MINISTRY OF HEALTH OF UKRAINE
I. HORBACHEVSKY TERNOPIL NATIONAL MEDICAL UNIVERSITY
OF THE MINISTRY OF HEALTH OF UKRAINE

Ifeanyi Abraham Uzubuaku

UDC: 614.2:316.334.2:364-1

Qualification Paper

POVERTY AND ITS INFLUENCE IN THE COURSE OF HEALTH CARE

Specialty 229 Public Health

Academic supervisor:
Yurii Petrashyk, PhD, Associate Professor
of Higher Education Institution,
Department of Public Health
and Healthcare Management,
I. Horbachevsky Ternopil National
Medical University
of the Ministry of Health of Ukraine

Ternopil – 2025

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

AL	Alabama	AK	Alaska
AZ	Arizona	AR	Arkansas
CA	California	CO	Colorado
CT	Connecticut	DE	Delaware
FL	Florida	GA	Georgia
HI	Hawaii	ID	Idaho
IL	Illinois	IN	Indiana
IA	Iowa	KS	Kansas
KY	Kentucky	LA	Louisiana
ME	Maine	MD	Maryland
MA	Massachusetts	MI	Michigan
MN	Minnesota	MS	Mississippi
MO	Missouri	MT	Montana
NE	Nebraska	NV	Nevada
NH	New Hampshire	NJ	New Jersey
NM	New Mexico	NY	New York
NC	North Carolina	ND	North Dakota
OH	Ohio	OK	Oklahoma
OR	Oregon	PA	Pennsylvania
RI	Rhode Island	SC	South Carolina
SD	South Dakota	TN	Tennessee
TX	Texas	UT	Utah
VT	Vermont	VA	Virginia
WA	Washington	WV	West Virginia
WI	Wisconsin	WY	Wyoming

INTRODUCTION

Poverty is a complex, multifaceted issue that remains a significant challenge worldwide, with far-reaching consequences for individuals, communities, and nations. One of the most profound impacts of poverty is on access to and the quality of healthcare. Poverty creates barriers to adequate healthcare services, leading to poor health outcomes, increased morbidity, and even premature death. The relationship between poverty and healthcare has been extensively researched, yet the complexities of how poverty influences health care delivery and outcomes continue to demand deeper exploration.

Over the years, health has gained significant attention in global development policies, recognized as a key driver of economic progress rather than just a beneficiary of growth. This shift in perspective has emphasized the interconnection between poverty and public health, highlighting how economic deprivation negatively affects healthcare access, quality, and overall health outcomes. While historical approaches, such as the ‘basic needs’ strategy of the 1970s and the Alma Ata Declaration of 1978, placed health at the core of development, recent international efforts — including the UN Millennium Development Goals (MDGs) and various global health funding initiatives — have further reinforced the need to address health disparities linked to poverty.

The influence of poverty on public health is profound, as economic deprivation limits individuals' ability to access medical services, afford nutritious food, and maintain hygienic living conditions, all of which are crucial for disease prevention and overall well-being. The World Health Organization’s Commission on Macroeconomics and Health has reaffirmed that poor health not only results from poverty but also perpetuates economic hardships, creating a vicious cycle of ill health and financial instability. Recognizing these challenges, global efforts, such as the Global Fund for AIDS, TB, and Malaria and the Global Alliance on Vaccines and Immunization (GAVI), have sought to mitigate the impact of poverty on health by increasing investments in medical research, healthcare infrastructure, and disease-specific interventions.

Despite these initiatives, weak health systems in impoverished regions remain a significant barrier to progress. Shortages of trained healthcare workers, insufficient medical supplies, inadequate health information systems, and lack of proper funding continue to hinder the effectiveness of healthcare delivery. These systemic issues disproportionately affect vulnerable populations, exacerbating health inequities and preventing the realization of universal healthcare goals.

This study explores the multifaceted relationship between poverty and public health, with the objective of analyzing how financial constraints impact healthcare access, identifying the key systemic barriers that perpetuate health disparities, and evaluating the effectiveness of current global health initiatives in addressing these challenges.

Purpose and Objectives of the Study. The primary purpose of this study is to investigate the influence of poverty on the accessibility and quality of healthcare services, and to identify the underlying factors that exacerbate health inequities for low-income individuals. By focusing on the relationship between poverty and healthcare, the study seeks to illuminate the broader societal consequences of economic deprivation and the ways in which healthcare systems can be improved to address these disparities.

The specific objectives of the study are: - to analyze how poverty influences healthcare access, affordability, and quality of care; - to identify the social, economic, and political factors that perpetuate health inequities among poor populations; - to examine the long-term health outcomes for individuals living in poverty, particularly in relation to chronic conditions, mental health, and maternal and child health; - to propose policy recommendations aimed at reducing healthcare disparities caused by poverty.

Object and Subject of the Study

The object of this study is the relationship between poverty and the healthcare system, focusing on the accessibility, quality, and outcomes of healthcare services. The subject of the study encompasses the lived experiences of individuals from low-income backgrounds, healthcare providers, and the structural challenges faced by healthcare systems in addressing the needs of impoverished populations.

The **scientific novelty** of this study lies in its exploration of the multifactorial influence of poverty on healthcare, particularly in a contemporary context. While there is existing research on the individual aspects of poverty and health, this study aims to offer a comprehensive and nuanced understanding of how poverty intersects with healthcare systems, social determinants of health, and the political landscape. Additionally, the study seeks to incorporate new evidence and insights from emerging trends in healthcare delivery, including the role of digital health services and public health interventions targeted at reducing health inequities.

The **practical significance** of this study is twofold. First, it provides healthcare professionals, policymakers, and researchers with a deeper understanding of the challenges and barriers faced by low-income individuals in accessing quality healthcare. Second, it offers evidence-based recommendations to address these challenges, contributing to the development of policies and interventions aimed at reducing health disparities. This research is essential for the design of inclusive and equitable healthcare systems that are better equipped to meet the needs of impoverished populations, ultimately improving public health outcomes and promoting social justice in healthcare delivery.

Approbation of the results: The following article was published, discussing some of the findings of the study:

ADDRESSING POVERTY-RELATED HEALTH DISPARITIES: MANAGING SUCCESSFUL PROJECTS, PROGRAMS AND COMMUNICATIONS BOTH NATIONALLY AND INTERNATIONALLY / Y. PETRASHYK et al. *Bulletin of Social Hygiene and Health Care Organization of Ukraine*. 2024. No. 4. P. 49–53. URL: https://doi.org/10.11603/1681-2786.2024.4.15218.

CHAPTER ONE
LITERATURE REVIEW

The connection between socioeconomic status and health has been recognized for centuries. Modern research has not only confirmed this relationship but has also revealed a more nuanced phenomenon — the "social gradient of health" — which demonstrates that health outcomes improve incrementally with each step up the economic ladder. Studies spanning decades consistently show that wealthier individuals experience lower rates of chronic and acute illness, better self-reported health, and longer life expectancies than their less affluent counterparts. This gradient is so pronounced that even when comparing narrow economic segments—such as income deciles—each higher bracket enjoys systematically better health outcomes than the one below it.

What makes modern poverty particularly insidious is its invisibility to those not experiencing it. The working poor often blend into the background—the janitor cleaning corporate offices at night, the fast-food worker serving meals they can't afford themselves, the gig economy laborer piecing together rent money one task at a time. Their struggles unfold parallel to, yet separate from, the lives of the more affluent. This segregation by class means many never witness the daily realities of poverty: the impossible choices between medicine and groceries, the constant stress of insecure housing, the humiliation of seeking assistance in a society that stigmatizes need.

The persistence of such deprivation in one of the world's wealthiest nations challenges fundamental assumptions about economic progress. It suggests that growth alone cannot address poverty when systemic barriers—from wage stagnation to rising housing costs—continually recreate conditions of scarcity. As Harrington recognized six decades ago, and as remains true today, poverty is not merely a lack of money but a distinct social reality, one that shapes health, opportunity, and even basic human dignity. Until those with privilege acknowledge this parallel America existing in their midst, the cycle of disadvantage will continue, hidden in plain sight.

The challenges faced by impoverished individuals extend beyond personal financial hardship, manifesting in the physical and social environments where they live. Poor people are more likely to reside in deteriorating neighborhoods where poverty is widespread, creating a cycle of disadvantage that is difficult to escape. This concentration of poverty has grown significantly in recent years, with research indicating a troubling rise in the number of people living in "extreme-poverty neighborhoods" between 2000 and 2009 [1]. These areas are often characterized by poor educational attainment, low homeownership rates, residential instability, and high eviction rates. Additionally, residents of such neighborhoods frequently lack access to vital resources, social networks, and influential connections that could help them advocate for better living conditions.

The health implications of residing in high-poverty areas are profound. Although the exact mechanisms remain unclear, studies suggest that relocating families from such neighborhoods can lead to measurable health improvements, including reduced risks of obesity and diabetes [2]. One possible explanation is that residents in impoverished communities often lack the time, financial means, or specialized knowledge to address health-related issues collectively. Unlike wealthier neighborhoods, where strong social networks and voluntary associations help mitigate stress and foster collective action, high-poverty areas struggle with isolation and diminished community efficacy [3].

Community activism, such as protests against environmental hazards — often referred to as Not in My Back Yard (NIMBY) movements — tends to be less frequent and less effective in low-income neighborhoods. While grassroots efforts do emerge, as seen in the environmental justice campaigns in Chester, Pennsylvania, they are more commonly successful in middle-class communities. Affluent residents often possess professional expertise, legal knowledge, and political connections that enable them to challenge harmful policies more effectively. Moreover, local governments are generally more responsive to the demands of wealthier constituents, leaving low-income residents with little recourse. As one Oakland resident succinctly noted, “We cannot get the attention of the elected officials" [4].

The disparities in neighborhood conditions and civic engagement highlight the structural barriers that perpetuate poverty and poor health. Addressing these issues requires not only economic investment but also policies that empower marginalized communities, strengthen social networks, and ensure equitable government responsiveness. Without such measures, the cycle of concentrated poverty and its detrimental effects will continue to undermine the well-being of society's most vulnerable members.

