

## Co-WIN and Ayushman Bharat Digital Mission: The way forward

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### ABSTRACT

As Covid-19 becomes, for better or worse, an endemic disease, the future of the revolutionary Covid-19 Vaccine Intelligence Network (Co-WIN) platform needs to be considered seriously. Rather than being made obsolete, the Co-WIN platform can serve as a stepping stone to catalyse a true digital healthcare revolution in India if steps are taken to harness its features and data for varied uses as part of the Ayushman Bharat Digital Mission. By bringing these features to other vaccinations, as well as integrating outbreak data from the Integrated Health Information Platform for public knowledge and awareness, disease responses can become faster and more public-driven (rather than government-driven as currently). This will also create a data pool that will be of value in post-vaccination monitoring.

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### Co-WIN OVERVIEW

As the Covid-19 pandemic morphs—in fits and starts—into an endemic situation that becomes one of many public health priorities, we are left to contend with what happens to all the infrastructure and knowledge that it leaves behind. For instance, the knowledge required to run large mass vaccination camps is something that is likely going to be filed away or put into cold storage until the next time that something like this is required. However, there is one aspect of the Covid-19 era in India that deserves to continue—not as is, but in modified form—into the future: the Covid-19 Vaccine Intelligence Network (Co-WIN) platform.

The Co-WIN platform was developed based on the foundation provided by 3 pre-existing key systems: the Electronic Vaccine Intelligence Network (eVIN), Surveillance and Action for Events following Vaccination (SAFE-VAC) and Digital Infrastructure for Verifiable Open Credentialing (DIVOC).<sup>1</sup> Each of these systems served a key role in creating the scalable and efficient vaccination architecture provided by Co-WIN.

The eVIN system is a cloud-based system developed by the Ministry of Health and Family Welfare with assistance from the United Nations Development Programme (UNDP).<sup>2</sup> Rolled out from 2014 onwards, it allows for digitalization of vaccine logistics by connecting thousands of sites in the vaccine cold chain.<sup>3</sup> This improved government monitoring and management of stocks. Moreover, the introduction of data from real-time temperature monitoring systems helped to improve the quality and safety of delivered vaccines.<sup>2</sup> This also worked with the National Cold Chain Management Information System, which uses digital monitoring to track cold chain availability and ensure it remains functional.<sup>4</sup>

Similarly, SAFE-VAC allowed for digital reporting and tracking of Adverse Events following Immunisation (AEFI), allowing regulators to better monitor adverse events from across the country and promptly investigate them.<sup>5</sup> Thus, post-deployment monitoring of vaccines improved with more data being collected on the frequency and types of side-effects and adverse events. Finally, leveraging on DIVOC which is an open-source software with ‘open [Application Programming Interface] API integration capabilities’<sup>6</sup> allowed for every individual to get a tamper-proof, verifiable QR code that could be scanned to receive their vaccine certificate, in a format compliant with relevant WHO and European Union (EU) standards.<sup>7</sup>

The Co-WIN system not only integrated all these systems on one platform but provided a one-stop solution for the entire Covid-19 vaccination process in India. For operations management, it provided data about vaccine stocks and inventory management with cold chain temperature monitoring. Administration was given the ability to set-up and plan vaccination sessions based on stock and personnel availability, whether at public or private facilities.<sup>1</sup> For users, it offered an easy digital means to register and schedule vaccine appointments while introducing a commendable level of transparency by displaying all key details of the vaccination upfront (brand of vaccine, age, public or private facility, cost, number of slots remaining).<sup>8</sup> The system was flexible enough to allow individuals to take doses at different sites by different providers, each time. The requirement to provide an identity document (ID) proof ensured that digital records were easily matched to a specific person, but there was flexibility introduced by accepting 9 different types of identity documents, allowing it to reach as many people as possible.<sup>8</sup> Finally, after the completion of the vaccine schedule, a digital QR-code verifiable certificate providing key details (beneficiary details, vaccination date, vaccine batch number)<sup>9</sup> was provided which eased the process for domestic and international travel. Moreover, easy linking of the Co-WIN vaccine certificate with the DigiLocker (government digital document repository), UMANG app (Unified Mobile Application for New-Age Governance; a government e-service app) and Aarogya Setu (government contact tracing app), facilitated greater ease-of-use by making certificate retrieval convenient.<sup>10</sup>

