DOI: 10.1111/1475-6773.14092

RESEARCH BRIEF

HSR Health Services Research

Growing inequities in mental health crisis services offered to indigent patients in Puerto Rico versus the US states before and after Hurricanes Maria and Irma

Jonathan Purtle DrPH, MSc[1] | Alexandra C. Rivera-González MPH[2] | Damaris Lopez Mercado MPH[2] | Clara B. Barajas MPH[2] | Ligia Chavez PhD[3] | Glorisa Canino Ph.D[4] | Alexander N. Ortega PhD[2]

[1]Department of Public Health Policy & Management, Director of Policy Research, Global Center for Implementation Science, New York University School of Global Public Health, New York City, New York, USA

[2]Drexel University Dornsife School of Public Health, Department of Health Management & Policy, Philadelphia, Pennsylvania, USA

[3]Medical Sciences Campus, Behavioral Sciences Research Institute, Rio Piedras, Puerto Rico

[4]University of Puerto Rico, Medical Sciences Campus, Behavioral Sciences Research Institute, Rio Piedras, Puerto Rico

Correspondence
Jonathan Purtle, Department of Public Health Policy & Management, Director of Policy Research, Global Center for Implementation Science, New York University School of Global Public Health, 708 Broadway, New York City, NY 10003, USA.
Email: jonathan.purtle@nyu.edu

Funding information
National Institute on Minority Health and Health Disparities, Grant/Award Numbers: R01MD013866, R01MD016426

[Correction added on 21 November 2022, after first online publication: author sequence was updated.]

Abstract

Objective: To assess changes in the availability of mental health crisis services in Puerto Rico relative to US states before and after Hurricanes Maria and Irma.

Data Sources/Study Setting: National Mental Health Services Surveys conducted in 2016 and 2020.

Study design: Repeated cross-sectional design. The independent variable was mental health facility location in Puerto Rico or a US state. Dependent variables were the availability of three mental health crisis services (psychiatric emergency walk-in services, suicide prevention services, and crisis intervention team services).

Data Collection/Extraction Methods: The proportion and per 100,000 population rate of facilities offering crisis services were calculated.

Principal Findings: The availability of crisis services at mental health facilities in Puerto Rico remained stable between 2016 and 2020. These services were offered less at indigent care facilities in Puerto Rico than US states (e.g., 38.2% vs. 49.5% for suicide prevention, $p = 0.06$) and the magnitude of difference increased following Hurricane Maria.

Conclusions: There are disparities between Puerto Rico and US states in the availability of mental health crisis services for indigent patients.

KEYWORDS
health care disparities, health care organizations and systems, indigent care, mental health, psychiatry, uninsured/safety net providers

What is known on this topic

- Puerto Rico has experienced a series of emergencies (e.g., Hurricanes Maria and Irma, earthquakes, the COVID-19 pandemic), which have had major mental health impacts on the island's population.
- Puerto Rico has experienced an extensive financial crisis and forced reformation of its health system by the US federal government in effort to reduce the territory's debt.
- Little prior research has focused on the availability of mental health crisis services or mental health services more broadly on the island of Puerto Rico.

What this study adds

- Availability of psychiatric emergency walk-in, suicide prevention, and crisis intervention team services was higher or equivalent in Puerto Rico than in the US states before and after Hurricanes Maria and Irma.
- The availability of crisis services at indigent care facilities was lower in Puerto Rico than in the US states during this period.
- The magnitude of this inequity in crisis service offerings at indigent care facilities increased after Hurricanes Maria and Irma.

