eGovernment for Development
eHealth Case Study No.6

Electronic Immunisation Registry and Tracking System in Bangladesh

Case Study Author

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Application

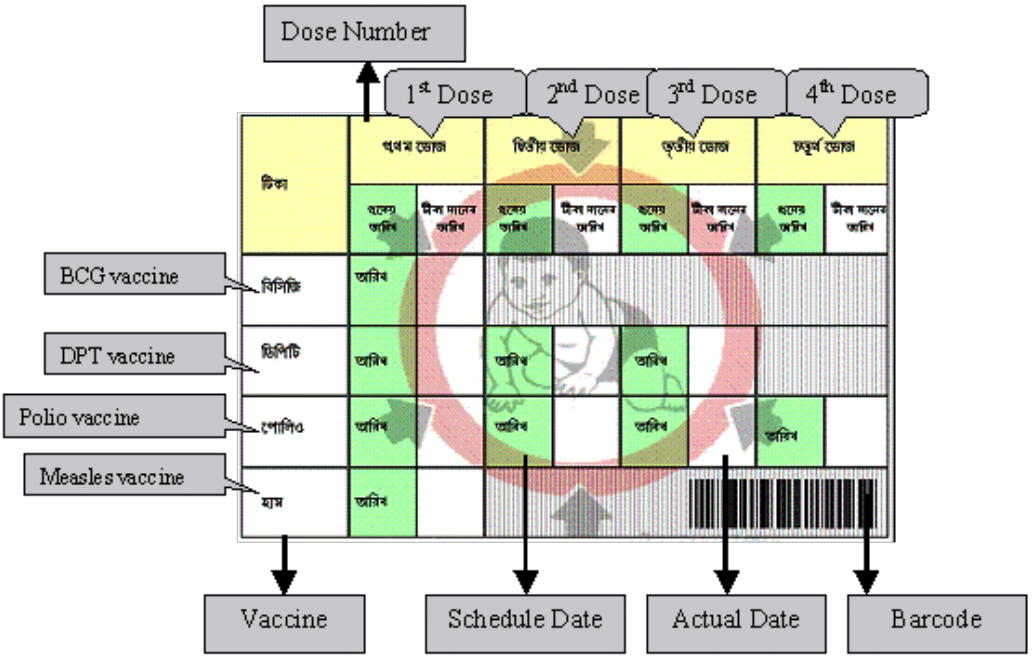
In 2001, a new computerised information system to register, schedule and track immunisation of children was introduced by the Department of Public Health in Rajshahi City Corporation, Bangladesh.

Application Description

Starting from 1985, Bangladesh introduced the Extended Programme for Immunisation to protect children from polio, measles, diphtheria, whooping cough and other infectious diseases. The programme has a quite well-established and systematic structure and workflow, with health workers distributed all over the country, and able to visit any family in the country within one week. A long and well-controlled 'cold chain' was also put into operation, enabling vaccines to be kept cold (and thus remain effective) throughout the country.

The system was based largely on manual record keeping, which led to problems. First, there was relatively limited ability to identify new-born children, since many births remained unregistered. The manual system was also relatively poor at tracking the four different vaccine doses that are required at four different points of time for each child (for example, the first vaccination needs to be completed within four weeks of birth; the second after another four weeks, and so on). Without the four vaccinations, children are not adequately protected. Yet drop-out rates were around 40% under the old system. There were particular problems for the fourth and final vaccination, which occurred nine months after the third, and which saw only 30-40% of children being vaccinated as parents and health workers simply lost track of what needed doing, and when. This problem was, in part, associated with the seasonal flooding in Bangladesh, when even local journeys are made more difficult.

The new computerised immunisation system addressed a number of these problems. On a daily basis, the system uploads new entries from Rajshahi City Corporation's electronic birth registration system (follow this link for further details about this system). For each new-born, a schedule of immunisation is created and printed, then given to the parents after registration of their baby's birth, attached to the child's birth registration ticket. An example of the schedule is shown below:



From this immunisation schedule, parents can be aware when they need to take their child to the nearest immunisation out-reach centre. The barcode on the schedule can be read at the centre, and health records for the child updated.

Even if parents lose the schedule or forget to take their child in, the system provides a safeguard. Every day, it prints out a target list of children whose immunisation is due or overdue for a particular centre. That list is delivered to the centre together with the daily vaccine delivery. Centre health workers can use the list for house visits, knowing the child, the address and the vaccination required.

Finally, the new system also supports vaccine usage and supply. Based on the target list, the health worker can see exactly how many bottles of vaccine are required to be taken out from the cold cabin.

Application Drivers/Purpose

The main overall rational purpose for the computerised immunisation system was to reduce the drop-out rates from vaccination programmes. The specific purposes of the system were to improve the quality of immunisation data (e.g. by elimination of duplicate records), and to provide access to that data for health workers to use in their operational work, and for managers and policy-makers to use for health planning. In 'softer' terms, the individual driving forces behind the project were the consultant-designer who formulated the idea for the system, and the Chief Health Officer of Rajshahi City Corporation. Both wanted to identify effective uses of ICTs in the health area, and to make more effective use of the birth registration information system by building it into a more integrated life event system. One purpose behind this was to try to make birth registration more attractive to parents in Bangladesh: only a minority currently register their child's birth because they see no advantage; adding in the immunisation schedule was intended to help incentivise registration. As noted below, the system was also driven on by the fact that it matched the interests of many of the key stakeholders.