The detrimental effects of poverty extend far beyond financial hardship, deeply infiltrating the very spaces where people should feel safest — their homes. For those living in poverty, housing options are severely limited, often forcing them into unsafe, unsanitary, and overcrowded living conditions that pose significant health risks [5]. Unlike wealthier individuals who can choose homes based on safety and comfort, the poor are frequently trapped in residences with inadequate heating, faulty plumbing, hazardous staircases, and infestations of mold, dust, cockroaches, and rodents [6]. These conditions are not merely unpleasant; they contribute to serious health problems, including respiratory illnesses, allergies, and neurological disorders [7]. Moreover, housing codes meant to protect residents are often weakly enforced in low-income neighborhoods, allowing landlords to neglect necessary repairs [8].

Overcrowding, another common feature of low-income housing, compounds these health risks. Studies show that living in cramped spaces leads to elevated blood pressure, heightened stress hormones, increased transmission of respiratory infections, and psychological distress [9]. The constant strain of such an environment leaves poor individuals more susceptible to chronic stress and illness, further entrenching the cycle of poverty.

At the extreme end of inadequate housing lies homelessness, a devastating reality for millions of Americans. In Chicago alone, an estimated 92,000 people — including 14,000 schoolchildren — experience homelessness each year [10]. Nationwide, evictions push countless individuals into unstable living situations or onto the streets. While some evictions follow legal procedures due to unpaid rent, others occur informally, often as a result of "nuisance property ordinances" that penalize landlords when police are called multiple times for disturbances [11]. Domestic violence victims face an impossible choice: endure abuse in silence or call for help and risk eviction. Tragically, landlords frequently respond to reports of domestic violence by evicting tenants, disproportionately affecting Black and Hispanic women, who face eviction at significantly higher rates than their white counterparts [12].

The intersection of substandard housing, eviction, and homelessness creates a public health crisis that disproportionately harms the poor. Without safe and stable housing, individuals struggle to maintain physical and mental well-being, perpetuating a cycle of poverty and illness. Addressing these issues requires stronger tenant protections, equitable enforcement of housing codes, and policies that prevent homelessness rather than criminalize poverty. Until then, the walls meant to shelter the poor will continue to undermine their health and stability.

For those without stable housing, emergency shelters and transitional housing offer only a temporary reprieve from the streets, but these spaces are far from safe havens. Overcrowding, lack of privacy, and unsanitary conditions in shelters contribute to both physical and mental health deterioration, increasing stress levels, blood pressure, and susceptibility to illness [13]. In many U.S. cities, the demand for shelter beds far exceeds availability, forcing countless individuals to sleep on sidewalks, in parks, or in makeshift cardboard shelters. The immediate dangers of exposure, violence, and disease make homelessness not just a social issue but, as researchers argue, a full-blown public health crisis [14].

The health risks faced by the poor extend beyond homelessness. Those who do secure housing often live in neighborhoods burdened by environmental pollution, compounding their vulnerability. Air pollution, a leading cause of cardio-respiratory diseases, asthma, and lung damage, disproportionately affects low-income communities [15]. Industrial plants, waste facilities, and other polluting operations are frequently concentrated in poor neighborhoods, creating a toxic cycle: industries relocate to these areas because land is cheap, labor is abundant, and residents lack the political power to resist [16]. Meanwhile, impoverished individuals move near these sites because housing is more affordable, even at the cost of their health.

This environmental injustice means that the poor suffer a double exposure — enduring both the health hazards of substandard housing and the toxic consequences of industrial pollution. While wealthier communities can mobilize against environmental threats through legal action or political pressure, low-income residents often lack the resources to fight back. The result is a deepening of health disparities, where poverty itself becomes a determinant of chronic illness and premature death.

Addressing these intertwined crises requires more than temporary shelters or pollution regulations — it demands systemic change. Strengthening tenant rights, expanding affordable housing, enforcing environmental protections in vulnerable communities, and empowering residents to challenge industrial abuses are all essential steps. Until then, the poor will continue to bear the heaviest burden of homelessness and environmental degradation, trapped in a cycle where they live determines how long — and how well — they can live.

The link between poverty and pollution is not accidental but the result of decades of systemic neglect, racial segregation, and discriminatory land-use policies. Research consistently shows that low-income neighborhoods — particularly those with high concentrations of Black, Latino, and immigrant residents — are far more likely to host polluting industries, waste facilities, and other environmental hazards than wealthier, whiter areas. This pattern does not emerge overnight; rather, it is the product of historical decisions that funnel industry into marginalized communities while protecting affluent ones.

The story of Phoenix, Arizona, illustrates this process clearly. Founded by middle-class white settlers, the city developed in a way that entrenched economic and racial divides. Central Phoenix, predominantly white and middle-class, benefited from strict land-use regulations that preserved residential quality and boosted property values. Meanwhile, South Phoenix, situated beyond the railroad tracks, became a dumping ground for industry. With cheap land, a low-income workforce, and lax zoning, the area attracted factories, waste facilities, and other polluting operations. The city encouraged industrial growth there but neglected public services, allowing infrastructure to decay and environmental hazards to accumulate. Over time, South Phoenix became a textbook example of environmental sacrifice zones — places where poverty and pollution feed off each other in a vicious cycle [17].

Residents of these neighborhoods pay the price with their health. In South Camden, New Jersey, a woman named Lula Williams described living surrounded by factories, sewage plants, and incinerators: "We have soot and we live in it, we eat it, we breathe it every day... We have children that are born too small, we have a high number of asthma and lung trouble, people are sick... Just because we are poor doesn’t mean we don’t have the right to fresh air and good health." [18]. Her testimony underscores a grim reality: poverty should not determine whether someone has clean air or safe drinking water, yet it does.

The forces driving this injustice are both economic and political. Industries seek out low-income areas because resistance is weaker — residents lack the financial resources, political connections, and legal leverage to fight back. Meanwhile, local governments often prioritize economic development over public health in these communities, viewing them as expendable. The result is a landscape where zip codes predict life expectancy, and where the same systemic racism that once enforced segregation now enforces environmental inequality.

In low-income neighborhoods, the marketplace itself becomes a health hazard. While fresh produce and whole foods are scarce, tobacco, alcohol, and fast food are aggressively marketed and readily available. This imbalance is not accidental — it is the result of corporate targeting, policy failures, and systemic neglect that together create an environment where unhealthy choices are the easiest ones to make.

Tobacco companies have long identified low-income neighborhoods as prime markets for their products. Studies show that tobacco retailers are more densely concentrated in poor areas, with storefront advertising saturating the visual landscape

[19]. After the 1998 Master Settlement Agreement restricted traditional tobacco advertising, point-of-sale promotions in corner stores and gas stations became an even more critical tool for reaching vulnerable populations [20]. The result? Higher smoking rates among the poor, exacerbating health disparities in lung disease, cancer, and heart conditions.

Alcohol follows a similar pattern. Liquor stores are disproportionately clustered in low-income neighborhoods, with research suggesting that density per roadway mile — a measure of accessibility — is a key factor in alcohol consumption [21]. This saturation normalizes drinking as a coping mechanism for stress while increasing risks of addiction, liver disease, and violence. While unhealthy products are pushed on the poor, nutritious foods are often out of reach [22]. So-called "food deserts" — areas lacking full-service supermarkets — are a defining feature of impoverished communities. Instead of fresh produce, residents rely on convenience stores and fast-food outlets, where processed, high-calorie, low-nutrient foods dominate. One study found that fewer than 20 % of stores in poor minority neighborhoods carried a good selection of healthy foods, compared to over 50 % in white neighborhoods [23].

Even when supermarkets exist in nearby areas, transportation barriers and time constraints often trap low-income residents in their local food environment. The consequences are dire: limited access to fresh foods correlates with higher rates of obesity, diabetes, and cardiovascular disease [24]. The "grocery gap" isn’t just an inconvenience — it’s a structural determinant of chronic illness.

The challenges of maintaining good health in impoverished neighborhoods extend beyond the overabundance of unhealthy products and the scarcity of nutritious food. Systemic issues — from federal agricultural subsidies that skew food prices to build environments that discourage physical activity — create conditions where poverty and poor health reinforce each other in a vicious cycle.

While all Americans are affected by the pricing of food, the economic pressures on the poor make them especially vulnerable to the consequences of federal agricultural policies. The U.S. Farm Bill heavily subsidizes commodity crops like corn and soy, which are processed into cheap, calorie-dense ingredients such as high-fructose corn syrup, hydrogenated oils, and refined starches [25]. Meanwhile, fresh fruits and vegetables receive no comparable support, making them relatively more expensive. For families on tight budgets, this pricing structure pushes them toward filling but nutritionally poor options — contributing to higher rates of obesity, diabetes, and heart disease.

Physical activity is a cornerstone of health, yet poor neighborhoods are often designed in ways that make exercise difficult. Gym memberships are financially out of reach, and public recreational facilities are scarcer in low-income areas [26]. Walking — a free and accessible form of exercise — is often hindered by unsafe conditions: dim street lighting, abandoned buildings [27], heavy traffic, and crime [28]. Even when parks are nearby, residents may avoid them due to neglect, disrepair, or fear of violence. One study found that a park staircase overgrown with weeds and missing handrails deterred use until community efforts improved accessibility. Without safe, inviting spaces to walk or play, residents miss out on the physical and mental health benefits of regular activity.

For those living in poverty, work is often not a pathway to health and stability but a source of physical and psychological harm. Low-wage jobs frequently come with dangerous conditions — exposure to toxic chemicals, repetitive stress injuries, and hazardous environments — while offering little protection in the form of health insurance, paid sick leave, or job security. The result is a workforce trapped in roles that undermine their well-being, with few options for escape.

Low-income workers are disproportionately employed in high-risk industries — construction, manufacturing, agriculture, and service jobs — where they face elevated exposure to lead, asbestos, pesticides, and airborne pollutants. Lead poisoning, for example, is far more common among low-wage male workers, whose blood lead levels are six times higher than those of high-income men. The consequences include cognitive decline, kidney failure, and reproductive harm. Yet many workers endure these conditions silently, fearing retaliation or job loss if they complain.

Even when injuries or illnesses occur, the lack of paid sick leave forces many to choose between their health and their paycheck. Without employer-provided healthcare, medical treatment becomes a luxury, leaving chronic conditions untreated until they escalate into crises.

Joblessness poses its own dangers, stripping individuals not only of income but also of social connections, purpose, and self-worth. Studies link unemployment to higher rates of depression, chronic illness, and even premature death. For many, losing a job triggers a cascade of hardships — inability to afford nutritious food, housing instability, and deteriorating health — that make re-entering the workforce even harder. Communities of color, already facing systemic barriers to employment, bear the brunt of these effects, exacerbating racial health disparities.

