

# Description of Patients Medications Needs and the Community Pharmacist's Role in Puerto Rico Following a Natural Disaster

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## Abstract

**Background:** In September 2017, Puerto Rico was hit by Hurricane Maria, a natural disaster that caused devastation. Initial reports of disruption to the health care system were later followed by increases in the death toll in Puerto Rico. **Objective:** This project assessed patient medications needs, level of satisfaction with community pharmacy services, and perceptions about the role of the pharmacist during the emergency following Hurricane Maria in Puerto Rico. **Methodology:** The investigation utilized a descriptive, cross-sectional design. Data were collected at 3 community pharmacies located in San Juan, Puerto Rico: Walgreens (Specialty Pharmacy and Store 891) and Farmacia Caridad #9. Patients receiving care at these locations were invited to complete a 10-item questionnaire. These were provided with an information sheet describing details of the study prior to participation. **Results:** Sixty-five patients participated in the study, with an average age of 59 years. The majority (77%) of the respondents reported problems related to their medications and nearly half (47.7%) reported having trouble either contacting or getting to their pharmacy following the hurricane. Regarding the role of pharmacists following a natural disaster, 94% of respondents reported the pharmacist was available to help them and 95% reported the information provided by the pharmacist was “trustworthy/very trustworthy.” **Conclusion:** Although the challenges reported in Puerto Rico with regard to medications following Hurricane Maria were significant, patients reported a high level of confidence in the ability of community pharmacists to help them.

## Keywords

emergency, natural disaster, Hurricane Maria, hurricane, community pharmacist, pharmacist role, medication needs, pharmacy practice, primary care, Puerto Rico

## Background

In September of 2017, Puerto Rico was hit by Hurricanes Irma and Maria. Loss of electricity and water supply, significant floods, and the collapse of communications presented a major challenge to Puerto Rican residents.<sup>1</sup> During and immediately following Hurricane Maria, the only source of information for many was one operational radio station.<sup>1,2</sup> In the aftermath of the storms, poor coordination of relief efforts combined with the magnitude of the damages contributed to a slow recovery. Although timely estimation of death tolls is key for immediate response and targeted recovery, the official death count in Puerto Rico stood at 64 for nearly a year after Hurricane Maria. Not until August of 2018 did the government raise

the death toll to 2975, with other estimates ranging from 1139 to 4645.<sup>3-7</sup>

During the storm, most of the island's hospitals were without electricity or fuel for generators. Medical emergencies following the storm put increased demand on these hospitals. Accumulation of debris and stagnant water lead

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to the development of infectious outbreaks including leptospirosis, dengue, zika, and chikungunya, creating a public health crisis.<sup>8</sup> Furthermore, impaired access to care led to exacerbations of chronic conditions.<sup>9,10</sup>

As one of the most accessible health care providers, community pharmacists play a vital role in the immediate response following a natural disaster because they can provide care in a variety of settings, including ambulatory care clinics, community pharmacies, and hospitals.<sup>11</sup> The pharmacist's roles in these settings following a disaster may include both clinical services, such as providing direct patient care, and logistical services, such as managing the distribution of medications. Although traditionally known for their role as dispensers, the roles of pharmacists have expanded as the health care system moves toward a more team-based approach. During an emergency, resources may be limited and barriers to technology systems may exist. Therefore, the availability of pharmacists, specifically in the community setting, makes them essential to natural disaster response.<sup>12</sup> Pharmacists can help during an emergency managing limitations in access to medication, overseeing storage areas for medications, and interviewing, triaging, and assessing patient needs for treatment.<sup>13-15</sup> As the role of pharmacists expands throughout health care, utilizing their skills during a disaster could increase access to care.

