

# Parental Reminder and Planner for Children Vaccination

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**Abstract**— Nowadays, vaccination for kids has been a necessity for them and it is one of the responsibilities of parents to give all the vaccines for their appropriately on the right date as well. In order to that, the objective of this project is to make an easier way of reminder for the parents to have an online vaccination planner website. Other than that, it also helps to keep record of the vaccinations which has been given earlier and it's easier to view the record anytime. Moreover this web-based has google cloud backup as an extra feature. The methodology that is used to develop this web-based system is by using Agile Unified Process (AUP) it consists of four phases which are inception, elaboration, construction and transition. As an outcome of the observation and survey, there are few difficulty takes place and the resolution can be done by developing this Parental Reminder and Planner for Children Vaccination. According to the observation, most of the users are keeping record of the vaccination given to their kids in a notebook or diary and they seems not to have any reminder for the upcoming vaccines. As a conclusion, by developing this Kids Vaccination Planner it will become a good initiative to help the parents to keep track of their kids vaccines and this web-based system also have some enhancement to be made for the future works.

**Keywords:** Agile Unified Process (AUP), Reminder, Google Cloud Backup, Vaccination Planner, Web-Based System.

## I. INTRODUCTION

Nowadays, vaccination for kids has been a necessity for them and it is one of the responsibilities of parents to completely give all the vaccines for their appropriately on the right date as well. Sometimes due to the busy schedules of the parents they tend to forget about their kids vaccinations. It would be easier if the parents are having a vaccination planner which can be carried along with them wherever they go [1]. Since internet is playing a big role in our life, it would be easier for the parents to have an online vaccination planner website. So far, there are no websites that are specially been made for vaccination planner but there are existing websites that have vaccination planner as one of their feature only [2].

Parental Reminder and Planner for Children Vaccination is being developed to ease the responsibilities of the parents. In addition, this web-based planner is being made specifically for kid's vaccinations only. This Kids Vaccination Planner has features such as vaccination calendar together with a

reminder sent via text message [3]. Other than that, this system also has the list of the Pediatricians who are available in the nearest hospital and together with the doctors contact information and specialization as well. Moreover, existing web-based system as database only for the data to be stored but this system has a unique feature which is Google Backup to prevent the data stored in database from being lost. As a conclusion this Kids Vaccination Planner would be essential for all the parents to use it and it will surely be very helpful for them.

Besides that, three problems were encountered and the first one is as we all know nowadays we are busy with our daily chores and parents with more than one kid tends to forget some important things such as the dates of their children's vaccination, as we can see there are no proper vaccination tracking planner applications or system in Malaysia which can be used to remind us on when the next vaccination is supposed to be done for their kid [4]. Secondly, the existing projects up to today do not have online backup so far which would be easier for the user to access, besides they only have data's stored in database only which can only be accessed by admin [5]. The third problem is that, most of the existing websites and planner applications doesn't provide the information of the pediatrics together with their information, so parents who has a busy schedule finds it difficult to fix an appointment with the doctor to put the vaccination for their kids on time [5].

The first objective of the project is to develop a Parental Reminder and Planner for Children Vaccination, which can ease the responsibilities of the parents and this planner can also be a gentle reminder to them as well. The second objective is to create project which has Google Cloud as a backup, since none of the existing project does not seem to offer this feature. The third objective is to provide the availability of the pediatrician who's working in that hospital and his contact information.

In addition, the scope of project is divided into two which are the user scope and the system scope. In order to that, the user scopes This program is written and developed to be used by Parents who have kids from the age 0 to 6 years old to keep a record of what are the vaccines that they have to give their child, and when it should be done. The program facilitates easy use where

the user can view the nearest hospital operational hours and even the availability of the pediatricians who works in that hospital. Other than that, the limitation of this project is that it only provides the information of the Pediatrics who are working in the hospitals which are situated in Shah Alam, Section 13 only.