1 | INTRODUCTION

Puerto Rico is a US territory that has experienced a series of major disasters and public health emergencies in recent years.[1–3] Hurricanes Irma and Maria were two Category 5 storms that struck the island in September 2017 and caused substantial death, infrastructure devastation, and health care system disruption.[4–12] In 2019, a cluster of earthquakes also caused major damage and distress across the island. Shortly after in 2020, the COVID-19 pandemic caused significant mortality, morbidity, and psychological distress. In the years prior to these emergencies, the territory was in the midst of an economic crisis and its health care system was undergoing forced reformation by the US federal government to reduce its debt.[13,14] Economic hardship among the island's residents is pervasive; the 2020 poverty rate was about four times higher in Puerto than the US states (43.4% vs. 11.4%).[15] A study also observed that health insurance coverage decreased among the island's residents following Hurricanes Irma and Maria.[16]

Disasters, public health emergencies, and economic stressors are well-established risk factors for community-level mental health problems, psychiatric emergencies, and suicidality.[17–20] Numerous studies have documented elevated rates of these issues among Puerto Rico's residents following Hurricanes Maria and Irma.[5–12] For example, the suicide rate on the island is estimated to have doubled 3 months following the storms,[10] and the prevalence of post-traumatic stress disorder among island residents 6 months after the storms was estimated to be 44%.[11] Over 20% of the island's residents reported that they or a household member received mental health services because of the storms, and an additional 17% believed that they needed these services but did not receive them.[12] News media reports have suggested that mental health outcomes in Puerto Rico have further worsened in light of the earthquakes and COVID-19 pandemic.[21–23]

Within this context of elevated need for mental health crisis services, it is important to characterize the mental health crisis services environment in Puerto Rico, understand how it might have changed after Hurricanes Maria and Irma, and describe how it compares to that of the US states.[24] More specifically, given the substantially higher poverty rate in Puerto Rico than the US states[15] and that insurance providers, such as Medicaid, often do not cover mental health crisis services,[25–28] there is a need to assess the availability of mental health crisis services for low-income patients who are unable to pay for care. Furthermore, understanding mental health crisis service environments is of elevated importance as the roll out of 9-8-8—the new three digit dialing code for the National Suicide Prevention Lifeline, which went into effect in July 2022—is projected to substantially increase demand for crisis services across the US states and its territories.[25,29,30]

Very little mental health services research has focused on Puerto Rico and the few studies focused on the topic were conducted more than 20 years ago.[31–35] Qualitative studies have documented health care system disruptions on the island following Hurricanes Maria and Irma,[36,37] but little of this work has focused on mental health services.[38] Quantitative studies have characterized trends in the offering of mental health services,[39–44] including crisis services,[39,45] in the United States, but these studies have excluded Puerto Rico and have not generated Puerto Rico-specific estimates.

This study will address these knowledge gaps through analyses of data from the 2016 (pre-Hurricane Maria/Irma) and 2020 (post-Hurricanes Maria/Irma) National Mental Health Services Surveys (N-MHSS). The primary study objectives were to assess changes in the offering of crisis services at mental health facilities in Puerto Rico before and after Hurricane Maria/Irma and compare the magnitude of these changes to those of the US states. The secondary objective is to assess the differences among facilities that offer services to indigent clients.

2 | METHODS

2.1 | Data and study design

Data on services offered at mental health facilities came from the N-MHSS, a web-based, post-mail, and telephone-based census conducted annually by the Substance Abuse and Mental Health Services Administration. The questionnaire is sent to the census of all known mental health facilities in the US mainland and its territories. N-MHSS datasets are publicly available and widely used in health services research.[39–44] We analyzed 2016 (pre-Hurricanes Maria/Irma) and 2020 (post-Hurricanes Maria/Irma) N-MHSS data. The 2016 survey aggregate response rate was 91% (n = 12,164) and the Puerto Rico response rate was 99% (n = 88). The 2020 survey aggregate response rate was 89% (n = 12,266), and the Puerto Rico response rate was 79% (n = 69). Although most facilities completed the N-MHSS for both years, a repeated cross-sectional design was used because the

TABLE 1 Proportions of mental health facilities offering crisis services: Puerto Rico and US States, 2016 and 2020

	2016			2020			2016–2020 Change	
Crisis service	Number of facilities offering service	Percentage of facilities offering service	Within year, between geography χ^2 p value	Number of facilities offering service	Percentage of facilities offering service	Within year, between geography χ^2 p value	Between year, within geography percentage point difference	Between year, within geography χ^2 p value
Psychiatric emergency walk-in								
US states	3685	30.5%	0.1	3908	32.2%	0.96	+1.70	0.01
Puerto Rico	34	38.6%		22	31.9%		−6.7	0.38
Suicide prevention								
US states	6503	53.9%	<0.001	8026	66.0%	0.10	+12.1	<0.001
Puerto Rico	66	75.0%		52	75.4%		+0.4	0.96
Crisis intervention team								
US states	5765	47.8%	<0.001	5789	47.7%	<0.001	−0.1%	0.94
Puerto Rico	60	68.2%		51	73.9%		+5.7	0.43

N-MHSS does not contain a unique identifier for facilities across survey years.