Over the past several decades, pharmacists have been involved in many disaster relief efforts in the United States and worldwide, including Hurricane Katrina (2005), Hurricane Sandy (2012), and Hurricane Matthew (2016).<sup>11,13-15</sup> Following the impact of Hurricane Maria, poor communication within the health care system created obstacles in Puerto Rico while drug needs and community pharmacy services demand increased.<sup>16</sup> Using their judgement, pharmacists had to decide whether to dispense medications to patients without a prescription, preventing the interruption of chronic therapies and promoting continuity of care.<sup>10</sup> Further complications included the loss of vaccines and other refrigerated medications due to loss of electricity and extended shortages of some medications due to disruptions in supply chains throughout the commonwealth. This study was designed to assess patient medications needs, level of satisfaction with community pharmacy services, and perceptions about the role of the pharmacist during the state of emergency following Hurricane Maria. To our knowledge, this is the first study in Puerto Rico about patient medications needs following a natural disaster.

## Methods

The investigation followed a descriptive, cross-sectional study at 3 community pharmacies located in San Juan, Puerto Rico: Walgreens (Specialty Pharmacy Store 15191 and Store 891) and Farmacia Caridad #9. Patients receiving

pharmacy services from these locations were invited to complete a 10-item questionnaire.

The survey utilized closed-ended questions with Likert scales and multiple-answer questions; it was administered in Spanish, the primary language of residents in Puerto Rico. The questionnaire was constructed specifically for the purpose of this research and due to the time-sensitive nature of the project following the natural disaster, a pilot group was not utilized. The research instrument underwent a content validation process under consultation with experts in the area of community pharmacy practice, education, and public health. The final instrument following this process was composed of 3 domains: patient medications needs (items 1-4), patient perceptions about the pharmacist's role in an emergency (items 5-7), and level of satisfaction with pharmacy services following Hurricane Maria (items 8-10). It also included demographic measurements of age and gender as well as an open-response space for comments on improving pharmacy services following a natural disaster.

Participants were provided with an information sheet describing details of the study prior to participation. The research protocol was approved by the Institutional Review Board of the University of Puerto Rico, Medical Sciences Campus (Protocols A8270118 and B1640118).

Patients aged 21 years of age or older that had received any pharmacy services from the research sites were eligible to participate in the study. Subjects younger than this were excluded from the study as the age of majority in Puerto Rico is 21 years. Patients invited to participate from Farmacia Caridad had the additional inclusion requirement of receiving delivery services from the pharmacy at an assisted-living facility. The patients from these facilities manage their own medication therapy but receive them via delivery from the pharmacy. Participation was voluntary and patients were informed that their decision on whether to participate would not affect the services they receive from the pharmacy. The survey was administered in both Walgreens and Farmacia Caridad as a face-to-face interview or by phone, according to patient preference.

This study utilized a convenience sampling method for participant recruitment. The investigators made the initial contact with Walgreens patients when they picked up medications, requested a refill, or received any other pharmacy services. Initial contact was also made by phone when a patient called requesting a refill or when the patient was contacted by the pharmacist to perform clinical interventions. The recruitment process for Farmacia Caridad began identifying the residents of the assisted-living facilities in the dispensing electronic platform in the pharmacy. Again, investigators contacted potential participants via phone or scheduled a face-to-face interview. The survey was completed right after the initial contact with the patient or at a later scheduled appointment based on participant preference. No patient identifiers were included in

