Systematic Review Article

Total Financial Burden Of Cancer: Differences Between Rural And Urban Patients Globally

Jack G. Baer

Amador Valley High School, 1155 Santa Rita Road, Pleasanton, CA, 94566, United States

ABSTRACT

It is known that financial burden can have a large effect on patient outcomes during the course of the disease. However, there is a lack of research on how these costs vary between urban and rural residents. A recurrent topic found between the studies is that they have a compounding socioeconomic disadvantage. Rural residents already have a preexisting socioeconomic disadvantage, with their job type and lack of medical resources stemming from this inherent disadvantage. In the case of cancer, these preexisting factors stimulate a need for travel to undergo treatment. This results in additional travel, accommodation, and food costs. These out-of-pocket costs are exacerbated by rural patients lacking insurance from their job type. This paper analyzes five papers to examine how the total financial burden of cancer differs between rural and urban patients. Patients' increased treatment costs, which stem from a rural patient's socioeconomic disadvantage, lead to a financial burden, as well as a decrease in the patient's socioeconomic status. Furthermore, there is no blanket solution to this problem, as pathways of financial burden vary by a region's development. However, there are general ideas that can be applied, such as transportation infrastructure, aid systems, and education improvement, that could be beneficial. These would need to be varied depending on where they are implicated, and their viability in certain regions is questionable due to their political climate. Ultimately, the financial burden of rural patients is higher because of the compounding socioeconomic burden, and policies need to be implemented to rectify this disparity.

Keywords: Urban; Rural; Financial Burden; Cancer treatment; United States; Rural Healthcare

INTRODUCTION

Financial burden is a broad term that describes the problems a patient faces related to the costs of medical care (1). The burden includes going into debt or bankruptcy, as well as not taking medication or avoiding visits to a doctor to save money (1, 2). Financial burden has increasingly become an issue in cancer care because cancer treatment costs have increased, with the average breast cancer treatment costs being $34,979.5, the average prostate cancer treatment costs being $28,108.5, and the average lung cancer treatment costs being $68,293.3 for initial care in the United States (3), contributing to the growing financial burden of cancer across the globe. These costs serve as a barrier that makes care unaffordable and often unrealistic to

Corresponding author: Jack G. Baer, E-mail: Jackgordonbaer@gmail.com.

Accepted October 21, 2025
https://doi.org/10.70251/HYJR2348.3510511067

many, despite care being a lifesaving necessity (4). However, these treatment costs often only represent a portion of the true financial burden of cancer, creating these negative outcomes (5). These non-direct medical costs are underestimated and underaddressed in cancer patients (6, 7).

There is significant importance in examining how the burden of these costs differs between groups, particularly the mechanisms behind how financial burden can vary depending on social group. However, there are a large number of groups that have different mechanisms and origins of financial burden (8, 9). This makes a form of standardization difficult. Two groups share similar mechanisms: rural and urban groups. They also cover a broad range of races, demographics, and areas (10), which will help with beginning to understand the pathways behind the financial burden of cancer for other interest groups. Rural groups could be at higher risk of financial burden themselves in the future as well. This is because the population is becoming increasingly urban, with the United Nations (UN) projecting that 68% of the population will be urban by 2025 (11). Further, the majority of hospitals are found in urban areas (12). Considering these two factors, it is possible that rural patients' rights and needs may be underaddressed in the future, and their challenges related to cancer care may become worse due to the centralization and catering of healthcare around the growing urban population (12, 13). This study synthesizes the available data on both urban and rural patients, to analyze if rural cancer patients experience financial burden differently, so that in the future rural cancer patients can receive the same quality and access to treatment as urban cancer patients. This study aims to discover how these costs affect patients and how the financial burden of these costs varies across regions, a factor under-represented currently, so that the total financial burden of cancer can be acknowledged and potentially managed, resulting in better patient outcomes.

METHODS AND MATERIALS

First, a search was conducted using the keywords "Urban", "Rural", "Burden", "Cancer treatment" and "United States" on PubMed. This yielded 94 results. Then, to further narrow this, only studies from the period 2015 to 2025 were included - this narrowed it down to 83 results. Further, only free full-text articles were included, resulting in 57 papers. Papers were further excluded if they did not specifically mention finances or rural or urban patients in the title or abstract. This yielded three results (Figure 1).

A secondary result was also conducted using the keywords "Urban", "Rural", "Burden" and "Cancer treatment." This yielded 315 results. To further narrow this, only studies from 2015 to 2025 were included - this narrowed it down to 260 results. Further, only free full-text articles were included. This left 194 papers. Papers that did not mention finances explicitly or rural or urban patients in their title or abstract were excluded. This resulted in five papers. However, three of the five were found with the original search. This left two results from the secondary search (Figure 1).

This literature review used a thematic identification, which was done through qualitative observations of repeated barriers, costs, and types of debt in patients for each of the five studies used for the review.

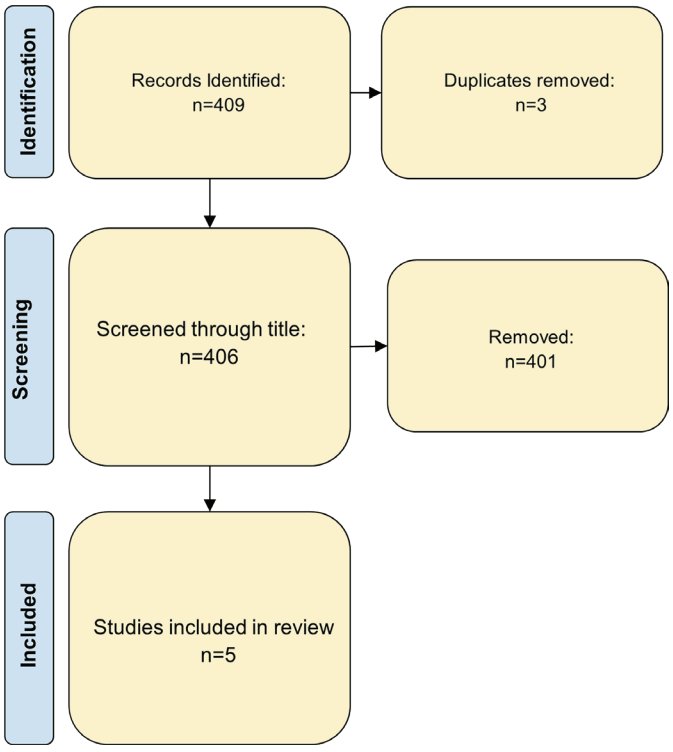

Figure 1. This maps out the distillation of studies to the ones used for this review. The 404 studies ultimately removed were from a lack of having free full text available, not including finances, rural, or urban patients in their title or abstract, or because they were a duplicate. It combines the two individual search queries used.

RESULTS AND DISCUSSION

Results

The five papers found were primarily authored by V. Petermann, C. Odahowski, N. Ali, Ren, and Sneha. They cover a wide range of geographic and cultural areas - India, China, Australia, and the United States. The relevant information from each study has been extracted below (Table 1).

Petermann et al. (2021) examined how cancer programs perceive and address the financial hardships of rural and urban patients in the United States (8). Financial hardship is not defined within the study, but is heavily related to financial toxicity - portrayed as another term to describe financial burden, specifically associated with negative patient outcomes (8), costs, and a greater socioeconomic disadvantage. It differentiates between rural and urban regions using

Table 1. This table breaks down key characteristics of each reviewed study including the title, references, origin, aim, methods, population, and key findings. Collectively, the studies share a common theme of rural patients having higher costs of treatment, and significantly higher expenses in many categories such as travel and accommodation. There was also little discussion between patient and healthcare professional which was more significant in rural patients, and there were functional barriers for both rural and urban patients.

