A WEB-BASED DENGUE MONITORING AND WARNING SYSTEM

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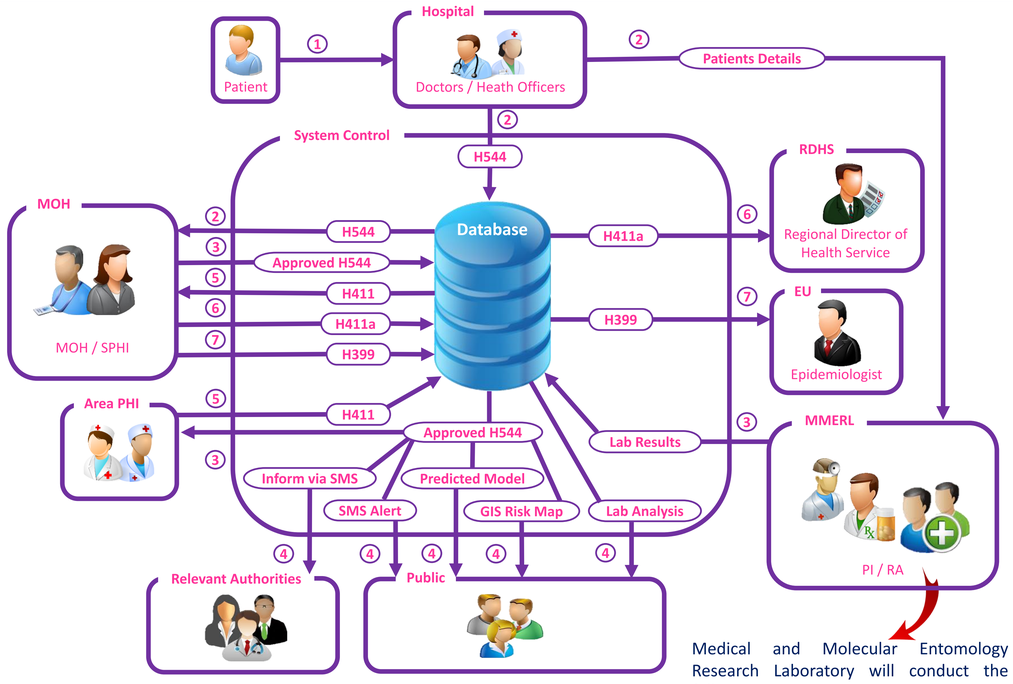
Introduction

Dengue is the most prevalent mosquito-borne viral disease that spreads rapidly among people [1]. In such case, disease prevention and control measures should be improved via early detection and monitoring of outbreaks. Early recognition of an outbreak supports the health officers to plan pre-emptive measures. However, there is no completely computerised dengue surveillance system in Sri Lanka to notify and prevent these kind of communicable diseases [2]. Present manual dengue outbreak prediction is incomplete and time consuming [3]. This study proposes a system that automates the entire manual surveillance system which deals with various level of health related officers by providing them facilities such as monitoring dengue risk areas and reporting dengue outbreaks to the public.

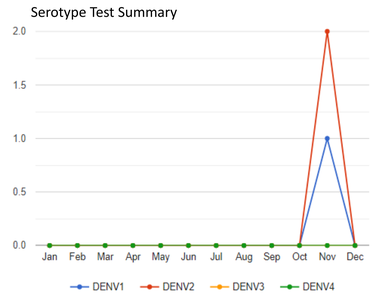
Contributions

- In order to make an efficient reporting and early warning system, a gap analysis was conducted with the help of northern region health officers and doctors of Jaffna Teaching Hospital to improve the solution.
- The developed dengue surveillance system mainly targets to alert the public.
- In the system, a dynamic GIS dengue risk map is integrated and a heatmap can be visualised to alert the public.
- Medical and Molecular Entomology Research Laboratory do the additional dengue confirmative and serotype test and provide the details through the system.