**Table 1.** Domain I: Patient Medication Needs.

Choices	Answers	%
Which of the following options best describes your problems with medications during the disaster of Hurricane Maria? (Select all that apply)		
Access to medications from the pharmacy	23	35.4
Damaged or lost medications	4	6.2
Remembering the medications I use	4	6.2
Problems with health insurance	3	4.6
Need of a new medication	7	10.8
A place to store refrigerated medications	19	29.2
Medication refills	21	32.3
Other (could not obtain a new prescription, home delivery of medications, delay of home delivery of medications)	3	4.6
None of the above (I did not have any medication needs)	14	21.5
How long were you without medications due to the disaster of Hurricane Maria?		
1-7 days	16	24.6
8-14 days	9	13.8
15-21 days	4	6.2
More than 21 days	2	3.1
None of the above (I did not have any medication needs)	34	52.3
What were the reasons that caused you to run out of medication? (Select all that apply)		
Problems communicating with the pharmacy	20	30.8
Transportation problems	11	16.9
Problems with the dispensing of medications in the pharmacy	2	3.1
Problems with home delivery of medications	11	16.9
Pharmacy was closed	4	6.2
Lack of money to pay for medications	3	4.6
Other: (Medication was not available, no electricity at home to keep refrigerated medications, did not have a prescription for medication)	4	6.2
None of the above (I did not run out of any of my medications)	33	50.8
Did you develop a new illness or complication of an existing medical condition during the disaster of Hurricane Maria where it was necessary to use a medication?		
Yes, I sought treatment for a new illness diagnosed by my physician	7	10.8
Yes, I sought treatment for a complication related to one of my existing conditions (ie, diabetes, high blood pressure, etc)	11	16.9
I did not develop a new illness or complication related to one of my existing conditions	47	72.3

the questionnaire or at any time during the study. The research was conducted over a 6-week period. In total, 65 patients were invited to participate from April 2018 through June 2018.

## Results

Sixty-five (65) patients agreed to participate in the study (55% from Walgreens; 45% from Farmacia Caridad). Most of the respondents were women (72%) and the average age was 59 years. As seen in Table 1, the top medication needs among the respondents were “Access to medications from the pharmacy” with 23 respondents (35.4%). Of the 65 respondents, 47.7% (31) of patients were without medications for at least 1 day following Hurricane Maria. Of these, over half (16) went between 1 and 7 days without medications. The most commonly reported reason for being

without a medication was having problems contacting the pharmacy. Overall, the majority (78.5%) of the respondents reported problems related to their medications and nearly half (47.7%) reported having trouble either contacting or getting to their pharmacy following the hurricane.

The top 3 services given by the pharmacists during the emergency according to the respondents were “Medication supply” with 54 respondents (83%), “Medication counseling” with 16 respondents (24.6%), and “Counseling regarding storing medications” with 15 respondents (23%). Table 2 presents patient perceptions about the pharmacist’s role during Hurricane Maria.

Patient reported perceptions about the pharmacist’s role during an emergency (Table 2) included the following: Supplying medications with 60 respondents, (92.3%); providing counseling on medications with 48 respondents, (73.8%); providing patients with a record of their

**Table 2.** Domain 2: Patient Perceptions About Pharmacist's Role in an Emergency.

Choices	Answers	%
To be able to resolve your medication needs during the disaster of Hurricane Maria, you sought the services of: (Select all that apply)		
Pharmacist	48	73.8
Physician	15	23.1
Nurse	2	3.1
Social worker	2	3.1
Other	6	9.2
Which of the following services do you believe could be provided by a pharmacist during a disaster such as Hurricane Maria? (Select all that apply)		
Providing medications	60	92.3
Replacement of damaged or lost medications	30	46.2
List or information about the medications I use	41	63.1
Resolve situations related to the coverage of medications by insurance	34	52.3
Education about medications	48	7.3
Information about the proper storage and management of medications	39	60
Education about health conditions	31	47.7
Consultations about over-the-counter (OTC) medications	41	63.1
Immunization	25	38.5
Blood pressure screening	28	43.1
Other (smoking cessation, early refill, etc)	1	1.5
None of the above	1	1.5
During the disaster of Hurricane Maria, which of the following services did you receive from a pharmacist? (Select all that apply)		
Providing medications	54	83.1
Replacement of damaged or lost medications	7	10.8
List or information about the medications I use	6	9.2
Resolve situations related to the coverage of medications by insurance	8	12.3
Education about medications	16	24.6
Information about the proper storage and management of medications	15	23.1
Education about health conditions	8	12.3
Consultations about over-the-counter (OTC) medications	11	16.9
Immunization	2	3.1
Blood pressure screening	3	4.6
Other (early refill)	2	3.1
None of the above (I did not have any medication needs)	6	9.2

prescription medications with 41 respondents (63%); and, providing counseling on self-care with over-the-counter products with 41 respondents (63%).