Title	Origin	Aim	Methods	Results
How cancer programs identify and address the financial burdens of rural cancer patients (8)	United States	How do cancer programs perceive and address the financial hardships of rural and urban patients in the United States?	This study uses the Cancer Prevention and Control Research Network (CPCRN) to sample cancer health professionals from six states that they then would give a semi-structured interview.	The population consisted of mostly female professionals from an urban area that worked at a hospital with a multi-county catchment area. Most had a master's degree. It was found that they think that rural patients have greater socioeconomic disadvantage, transportation and lodging costs, trouble accessing resources, and ideological differences. They also found a number of ways that healthcare professionals address and find financial hardship.
Financial hardship among rural cancer survivors: An analysis of the Medical Expenditure Panel Survey (14)	United States	Examine urban-rural differences in cancer survivor-reported financial hardship.	The authors used a MEPS-based survey to gather their data.	The majority of patients were upper income white females with a GED diploma or less. Rural patients were less educated and the majority of both samples had private insurance. Key findings primarily relate to patient and physician responses to financial burden. Particularly, they found that there is a lack of discussion between physicians and patients about finances. They also discussed the importance of type of insurance and Medicaid for relieving financial burden.
A systematic review on the qualitative experiences of people living with lung cancer in rural areas (5)	Australia & New Zeland	To identify and collate evidence surrounding the qualitative experiences of people with lung cancer living in rural areas as well as to thematically synthesize evidence surrounding the qualitative experiences of people with lung cancer living in rural areas.	This study uses a number of search engines to find studies that included adult participants from high to medium income countries. Then with these studies, thematic analysis was done.	Most studies included rural patients between the ages of 40 and 75, with the average patient age being around 65. There was a relatively equal amount of both genders. Upon examination, this study found that cancer patients have little to no quality communication with health professionals, along with little knowledge of how the system works, and did not seek help. Further, it was found that travel serves both as a burden and barrier to patients in care. Rural patients also did not recognize the true financial burden of their treatment.

Continued Table 1. This table breaks down key characteristics of each reviewed study including the title, references, origin, aim, methods, population, and key findings. Collectively, the studies share a common theme of rural patients having higher costs of treatment, and significantly higher expenses in many categories such as travel and accommodation. There was also little discussion between patient and healthcare professional which was more significant in rural patients, and there were functional barriers for both rural and urban patients.

Title	Origin	Aim	Methods	Results
Direct and indirect costs of families with a child with acute lymphoblastic leukaemia in an academic hospital in China: a cross-sectional survey (9)	China	To estimate indirect costs in families with a child with acute lymphoblastic leukaemia (ALL) in China.	This study searched for patients at the Shanghai Children's Medical Center that were diagnosed from the ages of 0 to 14 from 2010 to 2014. They then asked these patients questions related to finance while sourcing their data on medical costs directly from the hospital.	This study reviewed 161 patients with the average age being 4.9 years old. Most parents had health insurance. Rural patients were less educated than urban patients. The average household income was around 2,500 USD. It was found that in total rural and urban people paid similar median amounts for cancer treatment. However, they critically found that these high costs stemmed from China's in-provence reimbursement system which only reimburses for in-providence treatment.
Financial Burden Faced by Families due to Out-of-pocket Expenses during the Treatment of their Cancer Children: An Indian Perspective (15)	India	The aim of this study is to find out the details of out-of-pocket expenses incurred by the families during their treatment of cancer children and its implications on their quality of life.	This study examines patients from a single Indian hospital who were 0 to 18 years old and were at least three months from their cancer diagnosis. These patients were questioned with a structured questionnaire.	The majority of the sample was male, from a rural household, and lived in a household size of 3 to 4. Most patients took public transportation to the hospital and had an annual household income of 60,000 to 119,999 Rs. They found that rural patients pay much more for out-of-pocket expenses. The largest contributing factors were accommodation and transport. Further, a large number of families went into debt or used up all their savings, and could not borrow money from institutional sources.

the U.S. Department of Agriculture's (USDA's) 2013 Rural-Urban Continuum Codes (RUCC). This system defines places as urban vs rural based on population density and proximity to metropolitan areas. It then gives the county a score of 1-9, with the lower numbers representing a more metropolitan area. The study gathers its information using semi-structured interviews of 29 health professionals from seven states (IA, KY, NC, OH, OR, SC, WA). Fifty percent of the urban interviewees were social workers with a master's degree, while fifty percent of the rural interviewees worked in "other" with the examples given being public health and pharmacy. The majority of rural interviewees had a bachelor's degree. Key findings were that groups in rural areas experienced more financial hardship due to the greater socioeconomic disadvantage in the area that stemmed from a weaker job market. This was further exacerbated by the challenges that rural patients face when it comes to getting to the hospital for their treatment. These problems were not recognized by urban health professionals. Another key finding was that both groups faced challenges in accessing resources, primarily due to the complexities of the healthcare and insurance systems in America. Petermann and colleagues also found that this problem was worse for rural patients because they lacked financial support systems and internet access. The study also addressed significant issues among patients. Although not operationally defined, these issues include: "comfort discussing finances", "health literacy", and "language barriers". One significant finding is that rural patients are less likely to discuss finances and have lower health

literacy. The author attributes many of the challenges faced by rural patients to their socioeconomic status and the difficulty of paying for out-of-pocket costs not covered by insurance. Urban patients had many of the same issues; however, they were felt more strongly by rural patients (8). The study also found that the urban population had more access to and utilized more resources than rural patients. Despite all these factors, rural patients reported more often that their needs were met. As a whole, the bottom line is that rural patients are at higher risk of financial hardship, with distance from cities being correlated with more hardship.

Odahowski et al. (2019) conducted a retrospective study that examined the urban-rural differences in cancer survivor-reported financial hardship in the United States (14). Financial hardship is an undue financial burden because of the costs of care (14). The majority of the cancer survivors did not have financial hardship yet expressed financial worry. The age ranges of the participants were equally divided between 18–65-year-olds and the 65–85-year-olds. The majority of the rural participants did not have a diploma, while the majority of urban participants did. Both samples were mostly white, married, and with middle to high incomes. Most had insurance, and most were 5 years+ away from their last treatment. Participants of an older age and higher education were less prone to financial worry than younger and less educated people. Similar to other studies (8, 9), these reports on how insurance and insurance status are heavily correlated with financial hardship. Importantly, this study found that physicians don't tend to discuss finances with patients, and vice versa, as only 19% of patients who wanted to talk to their physicians about financial struggles followed through. This is detrimental as patients who talked with their doctors had less financial burden compared to those who did not. Another finding was that working-age people who have public insurance are more likely to experience financial hardship. Medicaid was found to help relieve a significant financial burden; however, access to this service is limited in rural areas.

Ali et al. (2024) identified and collated qualitative evidence and experiences of patients with lung cancer living in rural areas and synthesized the evidence surrounding these experiences (5). The participants tested were rural patients from high-income countries who exclusively had lung cancer. Eight out of nine of the studies were from Australia, and the other was from New Zealand. The majority of the studies included other non-lung cancer patients, but their data was excluded. The majority of the studies - 5 - used a qualitative design, while the others used a mixed design. Their range was from 2000-2023, and they only used adult studies in English. If a study included patients who had lung cancer or were rural, it was included. Out of the 102 results yielded, only nine were used. One of their studies found that health-related information was only occasionally given to survivors and that survivors had varying attitudes towards getting help due to emotional distress. Another found that patients with more access to support workers had better health outcomes and that urban health care professionals had little empathy for traveling rural patients. They also found that it took longer for rural patients to get intervention, and that they were more surprised by their diagnosis. Significantly, they also found that rural patients have little trust in health care, leading them to be reluctant to see health professionals. Additionally, they also have concerns about costs and experienced financial hardship and a lack of access to public transit. Finance was regarded as a large barrier as well. Out of this information, they identified five major themes. "Travel and financial burden" is the only one that strongly addresses finances, as it entails that travel and accommodation were large financial stressors for patients. "Communication and Information" briefly touched on finances by addressing how patients didn't know about any financial support available to them, at least initially.

