


# Disparities in Lung Cancer Screening in Puerto Rico: A United States Colony with Unequal Benefits

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## Keywords

lung cancer, lung cancer screening, disparities

Puerto Rico (PR) has the dubious moniker of being the “Oldest Colony in the World.” It is a small but populous Caribbean island, home to 3.2 million habitants of a Taino, Spanish, and African heritage. Puerto Rico’s colonization history dates back to the 15th century when it became a Spanish colony shortly after Christopher Columbus’s arrival. It remained under Spanish rule for 400 years until 1898, when Spain ceded the island to the United States (U.S.) after the Spanish-American War in what is known today as the Treaty of Paris. Decades later, PR became a U.S. territory in 1917 after the Jones Act was implemented. Since then, Puerto Ricans are born American citizens. Even though the U.S. controls many important aspects of the commonwealth, PR is not recognized as a state and, therefore, the benefits and support from the mainland differ from the one received by the actual states. There are disparities, in particular, with the health care system delivery compared to the United States.

Due to low income and socioeconomic status, nearly one-half (49%) of PR’s population receive government-provided health care services and receive medical care through the Medicaid Program, compared with 20% of all races and ethnicities who receive care through Medicaid in the United States.<sup>1</sup> In PR, the Medicaid program is vastly different from that of other regions in the United States. The Commonwealth or Municipal Government employs physicians who work in public facilities with full ancillary services providing medical services to patients under the Medicaid program. The health care funds for each beneficiary are limited to a pre-determined amount that has a maximum cap regardless of the actual cost and the level of care needed to receive. Therefore, there can be potential delays or restrictions in the medical care for the beneficiaries.<sup>2</sup> Despite some barriers within the health care system and delivery, primary prevention and screening modalities including colonoscopies, mammograms, and Pap

smears are prioritized and are part of the standard routine medical care. The rates for screening mammograms are higher in PR than in the United States.<sup>3</sup> The American Cancer Society estimated that up to 73% of women 45 years and older were up to date on mammography in PR as of 2018 compared to 68% in the United States.<sup>3</sup> For cervical cancer screening, the rates are similar amongst both at 83% and 85% in Puerto and the United States.<sup>3</sup> On the other hand, the rates for colorectal cancer screening in PR are much lower than in the United States at 58% vs 70%, respectively.<sup>3</sup> Meanwhile, low dose computed tomography (LDCT) is not a prevalent tool used for lung cancer screening on the island.

Lung cancer is the most common cause of cancer and the leading cause of cancer death worldwide.<sup>4</sup> It carries a high mortality rate with a 5-year overall survival of less than 20%.<sup>5</sup> Data have shown that metastatic lung cancer, which is diagnosed in over 50% of cases, has a 5-year survival rate of only 5%.<sup>5</sup> Localized lung cancer comprises only 16% of lung cancer diagnoses and has a dramatically superior 5-year overall survival of 56%.<sup>5</sup> Smoking is the leading cause of lung cancer and responsible for 80% of lung cancer deaths in women and 90% in men.<sup>6</sup> Over the last decades the smoking tendencies have decreased drastically due to education and promotion of tobacco cessation. A 2016 report stated that Puerto Ricans have the highest smoking rates among U.S.

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Hispanic groups with a total of 29% of all Puerto Ricans being active smokers at the time of the report.<sup>7</sup> However, there has been a decline in the incidence of smoking amongst Puerto Ricans living on the island, where 11% reported actively smoking in 2016 compared to 14.7% in 2005.<sup>7</sup> Despite the decline in tobacco use in PR, lung cancer remains the third most common cause of cancer-related death in men and women on the island.<sup>8</sup>