2.2 | Variables

The primary independent variable was whether each mental health facility was located in Puerto Rico or a US state. Facilities in other US territories were excluded from the analyses. The secondary independent variable was survey year (2016, pre-Hurricanes Maria/Irma or 2020, post-Hurricanes Maria/Irma). The primary dependent variables were separate dichotomous indicators of whether each facility offered three crisis services: (1) psychiatric emergency walk-in services, (2) suicide prevention services, and (3) a crisis intervention team that handles acute mental health issues at this facility and/or off-site (i.e., crisis intervention team services). The secondary dependent variable was a dichotomous indicator of whether each facility offered "treatment at no charge to clients who cannot afford to pay" and/or used a "sliding-scale fee" based on "income and other factors" *and* offered crisis services. These facilities are hereafter referred to as "indigent care" facilities.

2.3 | Analysis

The number and proportion of facilities providing each crisis service in Puerto Rico and all US states combined, respectively, were calculated and stratified by survey year. Chi-squared tests assessed the significance of differences in the proportion of facilities offering each crisis service between Puerto Rico and the US states within each survey year and the significance of changes in the proportion of facilities offering each service between survey years within each geography. *P*-values indicating the significance of differences between Puerto Rico and the US states and differences within Puerto Rico between years should be interpreted with caution because the total number of mental health facilities in Puerto Rico is relatively small (e.g., $n = 69$ in 2020, with the sample capturing 79% of all known mental health facilities on the island). Strict adherence to a *p*-value threshold of 0.05 may result in a Type 2 error when assessing these differences because of limited statistical power as a result of the small and finite number of mental health facilities in Puerto Rico.

Consistent with prior work assessing the availability of crisis services in the US mainland,[39] we estimated per 100,000 population rates of the number of mental health facilities offering each crisis service in Puerto Rico and the US states, respectively. Population size data were obtained from the 2016 American Community Survey, 2016 Puerto Rico Community Survey, and 2020 Decennial Census. For aggregate facility rates, total population size estimates were used. For indigent care facility rates per 100,000 population, the size of the population living below the federal poverty limit (FPL) was used. We used the size of the population below the FPL because it served as a more precise approximation of the size of the population that may not be able to pay for crisis services. When calculating rates, estimates of the number of mental health facilities offering each service were generated by multiplying the total number of facilities in Puerto Rico and the US states, respectively, by the percentage of facilities that indicated offering the service in the N-MHSS surveys. Although this approach is based on the potentially invalid assumption that the proportion of facilities offering each service is identical among facilities that did and did not complete the N-MHSS survey, it accounts for differences in N-MHSS response rates between Puerto Rico and the US states each survey year. Rate ratios were calculated to compare rates between Puerto Rico and the US states each survey year.

3 | RESULTS

Pre-Hurricanes Maria/Irma in 2016, larger proportions of facilities in Puerto Rico than the US states offered psychiatric emergency

walk-in services (38.6% vs. 30.5%, $p = 0.10$), suicide prevention services, (75.0% vs. 53.9%, $p < 0.001$), and crisis intervention team services (68.2% vs. 47.8%, $p < 0.001$) (Table 1). After Hurricanes Maria/Irma in 2020, the portion of facilities offering each of these services remained higher or equivalent in Puerto Rico than the US states. Between 2016 and 2020, the proportion of facilities offering psychiatric emergency walk-in services in Puerto Rico decreased by 6.7 percentage points, becoming equivalent with that in the US states (31.9% vs. 32.2%, $p = 0.96$). The proportion of facilities in Puerto Rico offering suicide prevention services increased by 0.4 percentage points from 2016 to 2020, while it increased by 12.1 percentage points in the US states but remained larger in Puerto Rico (75.4% vs. 66.0%, $p = 0.01$).