## II. RELATED WORK

The research regarding the current situation shows that in this new era, parents are busy with their daily schedules and because of that they are having difficulties in remembering the vaccination date of their kids. Though, the parents have a vaccination chart in a book which will be given from the hospital, they still tend to forget to look at it and check for the upcoming vaccination for their kids [6].

Moreover, there are no websites which has been made specifically for Vaccination Planner but there are some websites which has Vaccination Planner as a part of their features. Having online planner websites will help the parents to get a solution for this problem, they can give the vaccination to their kids on time if they had reminder given to them earlier [7].

There were 4 types of web-based system which is being compared with such as Centre for Disease Control and Prevention, Catchup Vaccination Scheduler, Children Vaccination Schedule- NHS Choice and Vaccines.GOV. These 4 web-based system were compared with the features that all 4 web-based system have in common. Most of it does not have the feature that is being implemented in Kids Vaccination Planner.

- **Centre for Disease Control and Prevention**

According to the 2018 Childhood and Adolescent Immunization Schedule suggested by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American College of Obstetricians and Gynecologists (ACOG), this immunization timetable was made. This timetable fundamentally produces supported dates for vaccinations following on the birth date of your kid. Your kid's vaccination history, therapeutic history, wellbeing status or travel outside the United States can impact these dates and the antibodies your kid needs. Meanwhile **Figure 2** is the logo of this web-based system.



Figure 1: Centre for Disease Control and Prevention

- **Catch-up Immunization Scheduler**

This tool is created with the reference of the 2017 Childhood and Adolescent Immunization Schedule suggested by the ACIP, AAP, AAFP,

and ACOG. This tool mainly recommends dates for immunizations based on the child's birth date and vaccination history. For children with diseases or for children receiving those kind of treatments, the schedule generated by this tool might need to be changed. Your personal physician or other Health Care Professional that you consult for your child may recommend additional vaccines based on state or local immunization requirements, your child's medical condition(s), or in the setting of a disease outbreak. **Figure 2** is the logo of this web-based system.



Figure 2: Catch-up Immunization Scheduler

- **Children Vaccination Schedule-NHS choices**

NHS Choices is intended to meet the needs of people with healthcare requirements, either directly or indirectly. This intention sets out what info, advice, data and services are presented by NHS Choices to the users. This intention has been designated to ensure that users can access appropriate information about the health and care services, and get interactive with these kind of services easily. Based on **figure 3**, it shows the logo of this web-based system.



Figure 3: Children Vaccination Schedule-NHS choices

- **Vaccines.GOV**

Vaccines.gov is the government entryway to data on antibodies and inoculation for newborn children, youngsters, teenagers, grown-ups, and senior residents. Vaccines.gov gives data from government organizations to the overall population and their networks about antibodies over the existence time.

This web-based system provides health information as a general knowledge for us. This system is not a permanent replacement for professional medical advice, diagnosis, or treatment. Parents need to seek advice from professional bodies without hesitation ask them any questions which you are unsure about medical-condition of your child. The **figure 4** shows the logo of this vaccines.gov web-based system.



Figure 4: Vaccines.gov

### III. PROPOSED METHOD

The Parental Reminder and Planner for Children Vaccination is developed by using agile methodology, Agile Unified Process (AUP) is used for the development of this system. This methodology is easy to be understood as it has a simple descriptions and straight to the point which is easy to be applied especially in developing a system or software. Firstly, in the inception phase research is done through the internet, journals and also try-out of few systems similar to the system that will be built to get the clear vision of how the system should work and also to the experiences from different types of system which offer different features. Secondly, in the elaboration phase the data analyzing will be conducted in this phase which the result of all the data gathering methods will be analyzed and also the coding, mechanism and approach that will be used to create the system will be determined. Meanwhile, in the construction phase the remaining requirements of the projects were identified and the sketched design of the system done by using Microsoft Visual Studio 2010 to develop the project. In the transition phase, this systems testing is focused and the validation of the complete system is done in this phase. Based on **figure 5**, it shows that the process to develop the Parental Reminder and Planner for Children Vaccination.