Clinical trials assessing the role of LDCT for lung cancer screening showed a mortality benefit with screening. These positive findings led U.S. organizations, such as the U.S. Preventive Services Task Force (USPSTF), to support lung cancer screening with LDCT in high-risk eligible individuals in 2013 with hopes of increasing early detection of lung cancer and improving the overall mortality rates.<sup>9,10</sup> Approximately 6.5 million high-risk Americans were eligible for lung cancer screening according to the USPSTF13 recommendations, with the possibility of preventing over 12 000 lung cancer deaths if at least half of the high-risk individuals (HRI) were screened.<sup>11</sup> In 2021, the USPSTF updated their screening guidelines to expand the eligibility criteria, including broadening the age group and lessening the pack-year smoking history in hopes of capturing more individuals at high risk for lung cancer. Under the new guidelines, approximately 14.5 million Americans will be eligible for screening, potentially saving an additional 10 000–20 000 lives each year with the implementation of the new guidelines.<sup>12</sup> LDCT is covered by Medicare, Medicaid, and most commercial insurances in the United States. Despite this, there is poor LDCT uptake for lung cancer screening in the United States and the national screening rate is only 5%.<sup>13</sup>

Since lung cancer screening recommendations were established by organizations such as the USPSTF and NCCN, national studies have been conducted to assess the rates of LDCT in eligible individuals and understand the common barriers to lung cancer screening implementation across the United States. Frequent barriers to LDCT uptake that have been identified in these studies are: lack of physician knowledge of the recommended guidelines, concerns about insurance coverage, potential radiation exposure, and utilizing the incorrect screening modality.<sup>14–16</sup> Nevertheless, the rates for LC screening are even lower in PR, where lung cancer screening is rarely ever implemented and LDCT is not a recognized screening modality on the island. Lung cancer screening is so uncommon in PR that there are only two studies based on the island that address lung cancer screening. One study created a qualitative study consisting of focus groups to understand the primary care physicians (PCP) and HRIs' knowledge and attitudes toward LDCT for lung cancer screening. The study aimed to identify the barriers to screening for lung cancer in PR compared to the United States. When learning about the availability of a screening modality for lung cancer, most of the 37 HRI participants were agreeable to undergo LDCT if recommended by their physician.<sup>17</sup> Common barriers proposed by HRI were: lack of

knowledge about screening, financial barriers, and concerns about insurance coverage. In the PCP's focus groups most reported only discussing lung cancer screening with a few eligible patients and those that had recommended screening did so mostly based on symptoms, smoking history, and other risk factors. Most PCP's admitted to choosing chest radiography as the first screening modality, followed by a LDCT if positive.<sup>18</sup> The majority of the PCPs agreed that the primary barrier to screening referral was the lack of insurance coverage (all types of insurance) and the need to focus on more acute issues. Many suggested that medical insurance requires a positive CXR before approving LDCT.<sup>17</sup> Most participants revealed that they did not frequently refer patients to lung cancer screening despite referring for other types of screening modalities such as colonoscopies and mammography, mainly due to lack of knowledge for LDCT and their opinion that insurance companies do not cover said modalities. The primary doctors suggest the need for an educational intervention, such as informative handouts and continued medical education, to enforce lung cancer screening with high-risk patients and increase screening referrals amongst PCPs.<sup>15</sup> Another study aimed to assess the awareness and perception of lung cancer screening amongst Pulmonologists in PR through a survey questionnaire. Of the 31 respondents, 97% were aware of the USPSTF lung cancer screening recommendations and 99% reported having the availability of CT chest within 1 hour of their practice. However, 16% admitted to not performing lung cancer screening at all and 77% reported limitations to screen. The respondents reported lack of insurance coverage as the most common barrier, followed by lack of infrastructure, limited personnel at the workplace, and lack of imaging or radiologist support in the community.<sup>18</sup>

In addition to lack of knowledge about lung cancer screening guidelines amongst PCPs, one factor potentially contributing to suboptimal lung cancer screening rates is the lack of acknowledgment from the Puerto Rican government. The government created the PR Comprehensive Cancer Control Plan from 2015-2020, which is an agenda with a plan to address cancer prevention, screening for early detection, and treatment.<sup>19</sup> In it, lung cancer is described as the third most common type of cancer in men and women as of 2011. The governmental agenda focuses on lung cancer prevention utilizing intense tobacco cessation education, rather than combining modalities to also include early detection. The Cancer Control Plan makes no mention of the approved guidelines for lung cancer screening, despite promoting in their plan screening for colon, breast, prostate, and cervical cancer.<sup>19</sup> Lack of lung cancer screening recognition, acknowledgment, and promotion by the government could directly impact the low screening rates on the island. Additionally, the lower incidence of lung cancer in PR, as well as the lower mortality rates compared to the United States, can reflect less emphasis on lung cancer screening, and perhaps be a factor in the decreased screening implementation in the island. Another important barrier to screening is resistance