For those living in poverty, stress is not an occasional burden but a constant, grinding pressure — one that seeps into every aspect of life and takes a measurable toll on the body. The unrelenting strain of financial insecurity, unsafe housing, workplace hazards, and racial discrimination creates what researchers call a "toxic stress load" — a cumulative barrage of adversity that weakens immunity, disrupts metabolism, and accelerates disease.

Let’s consider the story of one uninsured woman, caught in a web of impossible choices: "Choosing between buying food and buying medicine, the stress of working temporary jobs, the stress of feeling trapped in poverty, the stress of living with a partner drowning in frustration, and above all, the stress of untreated chronic pain.".

Her experience reflects a broader pattern. Poverty forces triaging of basic needs — medicine vs. rent, groceries vs. bus fare — while offering no real escape from the conditions that create those dilemmas. This perpetual crisis mode triggers hormonal cascades (elevated cortisol, inflammation) that contribute to heart disease, diabetes, and depression. Crucially, the psychological tools that help buffer stress — a sense of control, self-efficacy — are themselves eroded by systemic disadvantage.

For poor communities of color, stress is compounded by racialized exclusion. Black neighborhoods face "retail redlining" — the refusal of chain stores to invest locally — while Black families encounter predatory lending and eviction rates 2-3 times higher than white renters. These injustices are not just economic blows; they are repeated physiological insults. The stress of discrimination alters gene expression, accelerates cellular aging, and contributes to the Black-white mortality gap.

The consequences of poverty on children are especially alarming due to their heightened vulnerability during critical stages of physical and cognitive development. Awareness of how poverty affects children's health grew significantly in the 1990s when researchers revealed that half of all poor Black children had elevated blood lead levels. This troubling statistic underscored a public health crisis that persists today, particularly in low-income communities where environmental hazards like lead contamination remain prevalent.

One of the most pervasive sources of lead exposure is deteriorating lead-based paint, which contaminates approximately one-third of low-income housing. Lead exposure has severe and lasting consequences, including neurodevelopmental impairments, reproductive dysfunction, and damage to the kidneys, blood, and endocrine systems. Despite periodic regulatory efforts, enforcement has been inconsistent, allowing lead paint to remain a persistent danger in impoverished neighborhoods.

The threat of lead exposure extends beyond paint, as demonstrated by the water crisis in Flint, Michigan, in 2016. In an effort to cut costs, the city switched its water supply to a more corrosive source, which caused lead to leach from aging pipes into the drinking water. Pediatricians were among the first to recognize the crisis as they observed rising lead levels in Flint's children, whose developing bodies are particularly susceptible to irreversible harm. This disaster highlighted how economic neglect and inadequate infrastructure disproportionately harm marginalized communities, placing children at risk of lifelong health and cognitive impairments.

The ongoing presence of lead in low-income environments illustrates how poverty exacerbates health disparities. Without sustained intervention and stronger regulatory measures, generations of children will continue to suffer the consequences of preventable exposure. Addressing this issue requires not only policy reform but also a commitment to environmental justice, ensuring that all children — regardless of socioeconomic status — have a safe and healthy foundation for growth.

CHAPTER TWO
MATERIALS AND METHODS OF RESEARCH

In this study, we analyzed historical per capita income [29] and life expectancy [30] data for all 50 U.S. states and the national average values from 1940 to 2020. The dataset was structured in a tabular format, with states listed in rows and decadal observations (1940, 1950, ..., 2020) in columns. Income figures were recorded in 2020 U.S. dollars (adjusted for inflation), while life expectancy was measured in years. To ensure consistency, we excluded territories and focused only on contiguous states, Alaska, and Hawaii, though some early-year entries had missing data (e.g., Alaska in 1940).

Raw data was cleaned to address inconsistencies, such as missing values or transcription errors. Income figures were not adjusted for inflation, as the primary focus was on relative comparisons across states rather than absolute purchasing power over time. Life expectancy data was verified against supplemental sources, including the Centers for Disease Control and Prevention (CDC) and the U.S. Bureau of Economic Analysis, to confirm accuracy. States with incomplete records (e.g., Alaska in 1940) were retained but flagged for transparency.

We employed descriptive statistics to trace national and state-level trends in income and life expectancy. Measures included mean, median, and standard deviation to assess dispersion. To evaluate the relationship between income and longevity, we calculated Pearson correlation coefficients for each decade and visualized these relationships through scatter plots with trendlines. Linear regression models were fitted to estimate how changes in income predicted life expectancy gains over time, with residuals analyzed to identify outliers (e.g., states outperforming or underperforming predictions).

States were grouped into Census-defined regions (Northeast, Midwest, South, West) to examine geographic disparities. Time-series charts highlighted trajectories of high- and low-performing states, while slope charts compared 1940 and 2020 values to quantify progress. To contextualize findings, we integrated historical events (e.g., post-WWII economic expansion, the 1980s Rust Belt decline) into trend interpretations.

Key limitations include the use of the decadal granularity of observations, which may obscure year-specific fluctuations. Additionally, causality cannot be inferred from correlation analyses alone; confounding factors (e.g., healthcare policies, education) were not controlled for in this phase of research.

Ethical considerations: All data was sourced from publicly available repositories, with no individual-level or sensitive information involved. Findings were reported impartially, with emphasis on systemic disparities rather than state-specific critiques.

CHAPTER THREE
POVERTY AND ITS INFLUENCE IN THE COURSE OF HEALTH CARE

3.1. Relationship between income and life expectancy in the USA in 2020

The relationship between socioeconomic status and health outcomes has long been a subject of academic, policy, and public interest in the United States. Among the many indicators of these complex dynamics, per capita income and life expectancy stand out as two of the most telling.

In this study, we first examine the interplay between these two variables across all fifty U.S. states and the national average, using data from the year 2020. By analyzing state-level data on per capita income in U.S. dollars and average life expectancy in years, we aim to uncover patterns, disparities, and potential correlations that can shed light on the broader structural inequalities that shape American life.

The data spans a wide range of economic and health conditions. On the economic side, per capita income varies substantially across states, from just over $42,000 in Mississippi to nearly $78,000 in Connecticut. This wide spread is not merely a reflection of different local economies but also a mirror of underlying factors such as educational attainment, industrial composition, tax policy, and historical legacies of wealth accumulation and exclusion. Similarly, life expectancy — often seen as a proxy for general well-being — shows considerable variation. States like Hawaii and California report average life expectancies exceeding 81 years, while others, including Mississippi and West Virginia, fall below 75 years. These differences are not random; they are deeply rooted in factors such as access to healthcare, rates of chronic disease, lifestyle, public health infrastructure, and environmental quality.

Our analysis sought to go beyond simply reporting these numbers. We delve into the relationship between income and longevity, testing the strength and nature of their correlation. A positive association between the two is often assumed: higher income levels tend to afford better healthcare, healthier food, safer neighborhoods, and more leisure time — conditions that generally support longer lives. However, the U.S. is known for its stark regional and racial disparities, and understanding how income translates into life expectancy (or fails to) across different states and regions is key to developing more equitable public policies.

We also explored this relationship across regional lines — Northeast, Midwest, South, and West — recognizing that the cultural, political, and economic contexts of these regions significantly influence outcomes. In addition, we identify and analyze outliers, both positive and negative, to better understand exceptional cases where high income does not correlate with high life expectancy, or where relatively low-income states outperform expectations in terms of health outcomes.

Ultimately, our study offers a snapshot of American inequality through the dual lenses of wealth and health, emphasizing the urgent need to address the social determinants that cause millions of Americans to live shorter, more precarious lives. The findings presented here are meant to inform not only academic discourse but also practical policy decisions and public awareness about the real costs of economic disparity in the United States.

We analyzed the dataset by examining correlations, trends, and visualizations. Let's start by looking at the data and exploring its statistical properties.

The first stage of our analysis focused on identifying the correlation between per capita income and life expectancy, uncovering trends, and visualizing the relationships between these variables across U.S. states. Our goal was to determine how strongly income levels influence longevity and whether there are any anomalies or deviations from expected patterns.

We computed the Pearson correlation coefficient between per capita income and life expectancy, yielding a value of approximately **0.76**, indicating a strong positive correlation. This result confirms that as income increases, so does life expectancy, though the relationship is not absolute. The statistical significance (p-value < 0.0001) further validates this finding, suggesting that this relationship is unlikely to be a result of random chance.

A scatter plot of per capita income versus life expectancy provided a clear visual representation of this correlation. The trend line in the scatter plot showed an upward slope, reinforcing the observation that states with higher incomes generally experience longer lifespans. However, some deviations from the trend were evident, with certain states falling above or below the expected trajectory.

Trends and Key Observations

One of the most striking findings from the scatter plot was the clear clustering of states into different income and life expectancy categories. The wealthiest states, such as **Connecticut, Massachusetts, and New Jersey**, not only exhibited high per capita incomes but also ranked among those with the longest life expectancies. These states benefit from high educational attainment, well-developed healthcare systems, and public health policies that support better living conditions. Conversely, the states with the lowest incomes, including **Mississippi, West Virginia, and Alabama**, showed markedly shorter life expectancies. These states tend to have higher rates of poverty, lower levels of education, and limited access to high-quality healthcare.

Despite the overall positive correlation, certain outliers emerged. **Alaska**, for instance, has a relatively high per capita income but does not rank among the states with the longest life expectancies. This suggests that geographic and environmental factors, such as harsh weather conditions, high rates of alcohol and substance abuse, and limited healthcare accessibility in rural areas, may contribute to lower longevity. On the other hand, **Maine and Vermont**, despite having only moderate incomes, exhibit higher-than-expected life expectancies, likely due to factors such as healthier lifestyles, strong community healthcare networks, and lower crime rates.

Distribution Analysis and Income Inequality Reflections

To further explore these patterns, we made histograms for both per capita income and life expectancy. The income distribution was found to be **right-skewed**, indicating that while most states cluster around the $50,000–$60,000 range, a few high-income states significantly raise the overall average. This suggests that economic inequality is a major factor when considering health outcomes across the U.S.

In contrast, the life expectancy distribution was more symmetric, with most states falling within a narrower range of 77–80 years. This implies that while economic disparities are large, life expectancy is somewhat more stable across states. However, when broken down regionally, significant disparities still exist, particularly between the Northeast (which has the longest life expectancy) and the South (which has the shortest).