Ren et al. (2019) estimated the direct and indirect costs in families with a child with acute lymphoblastic leukaemia (ALL) in China (9). They draw their population from the Shanghai Children's Medical Center (SCMC), although most of the population (79%) comes from outside of the Shanghai province. Their inclusion criteria for their population were that the patients were all diagnosed between the ages of 0-14 during the period 2010 to 2012 at the SCMC with ALL. They were required to be at least two years from the first step of a three-year treatment plan. Interviews were conducted over the phone with 161 patients out of the 171 originally contacted. Rural patients were slightly older at health diagnosis, while also having a shorter treatment period, and a larger family size. Rural families also had higher rates of health insurance, despite urban patients having a higher income. It is worth noting that this population, although it covers a large part of China, is, on average, wealthier compared to the Chinese population at large. Costs were divided into three categories: Direct medical costs (broken into inpatient and outpatient costs), direct non-medical costs further broken down

into accommodation, transportation, expenses on food and nutrition, expenses on hygiene, and gifts), and indirect costs due to productivity loss. Rural patients spent more overall in direct medical costs (roughly USD 1,000 more), specifically much more in outpatient patient costs (roughly USD 1,000 more), but slightly less in inpatient costs (around USD 200 less). Both groups paid roughly the same in total nonmedical costs, but rural groups paid much more in accommodation costs. They paid similar amounts for transportation, and their findings on the cost of transportation were much lower than other literature. Rural groups spent less on food and supplements. Urban patients paid much more for hygiene and cleaning products, as well as gifts. Rural groups lost much more, around USD 1,400, in indirect costs from a lack of work/work productivity. They ended up with similar amounts on the median for total costs. It is worth considering that reimbursement was a problem for both groups, because China's insurance system only reimburses significantly for inpatient treatment. This problem was prevalent more in rural families because they lived outside of the Shanghai province. As aforementioned, one limitation of this study was a lack of participants with low socioeconomic status. All the data was self-reported and is therefore subject to bias. It was also focused on a single, but very large hospital.

Sneha et al. (2017) focused on finding the details of out-of-pocket expenses incurred by Indian families during their treatment of cancer among their children and its implications on their quality of life in a hospital in India where the children were undergoing treatment (15). They drew their population from an Indian setting. Their population included families from a single hospital currently undergoing treatment. They had to have a child aged 0-18 years who had been going through treatment for at least three months to be eligible. Out of this population, a random sample of 70 families was identified. Sixty-four percent of participants were rural residents. The majority have at least a primary school and/or a high school education. However, the authors did not indicate any further breakdown of education by region. The average household size was either 3-4 or >4. The participants fell pretty evenly into each group, with sixty percent of families having three to four members and forty percent having more than four members. The majority of patients had two kids. Most groups used public transit, but a fair percentage (38%) of participants used a hired or personal car. The majority of the participants made an income of 60,000 RS. - 120,000 Rs. (USD 1,158 to USD 2,317)[1]* far below the average 2025 Indian salary estimation, of around 8,67,007 Rs. (USD 10,000)[1]* (16). The original data was in Indian Rupees, as displayed. It was transferred into USD by first putting the data into the OANDA currency converter set for January 1st, 2017 and then converting it into 2025 USD using the Smart Asset Inflation Calculator. They found that rural participants spent nearly 10 times more on public transit costs than urban groups. This trend continued for taxis as rural groups spent almost double the amount that urban groups did. Rural groups spent 6131.32 Rs. (USD 118)* on average on rented accommodation per month, around five to ten percent of the average income per year of the families in the study, which is close to qualifying as an unfair, catastrophic financial burden (17). Rural groups also spent more on phone calls, 50 Rs., and had more days of reduced paid hours, of twelve hours/day on the high end for rural groups relative to the eight hours/day of urban residents, although urban patients lost more money 250 Rs. more on the high end, but they both lost similar amounts on the low end. Both groups had similar leave without pay numbers. According to the researchers, food, travel, and accommodation have emerged as the major factors that account for 54 percent of the out-of-pocket expenses incurred for each hospital admission for rural families, while these out-of-pocket expenses only accounted for about 20 percent of urban patients' total costs. Less than five percent of families decided to borrow from banks, and 22 percent of families borrowed money from moneylenders. However, money lenders have high interest rates of 12.5% which pushes families into debt. Out of all the participants, the majority went into debt or used up all of their savings during their time in the hospital. Ultimately, both groups spent a large amount of money on out-of-pocket expenses for each hospital trip, but rural groups had to spend more.

This section examines the major theme found among these five papers: Compound Socioeconomic Disadvantage. A conceptual framework of Compounding Financial Burden can be seen in Figure 2. This framework puts together the results from the five studies to illustrate how pre-existing issues relate to increased treatment cost, which in turn results in financial burden and other consequences such as poverty. Primarily, the preexisting issues consist of problems independent of cancer, such as job type. Cancer stimulated issues arise because of cancer treatment, and are directly related to it. Compound socioeconomic disadvantage is

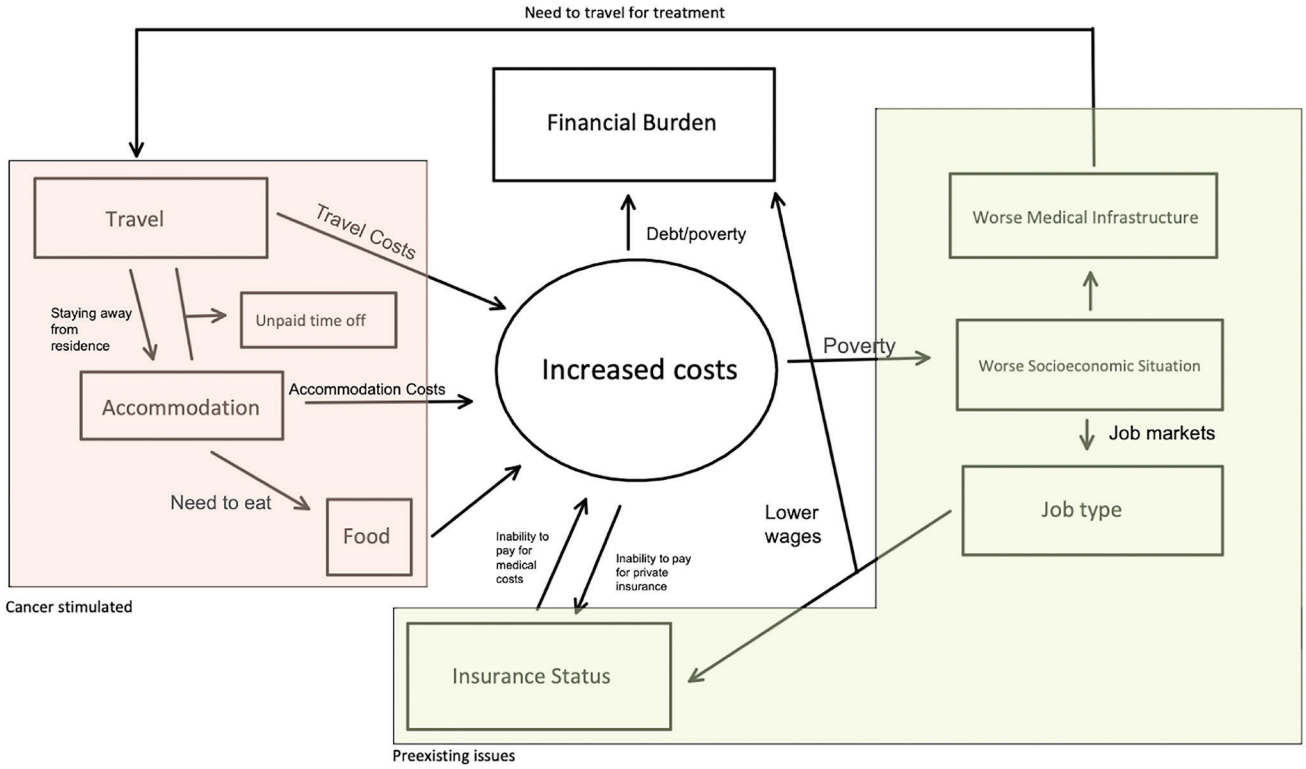

Figure 2. A conceptual framework of Compounding Financial Burden. This is based on the five papers examined and represents a rural patient's pathway to an cyclical increased cost of treatment and large financial burden. Primarily, the preexisting issues consist of problems independent of cancer, such as job type. Cancer stimulated issues arise because of cancer treatment and are directly related to cancer treatment. These are the majority factors directly contributing to increased costs of treatment, because they often relate to costs of treatment or getting to treatment. However, this cancer stimulated costs often exist because of the aforementioned preexisting issues, showing the cyclical nature behind cancer patient's costs. Ultimately, this model visually represents how there are a number of factors that not only contribute to rural patient's heightened financial burden but also exacerbate each other. This framework serves as a general representation of compounding financial burden that could be applied to most countries and regions.

due to increased expen-diture and job type. Increased expenditure covers the costs of travel, accommodation, and increased medical costs from a lack of insurance. Job type goes over how the jobs of rural residents leave them more vulnerable to financial burden because of decreased salary, time off, and how jobs contribute to insurance.