When focusing on indigent care mental health facilities, the proportions of those offering crisis services were similar between Puerto Rico and the US states in 2016 but then generally decreased in Puerto Rico in 2020 following Hurricanes Maria/Irma while they increased or remained constant in the US states (Table 2). Findings were similar when no charge and sliding-scale facilities were disaggregated (Appendixes A and B, respectively). For example, in 2016, 25.6% of mental health facilities in Puerto Rico were indigent care facilities that offered psychiatric emergency walk-in services, while the proportion

TABLE 2 Proportions of mental health facilities offering crisis services, limited to "Indigent care" facilities that offer and services to clients who cannot afford to pay: Puerto Rico and US States, 2016 and 2020

	2016			2020			2016–2020 Change	
Crisis service	Number of indigent care facilities offering service	Percentage of indigent care facilities offering service	Within year, between geography χ^2 p value	Number of indigent care facilities offering service	Percentage of indigent care facilities offering service	Within year, between geography χ^2 p value	Between year, within geography percentage point difference	Between year, within geography χ^2 p value
Psychiatric emergency walk-in								
US states	2868	24.7%	0.84	2938	25.5%	0.08	+0.8%	0.15
Puerto Rico	22	25.6%		11	16.2%		−9.4%	0.16
Suicide prevention								
US states	4712	40.5%	0.49	5711	49.5%	0.06	+9.0%	<0.001
Puerto Rico	38	44.2%		26	38.2%		−6.0%	0.46
Crisis intervention team								
US states	4358	37.5%	0.62	4349	37.8%	0.68	+0.3%	0.64
Puerto Rico	30	34.9%		24	35.3%		+0.4%	0.96

TABLE 3 Rates of mental health facilities offering crisis services: Puerto Rico and US States, 2016 and 2020

	All mental health facilities				"Indigent care" mental health facilities offering services to clients who cannot afford to pay			
Crisis service	2016 rate per 100,000 population	2016 within year, between geography rate ratio[a]	2020 rate per 100,000 population	2020 within year, between geography rate ratio[a]	2016 rate per 100,000 population in poverty	2016 within year, between geography rate ratio[a]	2020 rate per 100,000 population in poverty	2020 within year, between geography rate ratio[a]
Psychiatric emergency walk-in								
US states	1.14	1.13	1.20	1.24	7.27	4.72	8.34	7.32
Puerto Rico	1.01		0.97		1.54		1.14	
Suicide prevention								
US states	2.02	1.03	2.46	1.07	11.92	4.50	16.19	6.04
Puerto Rico	1.96		2.29		2.65		2.68	
Crisis intervention team								
US states	1.79	1.01	1.78	0.79	11.04	5.26	12.36	5.00
Puerto Rico	1.78		2.25		2.10		2.47	

[a]Reference group = Puerto Rico.

was 24.7% in the US states. However, in 2020, this proportion had decreased by 9.4 percentage points to 16.2% % in Puerto Rico, while it increased by 0.8 percentage points to 21.0% in the US states ($p = 0.08$). In 2016, 44.2% of mental health facilities in Puerto Rico were indigent care facilities that offered suicide prevention services compared with 40.5% of facilities in the US states. However, in 2020, this proportion had decreased by 6.0 percentage points to 38.2% in Puerto Rico, while it increased by 9.0 percentage points to 49.5% in the US states ($p = 0.06$).

When expressed as rates per 100,000 population, there were fewer mental health facilities offering crisis services in Puerto Rico than the US states, especially indigent care facilities offering these services (Table 3). When all facilities were considered in aggregate, per 100,000 population rates were slightly lower in Puerto Rico than the US states for psychiatric emergency walk-in services and suicide prevention services. When focusing on indigent care mental health facilities, however, larger inequities emerged.