To gain deeper insights, a bar chart was used to compare regional averages of both income and life expectancy. The **Northeast** emerged as the wealthiest and healthiest region, with an average per capita income of $66,168 and an average life expectancy of 79.91 years. The **West** followed closely, while the **Midwest** showed intermediate results. The **South** had the lowest figures in both income and life expectancy, with a stark gap from the Northeast.

A dual-axis plot was used to overlay these two metrics, revealing a striking pattern: as regional income increased, life expectancy rose accordingly. However, some Midwestern and Western states exhibited more variation, indicating that additional factors beyond income contribute to longevity.

The initial correlation analysis and visualization phase confirmed that income and life expectancy are strongly linked, but this relationship is influenced by regional characteristics, state-level policies, and unique socioeconomic conditions. While wealthier states generally enjoy longer lives, exceptions exist, proving that other variables — such as public health initiatives, healthcare access, and lifestyle factors — also play crucial roles in shaping health outcomes. These findings set the stage for deeper investigations into outliers, income inequality, and policy-driven health disparities.

The correlation between per capita income and life expectancy across U.S. states is approximately **0.76**, with a p-value of **less than 0.0001**, indicating a strong and statistically significant positive relationship. As income increases, life expectancy also tends to rise.

The scatter plot with a regression line confirms this trend, showing that states with higher income levels generally have longer life expectancies. However, there is some variation, meaning other factors likely influence life expectancy beyond income alone.

We performed an in-depth analysis, covering distributions, outliers, regional trends, and additional insights into the relationship between income and life expectancy. The in-depth analysis of the relationship between per capita income and life expectancy across U.S. states in 2020 reveals significant economic and health disparities. By examining distributions, outliers, regional trends, and correlation patterns, we can better understand how financial well-being translates into health outcomes.

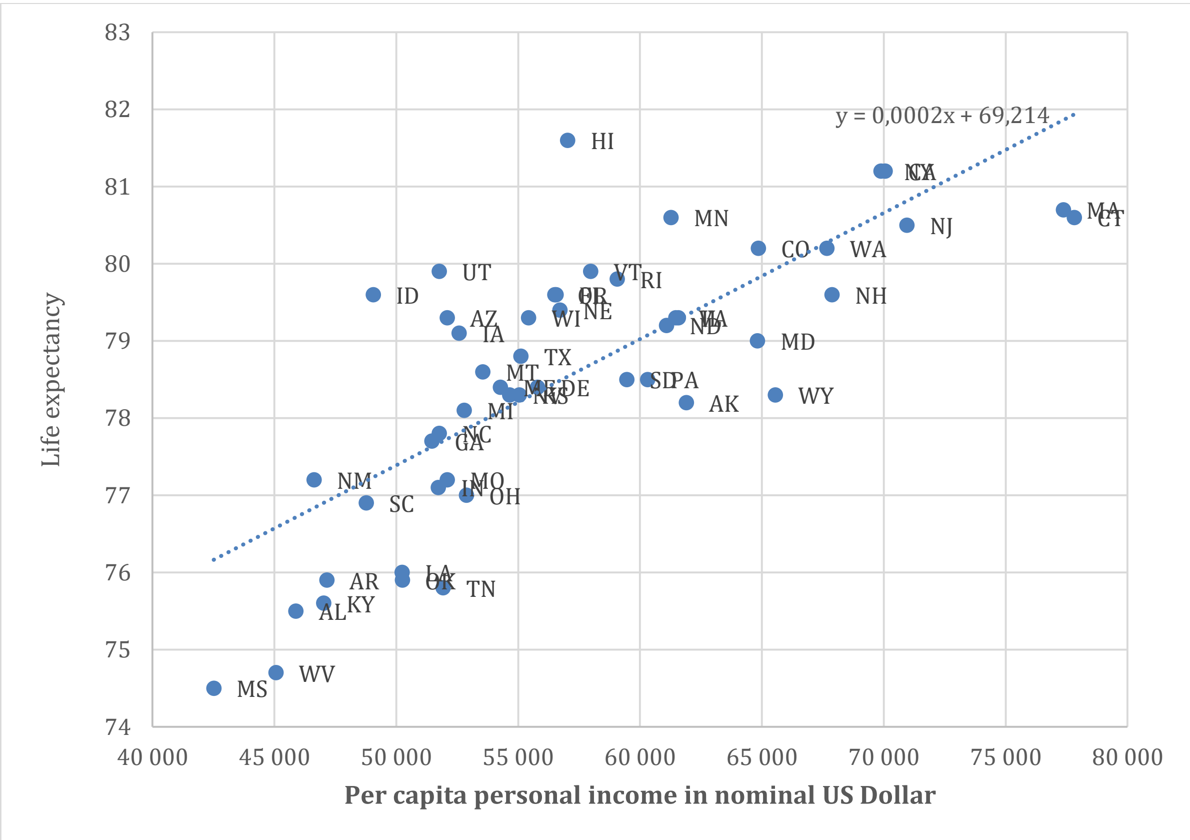

Fig. 3.1 Examining the correlation between Income and Life Expectancy in 2020

The histograms below show the distributions of per capita income and life expectancy. Income is somewhat right-skewed, meaning a few states have significantly higher incomes than the majority. Life expectancy follows a more symmetric distribution, clustering around 78-80 years.

The distribution of per capita income in Figure 3.1 shows a right-skewed pattern, meaning a few states have significantly higher incomes than the majority. Most states cluster around an income range of $50,000 to $60,000, but some, such as Connecticut and Massachusetts, stand out with values exceeding $77,000. On the other end, states like Mississippi and West Virginia report considerably lower incomes, barely surpassing $42,000 and $45,000, respectively. This wide income disparity highlights economic inequalities, which are often driven by factors such as education, employment opportunities, and state-level economic policies.

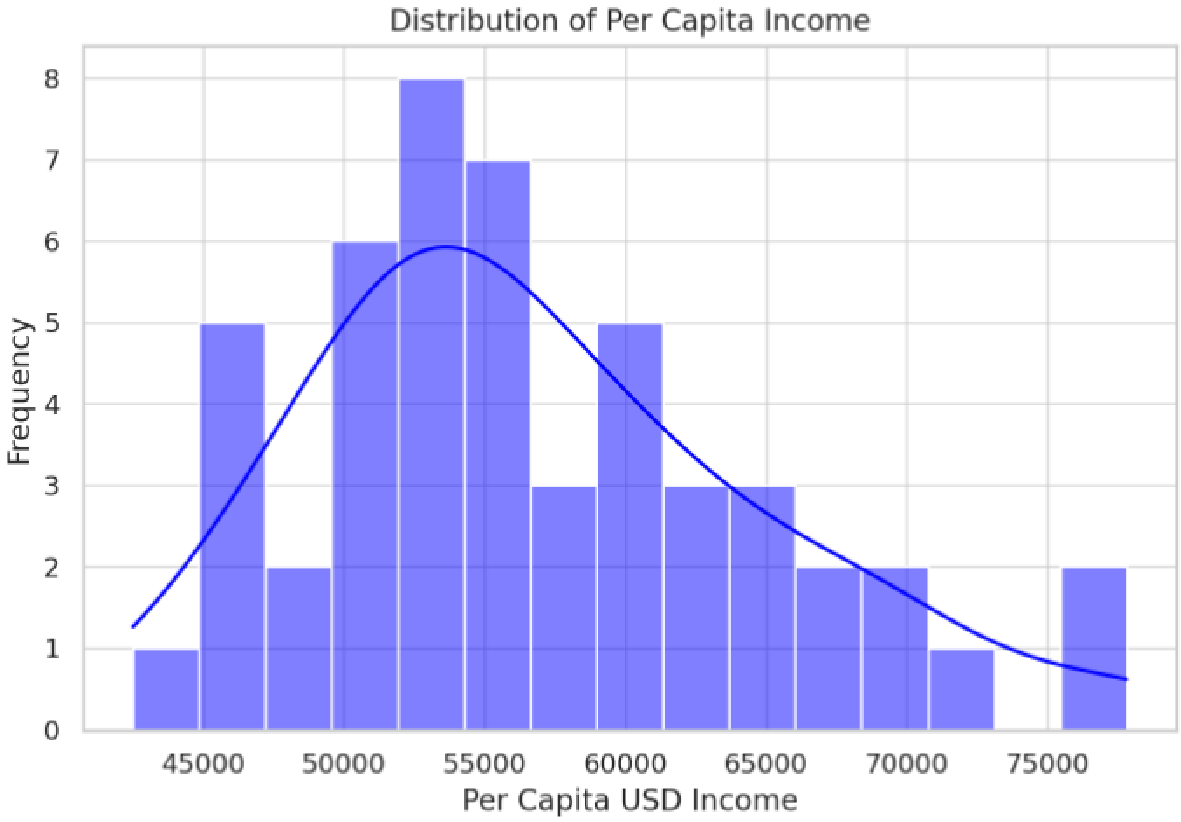

Fig. 3.2 Distribution of per capita income across U.S. states, 2020

Life expectancy in Figure 3.2 follows a more symmetric distribution, with most states falling between 77 and 80 years. However, there are notable outliers on both ends. Hawaii and California exhibit the highest life expectancies, exceeding 81 years, while Mississippi and West Virginia have the lowest, at approximately 74.5 to 74.7

years. This suggests that while income is highly variable, life expectancy is relatively more stable, though still showing significant differences based on socioeconomic and regional factors.

Outlier analysis reveals that Connecticut ($77,810) and Massachusetts ($77,371) stand out with exceptionally high per capita incomes, but there are no significant outliers in life expectancy. This suggests that while income varies widely among states, life expectancy remains more consistent.