Methodology

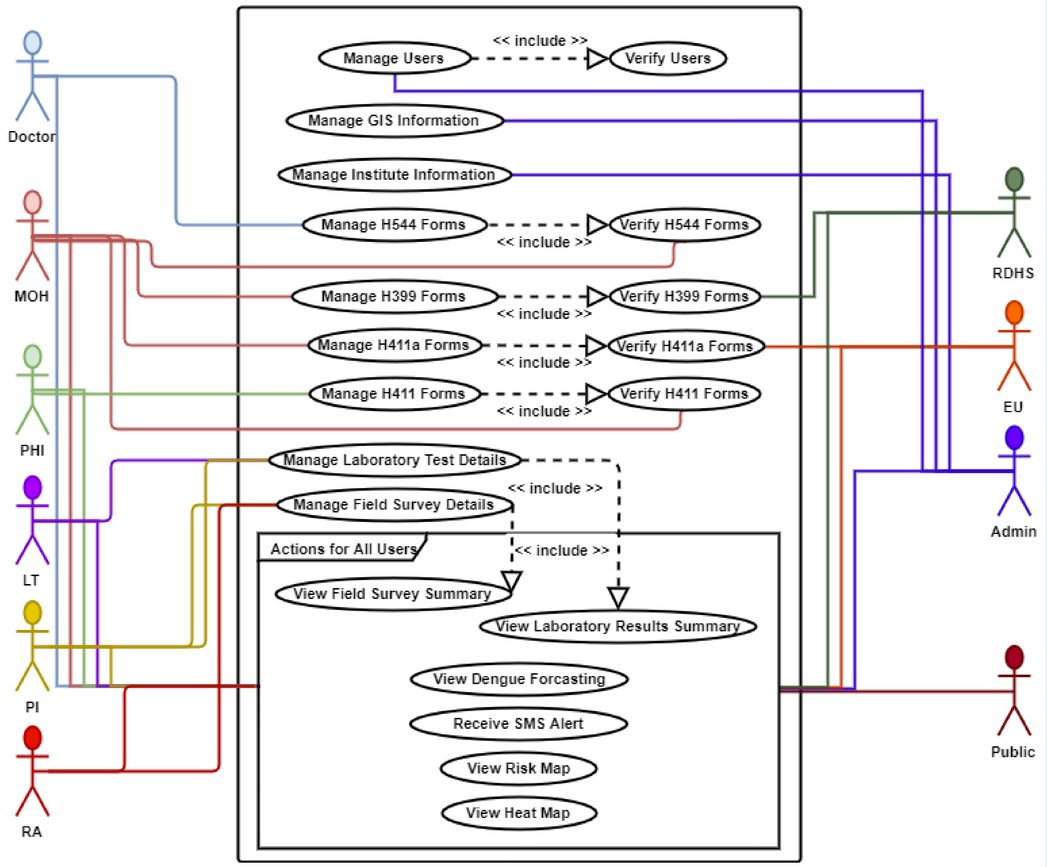


H399 : Weekly Return of Communicable Diseases
→ MOH will enter the data
H411 : Communicable Disease Report - Part I
→ PHI will enter the data
H411a: Communicable Disease Report - Part II
→ MOH will enter the data
H544 : Notification of Communicable Disease
→ Doctor will enter the data



Medical and Molecular Entomology Research Laboratory will conduct the following tests

1. Dengue confirmative test:
   - NS-1
   - IgM
   - IgG
2. Dengue virus serotype test:
   - DENV1
   - DENV2
   - DENV3
   - DENV4



MOH : Medical Officers of Health
SPHI : Supervising Public Health Inspector
PHI : Public Health Inspector
LT : Laboratory Technician
RA : Research Assistant
EU : Epidemiology Unit
MMERL: Medical and Molecular Entomology Research Laboratory
PI : Principal Investigator
RDHS : Regional Directorate of Health Services

Strengths of the System

- Active surveillance
- Inclusion of dengue risk notifications from private hospitals
- Integrating laboratory test results in to the notification process
- Centralised storage of dengue details that ensures data privacy
- Reduced time of notification process enables fast prevention
- Bridging the gap between medical officers and health officers.
- Summarising the data more user friendly
- Dengue risk predictions will be effective

Innovativeness

The proposed system is developed to be complete, timeliness and sensitivity that influence the information flow in the notification process when comparing to the existing manual notifiable disease surveillance system at different levels. The systems speeds-up the detection and prevention of dengue cases via a user friendly web-based intelligent system. In addition, public will be alerted through dengue risk map. Furthermore, the system is expected to predict future dengue outbreak through a mathematical model.

Future Work

As a near future work, the risk factors for dengue is being analysed and will be modelled to produce more valid prediction of outbreaks.

References

[1] Pathirana, S., Kawabata, M., and Goonetilake, R., "Study of Potential Risk of Dengue Disease Out break in Sri Lanka using GIS and Statistical Modelling", Journal of Rural and Tropical Public Health, vol. 8, pp. 8, 2009.
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[3] Kalpana, C., Mahesan, S., and Bath, P. A, "Notifiable Disease Surveillance in Sri Lanka and the United Kingdom: A comparative study", Sri Lanka Journal of Bio-Medical Informatics, vol. 4, 2013.