In 2016, there were 1.54 indigent care mental health facilities offering psychiatric emergency walk-in services per 100,000 Puerto Rico residents living in poverty compared with 7.27 facilities per 100,000 US state residents living in poverty (rate ratio = 4.72). After Hurricanes Maria/Irma in 2020, the rate decreased to 1.14 per 100,000 in Puerto Rico and increased to 8.34 per 100,000 in the US states (rate ratio = 7.32). A similar inequity existed for indigent care mental health facilities offering suicide prevention and crisis intervention team services. In 2020, the number of indigent care facilities offering suicide prevention services per 100,000 residents living in poverty was more than six times higher in the US states than Puerto Rico (rate ratio = 6.04) and more than five times higher for crisis intervention team services (rate ratio = 5.00).

4 | DISCUSSION

To our knowledge, this study is the first quantitative assessment of the availability of mental health crisis services in Puerto Rico. Despite the impact of Hurricanes Maria and Irma and other recent major public health emergencies on Puerto Rico's health care system,[36–38] we did not find that the availability of crisis services at mental health facilities decreased meaningfully on the island between 2016 and 2020 in absolute terms or relative to the US states. However, when limiting our analyses to indigent care facilities, we found less mental health crisis service availability in Puerto Rico than the US states, and that the size of this difference increased after Hurricanes Maria and Irma. This finding is concerning given the substantially higher poverty rate in Puerto Rico than the US states.[15]

Differences between Puerto Rico and the US states were largest for psychiatric emergency walk-in services, a service for patients with immediate service need and severe psychiatric distress. For a person experiencing a psychiatric emergency who cannot afford to pay for services in Puerto Rico in 2020, there was less than one facility per 100,000 persons living in poverty, while there were nearly seven such facilities per 100,000 persons in poverty in the US states. Although emergency psychiatric care can be obtained regardless of the patient's ability to pay through general hospital emergency departments under the Emergency Medical Treatment and Active Labor Act, the care is likely of higher quality at mental health facilities. Unlike most emergency departments, these facilities are staffed with trained mental health professionals, and there are well-established barriers to providing high-quality care for psychiatric emergencies in general hospital emergency departments.[46–48]

The finding that indigent care mental health facilities offering crisis services were less available in Puerto Rico compared with the US states may reflect efforts to reform and privatize Puerto Rico's health care system.[13,14] These efforts, which stem from the 2016 Puerto Rico Oversight, Management, and Economic Stability Act, which created a federal Financial Oversight and Management Board to address the territory's debt crisis, may have had the consequence of reducing access to public mental health crisis services for Puerto Rican residents with low incomes during a time of elevated service need.

4.1 | Limitations

N-MHSS is the primary data source for tracking services offered at mental health facilities in the US mainland and its territories, but it has limitations. Facilities indicate whether they provided specific mental health services but not the volume of or capacity for specific services.[49] For example, a facility that indicated offering crisis intervention team services could have multiple full-time teams working 24/7 or one part-time team. Such variation is not captured in the N-MHSS data. The data also do not provide indication of service quality, and some reports suggest that the quality of psychiatric care provided to indigent patients in Puerto Rico is inferior to that provided to privately insured patients.[50,51] The N-MHSS uses a self-report questionnaire and does not validate whether responses correspond with actual service offerings. Our study focused on comparing Puerto Rico to all US states combined. There is substantial geographic heterogeneity across US states and across the island of Puerto Rico in the availability of mental health crisis services,[39] and the study did not compare Puerto Rico to individual US states or assess geographic differences across Puerto Rico. Finally, as noted above, *p*-values should be interpreted with caution because the study may have been underpowered to detect significant differences at a threshold of 0.05, given that the total number of mental health facilities in Puerto Rico is relatively small.

5 | CONCLUSIONS

The availability of crisis services at mental health facilities in Puerto Rico remained fairly stable between 2016 and 2020, the period before and after Hurricanes Maria and Irma. However, inequities between Puerto Rico and the US states exist in terms of the availability of mental health crisis services for low-income patients. The size of these differences in services availability generally increased following

Hurricanes Maria and Irma. Efforts to reform Puerto Rico's health care system should ensure that mental health crisis services are available for island residents living in poverty, which make up nearly half of Puerto Rico's population.

ACKNOWLEDGMENTS

None.