Compounding Socioeconomic Disadvantage

This was the one major theme found through all five of the studies. It consists of two subthemes: higher expenditures and job type.

Higher Expenditures

One of the largest contributors to the increased expenditure of rural patients was travel. Travel is a unique issue for rural patients because, unlike urban patients, they often have to travel to receive the same level of treatment that urban patients receive (8, Figure 2). This is because rural healthcare systems aren't as developed as urban ones due to rural lack of infrastructure, and sometimes rural patients must travel for certain types of treatment (8). The costs of travel for rural patients are much higher than the costs of travel for urban patients as well (9). These increased costs of travel were demonstrated particularly in Sneha et al (2017). Rural and urban patients both had to pay for travel; however, the cost was much larger for rural patients (15). These costs were further advanced by the rural patients' use of private transit, particularly taxis. Both private and public transit methods were found to be expensive, which further compounds the financial

burden (Figure 2). One way that patients could have reduced costs in Sneha et al (2017) is with personal transportation, but no rural patients seemed to have it, likely due to their socioeconomic status (15). These travel costs were not insignificant either, as travel costs represented around 18% of rural patients' total costs; however, they only represented 10% of urban patients' total costs (15) - a large disparity that is hard to overlook.

These costs are not covered by insurance in most of the world, especially not the weaker insurance that most rural patients have due to their job types (8, 15, Figure 2). So, patients' travel costs play a significant role in the financial burden of patients, as they have to be paid entirely out-of-pocket. Petermann et al further found that physicians and other health professionals have little knowledge of this issue and rarely recognize it in rural patients (8) - this makes it harder for rural patients to manage this expense because they are less likely to receive referrals, aid, or have their schedules adjusted to accommodate their travel - contributing to financial burden (8). In continuation, the time away from home that travel demands weighs heavily on rural patients because it makes it so they may take leave from work, leaving a reduced income, making paying off treatment harder (Figure 2).

Another significant cost faced by rural patients that significantly increased their financial burden was the costs of accommodation, which generally accompanies travel, as families want to try to mitigate the costs and burden of travel through staying at a hospital (15). It was reported in all of the studies that quantitatively measured the costs of accommodation that accommodation was a large financial stressor for rural patients (15, 9). It ended up being close to a majority of their indirect cancer care expenses in Ren et al (2019) where an estimated 45% of non-medical costs were accommodation - similar numbers to Sneha et al (2017). This problem was identified as a unique issue for rural patients in Sneha et al (2017). Accommodation, however, was experienced by rural and urban groups in Ren et al (2019), but the costs of rural patients were much larger than those of urban patients - around USD 1000. This could possibly be because of the stronger internal resources seen to support urban patients inside of hospitals, with Peterman describing how there are more internal resources dedicated to helping urban patients deal with accommodation than there are for rural patients (8). So, despite the issue of accommodation weighing more on rural patients, there seems to be little infrastructure to correct this issue.

Beyond just the upfront costs of housing that accommodation presents, it could further present issues for rural residents that may not hold true for urban residents. Primarily, the long stay away from their home may further contribute to rural patients' financial burden by keeping them away from work for longer, supported by rural patients having a larger loss in paid work hours in Sneha et al (2017). Considering that rural people tend to work more for smaller companies or are self-employed (18), virtual or remote positions may not be possible because of their job type or internet access (8). By staying in accommodation, away from their place of work, rural patients may sacrifice paid work during the period of treatment. This loss of work and income makes several expenses harder, like paying out-of-pocket costs like travel and paying for private insurance (18), while further decreasing one's socioeconomic status and increasing financial burden.

Accommodation also comes along with further expenses that contribute to the financial burden, particularly food costs. Both Ren et al (2019) and Sneha et al (2017) found that urban and rural patients paid large amounts in food, with Ren et al (2019) suggesting that both paid similar amounts and Sneha et al (2017) saying that rural patients paid more, almost ten times more (15). The cost of food is almost always going to accompany foreign accommodation because patients either choose to get food, as they often prefer it to hospital food, or eat out (15). Both are expensive and contribute largely to the financial burden due to their out-of-pocket nature (Figure 2), which may be harder for rural patients to pay because of their lower socioeconomic status. Ultimately, rural patients use accommodation to avoid the costs of expanded travel and the burden it can have on their health and their finances. However, accommodation still leaves a large impact on the financial burden of the patient as a whole and presents problems for the patient and their employment during and after their treatment.

Another finding in many of the studies, Odahowski et al (2019) is that rural patients were less privately insured, less insured, and more publicly insured compared to urban patients, and that a patient's insurance status serves as a large indicator of whether a patient would be under financial burden (8, 14). This is because insurance pays for some of the medication, which comes at a large portion of the costs for many patients (15), helping to decrease the financial burden they face, even though it doesn't totally cover all of

it. So, a lack of insurance, which is found more in rural residents for several reasons, primarily because of medication costs, contributes to a higher overall financial burden (8, Figure 2). Rural patients are more at risk of this lack of insurance, bad type of insurance, and the increase in financial burden that stems from it (14, 18) primarily because of their jobs compared to urban residents. Further, rural patients' lower wages make it harder to obtain private insurance due to the cost. It was found that private insurance is much more effective than public insurance at reducing financial burden (14) because of its more complete coverage of wide-ranging medical costs (19). This is because public insurance, if it is available, is much less developed, with Medicaid and Chinese Insurance being the two examples in these sets of studies. Both offer less than complete coverage that depends strongly on where the patients live, with rural patients getting the short end of the stick, as rural patients often live in places with the least developed government plans, like Mississippi and Alabama - both have high rural populations but have not expanded Medicare or Medicaid (20, 21). Their lack of private insurance is also partially due to employment, as rural employers cover employee insurance less than urban ones (18).

Further, in the US, some patients can't afford or are not able to receive Medicaid but are also poor enough not to be able to afford private insurance (8), despite private insurance being a more favorable option compared to weaker employee insurance. With a strong insurance plan, patients are able to have more complete coverage of hospital and medical costs. They will therefore receive less financial burden from medical costs, which leaves them more able to cope with the non-insured costs because they are not being compounded upon by high medical costs. However, rural patients are frequently at a disadvantage when it comes to having this luxury (8, 18).

Job Type

One of the largest contributors and parts of the lower socioeconomic disadvantage for rural patients is their weaker job market, their lower income, job type, and how these factors compound with the increased leave that they have to take for cancer treatment. Primarily, rural patients were found to have a lower income (18, 14) this means that when rural patients take on out-of-pocket costs like the ones described, they are much more likely to weigh more heavily on these rural patients because they don't make as much, and are harder for them to pay off. Secondarily, it was found in an anecdotal account from Petermann et al (2021) that rural patients face challenges to cancer care because of their weaker job markets, and that there are few positions available. This speaks to the lack of job opportunities rural patients have, underlining the importance of the single job that they have, and how important it is to keep that job.

This on its own is an issue, and contributes to socioeconomic disadvantage, but it is how cancer leaves interact with a patient's job type that ultimately impacts and worsens financial burden. Petermann et al (2021) further reported that rural jobs often have less flexible leave policies than most urban jobs have because they are often small businesses or self-employed (18). This leaves issues for rural patients when they have to take leave for cancer because when they travel for their treatment, which most rural patients do, and need to take unpaid time off, which is unpaid due to their job type (Figure 2). Time off is also a relevant issue for urban patients; however, they often took less time off (15), and travel was the main motivator behind leaving a job behind for treatment (9).