from medical insurance regarding coverage. Since often insurance requires a negative CXR before justifying the need for LDCT, PCPs can see this as an additional hurdle that, on top of limited time and prioritizing acute issues, can lead to decrease patterns of screening. Lastly, insurance reimbursement could present a big barrier. Medicaid provides PCP with a capped stipend to cover each patient per year. Nevertheless, patients requiring thorough workups including PET/CT and/or invasive procedures such as biopsies, do not have to pay out of pocket despite surpassing the capped amount. The impact of this, however, is felt on PCP's that do not receive the appropriate reimbursement after the capped amount is reached, which, therefore could potentially play a role in screening referral patterns, to begin with.

It is quite notable that even though PR has been granted U.S. citizenship for over 100 years there are still many discrepancies within the health care system. Despite being born U.S. citizens, Puerto Ricans often face barriers in health care delivery on the island compared to the mainland-born United States. It is imperative to recognize and highlight these disparities and continue to promote and prioritize primary prevention and early detection, including lung cancer screening, which is known to provide a 20% mortality reduction in lung cancer. Ultimately, PR shares similar barriers to screening as the United States, including poor physician uptake and referral patterns to LDCT. However, PR's biggest roadblock to lung cancer screening is the lack of governmental recognition for lung cancer screening implementation and, therefore, lack of insurance coverage. Even though the tobacco trends have been down-trending during recent decades, lung cancer remains a big threat, as it is still the third leading cause of cancer-related deaths in PR. Unfortunately, the rates of LDCT eligible individuals in PR nor the lung cancer trends are not quantified and, if available, could be used as a tool to promote LC screening. Regardless, it is important to remain diligent in cancer control efforts, including early detection of lung cancer through the use of LDCT to continue to progress and improve lung cancer mortality in high-risk individuals. Along with continued smoking cessation intervention, governmental recognition and enforcement of lung cancer screening including implementation of screening centers, widespread education to PCPs about screening guidelines, promoting patient awareness, and decreasing coverage resistance from medical insurance should be a priority for the health care system in PR to help improve the overall mortality in high-risk individual.

Our plea is that the government recognizes lung cancer as a public thread costing the lives of many and supports LDCT for high-risk individuals, mandating public and private insurance companies to cover these services. Additionally, PCPs and Pulmonologists should focus their efforts to promote lung cancer screening and implement LDCT in similar patterns as colon, breast, cervical, and prostate screening modalities which are nationally recognized. We must take responsibility and action to address health disparities across America and its

territories and close the gap in the inequities many vulnerable populations face.

### Author's Note

Our study did not require an ethical board approval because it did not contain human or animal trials.