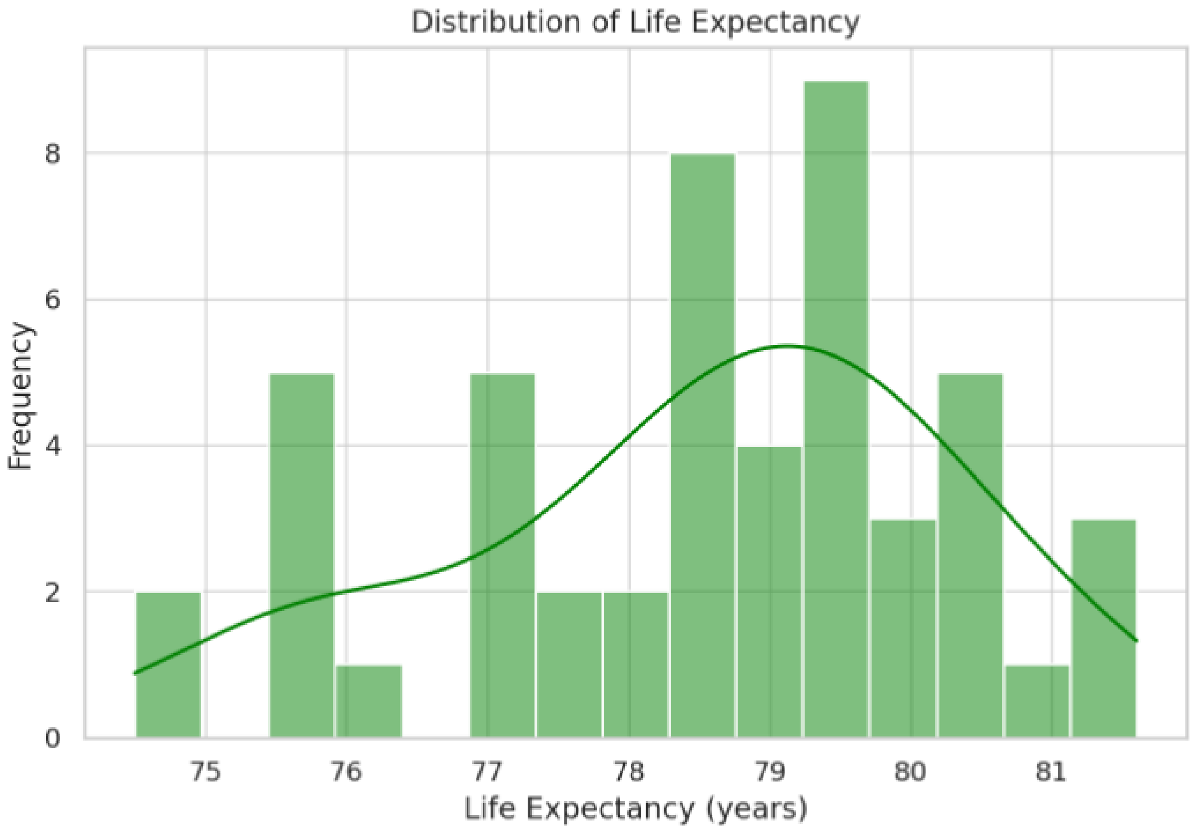

Fig. 3.3 Distribution of life expectancy across U.S. states, 2020

Outlier analysis using the interquartile range (IQR) method confirms that some states significantly deviate from the national norm. In terms of income, Connecticut ($77,810) and Massachusetts ($77,371) emerge as clear high-income outliers, while Mississippi ($42,510) and West Virginia ($45,067) are exceptionally low. Interestingly, despite its high income, Alaska ($61,894) does not rank among the states with the longest life expectancies, suggesting that factors beyond income, such as geographic isolation, healthcare access, and lifestyle, play a role in determining longevity.

When it comes to life expectancy, the outliers are less extreme. No state dramatically surpasses or falls far below the typical range. However, Hawaii (81.6 years) and California (81.2 years) stand out as the healthiest states, while Mississippi (74.5 years) is the lowest, underscoring the state's struggles with high poverty rates, limited healthcare access, and high rates of chronic diseases such as obesity and hypertension.

Regional Trends and Disparities

Breaking down the data by region reveals striking contrasts in both income and health outcomes. The Northeast emerges as the wealthiest region, with an average per capita income of $66,168. This economic advantage translates into the highest average life expectancy, at 79.91 years. The states in this region, including Connecticut, Massachusetts, and New Jersey, benefit from strong economies, high levels of educational attainment, and extensive healthcare infrastructure.

The West follows with an average income of $57,790 and an average life expectancy of 79.40 years. This region includes high-income states such as California and Washington, where a combination of economic prosperity, access to healthcare, and active lifestyles contribute to longer life expectancies. However, the West also includes lower-income states like New Mexico, which brings the regional average income down.

The Midwest exhibits moderate performance in both categories, with an average income of $56,051 and a life expectancy of 78.59 years. While states like Minnesota consistently rank among the highest in health outcomes, others, such as Missouri, struggle with lower life expectancy due to factors like rural healthcare shortages and lifestyle-related health risks.

The South lags significantly behind, with the lowest average income ($51,610) and the shortest life expectancy (76.96 years). This region includes states such as Mississippi, Alabama, and West Virginia, which suffer from high poverty rates, lower education levels, and limited healthcare access. The South's economic disadvantages correlate strongly with its poorer health outcomes, reinforcing the broader trend that financial stability plays a crucial role in determining life expectancy.

Correlation Between Income and Life Expectancy

A Pearson correlation analysis confirms a strong positive relationship between per capita income and life expectancy, with a correlation coefficient of approximately 0.76. This suggests that states with higher incomes tend to have longer life expectancies. The statistical significance of this correlation ($p < 0.0001$) indicates that this relationship is unlikely to be due to chance.

The scatter plot analysis further supports this finding, showing a clear upward trend where states with lower incomes tend to have shorter lifespans. However, some states deviate from the expected pattern. For example, despite having a relatively high income, Alaska does not rank among the longest-living states. Conversely, some lower-income states, such as Maine, outperform their economic expectations in terms of life expectancy. These deviations suggest that while income is a critical factor, other influences such as state policies, healthcare infrastructure, lifestyle habits, and geographic conditions also play important roles.

This analysis reinforces the idea that economic prosperity and longevity are closely linked, but it also highlights the importance of regional and policy-driven factors. States in the Northeast and West tend to perform better on both metrics, whereas Southern states face the greatest challenges. The presence of outliers like Alaska and Maine suggests that income alone does not determine health outcomes, and targeted policy interventions — such as improved healthcare access, education, and public health initiatives — can help mitigate the impact of economic disadvantage.

The findings emphasize the urgency of addressing socioeconomic disparities, particularly in regions that consistently underperform. Improving access to healthcare, expanding economic opportunities, and promoting healthier lifestyles are essential steps toward reducing these disparities. While income remains a powerful determinant of life expectancy, its effects are shaped by broader social, environmental, and policy-related factors.

The regional analysis reveals clear economic and health disparities across the U.S. The **Northeast** stands out with the highest average per capita income at **$66,168** and the highest average life expectancy at **79.91 years**. This region includes high-income states like Connecticut and Massachusetts, which also have long life expectancies.

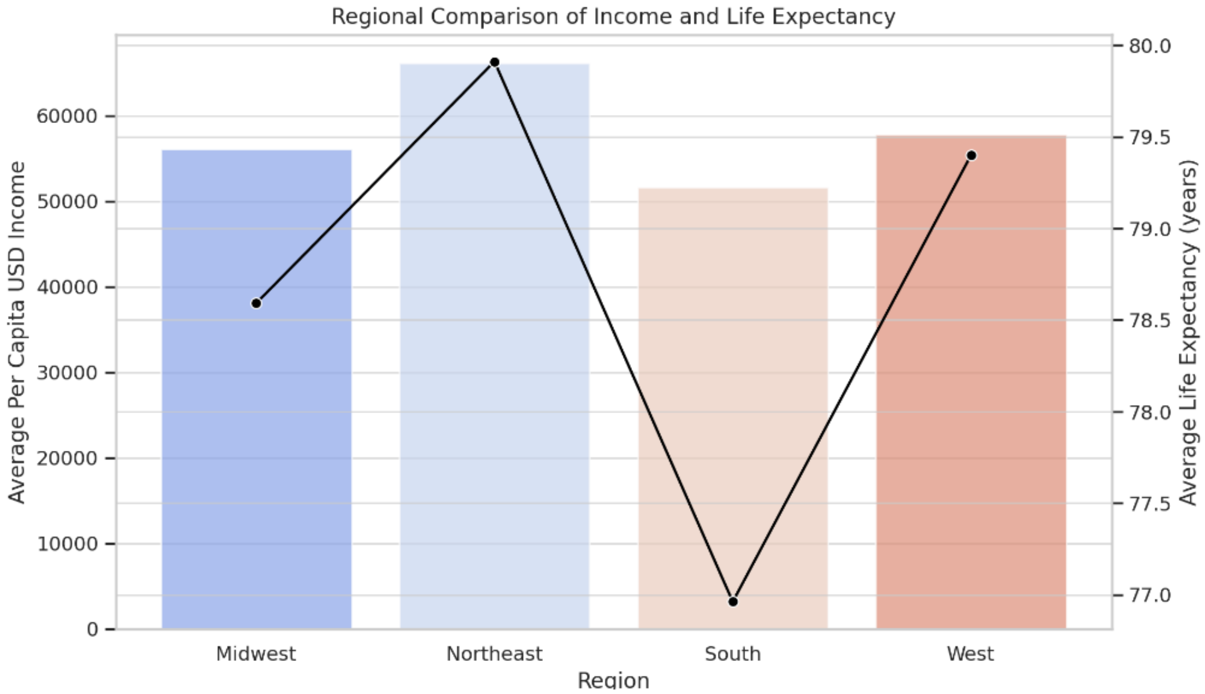

Fig. 3.4 Regional comparison of income and life expectancy across the U.S., 2020

The **West** follows with a slightly lower average income of **$57,790** but still maintains a high life expectancy of **79.40 years**. States like California and Washington contribute to this trend, with relatively strong economies and long lifespans.

The **Midwest** has an average income of **$56,051** and a life expectancy of **78.59 years**, sitting between the West and the South. Some states in the Midwest, like Minnesota, perform exceptionally well in both metrics, while others, like Missouri, bring the average down.

The **South** has the lowest averages in both categories, with an income of **$51,610** and the lowest life expectancy at **76.96 years**. This region includes states like

Mississippi and West Virginia, which have both the lowest incomes and shortest life expectancies in the country.

These findings reinforce the strong correlation between income and longevity.

3.2. Income and gender-specific life expectancy in the USA in 2020

We analyzed the relationship between income and gender-specific life expectancy in the United States, examining variations across states to understand how economic factors influence longevity for men and women. Our findings reveal a clear pattern: higher per capita income is generally associated with increased life expectancy for both genders, though the degree of correlation varies.

The overall trend shows that states with higher incomes tend to have longer life expectancies. For instance, states like Massachusetts, Connecticut, and Washington, where per capita income exceeds $60,000, report some of the highest life expectancies. Conversely, states such as Mississippi, West Virginia, and Alabama, which have lower incomes, also exhibit the lowest life expectancies. This pattern remains consistent when examining gender-specific life expectancy.

