Introduction
1. INTRODUCTION

In developing countries, data on the burden of infectious diseases is marked by lack of completeness. One of the factors contributing to lack of completeness of disease data is the presence of private sector health services, from which data is largely unavailable with the public sector. In India, the utilization of private sector practitioners and facilities is nearly two-fold higher than that of public sector services. Reporting of infectious diseases is not mandatory and the schedules of Notifiable diseases vary between different states of the country. This thesis aimed at investigating the process by which an efficient public-private disease reporting network could be established, and the outcome of such a network on the data generated.

1.1. Mixed health systems and engagement with private sector

Several low and middle-income countries like India are characterized by mixed health systems. Such systems are marked by inadequately funded public health services due to which out-of-pocket payments on private sector health services dominate as a means of obtaining health care. Private sector services are heterogeneous with a diversity of service providers, practicing different systems of medicine and of varying quality. In India, private sector services are accessed by 70% and 63% of the urban and rural population respectively. In terms of human resources for health, the doctor to population ratio is 3.53 doctors per 10,000 persons in the private sector and 0.74 doctors per 10,000 persons in the public sector. As such, the potential capability of such
mixed health systems to work cohesively for national health goals remains under-utilized. In most instances, private sector services develop without stewardship and regulation by the public sector. In the absence of effective nation-wide legislation for compulsory registration, data on private sector health providers and facilities are unavailable with the public health system in India. Such a health system therefore presents unique challenges for the achievement of public health goals. Research on engagement with private sector in India has focused largely on partnerships for the delivery of health care services. For example, public private mix initiatives for increased diagnosis and access to DOTS therapy for tuberculosis have been widely studied. In addition, non-government or charitable organizations have for long been associated with national health programmes for providing reproductive and child health services, particularly family planning services, running contracted-out primary health centres and in programmes for the control of infectious diseases. Partnerships with private for-profit health facilities and providers include conditional cash transfers for increased access to institutional deliveries and public insurance mechanisms that provide access to services in the private sector.

1.2. Infectious disease surveillance in mixed health systems and private sector participation

As contrasted to the focus on partnerships for delivery of health services, private sector participation for disease surveillance has received little priority. Developing countries have historically carried out surveillance for infectious diseases through vertical disease control programmes. In India, vertical programmes collate data on tuberculosis, vector borne diseases, leprosy, HIV infection and polio. The data however, only represents the population accessing public health facilities for diagnosis and treatment.
national programme for the control and elimination of polio was the only disease control programme to have successfully integrated private sector practitioners in a surveillance network.(37) The Integrated Disease Surveillance and Response (IDSR) strategy was initiated to address the limitations of vertical disease surveillance models.(38) A review on the implementation of IDSR in African and South East Asian countries reports the lack of inclusion of private sector health facilities in the reporting network as a primary structural flaw of the system in several countries.(15) This was stated to affect the completeness of surveillance data recorded. In India, IDSR is implemented as the Integrated Disease Surveillance Project (IDSP) and requires reporting from sentinel private health facilities as part of its guidelines.(16) There are limited published evaluations of the programme and these have shown no successful integration of the private sector in disease reporting.(17,18)

1.3. **Private sector representation in surveillance for malaria and dengue**

Surveillance data for malaria and dengue is reported primarily through the National Vector Borne Disease Control Programme (NVBDCP). Some level of integration with IDSP has been attempted, however the data reported remains an under-estimate of disease burden.(39) Studies report that data on malaria from the NVBDCP at best represent a trend in disease incidence rather than give true estimates of malaria burden.(19,20) Dhingra and colleagues while quantifying malaria deaths through the method of verbal autopsy obtained between 125,000 to 277,000 deaths attributable to malaria. while World Health Organization estimates for the same period were in the order of 15,000 deaths, about one eighth of the lower limit of the range.(40) Causes for the under-estimates have been stated to be the inadequacies in disease surveillance and high levels of under reporting of cases.(13,19,20) Under-reporting of dengue in official
estimates for India has been quantified in recent studies that sought to compare study
data to official data sources.(21,22) Estimation of the actual disease burden through an
empirical case study and expert opinion provided a national expansion factor of 282 (CI:
176-717) for every case reported by the national control programme.(22) Among factors
affecting disease estimates, the lack of data from private sector has been cited for India
particularly, as well as other developing countries.(23–27)

1.4. Origin of the study
This study originated during the pandemic influenza (H1N1) 2009 outbreak in Pune city,
India. The initial management of the outbreak highlighted the need for involving private
practitioners in a disease surveillance system. Community level transmission of the virus
was identified only when the first death occurred and was reported at a private sector
hospital through media reports.(41) This instance highlighted the need for engagement of
private sector practitioners and facilities in disease surveillance.

1.5. Research gap and aim
There is only one model (NADHI model) for involving private practitioners in disease
surveillance in India.(29) This public-private disease surveillance partnership was set up
and tested in a single district of Tamil Nadu and later in Kerala.(28,29) The studies did
not however provide a comparison of the data generated through the intervention with
existing surveillance programmes. There is therefore limited data on methods for private
sector engagement for infectious disease surveillance and their effects on case detection.
This doctoral study therefore aimed to set up and identify the facilitating factors and the
impediments to private sector engagement and reporting to a disease surveillance system.
It investigates whether increasing private sector reporting in a disease detection network

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affects case detection. In order to test the utility of the disease detection network, malaria and dengue were chosen due to their endemicity in India along with their outbreak potential. These diseases were appropriate for a time bound study on surveillance. Using a designated field area, this study outlines the steps in setting up a disease detection network and the lessons learnt with respect to private sector engagement and participation in surveillance for malaria and dengue while comparing the study data with the ongoing surveillance data of the NVBDCP.

1.6. Objectives

i. To determine the composition and characteristics of the available health resources in a defined study area of Pune city.

ii. To determine the characteristics of participation and reporting in a surveillance network of private and public sector resources.

iii. To determine the effect of private sector engagement on surveillance data generated.