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### References

1. *The Kaiser Commission on Medicaid and the Uninsured 8 Questions and Answers about Puerto Rico*. San Francisco, CA: The Henry J. Kaiser Family Foundation; 2016. <https://www.kff.org/disparities-policy/fact-sheet/8-questions-and-answers-about-puerto-rico/>.
2. Pagán-Berlucchi A, Muse DN. The Medicaid program in Puerto Rico: description, context, and trends. *Health Care Financ Rev*. 1983;4(4):1–17
3. National Cancer Institute. *State Cancer Profiles*. <https://statecancerprofiles.cancer.gov/quick-profiles/index.php?statename=puertorico#t=1>
4. World Health Organization. *Cancer Fact Sheet*; 2018.
5. U.S. National Institute Of Health, National Cancer Institute. *SEER Cancer Statistics Review*; 1975–2015.
6. Division of Cancer Prevention and Control. *What are the Risk Factors for Lung Cancer?* Atlanta, GA: Center for Disease Control and Prevention; 2018. [https://www.cdc.gov/cancer/lung/basic\\_info/risk\\_factors.htm](https://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm).
7. Martell BN, Garrett BE, Caraballo RS. Disparities in adult cigarette smoking — United States, 2002–2005 and 2010–2013. *MMWR Morb Mortal Wkly Rep* 2016;65:753–758. doi:10.15585/mmwr.mm6530a1
8. Zavala-Zegarra D, Tortolero-Luna G, Torres-Cintrón C, et al. *Cancer en Puerto Rico: 2008-2012; incidencia y mortalidad*. San Juan, PR: Puerto Rico Central Cancer Registry; 2015. <http://www.rcpr.org/Portals/0/Informe%202008-2012.pdf>.
9. Moyer VA, on behalf of the U.S. Preventive Services Task Force. Screening for lung cancer: U.S. preventive services task force recommendation statement. *Ann Intern Med*. 2014;160:330–338. doi:10.7326/M13-2771
10. *Lung Cancer Screening*. National Comprehensive Cancer Network, Inc. 2019.

11. Cheung LC, Katki HA, Chaturvedi AK, Jemal A, Berg CD. Preventing lung cancer mortality by computed tomography screening: the effect of risk-based versus U.S. preventive services task force eligibility criteria, 2005–2015. *Ann Intern Med.* 2018;168(3):229-232. doi:[10.7326/M17-2067](https://doi.org/10.7326/M17-2067)
12. Landy R, Young CD, Skarzynski M, et al. Using prediction-models to reduce persistent racial/ethnic disparities in draft 2020 USPSTF lung-cancer screening guidelines[published ahead of print January 5, 2021]. *J Natl Cancer Inst.* doi:[10.1093/jnci/djaa211](https://doi.org/10.1093/jnci/djaa211).
13. Fedewa SA, Kazerooni EA, Studts JL, et al. State variation in low-dose computed tomography scanning for lung cancer screening in the United States. *J Natl Cancer Inst.* 2021;113(8):1044-1052. doi:[10.1093/jnci/djaa170](https://doi.org/10.1093/jnci/djaa170).
14. Lewis JA, Petty WJ, Tooze JA, et al. Low-dose CT lung cancer screening practices and attitudes among primary care providers at an academic medical center. *Cancer Epidemiol Biomarkers Prev.* 2015;24(4):664–670.
15. Ersek JL, Eberth JM, McDonnell KK, et al. Knowledge of, attitudes toward, and use of low-dose computed tomography for lung cancer screening among family physicians. *Cancer.* 2006;122(15):2324–2331.
16. Eberth JM, McDonnell KK, Sercy E, et al. A national survey of primary care physicians: perceptions and practices of low-dose CT lung cancer screening. *Prev Med Rep.* 2018;11:93–99.
17. Rodríguez-Rabassa MS, Simmons VN, Vega A, Moreno D, Irizarry-Ramos J, Quinn GP. Perceptions of and barriers to lung cancer screening among physicians in Puerto Rico: a qualitative study. *J Health Care Poor Underserved.* 2020;31(2):973–991. doi:[10.1353/hpu.2020](https://doi.org/10.1353/hpu.2020).
18. Martinez-Gonzalez J, Rodriguez-Cintron W, Albors-Sanchez J, Rodriguez-Sepulveda Y. *Lung Cancer Screening in Community Based Practice in Puerto Rico: A Survey of Puerto Rico Pulmonologists.* American Thoracic Society. [https://www.atsjournals.org/doi/pdf/10.1164/ajrccmconference.2016.193.1\\_MeetingAbstracts.A4236](https://www.atsjournals.org/doi/pdf/10.1164/ajrccmconference.2016.193.1_MeetingAbstracts.A4236)
19. *Puerto Rico Comprehensive Cancer Control Plan.* [https://ftp.cdc.gov/pub/publications/cancer/ccc/puerto\\_rico\\_ccc\\_plan.pdf](https://ftp.cdc.gov/pub/publications/cancer/ccc/puerto_rico_ccc_plan.pdf)