In the period of extreme financial stress where some patients may end up either getting rid of all their savings, going into debt, or are forced to sell their belongings (15) due to the stress of their increased costs, being out of work makes it much harder to pay off these outstanding out of pocket costs because patients don't have a stable source of income - growing financial burden. In addition, if patient was fired due to the amount of time off that they had to take off due to their condition, it would be much harder for the patient to find a job due to the weaker job market, which may ultimately expand the time that they are financially burdened by cancer treatment, and intensify it because they are unable to pay it off due to their lack of work. Ultimately, a patient's job type, which stems from socioeconomic status, served as a significant contributor to financial burden, while also supplementing the other costs of cancer travel.

Similarities and Differences

As seen above, there is a general relationship between the studies that suggests this compounding financial burden. However, there are a number of disagreements between the studies. Primarily, almost all of the papers agreed that travel was a large burden for rural patients except for Ren et al (2019). They found rural patients pay roughly the same amount as urban patients in

travel. This could be for several reasons: 1) 79% of their total sample was not from the Shanghai Province, so 79% of their sample most likely had to travel some sort of distance to get to the hospital (9). This most likely balanced their numbers in travel because both groups were paying travel costs. This underlines that travel itself is a problem, and that it doesn't matter if one is urban vs rural; it matters that a patient has to travel to get access to treatment. However, this problem will still affect rural groups unequally compared to urban groups simply because urban centers house more hospitals than rural areas (22). This makes travel a requirement for rural residents, instead of an option or last resort like it may be for urban ones, and considering that China has a relatively high HDI (Human Development Index) (23), this problem is only exacerbated in less developed countries because there are fewer hospitals (24). However, this change in demographics is likely not the only reason why the urban-rural numbers are so similar. 2) These statistics could be explained by China having a relatively strong public transit system (25), especially in its urban centers. However, these public transit systems, like the ones in Shanghai, are increasingly less efficient the farther you get out from the city center as the number of city centers accessible going down dramatically as one gets farther and farther from the city (26). Further, public transit systems become less and less efficient as the proximity to city centers decreases, with private transit becoming the preferred option (26). This means that for rural patients, and most likely those out of province, the major and likely only option for efficient travel was private transport, despite it being out of reach due to their lower income.

This lack of availability of public transit is echoed across the globe, even in highly developed countries like the United States not all rural people having access to public transport to intercity regions (27), this makes costly-personal travel the only option for many and this access only decreases with a lower HDI in poorer region - the access to public transit between Africa and Europe drops by half (11). This private transit may be more difficult for rural patients across the globe rural patients as well, because in most underdeveloped countries, there is a significant lack of travel infrastructure around rural residents (11). Across low-development countries, there is still a lack of all-weather roads and other travel infrastructure that may increase the time and difficulty of travel for rural patients over long periods of time (11), which could end up with higher costs of travel and then increased financial burden. Ultimately, although travel is a problem that can be experienced by both rural and urban patients, as Ren et al (2019) suggest, rural patients experience more financial burden, and a greater effort needs to be taken in order to increase the infrastructure around rural travel.

On the other hand, part of the reason why accommodation seemed to weigh so heavily on all the patients is that there are few resources dedicated towards alleviating this issue at all. In China, for example, patients were able to stay in hospital rooms for 30 days, free of charge; however, this barely helps the issue as treatments rarely ever last 30 days, and giving 30 days of board is beneficial but doesn't solve the problem (9). This was further reported in the United States, where many hospital patients had to go look for accommodation and seemingly got no aid in finding shelter unless they requested it (8), which brings up further issues for rural residents, as they are much more reluctant to discuss finances than urban residents (8) meaning they are less likely to receive accommodation aid, despite needing it. Further, part of the reason why these costs weighed so heavily on patients is that they are entirely out of pocket, even with aid or insurance plans (15, 18). This means almost all patients accumulated these expenses.

Furthermore, healthcare professional-patient care also reappeared not as a direct contributor to financial burden but rather as a compounding factor on existing contributors to financial burden (8, 5). Primarily, in Petermann et al 2021, it was found that a significant barrier for rural patients was their lack of discussion about their finances, which is in agreement with and discusses this from a general distrust of health professionals, less financial literacy, and willingness to discuss finances with health professionals 8). This presents and compounds upon preexisting roadblocks to rural patients. First, as previously mentioned, health professionals tend to be unaware of rural barriers to treatments, particularly travel (5). This is most likely because almost all the methods used to identify financial hardship do not have a 100% catch rate; they are all exclusively based on participant answers. Furthermore, as Ali et al found, rural patients tend to be aware of the travel distance to treatment, so it is unlikely to appear on self-answer surveys, and rural patients' stoicism (5) would make this problem appear even less on self-report surveys. This means that unless rural patients communicate about the burden of travel to their provider, it will likely never be addressed, nor their treatment plan changed to accommodate this

roadblock and decrease the burden they face from travel.

Although it does not particularly align with one of the major costs of treatment found in this review, another consistently mentioned method that could be used to help alleviate the financial burden pathways of both rural and urban patients is by increasing their access to support systems. This is because one of the reasons why many of the aforementioned costs of treatment - accommodation and travel - contribute largely to financial burden is that there is a lack of ways to alleviate these costs. There are varying degrees of access to support systems between rural and urban patients. In the United States, urban patients have increased access to nationwide programs because of their internet access and larger social worker population at their hospitals to help them navigate these programs and refer them to others (8). Meanwhile, rural patients used local programs (8), most likely because of their inability to access nationwide ones due to their lack of resources stemming from their socioeconomic status. These local programs may struggle to cover the financial burden of urban patients as much, while nationwide programs may be able to contribute to the rural patients already increased financial burden. In a slightly less developed country, like China, it seems efforts need to be made to establish a reliable support system for patients, without caveats, so that all patients can have true functional access to a support system rather than conditional access. In even less developed countries such as India, the problem seems to be an outright lack of formal assistance from the government in place, so efforts must be made to create programs to help care for patients' economic burden so that patients do not have to rely on external aid sources that may change unreasonable interest (15).

CONCLUSION

Although there is substantial value in understanding the mechanisms behind the financial burden of rural patients, what will ultimately make an impact is the response to these mechanisms. There are a number of avenues that legislation, funding, and programs could take place in order to help rectify many of the aforementioned mechanisms.

Possible legislation that could take place to alleviate the cost of travel in patients could be in two forms. One is by enhancing or establishing preexisting road systems. By making private travel more efficient and easy for rural patients, the burden of travel, both financial (28, 29) and mental (30, 31), could be alleviated. Having access to a reliable transit system would make accessing medical centers easier. The alternative option is to establish and improve existing public transit. Currently, even in countries with well-established public transit systems, like China, progress needs to be made to connect rural and suburban residents to these cities (26). Expanding these preexisting systems to rural residents would be a viable option and potentially a way to help mitigate the costs of travel that many rural patients must face. However, there is more that needs to be done than just expanding these systems geographically, as they must be internally bettered as well. One of the primary reasons that Indian patients did not use public transit despite its availability was because of the fear of their child getting more ill on public transit (15). So, finding ways to mitigate passenger overflow on public transit, as well as keeping them clean, will be critical to patients utilizing these resources, if they are developed. In lower development countries, developing basic infrastructure is the best course of action as it will support future services (32). In more developed countries, or countries with an existing transport system, expanding to rural communities is likely the best course of action. If any of these actions are pursued, especially in tandem with each other, real steps could be made towards mitigating the costs of travel for rural patients (Table 2).

There are a few suggestions given for how to amend the costs of accommodation in any of the studies, despite its prevalence. There are a couple of actions that could be taken. Primarily, accommodation around hotels and major health facilities could give deals to patients who are staying for treatment. This would make staying near a hospital more financially viable for patients because of the reduced costs and, therefore, lowered financial burden. Secondarily, steps could be taken to establish new hospital housing, like the Ronald McDonald House. These could be effective in larger hospitals because they have the funding and resources from higher return rates (33). They also could be effective in rural areas because of larger land availability (34). However, the cost of land in rural areas, and the lack of resources at rural hospitals are at odds with these goals. To accomplish this, external funding would likely be possible to overcome the costs of land and a lack of resources.