FUNDING INFORMATION

This study was supported by grants R01MD016426 and R01MD013866 from the National Institute on Minority Health and Health Disparities (NIMHD) at the National Institutes of Health (NIH).

ORCID

Jonathan Purtle https://orcid.org/0000-0001-6908-5944

Alexandra C. Rivera-González https://orcid.org/0000-0003-0198-6599

Ligia Chavez https://orcid.org/0000-0001-5512-8552

REFERENCES

1. Cheatham A, Roy D. Puerto Rico: a U.S. territory in crisis. Published Februray 3, 2022. Accessed September 12, 2022. https://www.cfr.org/backgrounder/puerto-rico-us-territory-crisis.
2. Rodriguez H, Mora MT. Hurricane Maria: disaster response in Puerto Rico. *Oxford research encyclopedia of Politics*. Oxford Press; 2020.
3. Benach J, Díaz MR, Muñoz NJ, Martínez-Herrera E, Pericàs JM. What the Puerto Rican hurricanes make visible: chronicle of a public health disaster foretold. *Soc Sci Med*. 2019;238:112367.
4. Kishore N, Marqués D, Mahmud A, et al. Mortality in Puerto Rico after hurricane Maria. *NEJM*. 2018;379(2):162-170.
5. Collazo G, Ruiz A, Rivera M, et al. A retrospective cohort study on the increasing trend of suicide ideations and risks in an opioid-dependent population of Puerto Rico 2015–2018. *J Immigr Minor Health*. 2022;24(5):1367-1370.
6. Orengo-Aguayo R, Stewart RW, de Arellano MA, Suárez-Kindy JL, Young J. Disaster exposure and mental health among Puerto Rican youths after Hurricane Maria. *JAMA Netw Open*. 2019;2(4):e192619.
7. Espinel Z, Kossin JP, Galea S, Richardson AS, Shultz JM. Forecast: increasing mental health consequences from Atlantic hurricanes throughout the 21st century. *Psychiatr Serv*. 2019;70(12):1165-1167.
8. Ferré IM, Negrón S, Shultz JM, Schwartz SJ, Kossin JP, Pantin H. Hurricane Maria's impact on Punta Santiago, Puerto Rico: community needs and mental health assessment six months postimpact. *Disaster Med Public Health Prep*. 2019;13(1):18-23.
9. Abrams Z. Puerto Rico, two years after Maria. *Am Psychol Assoc*. 2019;50(8):28. Accessed September 12, 2022. https://www.apa.org/monitor/2019/09/puerto-rico
10. Coss-Guzmán MI, Román-Vazquez NI. Informe Mensual de Suicidios en Puerto Rico. Comisión para la Prevención del Suicidio, Departamento de Salud. Published June 2021. Accessed September 12, 2022. https://estadisticas.pr/files/Inventario/publicaciones/Junio%202021.pdf.
11. Scaramutti C, Salas-Wright CP, Vos SR, Schwartz SJ. The mental health impact of Hurricane Maria on Puerto Ricans in Puerto Rico and Florida. *Disaster Med Public Health Prep*. 2019;13(1):24-27.
12. DiJulio B, Muñana C, Brodie M. Views and experiences of Puerto Ricans one year after Hurricane Maria. Kaiser Family Foundation; 2018. Accesssed September 12, 2022. https://files.kff.org/attachment/Report-Views-and-Experiences-of-Puerto-Ricans-One-Year-After-Hurricane-Maria
13. Benavides X. Disparate health care in Puerto Rico: a battle beyond statehood. *U Pa JL Soc Change*. 2020;23:163.
14. Mulligan JM. *Unmanageable Care: an Ethnography of Health Care Privatization in Puerto Rico*. NYU Press; 2014.
15. United States Census Bureau. QuickFacts. Puerto Rico Accessed September 12, 2022. https://www.census.gov/quickfacts/PR
16. Cortés YI, Lassalle PP, Perreira KM. Health care access and health indicators in Puerto Rico pre-and post-hurricane Maria: behavioral risk factor surveillance system (2015–2019). *J Immigr Minor Health*. 2022;1-8. [Online ahead of print].