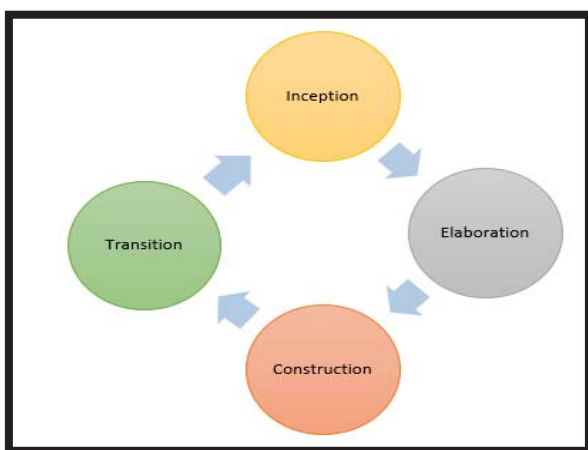


Figure 5: Developing process

The type of research method which is used are survey and observation. The survey is done by using survey papers and it was distributed to the Faculty of health and life Sciences students. The total number of questions are 10 questions, the question were about the features and the performance which are in the Kids Vaccination Planner together with the usability of the

web-based system, lastly whether it's convenient to use or not was questioned as well to the users.

Meanwhile, the observation is been done near the area of Section 7, Shah Alam. The reason for selecting this place is because it is the nearest place that can be found to do observation about the vaccines that are needed by kids. There is table for our reference regarding the vaccines that the kids need according to their age [8] [9]. Based on **figure 6**, it will show the sample of the vaccination chart.

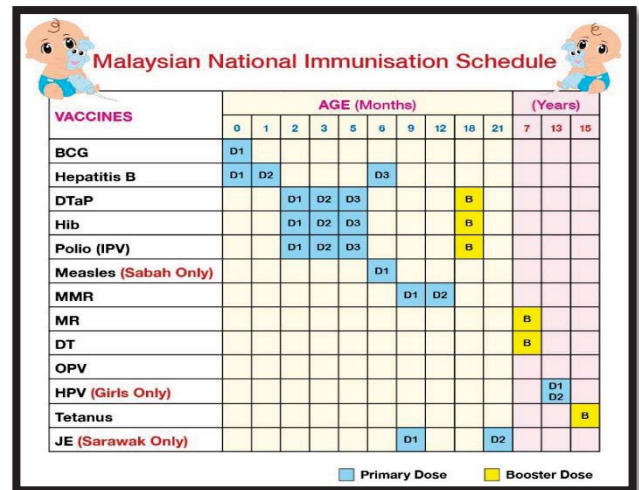


Figure 6: Malaysian National Immunization Schedule

The software that is used to develop the Kids Vaccination Planner is by using Visual Studio 2010, Google Cloud and www.SMS123.Net. The purpose of using Visual Studio to create this web-based system in Asp.net programming language which is available in Visual Studio. Besides that, the Google Cloud is used to store the database of this web-based system and to implements the database of this web-based system. Other than that, the SMS gateway which is used to generate SMS to the user of this web-based system is www.SMS123.Net.

The design for the system was done in several UML diagrams which are class diagram, communication diagram, sequence diagram, activity diagram, use case design and state diagram. The sequence diagram and communication diagram must be similar to make sure that the system can run alike, where it must follow the class diagram flow. In order to that, the system interface is made to showcase the functions and the feature of what each interface has in this web-based system. [12]

### IV. RESULTS

To check the compatibility of this Parental Reminder and Planner for Children Vaccination, several types of testing were done to mainly test the usability of this web-based system. The expected outcome of this system was achieved while the objectives of this system were fulfilled as well. In addition, to that some of the results of the beta testing which was conducted is shown below to have a clearer view of the experiences of the early users are forwarded back to the developers who make final changes

before launching the software officially. The system was responded by 20 peoples and there were few different opinions from the respondents. In order to that, **Figure 7** shows one of the beta testing question's results. Based on the results shown in **Figure 7** we can clearly see that majority of the respondents have not used a system with such functionalities before.