Communication could also play a large role in helping diminish the financial burden of both rural and urban patients by assisting in the role that insurance and

socioeconomic status play in their treatment. This would be done through direct physician-patient communication about their financial state during treatment, which allows the patient's physicians to properly alter their treatment plan through medication (35) to fit their financial situation during treatment. Discussion as a whole, along with more skillful communication, was found to create better patient outcomes (36). However, this action is pursued by very few patients - only around 19% of patients followed through with discussing with their physician when they wanted (14). This discussion could play a role in alleviating the socioeconomic disadvantage for rural patients, because a decrease in the medical costs covered by insurance means that a worse quality of insurance could be remedied by less of an upfront cost, leaving less burden for rural patients with a less favorable insurance status (Table 2).

Increasing education was also suggested as a way of managing finances; this solution goes hand-in-hand with communication while also helping to alleviate the effects of bad communication. In more free countries, adjusting education could be a cost-effective way to improve access and usage of preexisting programs, which is what patients seemed to largely struggle with when they did not have physician support. This is because the major boundaries in accessing financial aid often stem from technical literacy (8). If more time and attention were spent in schooling, higher-level education, or in government-created educational programs on learning how to access these resources, they could see higher usage rates and a larger effect radius because all the patients who want to use them could find a way to use them (Table 2). Primarily, it could help rural demographics who already struggle with accessing resources. By increasing the level of literacy between rural and urban patients, some of the socioeconomic gaps between the two regions could be leveled (37). Further, this could help reduce the need for social workers and professionals specifically dedicated to helping people navigate financial resources. By increasing patient's self-efficacy, especially in rural regions, the need for social workers would be less, as patients could perform by themselves. For rural patients, this could be groundbreaking as they are already at a lack of social workers (8), and lessening their need could help decrease the preexisting socioeconomic disadvantage of rural groups.

However, there is something to be said for there being work done to preexisting educational resources and medical resources in general. It was found that most medical resources are higher than the average reading level of most of their patients, at least in the United States (38). This is detrimental to both urban and rural resources as it makes their entire healthcare journey more challenging. This problem could be remedied by making an effort to reduce the reading level of all healthcare educational material (Table 2). This could better patient outcomes, because patients will be able to make more informed decisions about their health, and potentially lower financial burden because patients could have a higher level understanding of how to acquire aid. Both of these present issues in higher and lower development countries. Primarily, in higher development countries, it may be difficult to get private medical practices to change their educational material (39). Further, in the United States, it seems unlikely that it will move in the direction of higher education, changing education, and supporting advancements in the medical system. These trends are represented in the administration's actions towards education funding (40, 41) and its funding cuts towards major medical centers (42). For lower development countries as well, they may lack the resources to change their educational system or develop updated health resources for patients (Table 2).

The strategy of increasing aid resources was discussed frequently within the studies for our chosen literature review. In Petermann et al (2021) and Odahowski et al (2019), there are a number of options given for how to expand aid and aid effectiveness. One of the given suggestions is to increase the functional access of rural patients to preexisting resources through increasing internet access and navigation services (8, 14). These improvements would be substantial in helping manage the financial burden of rural patients, as they would give them more access to financial services. However, access to these services seems almost irrelevant if they do not exist. To help solve this problem, Petermann et al (2021) suggests the expansion of already established services like Medicaid. This Medicaid expansion would help include more people in their range of aid, so that more people could get referred to Medicaid and then receive aid. Assuming or recommending this aid on a wide scale in the United States is very unlikely and unrealistic though as Medicaid and Medicare expansion is often up to the states (43), and expecting each state to decide to expand these programs is unlikely, considering how distinctly each state has already acted when given the choice to expand Medicaid (43). Further, it is unrealistic to expect a federally mandated expansion considering the current

administration's direction on healthcare aid and support (44). So a more likely approach to expanding aid for rural residents would be individual expansion by non-profits or non-national resources. This action makes more sense considering the resources utilized currently by rural patients. However, due to the lack of regulation on these programs, it is also unlikely to expect action or improvement from these programs.

Petermann's and Odahowski's approach of expanding current social programs was also addressed in Ren et al., where they suggested action in removing the barriers to accessing insurance (Table 2). This approach could work in countries that are still developing nationwide aid systems, like China. This is because China has a very strong pipeline for passing laws and legislation that are in line with its current goals (45). Legislation to develop rural regions of China is currently being passed (46), and although it is mostly based on basic infrastructure and expanding rural region's economic capabilities (46), this does establish intent to improve rural regions. Considering this it is possible that China may adjust rural aid systems later, but this is purely speculative.

Although it was not discussed in Sneha et al, one of the best ways to overcome the patient's financial burden may be through creating an official source of financial aid for patients. In Sneha et al, there were a few official options for patients to get aid. They rarely utilized banks, and patients did not use money lenders either because they charged high interest rates. So, the patients utilized less formal and more personal resources, like borrowing money from family (15). If efforts were made to establish a government-sponsored and fair system of support, there would be less need for patients to borrow money from external sources (Table 2).

There are current issues that present for all of these solutions. Primarily, with the United States leaving the World Health Organization (47) due to President Trump's executive order, the WHO loses a large amount of funding, around twelve to fifteen percent of its total amount of funding (47). This loss of funding will make it difficult for them to lead or enact any large health initiatives to make any of the aforementioned solutions possible.

Furthermore, from President Trump's current policy standpoint it is clear that he is focusing less on global health and more on America's health and chronic disease crisis (48). Because it is less likely that the United States will lead any foreign health initiatives or equity initiatives due to them being less involved in global health, the US will seldom support initiatives like the ones mentioned above. Considering this, there

Table 2. Description of Major Barriers from each of the study's regions and how these barriers could be rectified. The Chinese section represents how the lack of consistent aid given and a lack of rural travel infrastructure are key issues that could ultimately be addressed through infrastructure legislation and changes to the insurance system. The United States section underlines how there is a lack of functional access to support systems for many rural Americans, and how that can be remedied through both increasing infrastructure in rural regions and improving education. Furthermore, in Australia there is a lack of communication between physicians, and by improving patient trust in physicians better outcomes can be achieved. Lastly, in India there is a lack of support systems which stems from the lack of a government aid plan. This gap could be mended with a government sponsored aid plan.

Country/Region	Major Barriers	Policy/Institutional Gap[1]	Policy/Institutional Gap[2]	Policy Solutions
China	Travel falls off at a distance, lack of consistent aid.	Lesser developed public transit the farther from cities a patient is.	Insurance is conditional depending on where a patient receives treatment.	Increase the range of travel infrastructure and remove barriers of insurance
United States	Functional v. Formal Access to support systems[1], Education[2]	Internet access, patient communication, lack of social workers.	Health resources are above reading level.	Resources need to be developed for rural patients, both technological and educational.
Australia	Lack of communication	Physician distrust and physician attitudes.		Increase patient trust.
India	Lack of a support system.	Lack of a government funded wide reaching aid plan.		Develop a government sponsored aid plan.

will likely have to be a new leader on the world stage for enacting change for health emergencies like cancer and cancer inequity.

Ultimately, due to the variance in the general problems faced by rural patients, there is not one blanket policy that could be used to address these issues. However, there are broad policy trends and actions that could be taken and applied to communities and countries to help alleviate these issues. These actions do come with a lot of challenges, especially when applied on an international stage; however, they are possible with sufficient backing and support. This makes international support critical to this endeavor, as well as increased advocacy for these issues. This will likely be possible because of the number of health initiatives it falls into (49, 50).

The current literature on the financial burden of cancer for rural and urban patients demonstrates that rural patients have a significantly larger amount of financial burden from cancer treatment than urban patients do. This is due to their compound socioeconomic disadvantage, where cancer-stimulated costs - travel, accommodation, and medical costs - are increased because of the inherent socioeconomic disadvantage that rural patients have: job type, worse healthcare systems, and insurance. These factors cyclically decrease the socioeconomic status of rural patients while further increasing their costs, leaving them with a heightened financial burden. Even though urban patients and rural patients suffer from many of the same issues, rural patients suffer much more from them because of this cycle of socioeconomic disadvantage. This financial burden and the mechanisms around it often lead to worse patient outcomes, and occasionally prevent patients from pursuing care altogether, so the problem of financial burden needs to be taken as not only an issue affecting the finances of patients, but their treatment and chances at its success as a whole. As a whole, the total financial burden of cancer for rural patients is higher than that of urban patients, and for the sake of equitable health and wellness across the globe, further actions and research need to be pursued to address this disparity.