17. Goldmann E, Galea S. Mental health consequences of disasters. *Annu Rev Public Health*. 2014;35:169-183.
18. Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: a systematic review. *Psychol Med*. 2008;38(4):467-480.
19. Galea S, Brewin CR, Gruber M, et al. Exposure to hurricane-related stressors and mental illness after Hurricane Katrina. *Arch Gen Psychiatry*. 2007;64(12):1427-1434.
20. Canino G, Bravo M, Rubio-Stipec M, Woodbury M. The impact of disaster on mental health: prospective and retrospective analyses. *Int J Forensic Ment Health*. 1990;19(1):51-69.
21. Martínez Rosario JI-RC, Calderón CJ. Reflection in a Puerto Rico in crisis: emotional help in the midst of disasters. *Psicologías*. 2021;4:160-181. Accessed September 10, 2022. https://revistas.upr.edu/index.php/psicologias/article/view/18767
22. Umpierre A. After Puerto Rico's earthquakes. DirectRelief. Published March 18, 2021. Accessed September 12, 2022. https://www.directrelief.org/2021/03/after-puerto-ricos-earthquakes-renal-patients-feel-mental-health-effects/
23. Rivera BC. The pandemic worsened the mental health of Puerto Ricans. El Nuevo Dia. Published July 2021. Accessed September 10, 2022. https://www.elnuevodia.com/noticias/locales/notas/la-pandemia-desmejoro-la-salud-mental-de-los-puertorriquenos/
24. Shultz JM, Galea S. Preparing for the next Harvey, Irma, or Maria—addressing research gaps. *NEJM*. 2017;377(19):1804-1806.
25. Hogan MF, Goldman MLJPS. New opportunities to improve mental health crisis systems. *Psychiatr Serv*. 2021;72(2):169-173.
26. Lawson N, Dwyer A. Medicaid and the 988 Mental Health Crisis Services Lifeline State Approaches. Published August 3, 2022. Accessed Sepetmber 12, 2022. https://ccf.georgetown.edu/2022/08/03/medicaid-and-the-988-mental-health-crisis-services-lifeline-state-approaches/.
27. Centers for Medicare & Medicaid Services. Department of Health & Human Services. Opportunities to Design Innovative service delivery Systems for Adults with a Serious Mental Illness or Children with a Serious Emotional Distrubance. Published November 12, 2018. Accessed September 12, 2022. https://www.medicaid.gov/federal-policy-guidance/downloads/smd18011.pdf.
28. Centers for Medicare & Medicaid Services. Department of Health & Human Services. Medicaid Guidance on the Scope of and Payments for Qualifying community-Based Mobile Crisis Intervention Services. Published December 28, 2021. Accessed September 12, 2022. https://www.medicaid.gov/federal-policy-guidance/downloads/sho21008.pdf.
29. Fix RL, Bandara S, Fallin MD, Barry CL. Creating comprehensive crisis response systems: an opportunity to build on the promise of 988. *Community Ment Health J*. 2022 Aug;23:1-4.
30. Purtle J, Lindsey MA, Raghavan R, Stuart EA. National Suicide Prevention Lifeline 2020 in-state answer rates, stratified by call volume rates and geographic region. *Psychiatr Serv*. 2022;appips202200020. https://doi.org/10.1176/appi.ps.202200020
31. Alegría M, McGuire T, Vera M, Canino G, Matías L, Calderón J. Changes in access to mental health care among the poor and non-poor: results from the health care reform in Puerto Rico. *Am J Public Health*. 2001;91(9):1431-1434.