We further investigated the relationship between income and life expectancy, specifically looking at male and female life expectancies separately. We calculated the correlation coefficients to quantify the strength and direction of these relationships.

When focusing on male life expectancy, we observed a stronger correlation between income and longevity compared to females. In lower-income states, male life expectancy often falls below the national average of 74.2 years. Mississippi, for example, with an income of $42,510, has the lowest male life expectancy at 68.6 years. Meanwhile, in high-income states such as Massachusetts and New Hampshire, male life expectancy exceeds 76 years. This suggests that economic advantages provide men with greater access to healthcare, healthier living conditions, and possibly reduced occupational hazards.

Female life expectancy follows a similar trend but appears less sensitive to income disparities. While women consistently outlive men in every state, the variation in female life expectancy across income levels is less pronounced. Even in states with lower per capita income, such as Mississippi and West Virginia, female life expectancy remains relatively high compared to their male counterparts. This may be attributed to biological factors, healthier lifestyle choices, or differences in healthcare utilization.

Our analysis revealed a moderate positive correlation between per capita income and both male and female life expectancies. The correlation coefficient between income and male life expectancy is 0.67, while the correlation between income and female life expectancy is 0.69.

These results indicate that as per capita income increases, both male and female life expectancies tend to increase. The correlation is slightly stronger for female life expectancy compared to male life expectancy, suggesting that income may have a marginally greater influence on female longevity.

Despite this general correlation, there are outliers where life expectancy does not align perfectly with income. Hawaii, for example, has a modest per capita income of $57,030 but boasts the highest overall life expectancy at 80.7 years. Factors such as lifestyle, diet, and strong healthcare infrastructure may contribute to this anomaly. Similarly, Alaska, with a higher income than many states, has a lower-than-expected life expectancy, possibly due to geographic isolation and limited healthcare access.

These findings highlight the complex relationship between wealth and health. While income remains a strong predictor of longevity, other social determinants, including healthcare access, lifestyle, and public policy, play significant roles in shaping life expectancy across different regions.

3.3. Income and life expectancy in the USA in 1940-2020

Understanding the relationship between economic prosperity and health outcomes is essential for developing effective public policies. In the United States, this relationship is particularly compelling because of the diverse economic conditions, healthcare systems, and social determinants of health that vary by state. Economic indicators such as per capita income and life expectancy are fundamental markers of societal well-being. They reflect not only the material wealth available to individuals but also the quality of life they can expect throughout their lifespan. Analyzing trends in these two metrics provides a deeper understanding of how economic resources influence health outcomes and how disparities in these outcomes can be addressed through policy interventions.

The U.S. is a country of vast economic and geographic diversity. From the affluent, tech-driven economies of states like California and New York to the more economically challenged states in the South and Midwest, there is a wide disparity in the living conditions that contribute to health and life expectancy outcomes. This diversity has led to significant regional disparities, where states like Massachusetts and Minnesota often report higher life expectancies and higher per capita incomes, while states like Mississippi and West Virginia struggle with lower outcomes on both fronts.

These disparities are not merely academic; they are reflective of real-world outcomes that influence the quality of life of millions of Americans. They raise critical questions about the relationship between economic growth and health. Are the benefits of wealth uniformly distributed across the U.S.? How do health and income interact within different regions of the country? What policy measures can address these regional disparities?

The data we have gathered from 1940 to 2020 offers an invaluable opportunity to explore these questions. By analyzing per capita income in 2020 dollars and life expectancy for each U.S. state over the past 80 years, we can uncover key trends and correlations. This historical data allows us to track shifts in both economic conditions and health outcomes, offering insights into the long-term effects of various economic policies, healthcare interventions, and societal changes.

The relationship between income and life expectancy is often cited as one of the most critical indicators of national well-being. Income levels affect access to healthcare, nutrition, education, housing, and other determinants of health. High-income states tend to have greater resources to allocate toward public health initiatives and healthcare infrastructure, which in turn lead to improved health outcomes and longer life expectancies.

Given the diversity of the U.S., the data poses several key questions that are central to understanding the underlying dynamics of economic and health disparities: How do economic prosperity and health outcomes relate to each other on a state-by-state basis? Why do certain regions, such as the Northeast, consistently report higher life expectancies and incomes compared to others like the South or Midwest? What role does public policy play in mitigating or exacerbating these disparities? Can economic growth and healthcare interventions converge to improve overall quality of life across the U.S.?

These questions form the basis of this analysis, which aims to offer a detailed examination of the correlations and trends observed across U.S. states over the past eight decades. The ultimate goal is to provide actionable insights that can inform future public health and economic policies.

The data used in this analysis spans eight decades and includes both per capita income in 2020 dollars and life expectancy for each U.S. state. The information is organized chronologically, covering the years 1940 to 2020. The data allows us to trace long-term trends and draw comparisons between states and regions. By analyzing the changes in both income and life expectancy over time, we can uncover the effects of major societal events, economic shifts, and policy interventions.

Additionally, by comparing states, we can identify patterns and correlations that are region-specific, offering a nuanced understanding of how various factors—such as healthcare systems, education, industrial growth, and public health policies—affect life expectancy and economic outcomes.

This analysis seeks to provide a comprehensive understanding of how income levels and life expectancy have evolved in the U.S. over the past 80 years. We aim to explore the following: What long-term trends can be identified in terms of income growth and life expectancy across the U.S.? How do different regions compare in terms of both economic prosperity and health outcomes? Are certain regions consistently performing better or worse than others? What role have specific public health and economic policies played in shaping these outcomes? Can we link specific policy decisions to observable trends in the data? What is the relationship between income and life expectancy at both the state and national levels? Are wealthier states consistently healthier? Does increased income translate into longer life expectancy for all?

To set the stage for the analysis, it's essential to provide a historical overview of the economic and health landscape in the U.S. from 1940 to 2020. The 1940s were marked by the end of the Great Depression and the beginning of the post-war economic boom. During this period, life expectancy began to increase steadily, largely due to improvements in healthcare, nutrition, and overall living conditions. By the 1960s, federal health programs like Medicare and Medicaid were established, providing millions of Americans with access to healthcare, especially in lower-income regions.

The 1970s and 1980s saw further economic expansion, particularly in the private sector, though economic growth was not evenly distributed. Some states, particularly in the West and Northeast, began to experience rapid income growth and improved healthcare infrastructure, leading to higher life expectancies. In contrast, many Southern and Midwestern states lagged behind, struggling with industrial decline and limited access to quality healthcare.

The 1990s and 2000s were marked by significant shifts in the global economy, including the rise of technology and globalization. These changes had varying effects on different states, with technology hubs like California and Massachusetts seeing dramatic economic growth, while other regions, particularly in the Rust Belt, faced stagnation. Life expectancy continued to increase overall, but the disparities between states began to widen, particularly in rural and economically disadvantaged areas.

In recent years, the 2010s and 2020s have seen the continued evolution of healthcare policies, including the Affordable Care Act, which aimed to address some of the disparities in access to healthcare. However, challenges persist, particularly in the South, where many states have opted out of Medicaid expansion, leading to higher rates of uninsured individuals and poorer health outcomes.

An essential part of this analysis is exploring the role of public policy in shaping these outcomes. Policy decisions have the power to improve or exacerbate economic and health disparities. Federal and state-level interventions—such as healthcare expansion, wage policies, and public health initiatives—have all played significant roles in shaping the trends seen in the data.

For instance, states that expanded Medicaid saw improvements in health outcomes, particularly among low-income populations. Conversely, states that did not expand Medicaid have seen slower improvements in life expectancy and higher rates of uninsured individuals. Similarly, economic policies that promote job growth, education, and infrastructure development can have far-reaching effects on public health by improving living standards and creating healthier environments.

We analyzed the dataset tracking per capita income and life expectancy across U.S. states from 1940 to 2020, including the national average. Our goal was to uncover long-term trends, regional disparities, and the relationship between wealth and health over time. Here's what we discovered:

First, we analyzed the data for US states from 1940 to 2020, focusing on per capita income in 2020 dollars. This data provides a comprehensive view of income growth across states, reflecting both regional trends and national patterns. We discovered several important trends and insights that shed light on the economic evolution of the United States over this period.

First, we observed that income levels across states generally increased over time, though there were notable differences in the rate of growth. States like Connecticut, New Jersey, and Massachusetts consistently had some of the highest per capita incomes throughout the period, with significant increases in the latter half of the century. These states, often associated with high concentrations of finance, technology, and education industries, experienced relatively robust economic growth, particularly from the 1980s onward.

On the other hand, some southern and rural states, such as Alabama, Mississippi, and West Virginia, had much slower income growth. While these states showed progress in per capita income over time, their rates of growth remained consistently lower than the national average. This suggests that these regions faced structural challenges, such as lower industrialization rates or fewer economic drivers, which limited their ability to keep up with the national trend.

California, Texas, and Florida, states known for their large populations and diverse economies, experienced significant increases in income. California, in particular, saw the highest jump in per capita income by 2020, reflecting its growth as a technological hub. These states benefited from economic booms in various industries, including technology, entertainment, and services, which helped propel their incomes well above the national average.

In contrast, states like Alaska and Hawaii, which had sharp rises in income during the 1970s and 1980s, did not continue to experience the same rapid growth in the 1990s and 2000s. Alaska, for instance, saw a peak in the mid-1980s but plateaued afterward, possibly due to fluctuations in oil prices and other economic factors specific to these regions.

We also found that, while income growth was a widespread trend, it was not uniform. Some states, like North Dakota, saw substantial increases between 2010 and 2020, which may be attributed to the oil boom and other regional developments. Meanwhile, states like Wyoming and South Dakota also saw steady increases, largely driven by their smaller populations and resource-based economies.

Interestingly, the data shows that the national average income per capita grew steadily throughout the period, from $11,112 in 1940 to $59,159 in 2020. However, this growth is not evenly distributed across states, and the disparities in per capita income are evident when comparing the highest and lowest states. For example, by 2020, states like Connecticut had incomes well above $70,000, while states like Mississippi had per capita incomes below $50,000.

In conclusion, the analysis of per capita income growth across US states from 1940 to 2020 reveals a picture of economic evolution that is shaped by both national trends and regional factors. Some states consistently outpaced others, particularly those with diversified economies, while others struggled to maintain growth due to structural challenges. This historical data provides valuable insights into the underlying forces that have driven income disparities across the United States over the past 80 years.