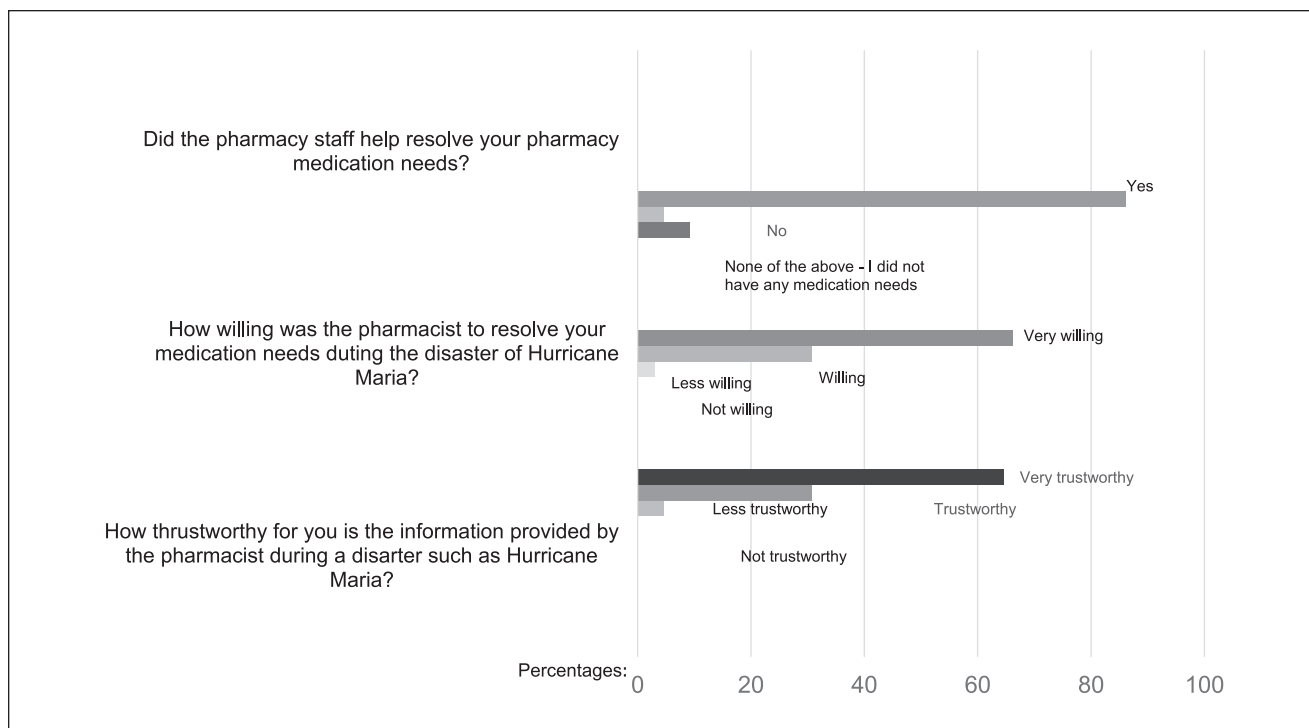
With regard to patient satisfaction with pharmacy services (Figure 1) following the hurricane, 56 respondents (86.2%) stated that the pharmacy staff helped solve problems related to medications and 63 respondents (97%) believed that the pharmacist was willing or very willing to provide help during the emergency. Sixty-two respondents (95.4%) indicated that the information provided by the pharmacist was trustworthy or very trustworthy. When given the opportunity to provide comments about the patient experience following Hurricane Maria, the most common responses were related to expressing satisfaction with the pharmacy services they received as well as with pharmacy services to deliver medications. Several respondents also

indicated that pharmacy services could be improved upon in this setting by implementing back-up methods of communication following a natural disaster such as satellite phone services or other dedicated lines not dependent on a functioning electric grid.