32. Martínez RE, Sesman Rodríguez M, Bravo M, Canino G, Rubio SM. Use of health services in Puerto Rico by persons with mental disorders [in Spanish]. *Acta Psiquiatr Psicol Am Lat*. 1991;37(2):143-147.
33. Alegría M, Robles R, Freeman DH, et al. Patterns of mental health utilization among Island Puerto Rican poor. *Am J Public Health*. 1991; 81(7):875-879.
34. Vera M, Alegria M, Freeman DH Jr, Robles R, Pescosolido B, Pena M. Help seeking for mental health care among poor Puerto Ricans: problem recognition, service use, and type of provider. *Med Care*. 1998; 36:1047-1056.
35. Pescosolido BA, Wright ER, Alegria M, Vera M. Social networks and patterns of use among the poor with mental health problems in Puerto Rico. *Med Care*. 1998;36:1057-1072.
36. Rodríguez-Madera SL, Varas-Díaz N, Padilla M, et al. The impact of Hurricane Maria on Puerto Rico's health system: post-disaster perceptions and experiences of health care providers and administrators. *J Glob Health*. 2021;6(1):1-11.
37. Chandra A, Marsh T, Madrigano J, et al. Health and social Services in Puerto Rico before and after Hurricane Maria: Predisaster conditions, hurricane damage, and themes for recovery. *Rand Health Q*. 2021;9(2).
38. Alto ME, Nicasio AV, Stewart R, Rodríguez-Sanfiorenzo TD, González-Elías G, Orengo-Aguayo R. Provision of mental health services immediately following a natural disaster: experiences after Hurricane Maria in Puerto Rico. *IJEM*. 2021;19(8):167-175.
39. Kalb LG, Holingue C, Stapp EK, Van Eck K, Thrul J. Trends and geographic availability of emergency psychiatric walk-In and crisis Services in the United States. *Psychiatr Serv*. 2022;73(1):26-31.
40. Cummings JR, Smith JL, Cullen SW, Marcus SC. The changing landscape of community mental health care: availability of treatment Services in National Data, 2010–2017. *Psychiatr Serv*. 2021;72(2): 204-208.
41. Hung P, Busch SH, Shih YW, McGregor AJ, Wang S. Changes in community mental health services availability and suicide mortality in the US: a retrospective study. *BMC Psychiatry*. 2020;20(1):188.
42. Loho H, Rosenheck RA. Provision of non-English language Services in U.S. mental health facilities. *Psychiatr Serv*. 2021;73(3):339-342.
43. Spivak S, Cullen BA, Green C, Firth T, Sater H, Mojtabai R. Availability of assertive community treatment in the United States: 2010 to 2016. *Psychiatr Serv*. 2019;70(10):948-951.
44. Spivak S, Strain EC, Cullen B, Ruble AAE, Antoine DG, Mojtabai R. Electronic health record adoption among US substance use disorder and other mental health treatment facilities. *Drug Alcohol Depend*. 2021;220:108515.
45. Larkin GL, Beautrais AL, Spirito A, Kirrane BM, Lippmann MJ, Milzman D. Mental health and emergency medicine: a research agenda. *AEM*. 2009;16(11):1110-1119.
46. Dombagolla MH, Kant JA, Lai FW, Hendarto A, Taylor DM. Barriers to providing optimal management of psychiatric patients in the emergency department (psychiatric patient management). *Australas Emerg Care*. 2019;22(1):8-12.
47. Shattell MM, Andes M. Treatment of persons with mental illness and substance use disorders in medical emergency departments in the United States. *Issues Ment Health Nurs*. 2011;32(2):140-141.
48. Mercado EM. Children and Adolescents Left without their Public Psychiatric Hospital [in Spanish]. Centro de Periodismo Investigativo. Published Jun 2021. Accessed September 12, 2022. https://periodismoinvestigativo.com/2021/06/hospital-psiquiatrico-ninos-adolescentes-puerto-rico/.
49. Wiscovitch PJ. Patients in the dark about the performance of their medical plans. Centro de Periodismo Investigativo; 2022. Accessed September 10. https://periodismoinvestigativo.com/2022/08/patients-in-the-dark-about-the-performance-of-their-health-insurance-plans/
50. Media J. ASES evaluates compliance with mental health coverage of the vital plan [in Spanish]. Jay Fonseca. Published October 29, 2021. Accessed September 12, 2022. https://jayfonseca.com/ases-evalua-cumplimiento-de-cubierta-de-salud-mental-del-plan-vital/

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Purtle J, Rivera-González AC, Mercado DL, et al. Growing inequities in mental health crisis services offered to indigent patients in Puerto Rico versus the US states before and after Hurricanes Maria and Irma. *Health Serv Res*. 2023;58(2):325-331. doi:10.1111/1475-6773.14092