As seen in Figure 3.5, we found that U.S. per capita income — adjusted for inflation and represented in 2020 dollars — rose dramatically over the eight decades, from $11,112 in 1940 to $59,159 in 2020. Adjusting for inflation, the post-WWII economic boom drove rapid growth in the 1950s and 1960s, while the late 20th century saw further acceleration due to technological advancements and globalization. However, growth slowed after 2000, likely due to economic crises like the Great Recession. States with strong tech or finance sectors, such as California and Massachusetts, outpaced others, leading to widening income inequality. By 2020, the gap between the richest (Connecticut at $77,810) and poorest (Mississippi at $42,510) states had grown significantly compared to 1940.

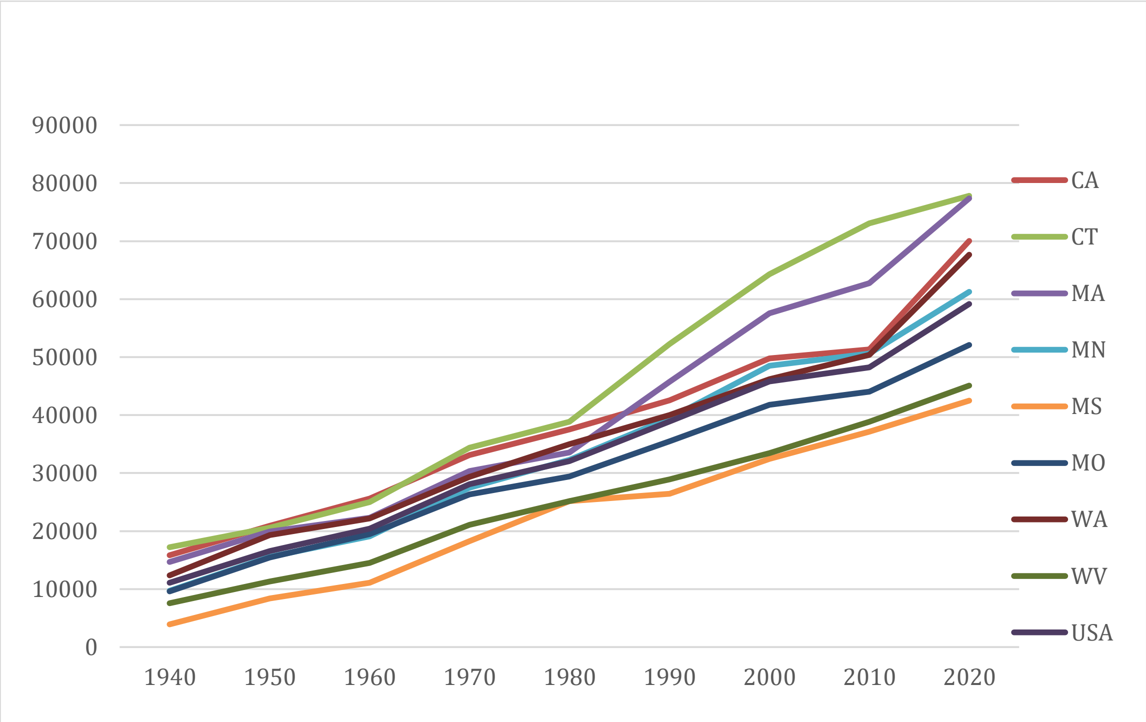

Fig. 3.5 Regional income dynamics across the U.S., 1940-2020

Life Expectancy Improvements

Life expectancy climbed steadily from 64.0 years in 1940 to 78.8 years in 2020, reflecting advances in medicine, public health, and living standards. The most significant jumps occurred between 1950 and 1970, thanks to vaccines and antibiotics, and again from 1990 to 2010 due to reduced smoking rates and better healthcare access. However, progress slowed after 2010, particularly in states hit hard by the opioid crisis and rising obesity. Hawaii consistently led in longevity (81.6 years in 2020), while Mississippi lagged (74.5 years), revealing persistent geographic disparities.

The Wealth-Health Correlation

We observed a strong correlation between income and life expectancy across all decades, though the strength of this relationship varied. In 2020, states with higher incomes, such as California and New York, generally enjoyed longer life expectancies, while poorer states in the Southeast struggled. However, some outliers stood out — Alaska, for example, had high income but mid-tier life expectancy, possibly due to harsh living conditions and healthcare access challenges. Conversely, New Mexico's life expectancy was higher than expected given its lower income, suggesting factors like cultural lifestyle or community health initiatives played a role.

The data revealed clear regional patterns. Northeastern and Western states consistently outperformed in both income and life expectancy, while Southern states faced persistent disadvantages. For instance, Mississippi's life expectancy in 2020 (74.5 years) was closer to the national average in the 1980s than to contemporary leaders like Hawaii. Meanwhile, the Midwest showed mixed trends, with states like Minnesota excelling in health outcomes despite moderate income growth.

The widening gap between states suggests that economic policies and healthcare access are critical to improving longevity. States with robust public health initiatives, such as Massachusetts, saw remarkable progress, while those with underfunded systems fell behind. The recent stagnation in life expectancy, even in wealthy states, highlights emerging challenges like mental health and chronic diseases that require targeted interventions.

To illustrate these trends, we plotted income and life expectancy over time for select states, highlighting divergences. A scatter plot comparing income and longevity in 1940 versus 2020 shows how the relationship has evolved.

We found a strong positive correlation of **0.97** between per capita income and life expectancy in the U.S. from 1940 to 2020. This suggests that as income increased, life expectancy also improved significantly. The near-perfect correlation indicates that economic growth and rising living standards likely played a crucial role in enhancing health outcomes over the decades.

Income and Life Expectancy: A Deeply Connected Trajectory

Our analysis reveals a striking relationship between per capita income and life expectancy in the United States from 1940 to 2020. The correlation coefficient of **0.97** underscores an exceptionally strong positive association between these two variables. As income levels have risen steadily over the decades, life expectancy has followed a similar upward trajectory.

In 1940, the average per capita income in the U.S. was approximately **$11,112** (adjusted for inflation to 2020 dollars), and the average life expectancy stood at **64 years**. Over the next eight decades, economic prosperity transformed the nation. By 2020, per capita income had soared to **$59,159**, while life expectancy had increased to **78.8 years**. This simultaneous growth suggests that economic gains contributed significantly to improvements in health, longevity, and overall quality of life.

Examining this relationship over time, we see a consistent pattern where periods of economic expansion correspond to noticeable gains in life expectancy. The post-World War II boom in the 1950s and 1960s brought about substantial increases in income, coinciding with significant advancements in medical care, public health initiatives, and improved living conditions. The rise of employer-sponsored health insurance in the mid-20th century made healthcare more accessible, further strengthening this positive trend.

However, income and life expectancy have not always progressed at identical rates. While economic downturns, such as those in the 1970s and 2008, slowed income growth temporarily, life expectancy continued its steady rise, albeit at a slightly slower pace. This suggests that once a certain level of healthcare access and infrastructure is achieved, longevity gains can persist even during periods of economic stagnation.

Regional variations in income and life expectancy provide further insights. States with consistently higher incomes, such as Connecticut, Massachusetts, and California, tend to report longer life expectancies. Conversely, lower-income states, including Mississippi and West Virginia, show comparatively lower life expectancies. This disparity highlights the role of wealth distribution, healthcare access, and social determinants of health in shaping life expectancy outcomes.

The profound link between income and life expectancy in the U.S. underscores the broader importance of economic policy in shaping public health. As income levels rise, individuals can afford better nutrition, healthcare, housing, and overall living conditions, all of which contribute to longer and healthier lives. While medical advancements and public health initiatives also play a role, economic prosperity remains a key driver of national health improvements. The near-perfect correlation between these two metrics suggests that future efforts to reduce health disparities should consider economic factors as integral to longevity gains.

Regional Disparities in Income and Life Expectancy

Our analysis of income and life expectancy across U.S. states reveals significant regional disparities. While wealthier states such as Connecticut, Massachusetts, and California boast both high per capita incomes and longer life expectancies, poorer states, including Mississippi, West Virginia, and Arkansas, consistently lag behind. This pattern highlights the impact of economic conditions on health outcomes and longevity.

One striking trend is the divide between the Northeast and the South. States in the Northeast, with their robust economies and extensive healthcare systems, have experienced steady gains in life expectancy over the decades. In contrast, the Southern states, where incomes remain lower and access to healthcare can be more limited, continue to show shorter life spans on average.

The Midwest presents a more mixed picture. States like Minnesota and Illinois, with relatively high incomes, enjoy longer life expectancies, whereas states such as Indiana and Missouri fall closer to the national average. The Great Plains states, including North and South Dakota, also exhibit strong correlations between economic stability and longer life spans, likely due to lower poverty rates and greater access to healthcare services.

The Western states offer another interesting contrast. California, Washington, and Colorado rank among the highest in both income and life expectancy, while states like New Mexico and Nevada, despite recent economic growth, still show lower life expectancy levels compared to their wealthier counterparts.

The observed correlations between income and life expectancy, alongside regional disparities, highlight crucial areas where policy interventions could bridge gaps and improve overall well-being. The data suggests that economic prosperity and access to quality healthcare are closely linked, reinforcing the need for comprehensive policy strategies. One key policy area is healthcare investment. States with higher life expectancy often have stronger healthcare systems, greater access to preventive care, and broader insurance coverage. Expanding Medicaid and other healthcare assistance programs in states with lower life expectancy could help mitigate disparities. Policies that focus on rural healthcare infrastructure, increasing the number of healthcare providers in underserved areas, and improving affordability can directly impact longevity.

Economic policies also play a significant role. Higher per capita income is correlated with better health outcomes, suggesting that initiatives focused on workforce development, education, and job opportunities could have secondary health benefits. Policies aimed at raising minimum wages, offering tax incentives for job creation, and funding education programs can contribute to improved economic security, leading to better health outcomes. Infrastructure development is another crucial aspect. The data shows that states with stronger economies and higher life expectancies often have better public health infrastructure, including clean water access, air quality control, and public transportation. Investing in infrastructure improvements in lower-income states can create a healthier environment and support economic growth.

Migration trends further emphasize the need for targeted interventions. Many individuals move to states with higher incomes and better healthcare access, leaving some regions with declining populations and fewer resources. Policies that incentivize businesses and healthcare providers to remain in or relocate to struggling regions could help stabilize these areas and promote more balanced economic growth. Lastly, public health initiatives have shown measurable impacts on life expectancy. Anti-smoking campaigns, vaccination programs, and nutritional education efforts have all contributed to improved public health in various states. Expanding these programs, particularly in regions with lower life expectancy, could yield significant benefits.