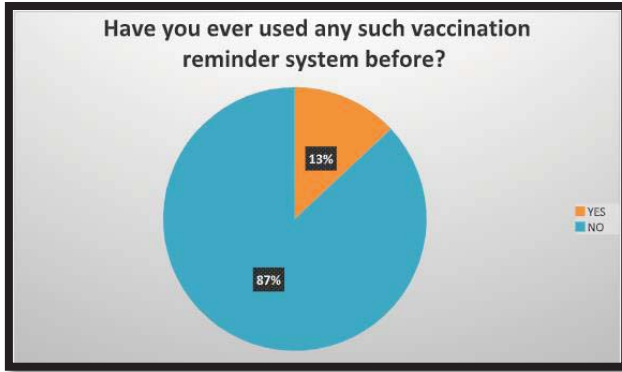


Figure 7: Analysis on ever used any such vaccination reminder system before

Based on the results shown in **Figure 8** we can clearly see that almost all of the respondents had agreed on it was really easy and clear for them to navigate through different pages of this system.

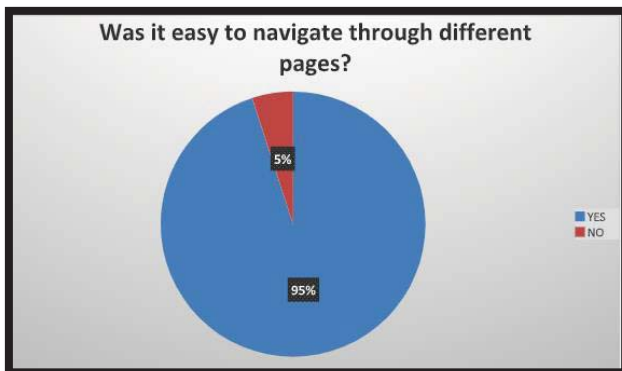


Figure 8: Analysis on the navigation through pages of the system

**Figure 9** shows the feedback from the user who used this system, all of them claims to receive the SMS notification from this system on time and accurately.

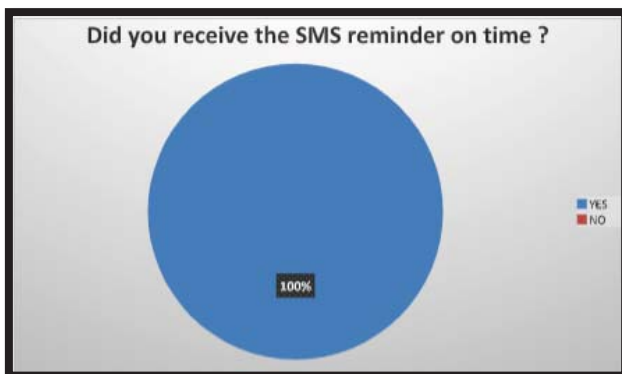


Figure 9: Analysis on was the SMS reminder sent on time

Other than that, this system is compatible to send the SMS reminder on time to the user and plans the upcoming

vaccines according to the order of dates from the mandatory vaccines list. Besides, all of the features in Parental Reminder and Planner for children Vaccination system is tested one by one. In addition, this test plan is done to achieve the requirement of developing the Parental Reminder and Planner for children Vaccination system. Based on **figure 10**, it shows the user registration page, the information collected from this page will be stored to send reminder to the user through SMS from the Parental Reminder and Planner for Children Vaccination System.

Figure 10: User Registration Page

Based on **Figure 11** it shows the login page of the user, the Email ID and the password must be entered during each and every time the user logs into the Parental Reminder and Planner for Children Vaccination system.