## Discussion

The most common medication needs among the respondents were related to access to medications and appropriate medication storage. These results align with anecdotal reports of the crisis experienced after Hurricane Maria, where the majority of people had no electricity and health care services were limited.<sup>2,17</sup>

Perhaps unsurprising given the level of disruption caused by the hurricane, nearly half (47.7%) of patients



**Figure 1.** Domain 3: Level of satisfaction with pharmacy services following Hurricane Maria.

reported going without their medications for some time. However, the majority of those reporting a gap in their medication therapy were for 7 days or less. These relatively short-term gaps in treatment may partially be due to the fact that all recruitment sites were located in San Juan, the capital of Puerto Rico, where the reestablishment to normal activities occurred somewhat faster than other areas in the commonwealth. The results of the instrument utilized in this study might vary significantly if administered in different geographic locations throughout Puerto Rico. The reports that the most common reason behind gaps in medications were related to inability to contact or get to the pharmacy is consistent with the many reports of unstable telecommunications systems and scarce gasoline supplies sometimes requiring hours or even days of waiting in line at local gas stations.<sup>2</sup> The fact that few participants in this study reported a new illness or chronic disease exacerbation may be partially due to the fact that the majority of our population did not spend more than 7 days without their medications.

During recent decades, the pharmacy profession has shifted the focus of pharmacists from product centered to patient oriented. However, these results suggest that the most prevalent patient perception of the pharmacist's role following a natural disaster is still related to medication dispensing. Nonetheless, the level of satisfaction with the pharmacy services experienced during this time was high.

This study has several limitations. Because of the extreme limitations put on the health care system immediately following Hurricane Maria, it was not possible to immediately collect data. Therefore, data collection was performed seven months after Hurricane Maria and respondents may have forgotten some details related to their experiences following the natural disaster. The relatively small sample size precluded the performance of inferential statistical analysis. Furthermore, the convenience sample surveyed depicts the medication needs of a select population in the metropolitan area in Puerto Rico and may not be representative of other populations. Convenience sampling was chosen considering the low cost and short time requirements it carries, in comparison with other techniques, especially in the postdisaster context in which the research was being conducted. Despite these limitations, we believe the responses obtained in this study are a valuable contribution to the existing literature describing patient experiences and challenges following the natural disaster of Hurricane Maria. Furthermore, the instrument developed for this research may serve as an important tool regarding medication needs patients may encounter after a natural disaster.

To our knowledge, this is the first study to assess patient medications needs, level of satisfaction with community pharmacy services, and perceptions about the role of the pharmacist following a natural disaster in Puerto Rico. One report from the Centers for Disease Control and Prevention



estimated the most commonly required prescription medications of outpatients in Puerto Rico around the time of the hurricane by examining the IQVIA database.<sup>18</sup> This database contains information on drugs dispensed by retail facilities and is normally used by industry to monitor drug use and trends in the market. Although this report primarily provides information about prescription patterns in Puerto Rico, its findings that the majority of prescription medications were for chronic conditions (cardiovascular, psychiatric, diabetic, etc) is significant in the context of the large number of patients in this study who reported going without their medications following the hurricane.

## Conclusion

Patients from community pharmacies in San Juan, Puerto Rico reported difficulty with access to medications and lack of appropriate storage for refrigerated medications following the natural disaster of Hurricane Maria. Communication and transportation challenges were identified as the primary contributors to patients going without medications. Although these reported challenges following Hurricane Maria were significant, patients reported a high level of confidence in the ability of community pharmacists to help them. The findings of this project can be used to improve pharmacy preparedness for future hurricane seasons and aid in the development of disaster management government policies. Specifically, such policies must incorporate strategies to overcome the logistical challenges in obtaining access to medications created by a natural disaster. As access to medications is an essential component of the primary health care system, the limitations identified by patients in this study must be addressed in future disaster response planning to ensure the health of the most vulnerable, particularly those with multiple chronic illnesses and maintenance medications.

## Authors' Note

Nicole Quiles-Alves is now affiliated with Columbia Care Puerto Rico, San Juan, Puerto Rico.

## Declaration of Conflicting Interests

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