Strengths and Limitations

One of the large strengths of this literature review is that it synthesizes data from multiple countries at various stages of development. Much of the preexisting literature on this topic is very narrow in the fact that it focuses on a single country. This paper tries to advance the field by developing a more global perspective on cancer treatment that is not necessarily displayed in other papers.

One of the limitations of this paper is that it doesn't include literature from incredibly disadvantaged countries. Although there is a wide range of development displayed in the paper, this is a flaw that is hard to overlook. This stems from the lack of free literature that includes these countries. There is likely literature out there that represents these countries, but it was out of the scope of this paper and beyond the resources available to the author. Further, many of the studies look at single populations. Both Ren et al (2017) and Sneha et al (2017) only review populations from single hospitals; this makes them very limited in scope, making it hard to ascertain a complete view of the region being studied. However, this being considered, both studies used large hospitals that include.

ACKNOWLEDGEMENTS

I would like to extend my most sincere thanks to my family for their support, which helped make this paper possible. I would also like to express my gratitude to Dr. Torio, PhD, MPH, for guiding me through this process and pushing my thinking. Lastly, thank you to Kiana for assisting in the publication process and to Dr. Ortiz for assisting in copy editing.

FUNDING

No external funding was received at any point.

CONFLICT OF INTERESTS

The author declares that there are no conflicts of interest regarding the publication of this article.

REFERENCES

1. https://www.cancer.gov/publications/dictionaries/cancer-terms/def/financial-burden [Internet]. www.cancer.gov. 2011. Available from: https://www.cancer.gov/publications/dictionaries/cancer-terms/def/financial-burden (Accessed on 2025-7-25)
2. Chung H, Hyatt A, Kosmider S, Webber K, Meinir Krishnasamy. Availability and accessibility of services to address financial toxicity described by Australian lung cancer patients and healthcare professionals. *Supportive Care in Cancer.* 2023 Sep 1; 31 (9).

(Accessed on 2025-6-21). https://doi.org/10.1007/s00520-023-08019-4

3. National Cancer Institute. Financial burden of cancer care | cancer trends progress report [Internet]. Cancer.gov. 2024. Available from: https://progressreport.cancer.gov/after/economic_burden (Accessed on 2025-6-28)
4. Commentary: Oncologist speaks out on human toll of high health care costs [Internet]. Fred Hutch. 2016. Available from: https://www.fredhutch.org/en/news/center-news/2016/02/Oncologist-speaks-out-on-how-greed-is-harming-cancer-patients.html (Accessed on 2025-10-11)
5. Ali N, Nelson D, McInnerney D, Quaife SL, et al. A systematic review on the qualitative experiences of people living with lung cancer in rural areas. *Supportive Care in Cancer [Internet]*. 2024 Feb 6; 32 (3). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10844412/ (Accessed on 2025-6-21). https://doi.org/10.1007/s00520-024-08342-4
6. Oshima SM, Tait SD, Rushing C, Lane W, et al. Patient Perspectives on the Financial Costs and Burdens of Breast Cancer Surgery. *JCO Oncology Practice*. 2021 Jun; 17 (6): e872-81. (Accessed on 2025-6-30). https://doi.org/10.1200/OP.20.00780
7. Iragorri N, de Oliveira C, Fitzgerald N, Essue B. The Out-of-Pocket Cost Burden of Cancer Care-A Systematic Literature Review. *Current Oncology*. 2021; 28 (2): 1216-48. (Accessed on 2025-8-2). https://doi.org/10.3390/curroncol28020117
8. Petermann V, Zahnd WE, Vanderpool RC, Eberth JM, et al. How cancer programs identify and address the financial burdens of rural cancer patients. *Supportive Care in Cancer*. 2021 Oct 16; 30 (3): 2047-58. (Accessed on 2025-6-21). https://doi.org/10.1007/s00520-021-06577-z
9. Ren Y, Li X. Direct and indirect costs of families with a child with acute lymphoblastic leukaemia in an academic hospital in China: a cross-sectional survey. *BMJ Open*. 2019 Jul 1; 9 (7): e030511-1. (Accessed on 2025-6-21). https://doi.org/10.1136/bmjopen-2019-030511
10. Pew Research Center. Demographic and economic trends in urban, suburban and rural communities [Internet]. Pew Research Center's Social & Demographic Trends Project. 2018. Available from: https://www.pewresearch.org/social-trends/2018/05/22/demographic-and-economic-trends-in-urban-suburban-and-rural-communities/ (Accessed on 2025-10-8)
11. United Nations. 68% of the World Population Projected to Live in Urban Areas by 2050, Says UN [Internet]. United Nations. 2018. Available from: https://www.un.org/uk/desa/68-world-population-projected-live-urban-areas-2050-says-un (Accessed on 2025-7-5)
12. Broman K, Richman J, Ross E, F. Zengul, R. Weech-Maldonado, Bhatia S. Hub and spoke framework for study of surgical centralization within United States health systems. *The American journal of surgery*. 2023 Oct 1; 226 (4): 524-30. (Accessed on 2025-8-6). https://doi.org/10.1016/j.amjsurg.2023.05.006
13. NRHA. About Rural Health Care [Internet]. National Rural Health. 2024. Available from: https://www.ruralhealth.us/about-us/about-rural-health-care (Accessed on 2025-10-8)
14. Odahowski CL, Zahnd WE, Zgodic A, Edward JS, et al. Financial hardship among rural cancer survivors: An analysis of the Medical Expenditure Panel Survey. *Preventive Medicine*. 2019 Dec; 129: 105881. (Accessed on 2025-6-21). https://doi.org/10.1016/j.ypmed.2019.105881
15. Sneha L, Sai J, Ashwini S, Ramaswamy S, Rajan M, Scott J. Financial burden faced by families due to out-of-pocket expenses during the treatment of their cancer children: An Indian perspective. *Indian Journal of Medical and Paediatric Oncology [Internet]*. 2017; 38 (1): 4. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5398105/ (Accessed on 2025-6-21). https://doi.org/10.4103/0971-5851.203493
16. ERI Economic Research Institute. Salary Expert - Average Salary in India [Internet]. Salary Expert. 2025. Available from: https://www.salaryexpert.com/salary/area/india (Accessed on 2025-7-30)
17. Lansky SB. The high cost of cancer. *The American journal of pediatric hematology/oncology [Internet]*. 1987; 9 (1): 89-91. Available from: https://pubmed.ncbi.nlm.nih.gov/3592121/ (Accessed on 2025-7-4). https://doi.org/10.1097/00043426-198721000-00015
18. Jennifer Schlichting, PhD [Internet]. Cancer Network. 2015. Available from: https://www.cancernetwork.com/authors/jennifer-schlichting-phd (Accessed on 2025-7-10)
19. Scheufler L. Private vs. Public Health Insurance: Weighing the Pros and Cons [Internet]. Cover Kansas. 2023. Available from: https://getcoveredkansas.org/private-vs-public-health-insurance-weighing-the-pros-and-cons (Accessed on 2025-7-10)
20. Kaiser Family Foundation. Status of state medicaid expansion decisions [Internet]. KFF. 2025. Available from: https://www.kff.org/status-of-state-medicaid-expansion-decisions/ (Accessed on 2025-7-10)
21. Explore Rural Population in the United States | AHR [Internet]. America's Health Rankings. Available from: https://www.americashealthrankings.org/explore/measures/pct_rural_b (Accessed on 2025-10-10)

