

**A CROSS-SECTIONAL STUDY TO ESTIMATE THE OVERALL EXPENDITURE
ASSOCIATED TO THE HOSPITAL-BASED TREATMENT OF PATIENTS WITH
LEPTOSPIROSIS DURING THE OUBREAK FOLLOWING TROPICAL STORM
ONDOY FOR THE HOSPITALS OF THE DEPARTMENT OF HEALTH THAT
ATTENDED PATIENTS FROM MARIKINA CITY, THE PHILIPPINES FROM
SEPTEMBER 26TH TO OCTOBER 31ST 2009.**

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Background. Due to its geographic location along the so-called Pacific Ring of Fire and the Typhoon Belt, the Philippines face diverse natural disasters such as typhoons and floods among others. Since 2006, it has been consistently among those countries most often hit by natural disasters, and in 2009, it topped the list, ranking third in terms of mortality and second in terms of number of victims. Tropical Storm Ondoy (International Name Ketsana) caused the worst flood recorded for the Manila region in more than 40 years. Landfall occurred in the early morning of September 26th, 2009, and it crossed the country within 12 hours leaving behind an unusual high volume of rain and widespread flooding. The rainfall recorded was about 450 mm⁷, which can be related statistically to an event that happens once every 180 years.

Marikina City is one of the 14 cities and 3 municipalities that comprise the Metro Manila Area. It was estimated that about 70% of its land area was exposed to the flood, affecting 80% of its population. 11 out of 16 Barangay Health Centers (BHC) were affected to some extent. The situation got even more complex when one of the world's largest leptospirosis outbreaks hit the country, with an important 3,382 patients diagnosed and 249 killed, being the Metro Manila region one of the most affected areas, accounting for 73% of these patients (DS 2009). The hospitals of the DOH had to respond to this situation despite they were also affected. This represented an unexpected burden to the DOH. Not much has been written about the costs associated to the inpatient treatment of patients with leptospirosis. Most efforts have been focused in isolated aspects of the overall patient care as antibiotic efficacy with minor remarks about costs, the post-exposure prophylactic treatment, or diagnostic procedures. Tropical storm Ondoy somehow represents in this sense, an opportunity to learn, to be prepared for similar events that could happen in the future.

Objectives and Methods. To create a characterization of the Leptospirosis epidemic that followed tropical storm Ondoy, and to estimate the direct costs associated to the inpatient hospital care for these patients for the Hospitals of the DOH, an observational cross-sectional study was conducted in QMMC, a 350 bed capacity hospital of the DOH located in Quezon City. It included the population that lived Marikina City between September 26th and October 31st 2009 and that was reported to the MCHO as patients with leptospirosis, whose cases were encoded using the International Classification of Diseases 10th Edition (ICD-10), and that received inpatient hospital care in QMMC. Ethical clearance was obtained and from 347 patients, 40 accounted for the total amount of eligible patients from Marikina in QMMC and

were included. Diverse demographic and clinical information was extracted from their medical records using a data extraction form. The information was converted into a data base using EpiData Version 3.1. and afterwards exported to MS Excel for analysis.

Results. It was found that the outbreak affected mostly male patients from 19 - 64 years old that lived in the barangays next to the Marikina-Pasig River, being Malanday (0.22%), Tumana (0.15%), Tañong and Nangka (0.11% each) the ones with higher incidence.

Fever was identified as the most common chief complaint and was also seen as one of the mainly reported symptoms, followed by vomits (80%), oliguria (60%), and calf pain (57.5%). The estimated case fatality rate was 5%. The average LOS varied among the groups ranging from 5 to 6.78 days, with important differences among them.

In terms of costs, it was estimated that the overall expenditure associated to the hospital-based treatment of patients with leptospirosis from Marikina city that developed the disease as a direct consequence of tropical storm Ondoy was approximately PHP 371,734.50. Patients were divided in 3 groups according to their clinical condition. An average PHP 9293.36 per patient was estimated, with disregard of their clinical presentation. If accounting for it, the group that had severe leptospirosis with a concomitant secondary acute renal failure accounted for approximately 75% of the total expenditure, identifying the ALOS, the type of medical guard needed, and laboratory tests as the main drivers of these costs. When extrapolating the results to 2008, when no outbreak was seen, the total expenditure was tripled, even if it was compared with the complete NCR and for a complete year. These findings highlight the need of a fast, effective and efficient contingency mechanism to be prepared to face future outbreaks as well as the need of important structural changes and the involvement of other institutions to address the problem. The situation is not likely to change by itself and more outbreaks should be expected within the upcoming years.