Nevertheless, the Co-WIN platform certainly did suffer growing pains, with the early days being marred by glitches that were amplified by the sheer number of people on the platform trying to search for scarce vaccine slots.<sup>11</sup> There were also serious concerns about whether a digital platform-oriented strategy would leave the digitally-illiterate behind,<sup>12</sup> especially the elderly and the poor. However, the flexibility of Co-WIN enabled a multi-pronged strategy that allowed individuals to register up to 6 people on one mobile number<sup>13</sup> (allowing digitally-literate family/friends to register those who cannot use the platform) as well as through help rendered by healthcare providers who helped digitally-illiterate beneficiaries get registered<sup>14</sup> and conduct door-to-door vaccination campaigns to seek out eligible beneficiaries for the first, second or precaution doses.<sup>15</sup>

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Consequently, this powerful system stands as a key enabler of India's success in fighting Covid-19. The functionality and ease-of-use of this platform makes it a *bona fide* revolution in Indian vaccination delivery.

#### Co-WIN AND ABDM: USING NUDGES TO FACILITATE ONBOARDING

It appears that the Indian government did see the potential of using such digital infrastructure to revolutionize the delivery of healthcare and decided to implement the Ayushman Bharat Digital Mission (ABDM) which offers a digital ID that can link together varied aspects of the healthcare system.<sup>16</sup> Yet, what is unfortunate is that while the ABDM seems to have spawned off Co-WIN it does not appear to be using the wealth of data that Co-WIN has already collected. Rather than getting both people and healthcare institutions to register with a new system and get a new ID, the ideal would have been to upgrade the Co-WIN portal such that it became the new website for the ABDM. Users could have been given the choice of whether they want to 'Add Functionality' or 'Update to incorporate new features' or not, which might have provided the 'nudge' for more healthcare institutions and individuals to get on to the ABDM. Moreover, using a portal and system that many are familiar with also brings with it a sense of trust and familiarity that would have likely resulted in greater uptake. Know-Your-Customer (KYC) requirements should ideally not be an issue because registering on the Co-WIN portal requires ID proof which is registered in the system—if anything, it offers more options for individuals as opposed to the restriction to Aadhaar number or Driving licence within the ABDM.<sup>17</sup> Even now, making these changes and offering those on the Co-WIN portal an easy transition to the ABDM such that anyone who signs-up for the ABDM has all their data preloaded once they input their Co-WIN code is likely to increase uptake.

#### UPGRADING THE UNIVERSAL IMMUNISATION PROGRAMME (UIP)

Such a transformative system cannot be left as a purely opt-in scheme, especially for certain medical procedures such as vaccinations. To my knowledge, there is no way for an individual or healthcare provider currently to access all the immunizations that a person has got over the course of their life, even though such information is of great consequence. As per some reports, the Indian government currently looks to be working on retooling their systems to record all the 12 vaccines in the UIP which would be a step-up from the current system and allow parents or healthcare workers to easily check vaccination records.<sup>18</sup> It is reported that a portal called U-WIN has been soft launched for this very purpose in two districts in every state and Union Territory in India.<sup>18</sup> It is especially important for all these UIP vaccinations to be on the system in the same way that Covid-19 vaccines can currently be found—allowing each individual to see what are the vaccination centres, brand of vaccine, cost and number of slots available, in order to ease the process and encourage uptake by facilitating individual choice. Similar to Co-WIN, children (or their parents) would be alerted to take vaccinations, once they are eligible, for all UIP vaccines along with it being easy for healthcare authorities to collate who has not followed the schedule and seek them out.

While this would allow parents and healthcare authorities to better track vaccinations, the benefits of this would extend far beyond that.

For example, in the measles outbreak in Mumbai in the last quarter of 2022,<sup>19</sup> it would increase the granularity of data that officials have which would aid their investigations. Better data would tell whether the children who died (including those who were vaccinated as per their parents)<sup>19</sup> or suffered from severe infections were truly vaccinated or whether their parents had confused the measles vaccine with some other vaccine given to their child. If they were vaccinated, were most severe cases/fatalities from those given vaccines from a particular company or batch (implying quality control issues)? Or were there certain clusters of cases linked to vaccines given in certain healthcare facilities or camps (implying improper cold chain, storage and handling)?