Stakeholders

Individual children and their families are the major intended beneficiaries of the system, and public health staff are the other main stakeholders. Managers particularly in the public health department welcomed the greater potential to achieve immunisation targets, and to understand what their workforce were doing. In addition to the consultant-designer, other stakeholders can be seen as international agencies such as WHO and Unicef who are focused on immunisation indicators. However, a number of donor and government agencies - who could be stakeholders - have tended to be bureaucratic and uninterested in 'home-grown' and innovative approaches to health issues.

Health and the Poor

This immunisation system does not differentiate between rich and poor children. However, the richer sections in Bangladesh society tend to take their children direct to hospitals to be

immunised; the outreach centres where this application was based are mostly used by poor families. In addition, it is likely that drop-rates are much higher among poorer families. Therefore, this application should have a disproportionately beneficial impact on poor children and their families.

Impact: Costs and Benefits

The project was developed as one element in the broader birth registration project. No direct funding was provided for it, but the assumed cost would be not more than US$5,000.

Health workers in all but one of Rajshahi City's 30 wards use the system on a daily basis to plan their immunisation schedules, and a statistical report shows that 84% of the population is now covered by the system. The system's main contribution is in helping in the planning and execution of effective immunisation at an operational level: providing a back-up even if parents forget their child's vaccination dates; guiding health workers towards those who need their doses; and potentially reducing vaccine wastage. In addition, the system's reports can help various levels of decision-making. It helps show individual health workers and their managers how they are performing, and helps them make better and more quantified performance-related decisions. It gives health managers a comparative understanding of different parts of the city; this helps them focus on particular problem areas and also understand the impact of particular targeted promotional campaigns. And it provides a means for some demand forecasting. Paperwork has been reduced, helping release time of health workers for more productive activities. There should also be benefits from bringing a greater number of mothers and young babies into regular contact with health workers.

Evaluation: Failure or Success?

There has been no independent evaluation of the system, but it has been operating for three years - particularly notable given that there has been no external support from donors or central government.

Enablers/Critical Success Factors

1. ***High-level support*** . A key success factor for e-health applications is support from high levels within the public sector - this support releases both physical and political resources that help ensure the application can be implemented. In this case, the high level is relatively localised and came from the Chief Health Officer of Rajshahi City Corporation, who provided a strong push to get health workers to use the system.
2. ***User-friendly interface*** . A number of e-health applications around the world have to be operated in English or one of the other main European languages. In some places this is appropriate, but in many others it is not. The immunisation system benefited from having a Bengali interface, which reduced the barriers to its operation by local staff. Given the WIMP interface and use of barcodes, this means that there are very few inputs that have to be made by typing: again, this reduces the barriers to system usability.
3. ***Meeting stakeholder needs*** . A vital part of this e-health application's success comes from its being designed to meet the specific interests of a number of different stakeholders. Only in this way can an e-health application be sustainable. For the health workers, the system has significantly reduced the amount of time they have to spend searching records. They have also been afraid of losing their jobs if they fail to fulfil their immunisation targets, and this system has provided a way to help them achieve those targets. Managerial staff previously found it hard to know what was going on in the immunisation system. Now they find it easier to supervise their staff, and to produce reports on various performance indicators. Citizens also have wanted some better way to ensure protection for their children, which the system helps provide. Finally, some of the public servants involved have been supportive of the system for more personal reasons - successful operation of the immunisation system demonstrates the possibility that this could be built up into a larger-scale, externally-funded project which would bring with it some individual financial motivations for those staff.

Constraints/Challenges

1. ***Bureaucratic divisions*** . At a technical level, it has been possible to link this system with the system for birth registration, largely because the same individual was the main developer for both, and because both responsibilities fall within the purview of the Department of Public Health at city level. At a higher level, though, there is very little co-ordination between the two functions. Birth registration is a task overseen by the Local Government Division in central government; immunisation is the responsibility of the Ministry of Health. Each of these agencies wants to build its own information systems, and there are few chances of co-operation. Therefore there are few opportunities for scaling-up this type of project.

2. ***Donor divisions*** . The same divisions seen within government were replicated in the main donor agency with responsibilities in this area. One of their departments was responsible for child health, but a different one dealt with the issue of birth registration. These divisions prevented an integrated approach being supported by the donor.
3. ***Barriers to innovation*** . Innovative and successful e-health solutions ought to be recognised and diffused rapidly. Yet the opposite seems to happen. In government, there seems to be a deep suspicion of innovation - staff there seemed most interested in trying to stagnate diffusion of the current system by demanding long-winded appraisals, evaluations and then further reviews. In donor agencies, the legacy of widespread corruption in Bangladesh seems to be a disbelief that anything home-grown can be either genuine or valuable, and an attitude of ignoring local innovations.

Recommendations

1. ***Adopt an integrated approach to e-health systems*** . Individual e-health systems can be valuable, but it can be more valuable to take a longer-term perspective, and see how a more fully integrated system might exist. For example, on its own a birth registration system adds limited value to the lives of citizens. However, it becomes more valuable if seen as a building block for other information systems. By integrating birth registration with immunisation, the value of both information systems was enhanced, and costs were reduced - for example, ID numbers and dates could be automatically transferred from one system to the other.
2. ***Start from the lives of citizens*** . eGovernment systems that deliver Web-enabled government services may seem modern and high-tech, but they are often of little real use in developing countries where the vast majority of the population remain on the wrong side of the digital divide. Utilisation of ICTs in poor countries should instead be mainly targeted at those intermediaries (such as health workers) who play a key role in the lives of the poor through high-contact service delivery. Empowering those workers and helping improve the effectiveness of their service delivery will do more for the poor than any number of e-government portals.

Further Information

Contact author.

Case Details

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