The challenges and potential of electronic immunization registries to solve for immunization barriers

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<th>Common immunization program barriers</th>
<th>How electronic immunization registries (EIRs) can help address barriers</th>
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| Inherent lack of understanding about what drives demand at all levels: There are many reasons that contribute to children not getting vaccinated, but we do not currently understand the breadth and depth of these reasons. | • EIR data can identify un- or under-immunized children and explore drivers of their vaccination status (e.g., geography, demographic characteristics, facility type).  
• EIR data can be used to analyze at what point children drop out of the continuum of care.  
• EIRs can have embedded decision-support to guide health workers in delivering tailored messages/services to increase acceptance and uptake. |
| Overly complex processes: This may include processes that are designed for reporting, rather than decision-making. | • EIRs can be designed to streamline data capture and reduce the burden of data entry.  
• EIR requirements should be defined to meet decision-making needs for end users. |
| Skill level and availability of human resources. | • Access to data through EIRs can empower and motivate users and strengthen agency.  
• If EIRs are designed so that each individual health worker has their own login, EIRs can inform the tracking of human resources for health based on active health worker profiles.  
• EIR data can identify error rates of individual health workers and link them to additional training or supportive supervision if necessary.  
• EIRs can have embedded training resources or capacity assessments.  
• EIR data can be used to forecast service delivery needs by facility or district to plan for adequate human resources. |
| Geographic and social barriers to access: These include the limited number of health facilities; inadequate prioritization of services/outreach to reach vulnerable populations; and the lack of integration between the public and private sector. | • EIR data can identify un- or under-immunized children to explore whether they are concentrated in certain geographic areas and/or if they have shared demographic characteristics (e.g., to inform targeted outreach).  
• EIRs can track children’s vaccinations across public and private sector facilities. |
| Microplanning challenges: These include inadequate capacity for microplanning; a lack of up-to-date denominators; inadequate descriptions of at-risk populations; and children who have missed vaccination due to not | • EIRs can capture more accurate, timely, and complete denominators to inform microplanning.  
• EIR data can identify un- or under-immunized children and explore drivers of their vaccination status and their geographic location. |
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<th>Topic</th>
<th>EIR Data Benefits</th>
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<td>knowing where vulnerable populations are</td>
<td>• EIR data can be used to understand population movement or health-seeking behaviors to inform microplanning (e.g., how common it is for children to move between multiple facilities).</td>
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<td>Inadequate introduction of new vaccines: A lack of strategic planning for new vaccine introductions impacts stability and the ability to finance.</td>
<td>• EIR data can inform vaccine forecasting based on current service delivery, which can also inform adequate staffing levels or lack of attendance of health workers at facilities/health posts.</td>
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| Inadequate governance structures and capacities: This includes a lack of technical capacity for costing, budgeting, and budget implementation. | • The process of designing an EIR should include discussing and documenting an EIR governance structure.  
• EIR data can provide more accurate denominator estimates to inform budgets. |
| A lack of resilience in leadership: This includes responsibilities, authority, and the misalignment of accountability with existing structures. | • EIRs can encourage continuous quality improvement by highlighting trends/outliers/patterns that may require adaptive management.  
• EIRs can provide a platform for remote, virtual supportive supervision. |
| Gaps in information systems: This includes a lack of incentivization for reporting. | • EIRs can show which facilities are entering data or not, and factors associated with reporting.  
• EIRs can be designed to mimic health worker workflows to streamline data collection and reporting practices. |
| Poor quality of stock data from health facilities: This may be due to limited incentives to report quality data and complex data collection processes. | • EIR service delivery data can be triangulated to see how consistent it is with vaccine stock data and/or to forecast stock needs.  
• EIR service delivery data can be used to inform decisions about vial size (e.g. whether smaller vial sizes are needed in some areas to reduce wastage).  
• Where EIRs include stock reorder alerts, we can analyze how successful they are in reducing stockout frequency. |
| Mismatched supply chains to service delivery: Supply chains are considered separate from service delivery. | • EIRs can identify the number of vaccines provided by day/time to support health worker allocation to match demand.  
• EIRs that capture check-in time and vaccination time can calculate patient wait times.  
• EIRs can identify missed opportunities for vaccination. |
| Poor quality of service delivery: This may include long wait times and inadequate sensitization. | • EIR data triangulated with patient-level data on adverse events following immunization or surveillance data can answer questions about the effectiveness of vaccines given at different times. |
| Vaccine safety and effectiveness. | • EIR data triangulated with patient-level data on adverse events following immunization or surveillance data can answer questions about the effectiveness of vaccines given at different times. |