Figure 11: User Login Page

**Figure 12** shows the child registration page, once the user successfully login to the system they can register their child by entering all these required information such as name, father name, date of birth, gender, hospital name, address, parents contact number and email ID.



Figure 12: Child Registration page

Based on **figure 13**, it shows the add child page, each of the user can add up to 6 child in this Parental Reminder and Planner for children Vaccination system.

CHILDREN ID	C1
NAME	Chansell
FATHER NAME	Paipandi
DATE OF BIRTH	4-Jan-2016
GENDER	Female
HOSPITAL	Hospital Shah Alam
ADDRESS	Malaysia
CITY	Malaysia
NUMBER	010 2345679
MAIL ID	radhapaipandi@gmail.com
DELIVERY TYPE	Operation
BIRTH CERTIFICATE NO	BC1098
	Update Cancel

Figure 13: Add Child Page

**Figure 14** shows the feature of the Parental Reminder and Planner for children Vaccination system where the vaccinations are planned according to the age of the child. The planned vaccinations will be stored in a graph.

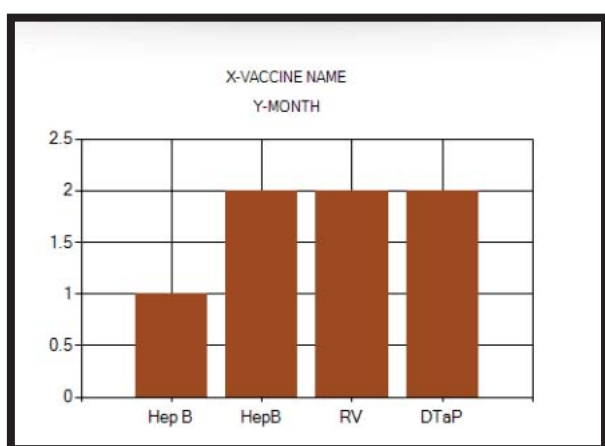


Figure 14: Vaccination Chart

The next feature is shown in **figure 15**, this is the SMS reminder which will be sent to the user to remind them about the upcoming vaccines for the user's children. The Reminder will be sent 3 days before the vaccination date.

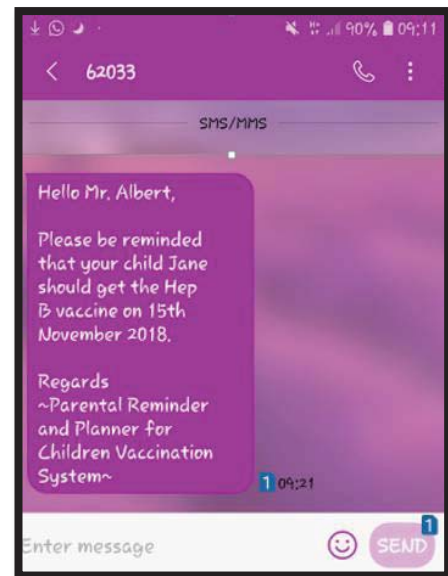


Figure 15: Vaccination Reminder SMS

## V. CONCLUSION

As a conclusion, this Parental Reminder and Planner for Children Vaccination project is mainly done to provide a proper reminder for the user to remember their kid's vaccines and give the appropriate vaccines to their kids on time. In addition, this system also helps to keep an updated record of the vaccines which are given to the kids of the users in a schedule form. Furthermore, the benefits of creating Parental Reminder and Planner for Children Vaccination is to help the user to be reminded on the upcoming vaccination by sending an alert via text message to them, so that they will not tend to forget the vaccination that they should give to their child on time. In addition, this project also provides the contact information and the specialization of the Pediatrics who are working in the nearest hospital, so this would be useful for the user so that they can place their appointments with the doctors without going to the hospital. Besides that, this project has an additional backup in Google Cloud which helps to prevent loss of data from the Database. Lastly, by having this Parental Reminder and Planner for Children Vaccination it will surely be a benefit for the user and it will also be very helpful for the parents who are leading a busy lifestyle.

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