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PROBLEM STATEMENT

In rural and urban areas, by educated and non-educated people the vaccine is getting wasted in India even though we know that there is a shortage of it.
Problem Identification

<table>
<thead>
<tr>
<th>State</th>
<th>Wastage Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telangana</td>
<td>17.6%</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>11.6%</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>9.4%</td>
</tr>
<tr>
<td>Karnataka</td>
<td>6.9%</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>6.6%</td>
</tr>
<tr>
<td><strong>National average</strong></td>
<td><strong>6.5%</strong></td>
</tr>
<tr>
<td>Rajasthan</td>
<td>5.6%</td>
</tr>
<tr>
<td>Assam</td>
<td>5.5%</td>
</tr>
<tr>
<td>Gujarat</td>
<td>5.3%</td>
</tr>
<tr>
<td>West Bengal</td>
<td>4.8%</td>
</tr>
<tr>
<td>Bihar</td>
<td>4%</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

- We read newspapers and web articles and got to know about the vaccine getting wasted in India.
We ourselves consulted health workers involved in vaccination drive and asked them why was it difficult to get a vaccine slot. They responded with two keys reasons a) Lack of availability of required number of doses of vaccines. b) People don’t take vaccines even after booking slots which that deprives the deserving candidates of the vaccine resulting in its wastage at last.

Targeted beneficiaries
It is a problem that had to be solved for both the domains that is both rural and urban.

People in both the areas had their own reason and cause for not taking vaccine.

Number of doses required in an area is calculated as: -
Requirement = (Total population to be covered in the catchment area) × (% of the population to be covered in this catchment area/no. of months of the campaign) × 2 doses × WMF.

WMF is the Wastage multiple factor and it is calculated as:

\[ WMF = \frac{100}{100 - \text{wastage}}. \]

**Finding the solution.**

Optimizing the number of doses required or if that not then at least meeting the already requirement could help us solve the problem.

This became the road to finding the solution.

After reading articles and paper published earlier, we shortlisted a few solutions that could solve the problem.
Frequency and causes of vaccine wastage

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Received 26 February 2001; received in revised form 24 September 2001; accepted 9 October 2001

Abstract

Assessing the frequency of vaccine wastage and the relative magnitude of its various causes may help to target efforts to reduce these losses and to husband funds for increasingly expensive vaccines. Methods: As a preliminary overview of wastage in the United States, 64 public-sector state and local health department immunization programs were polled in 1998 and 1999 for wastage recording practices. Actual wastage data were collected from a non-random subset of five states. Data on returns of wasted vaccine to manufacturers were analyzed from routine national biologics surveillance and from an ad-hoc survey. Excise tax credit requests for such returns between 1994 and 1999 were reviewed. Results: Rates of wastage among the five states ranged from about 1 to 5% in 1998, with an overall rate of 2.6% among 57 immunization programs in 1999. Categories of wastage used by the health departments varied widely, with overlapping classifications. The major causes appeared to be refrigeration (cold chain) lapses, followed by expiration. Overall rates of vaccine returns varied up to 8% by manufacturer, and from 1 to 50% by vaccine type, with higher return rates generally found for lesser-used vaccines. Conclusions: If these wastage estimates of 1-5% applied nationally, in 1999 there would have been approximately US$6-31 million worth of unused vaccine in the public sector alone. The two most common forms of wastage reveal the potential value of developing vaccines with improved heat stability and longer shelf lives. We propose six main classifications of vaccine wastage for use in routine monitoring and reporting. Published by Elsevier Science Ltd.

Keywords: Wastage; cold chain; Expiration
Listing solutions.

- Making a Cowin application that allows slot booking and cancellation making slot allotment process more efficient.
- Making an animated video to educate people about vaccine and questions related to it.
- Redesigning of vials.
- Gamifying the vaccination drive process so as to motivate people for taking vaccines.

Scaling up the solution.

After conducting a survey amongst our peers and family members we figured out to work with the first two solutions as they were the most preferred.

Developing a Cowin application was specifically targeted to Urban areas and making an animated video was to target the rural areas.

1.) **Cowin application**

The application provides features of slot booking and cancellation analogous to Ticket booking system in Indian Railways. The app gives a gentle reminder through an automated call to the user for confirmation
of whether the user is coming to vaccination center or not and if the answer is no then the slot is allotted to another person.

Flowchart.

App wireframe.
2.) **Making an animated video**

We did a survey with elder people and people living in rural areas where we asked them about their experience about vaccines if they have taken. We prepared a questionnaire depending upon their suggestions on what they will want to know if they were to be educated about vaccines. Then we consulted a doctor Ms. Vrinda Jha (MBBS, MD) who is currently working and doing her P.G. from DMCH (Darbhanga Medical College and Hospital) and asked answers to the questions in questionnaire and also, we did research and searched some answers from WHO site. After all this we made an animated video which has information about vaccine and questions related to it like benefits of a vaccine, side effects of it etc.
A glimpse from our video is:

**Final Survey**

We created a google form so as to conduct a survey amongst the common public to know which solution would be the best for them and here are the results.
Conclusion.
Reducing vaccine wastage in India requires a technical and psychological solution for which we have worked upon. People preferred to get educated as there is more lack of awareness amongst them, because no proper drive for spreading awareness has taken place in extreme to moderate rural areas. However, the technical solution can make vaccination process more efficient thus, minimizing the wastage in the urban areas and towns.

Acknowledgement.
We would like to acknowledge the whole team of SRISTI and whole team of professors who were involved in our grooming during this summer school. A special thanks to
Prof Anil Gupta sir who throughout the process monitored us and gave us valuable suggestions to improve our ideas.

**References**

Following are the links we referred for our project:-

- [Vaccines and immunization: What is vaccination?](https://www.who.int) (who.int)
- [Co-WIN Vaccinator App - Apps on Google Play](https://play.google.com)
- [CoWIN](https://covi.dz)
- [(PDF) Frequency and causes of vaccine wastage | Hugh Mainzer and Michael Washington](https://academia.edu) - Academia.edu
- [Presentation Title to Come](https://pda.org)
- [schott-brochure-schott-vials-english-us-20092017.pdf](https://schott.com)
- [COVID-19 Vaccine FAQs for Healthcare Professionals | CDC](https://www.cdc.gov)
- [COVID-19 vaccines - Harvard Health](https://health.harvard.edu)
- [Key Things to Know About COVID-19 Vaccines](https://www.cdc.gov)
- [Vaccine Storage and Handling Resources | CDC](https://www.cdc.gov)