Moreover, having data on the dose gap period on a convenient digital platform will facilitate post-release monitoring by giving valuable information on optimal dose gaps, real-world effectiveness and occurrence of side-effects. This will allow regulators to make much more informed decisions. This data pool can be also used, with appropriate safeguards, to be analysed by independent researchers in an anonymized fashion to guide better public health strategies.

Finally, there would be major benefits for India's internal migrants which number a colossal ~100 million as of 2020.<sup>20</sup> Most migrants are part of the informal system and are from 'very poor backgrounds'<sup>20</sup> meaning that they may not have access to their (often paper-based) vaccination records as they move from place-to-place, many times with children in tow. With a unified digital portal that uses identity proof to confirm their identity and link their records as they move across towns and states, healthcare providers can more easily ensure they remain on-schedule and do not fall through the cracks of the system, with concomitant benefits to their wellbeing and public health through better vaccine take-up.

It would be unfortunate to stop there, however. With appropriate software modifications, the Co-WIN/ABDM framework can be used to create a digital healthcare system that would be best-in-class globally, with respect to the aspects of vaccination, outbreak management and medical reports.

#### Co-WIN AND ABDM: MAKING THE QUANTUM LEAP

##### *Covering all vaccinations outside the UIP*

First, the system must not just cover the UIP but rather any and all vaccinations given (whether in public or private healthcare systems) in India. This would mean, for example, data of vaccinations for diseases such as Japanese encephalitis (JE), adult vaccinations with the Tdap/Td/tetanus vaccine, pre/post-exposure rabies vaccination and so on. Again, as previously mentioned, people should also be able to search for all these vaccines in the same manner that they can currently do for Covid-19, getting information on vaccine centres, brand, cost and number of slots available at a centre. Acquiring this data would have monumental impacts on public health.

For example, take a 60-year-old woman who has had a fall and suffered a deep gash. It is common practice to provide them with a tetanus booster to avoid the risk of tetanus amongst other things. However, if she had fallen just 3 months prior and had already got a tetanus booster, to give her another booster would provide no real benefit and unnecessarily expose her to the ever-present risk of side-effects. With a digital record of this data, she can be spared an unnecessary injection and the possible side-effects. Conversely, if the system shows she never received the tetanus vaccine or last got it in her 20s, the

doctor can then confidently recommend this vaccination to protect them. At the very least, it should be made mandatory for all vaccination records to be listed on Co-WIN/ABDM so that healthcare providers know when to vaccinate and when not to. Additionally, knowing the dates of vaccinations (dose gap) and being able to match that to infection data will allow the government to make more informed decisions about what dose gaps are optimal.

To make these changes, would also save a lot of time and effort on the part of health authorities in the case of disease outbreaks such as the measles outbreak in Mumbai in 2022<sup>19</sup> or the increased incidence of rabies reported in Kerala.<sup>21</sup> With better identification of gaps, increased granularity of data and more certainty about where and who to vaccinate, it is likely that outbreaks can be brought under control far more quickly.

Moreover, there would be advantages for the vast cohort who intend to travel overseas, whether for short-term travel or long-term stay. India has the world's largest diaspora numbering ~18 million in 2020<sup>22</sup> and many end-destination countries have their unique vaccination requirements that need to be met before student or immigrant visas can be processed. Even for short-term travel, many countries have prophylactic vaccination requirements due to local disease prevalence. For example, many African and South American countries are yellow fever-endemic and require travellers to take yellow fever vaccination before arriving.<sup>23</sup> Similarly, due to the risk of meningococcal disease, travellers going on the Hajj are mandated by Saudi Arabia to take quadrivalent meningitis vaccines.<sup>24</sup> With a singular repository of vaccination data that is provided in a format compliant with various international standards, the process of overseas travel can be eased as well.

