is better. Also the time spent on data management is almost one fourth to one fifth the total work time available.

What is a desirable when the system is providing only this small basket of services, it becomes mandatory when the basket of services expands. The system would need to invest in digital devices that a field level primary care provider can use to record information on services delivered- and this would enable follow up of the service user at the appropriate time as well as take over the compilation of records for reporting purposes. It would also need to invest in more HIS human resources at the primary center level- so that the collection of information from so many individual clinical care giving encounters by so many care providers is properly stored and retrieved.

2. The Need for Population Basing of Services: Implications for HIS:

Going beyond the recording of services provided, the primary care facility has to track what proportion of the population is covered, and identify those who are unable to utilize these services. It also requires an

understanding of the disease profile of the population. In terms of HIS, it means a good coordination with the civil registration system of births- for ensuring the full population is identified and deaths – for a reliable and readily available measure of illness. It requires information on what percentage of the population, disaggregated by equity concerns have been screened for specific diseases and have utilized services or have experience illnesses that were preventable. Here the challenge is to relate the clinical encounters and records of service provided to the population data base and generate the necessary analytics at the decentralized level.

Another related issue- not so much a problem in developed nation contexts, but of great importance when we look at the equity imperative is to be able to identify exclusions.

3. Ensuring Continuity of Care: Implications for HIS

Ideally this is solved if we have a standardized electronic health record, with rules in place for access, privacy, confidentiality in place. The case record of the patient seen by a specialist is available to the primary provider for follow up, and to the specialist during the subsequent check-up with exchange of information and instructions between providers. Many HIS systems in the OECD countries are built around this. Further, if all EHRs are on a common data warehouse, there can be disease specific registries that would provide support to research too.

Technical capacity for doing this is readily available. Indeed much of the support of EHR based information systems even for the USA is done from Indian shores, and often by Indian companies. What is not in place is institutional capacity. The district would have to incrementally move forward by first introducing hospital information systems, then increasing the level of completion of EHRs in these hospitals and then sharing at least key portions of this with primary providers and arranging for information transfer to accompany referrals in either direction. The primary care provider would also be unable to start with EHRs and various interim name based arrangements may have to be experimented with. Also the rules and obligations for such necessary information transfers would need to be put in place.

Where insurance based purchasing is in operation, mandate to provide population based aggregate data to district and sub-district public health managers, and primary care follow up data to primary providers would need to be mandated. This is easier said than done. To the corporate provider the profit is in the tertiary care hospital- which acts as the hub, and primary care – the spokes- becomes as much a mechanism to scout for tertiary care opportunities as to provide primary care. The information priorities of such a model are very different from a model where the primary provider is the hub, acting as a gatekeeper against inessential tertiary care and putting the emphasis on prevention and local follow up, rather than on repeated visits to the specialists and costly diagnostics. When a HIS has to ensure continuity of care between a public primary care provider and an insurance paid tertiary care provider, these problems could become the limiting factors to any model ever going through.

4. Resource Allocation- the implications for HIS.

As the number of services increases normative fund allocation to facilities break down as patterns of utilization begin to vary widely across facilities, and across regions. Management of resource allocation-whether financial, human, or drugs and supplies would need reliable systems of information gathering, validation and use. Insurance companies do make payments based on information gathered electronically- but the same logic does not apply to primary care or for provision of critical management inputs in public systems. Most national HIS have some level of integration with financial management, logistic and human resource management systems- but clearly the demands on these in a move towards UHC would be much more.

5. Monitoring Financial Protection and Costs of Care: Implications for HIS:

A new challenge is the measurement of both financial protection and the costs of care. . There is now an international consensus on key indices of financial protection- the catastrophic head count, the mean positive overshoot due to catastrophic payments and the incidence of impoverishment due to health care. Though the computation of these indices will continue to depend on periodic well-constructed surveys, the role of monitoring out of pocket expenditure gains importance, given the primary focus on financial risk protection. Details that will need to be compiled will include costs and break up of costs into components like consultation fees, medication, diagnostics, in-patient services, therapeutic procedures, travel etc.

A further challenge is to measure the costs of care to the provider and system which is important to ensure value for money in a context where there is a multiplicity of providers including the government, private insurance companies, community based organizations and others. Some of these latter indicators

will necessarily come from multiple sources such as departments of finance, statistics, health and home. To generate these indicators the NHIS will need to be able to speak to these different databases and access data.

4 Discussion

Implementation Challenges:

Having mapped the extensive needs of information, even for such a modest move towards UHC as is planned in the district UHC pilots of Punjab state we briefly touch upon three implementation challenges for such a transition.

The first and foremost challenge is the need for integration and interoperability across multiple systems. It is unlikely and undesirable for all this information to be gathered and maintained on a single application. Multiple systems are inevitable and unless these systems can talk to each other, there would be no possibility for getting the information required.

Ensuring interoperability would require forward movement at three levels- firstly in defining the data definitions, and secondly in defining the data and meta-data standards, and finally putting in place the necessary rules and obligations at the institutional level. Considerable work has happened in defining these in the Indian context, and a high powered committee has prepared and widely disseminated a set of draft standards. But curiously like in many other aspects of UHC there is a last mile in terms of notifying the standards and putting a mechanism to monitor implementation that is not done.

The second big challenge is in implementation is capacity building. The staff, systems and the skills needed for such an expansion in HIS require higher investments and well planned skill development programmes.

The third big challenge relates to governance and institutional processes required for appropriate technology choices and innovation. The current mechanisms of procurement and contracting of IT developers, involves selection of single agency through a competitive bidding process, who can then provide the solutions and assist the operationalization through a single all time contract. What we probably need is a multiple innovators working in parallel in developing prototypes in a collegial atmosphere, with a long time commitment to support requirements that would be dynamic and evolving. Technology choice currently favors a design where a strong central agency is able to see all, and record and monitor every single health encounter on a single central platform. What is more likely to sustain is a system that empowers local providers and mid-level managers in an atmosphere of trust, with information needs of higher levels of governance being obtained as a collateral to the local process.

Conclusions: building global and local research agendas on HIS to support UHC

Traditionally, HIS in countries have focused on aggregate systems for the generation of statistics. For UHC to be actively supported by effective HIS, a radically new type of HIS would need to be developed which spans the three dimensions of UHC, and would also need models of governance which are necessarily multi-sectorial and with stronger frameworks of regulation. WHO and other global agencies have identified the need for research to develop models of UHC which are both country specific and also represent global priorities. This research agenda needs to be further expanded to also include research into the development of appropriate supporting HIS. Such research will necessarily need to be based on inter and intra-country models involving multi-stakeholder participation to understand these complex and uncharted territories. Further, the research will necessarily need to be long term and multi-disciplinary involving health policy, information systems, public health, anthropology, implementation and various others.

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