22. Du X, Du Y, Zhang Y, Zhu Y, Yang Y. Urban and rural disparities in general hospital accessibility within a Chinese metropolis. *Scientific Reports*. 2024 Oct 7; 14 (1). (Accessed on 2025-7-1). https://doi.org/10.1038/s41598-024-74816-4
23. Human Development Index [Internet]. Our World in Data. 2025. Available from: https://ourworldindata.org/grapher/human-development-index?tab=discrete-bar&time=latest (Accessed on 2025-7-1)
24. Peters DH, Garg A, Bloom G, Walker DG, Brieger WR, Hafizur Rahman M. Poverty and Access to Health Care in Developing Countries. *Annals of the New York Academy of Sciences [Internet]*. 2008 Jul 25; 1136 (1): 161-71. Available from: https://pubmed.ncbi.nlm.nih.gov/17954679/ (Accessed on 2025-7-8). https://doi.org/10.1196/annals.1425.011
25. Wu W, Hong J. Does public transit improvement affect commuting behavior in Beijing, China? A spatial multilevel approach. *Transportation Research Part D: Transport and Environment*. 2017 May; 52: 471-9. (Accessed on 2025-7-20). https://doi.org/10.1016/j.trd.2016.08.032
26. Fan N, chen xiaohong, tiantian tian, zhao siyu. Comparison of the transportation network for public trans [Internet]. Cell.com. Cell Press; 2024 [cited 2025 Aug 10]. Available from: https://www.cell.com/action/showPdf?pii=S2405-8440%2824%2900917-4 (Accessed on 2025-7-10)
27. 85% of Rural Residents Have Reasonable Access to Intercity Transportation; Lack of Reasonable Access Falls Disproportionately on Low-Income Households | Bureau of Transportation Statistics [Internet]. Bts.gov. 2023. Available from: https://www.bts.gov/data-spotlight/85-rural-residents-have-reasonable-access-intercity-transportation-lack-reasonable (Accessed on 2025-7-10)
28. Santos A, Maia P, Jacob R, Wei H, et al. Road conditions and driving patterns on fuel usage: Lessons from an emerging economy. *Energy*. 2024 May 1; 295: 130979-9. (Accessed on 2025-7-21). https://doi.org/10.1016/j.energy.2024.130979
29. Benardos A, Skenderas D. Exploring the true cost of infrastructure transit projects: Road vs Tunnel alternatives. *Tunnelling and Underground Space Technology*. 2025 Apr 11; 162: 106624-4. (Accessed on 2025-9-5). https://doi.org/10.1016/j.tust.2025.106624
30. Parameshwaran S. What Causes Traffic -- and How It Separates Rich and Poor Countries [Internet]. Knowledge at Wharton. 2023. Available from: https://knowledge.wharton.upenn.edu/article/what-causes-traffic-and-how-it-separates-rich-and-poor-countries/ (Accessed on 2025-8-14)
31. Rocque GB, Williams CP, Miller HD, Azuero A, et al. Impact of Travel Time on Health Care Costs and Resource Use by Phase of Care for Older Patients With Cancer. *Journal of Clinical Oncology [Internet]*. 2019 Aug 1; 37 (22): 1935-45. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6804875/ (Accessed on 2025-7-29). https://doi.org/10.1200/JCO.19.00175
32. Infrastructure investment [Internet]. OECD. Available from: https://www.oecd.org/en/data/indicators/infrastructure-investment.html (Accessed on 2025-8-4)
33. The Two Different Types of Hospitals in the U.S. The Need to Control Hospital Spending Without Harming Patients [Internet]. Available from: https://chqpr.org/downloads/Two_Types_of_Hospitals_in_US.pdf (Accessed on 2025-8-2)
34. Urban vs. Rural Land Acquisition: Key Differences and Challenges - Whitman Land Group [Internet]. Available from: https://whitmanlandgroup.com/urban-vs-rural-land-acquisition-key-differences-and-challenges/ (Accessed on 2025-10-10)
35. Zafar SY, Chino F, Ubel PA, Rushing C, et al. The utility of cost discussions between patients with cancer and oncologists. *The American journal of managed care [Internet]*. 2015 Sep; 21 (9): 607-15. Available from: https://pubmed.ncbi.nlm.nih.gov/26618364/ (Accessed on 2025-8-2)
36. Haskard Zolnierek KB, DiMatteo MR. Physician Communication and Patient Adherence to Treatment. *Medical Care [Internet]*. 2009; 47 (8): 826-34. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2728700/ (Accessed on 2025-8-2). https://doi.org/10.1097/MLR.0b013e31819a5acc
37. Chen X, Orom H, Hay JL, Waters EA, et al. Differences in Rural and Urban Health Information Access and Use. *The Journal of Rural Health [Internet]*. 2019 Nov 16; 35 (3): 405-17. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6522336/ (Accessed on 2025-10-9). https://doi.org/10.1111/jrh.12335
38. Eltorai A, Ghanian S, Adams C, Born C, Daniels A. Readability of Patient Education Materials on the American Association for Surgery of Trauma Website. *Archives of Trauma Research [Internet]*. 2014 Mar 31; 3 (1). Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4139691/ (Accessed on 2025-7-28). https://doi.org/10.5812/atr.18161
39. Greiner AC, Knebel E. Challenges Facing the Health System and Implications for Educational Reform [Internet]. Nih.gov. National Academies Press (US); 2020. Available from: https://www.ncbi.nlm.nih.gov/books/NBK221522/ (Accessed on 2025-10-8)

40. Mimbela R. Trump's attack on the department of education, explained [Internet]. *American Civil Liberties Union*. 2025. Available from: https://www.aclu.org/news/racial-justice/trumps-attack-on-the-department-of-education-explained (Accessed on 2025-8-2)
41. President Trump's Executive Orders (EOs) and Executive Actions Impacting Higher Education [Internet]. Available from: https://www.acenet.edu/Documents/Trump-EO-Summary.pdf (Accessed on 2025-8-2)
42. Collier R. Massive cuts to science and medicine in Trump budget. *CMAJ: Canadian Medical Association Journal [Internet]*. 2017 Jun 12; 189 (23): E812-3. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5468112/ (Accessed on 2025-8-2). https://doi.org/10.1503/cmaj.1095437
43. National Constitution Center. National Federation of Independent Business v. Sebelius | The National Constitution Center [Internet]. National Constitution Center - constitutioncenter.org. 2012. Available from: https://constitutioncenter.org/the-constitution/supreme-court-case-library/nfib-v-sebelius (Accessed on 2025-8-2)
44. Arrington J. Text - H.R.1 - 119th Congress (2025-2026): One Big Beautiful Bill Act [Internet]. Congress.gov. 2025. Available from: https://www.congress.gov/bill/119th-congress/house-bill/1/text (Accessed on 2025-8-2)
45. Yan W. Party-Legislation of Legislating-Party in the Chinese Socialist Rule of Law: The Role of the CCP in the Party-State Legislation Revisited. German Law Journal. 2024 Nov 7;1-22.(Accessed on 2025-10-10)
46. 郝瑀然.中共中央国务院印发《乡村全面振兴规划（2024-2027年）》_中央有关文件_中国政府网 [Internet]. Www.gov.cn. 2024. Available from: https://www.gov.cn/zhengce/202501/content_7000493.htm (Accessed on 2025-10-10)
47. Press A. Who Funds the World Health Organization? A List of Its Biggest Donors [Internet]. US News & World Report. U.S. News & World Report; 2025. Available from: https://www.usnews.com/news/health-news/articles/2025-01-28/who-funds-the-world-health-organization-a-list-of-its-biggest-donors (Accessed on 2025-8-2)
48. Bollyky TJ, Dieleman JL, Pedroza P, Searchinger C. An "Americas First" foreign policy includes global health. The Lancet Regional Health - Americas. 2025 Apr;44:101069. (Accessed on 2025-8-5). https://doi.org/10.1016/j.lana.2025.101069
49. United Nations. Goal 3 | ensure healthy lives and promote well-being for all at all ages [Internet]. United Nations. Available from: https://sdgs.un.org/goals/goal3#targets_and_indicators (Accessed on 2025-7-10)
50. Global Cancer Work | Public Health | American Cancer Society [Internet]. www.cancer.org. Available from: https://www.cancer.org/about-us/our-global-health-work.html (Accessed on 2025-7-1)