#### *Using system prompts for disease outbreaks, missed immunizations and treatments*

The system must incorporate appropriate system notifications in the case of outbreaks. Take as an example that City A is marked as the home city by the user of an upgraded version of the ABDM app. Unfortunately, in a given year, the prevalence of JE is extremely high and the data from the Integrated Health Information Platform (IHIP) is used by the government to conclude that it is an outbreak situation that requires teams to be sent for door-to-door vaccination. The moment the government notifies or initiates this campaign in City A, prompts should pop-up on the user's device notifying him of this outbreak and offering appropriate pathways for responding to the alert such as preventive lifestyle changes (using mosquito repellent, wearing long clothing, clearing stagnant water and trash) and also directing him to nearby sites for JE vaccines. Such prompts would aid outbreak responses for so many diseases (whether rarer such as JE or more common such as dengue or malaria) because they allow people to be health-aware and take steps on their own rather than the government having to do all.

System prompts must also come into play by prompting individuals and healthcare authorities if someone misses an important immunization or treatment. Recently, there was an increase in the number of cases of rabies reported in Kerala that led to a central team being deputed there.<sup>21</sup> It was reported that the central team had concluded that many deaths were due to people missing their doses or taking it outside the schedule.<sup>21</sup> Rabies is an almost-invariably fatal disease if vaccinations are not taken in time and as per the schedule.<sup>25</sup> Moreover, whether

one has taken the vaccine before or not makes a difference to the treatment plan.<sup>25</sup> In this case, if someone has the 1st dose of anti-rabies vaccine given to them and marked on the ABDM system and then vanishes for the 2nd, 3rd and/or 4th doses (a known risk with any regimen requiring multiple doses), alerts would be sent out on the person's device, if any, alerting them of the importance of completing the series. At the same time, this would pop-up with state health authorities allowing them to send out staff and ensure the vaccine regimen is adhered to. This would apply to any and all vaccinations, including UIP.

This is not solely limited to immunizations and will be useful in ensuring adherence to tuberculosis (TB) drug regimens, HIV antiretrovirals and filariasis treatments as just 3 important examples. For instance, a HIV-positive truck driver (a key demographic implicated in rural spread)<sup>26</sup> who is unable to maintain antiretroviral compliance due to job requirements would be alerted as soon as they miss a dose and be able to find facilities near their location that provide antiretrovirals.

#### *The way forward with search features and medical reports*

Eventually the ABDM should incorporate search features as well. Admittedly, this is more of a long-term need rather than an immediate one. However, with integrated mapping of outbreak situations by the healthcare authorities via the IHIP,<sup>27</sup> adding this feature is the next, obvious step. These search features would benefit individuals going from one part of India to another for any reason, whether for leisure travel, business, relocation and so on. In this case, a person could search up a location by name or by pincode and consider whether they need to maintain any health precautions or be aware of any outbreak situation while making their travel plans.

This scheme should also be extended to other areas such as healthcare reports (scans, laboratory tests). In India, the practice of seeking a 'second opinion' is extremely common but can lead to unnecessary tests being done when doctors do not know what has previously happened. This leads to delay in treatment and increases costs. While there has been an integration of the 'DigiLocker' app with the Ayushman Bharat Health Account (ABHA) in November 2022 that allows individuals to store all these records on DigiLocker and share them with other doctors as per their requirement,<sup>28</sup> there needs to be greater awareness building and appropriate use of psychological 'nudges' to make this an easy and instinctive process. Moreover, all certified laboratories and test centres should be pushed to become ABDM-registered to ease the process for consumers.

#### CONCLUSIONS

Making these changes would not only foster adoption of ABDM but provide it a transformative power in Indian healthcare. Doing so would create a 'Health Stack' that would likely be the 'best-in-class' globally, for these features, with immense benefits. Naturally, some aspects of these technological improvements will not be able to reach those who are still users of feature phones. On such devices, there are likely to be technological barriers to users being able to search for their own treatments and vaccinations. However, a large part of the core functionality will remain including alerts for missed medications, e.g. TB drugs, vaccines and outbreaks which can be done via SMS. Thus, this is no reason to hold up this transformation in healthcare while we look for appropriate solutions to enable greater inclusion.

*Conflicts of interest.* None declared

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