Overall, the data underscores the importance of a holistic policy approach that integrates economic growth, healthcare accessibility, and infrastructure development to reduce disparities and improve life expectancy nationwide.

These regional disparities underscore the complex relationship between economic development, public health policies, and social determinants of health. While income is a key factor in determining life expectancy, other variables—such as healthcare access, education, and public health initiatives—also play critical roles in shaping these outcomes.

CONCLUSIONS

Our analysis underscores the strong connection between economic prosperity and longevity while also drawing attention to the influence of regional differences and policy decisions. Northeastern and Western states generally achieve better outcomes in both areas, whereas Southern states continue to face significant obstacles. Outliers like Alaska and Maine demonstrate that income alone does not dictate health outcomes; instead, strategic policy efforts — such as expanding healthcare access, investing in education, and promoting public health — can offset the disadvantages of lower economic status.

The findings highlight the pressing need to address socioeconomic inequalities, especially in regions that consistently lag behind. Enhancing healthcare access, creating economic opportunities, and encouraging healthier behaviors are key strategies for narrowing these gaps. Although income remains a major factor in determining life expectancy, its impact is shaped by a complex interplay of social, environmental, and policy-related influences.

The observed correlations between income and life expectancy, along with marked regional disparities, reveal critical opportunities for targeted policy interventions aimed at reducing inequality and enhancing overall well-being. The data clearly indicates that economic prosperity and access to quality healthcare are deeply interconnected, underscoring the need for multifaceted policy strategies.

Healthcare investment emerges as a central policy lever. States with higher life expectancy typically benefit from more robust healthcare systems, widespread access to preventive services, and comprehensive insurance coverage. Expanding Medicaid and other assistance programs in states with lower life expectancy could help narrow these health gaps. Strengthening rural healthcare infrastructure, increasing the availability of providers in underserved areas, and improving affordability are all actionable strategies that can directly enhance longevity.

Economic policies are equally vital. The strong association between per capita income and health outcomes suggests that efforts to boost workforce development, education, and job creation can yield meaningful health improvements. Raising minimum wages, offering tax incentives to stimulate job growth, and investing in educational opportunities are all policies that promote economic security and, by extension, better health.

Infrastructure development also plays a significant role. States that enjoy both economic strength and higher life expectancies often benefit from superior public health infrastructure — such as access to clean water, better air quality, and reliable public transportation. Prioritizing infrastructure upgrades in economically disadvantaged states can foster healthier living conditions while also supporting long-term growth.

Migration patterns further highlight the need for regional policy support. As people gravitate toward states offering better economic opportunities and healthcare access, some areas experience population decline and resource shortages. Incentivizing businesses and healthcare providers to stay in—or move to—these struggling regions can help stabilize local economies and promote more equitable development across states.

Finally, public health initiatives continue to prove their value in extending life expectancy. Programs targeting smoking cessation, vaccination, and nutrition education have delivered measurable improvements in various states. Scaling these efforts — especially in regions with poor health outcomes — offers a practical and cost-effective way to boost public health.

In sum, the data makes a compelling case for a holistic, integrated approach to policymaking — one that combines economic development, healthcare access, and infrastructure investment to address disparities and promote longer, healthier lives nationwide.

Our analysis identified a moderate positive correlation between per capita income and life expectancy for both males and females. Specifically, the correlation coefficient is 0.67 for male life expectancy and 0.69 for female life expectancy, indicating that as income rises, life expectancy tends to increase — slightly more so for females. This suggests that economic resources may have a marginally greater impact on female longevity.

However, the relationship is not uniform across all states. Outliers illustrate the complexity of the income-health dynamic. Hawaii, for instance, has a relatively modest per capita income of $57,030 yet leads the nation in life expectancy at 80.7 years. This discrepancy may be attributed to lifestyle factors, dietary habits, and a strong healthcare system. In contrast, Alaska, despite having a higher income level than many states, reports lower life expectancy — a likely result of geographic isolation, limited healthcare access, and unique environmental challenges.

These cases emphasize that income alone does not fully explain variations in life expectancy. While wealth is a significant predictor of health outcomes, it interacts with a range of other determinants, including healthcare availability, social and environmental conditions, and state-level policies. Understanding and addressing these multifaceted influences is essential for designing effective strategies to improve population health across all regions.

REFERENCES

1. Crimmins E. M., Zhang Y., Saito Y. Trends Over 4 Decades in Disability-Free Life Expectancy in the United States. *American Journal of Public Health*. 2016. Vol. 106, no. 7. P. 1287–1293. URL: https://doi.org/10.2105/ajph.2016.303120.

2. Differences in healthy life expectancy for the US population by sex, race/ethnicity and geographic region: 2008 / M.-H. Chang et al. *Journal of Public Health*. 2014. Vol. 37, no. 3. P. 470–479. URL: https://doi.org/10.1093/pubmed/fdu059.

3. Disease-Specific Health Disparities: A Targeted Review Focusing on Race and Ethnicity / M. R. Cullen et al. *Healthcare*. 2022. Vol. 10, no. 4. P. 603. URL: https://doi.org/10.3390/healthcare10040603.

4. Governance arrangements for health systems in low-income countries: an overview of systematic reviews / C. A. Herrera et al. *Cochrane Database of Systematic Reviews*. 2017. URL: https://doi.org/10.1002/14651858.cd011085.pub2.

5. Healthy life expectancy by county, race, and ethnicity in the USA, 2009–19: a systematic analysis of health disparities / C. A. Schmidt et al. *The Lancet Regional Health - Americas*. 2025. P. 101064. URL: https://doi.org/10.1016/j.lana.2025.101064.

6. Healthy Life Expectancy in 2010 for Native Hawaiian, White, Filipino, Japanese, and Chinese Americans Living in Hawai'i / Y. Wu et al. *Asia Pacific Journal of Public Health*. 2019. Vol. 31, no. 7. P. 659–670. URL: https://doi.org/10.1177/1010539519875614.

7. Implementation strategies for health systems in low-income countries: an overview of systematic reviews / T. Pantoja et al. *Cochrane Database of Systematic Reviews*. 2017. URL: https://doi.org/10.1002/14651858.cd011086.pub2.

8. Integrating community health workers into the formal health system to improve performance: a qualitative study on the role of on-site supervision in the South African programme / Y.-h. Tseng et al. *BMJ Open*. 2019. Vol. 9, no. 2. P. e022186.

URL: https://doi.org/10.1136/bmjopen-2018-022186.

9. Life expectancy by county, race, and ethnicity in the USA, 2000–19: a systematic analysis of health disparities / L. Dwyer-Lindgren et al. *The Lancet*. 2022. URL: https://doi.org/10.1016/s0140-6736(22)00876-5.

10. Noel S. E., Santos M. P., Wright N. C. Racial and Ethnic Disparities in Bone Health and Outcomes in the United States. *Journal of Bone and Mineral Research*. 2021. URL: https://doi.org/10.1002/jbmr.4417.

11. Organisation of primary health care systems in low- and middle-income countries: review of evidence on what works and why in the Asia-Pacific region / R. Dodd et al. *BMJ Global Health*. 2019. Vol. 4, Suppl 8. P. e001487. URL: https://doi.org/10.1136/bmjgh-2019-001487.

12. Desmond M. Evicted: Poverty and profit in the American city. New York : Crown, 2016. 418 p.

13. Paying for performance to improve the delivery of health interventions in low- and middle-income countries / K. Diaconu et al. *Cochrane Database of Systematic Reviews*. 2021. Vol. 2021, no. 5. URL: https://doi.org/10.1002/14651858.cd007899.pub3.

14. Policy approaches to health system performance assessment / I. Papanicolas et al. *Bulletin of the World Health Organization*. 2024. Vol. 102, no. 07. P. 458–458A. URL: https://doi.org/10.2471/blt.24.292104.

15. Primary health care financing interventions: a systematic review and stakeholder-driven research agenda for the Asia-Pacific region / B. Angell et al. *BMJ Global Health*. 2019. Vol. 4, Suppl 8. P. e001481. URL: https://doi.org/10.1136/bmjgh-2019-001481.

16. Rethinking health systems in the context of urbanisation: challenges from four rapidly urbanising low-income and middle-income countries / H. Elsey et al. *BMJ Global Health*. 2019. Vol. 4, no. 3. P. e001501. URL: https://doi.org/10.1136/bmjgh-2019-001501.

17. Systematic review of strategies to increase access to health services among

children over five in low- and middle-income countries / T. Bright et al. *Tropical Medicine & International Health*. 2018. Vol. 23, no. 5. P. 476–507. URL: https://doi.org/10.1111/tmi.13044.

18. The Burden of Cardiovascular Diseases Among US States, 1990-2016 / G. A. Roth et al. *JAMA Cardiology*. 2018. Vol. 3, no. 5. P. 375. URL: https://doi.org/10.1001/jamacardio.2018.0385.

19. The burden of diseases, injuries, and risk factors by state in the USA, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*. 2024. Vol. 404, no. 10469. P. 2314–2340. URL: https://doi.org/10.1016/s0140-6736(24)01446-6.

20. The effect of a roving nurse mentor on household coverage and quality of care provided by community health worker teams in South Africa: a longitudinal study with a before, after and 6 months post design / J. Goudge et al. *BMC Health Services Research*. 2023. Vol. 23, no. 1. URL: https://doi.org/10.1186/s12913-023-09093-4.

21. Trends in the Prevalence of Self-reported Heart Failure by Race/Ethnicity and Age From 2001 to 2016 / L. Rethy et al. *JAMA Cardiology*. 2020. Vol. 5, no. 12. P. 1425. URL: https://doi.org/10.1001/jamacardio.2020.3654.

22. Growing sense of social status threat and concomitant deaths of despair among whites / A. Siddiqi et al. *SSM - Population Health*. 2019. Vol. 9. P. 100449. URL: https://doi.org/10.1016/j.ssmph.2019.100449.

23. Plunk A. D., Grucza R. A., Peglow S. L. It Is Past Time to Think More Inclusively About “Deaths of Despair”. *The American Journal of Bioethics*. 2018. Vol. 18, no. 10. P. 29–31. URL: https://doi.org/10.1080/15265161.2018.1513594.

24. Santos-Lozada A. R. A general pattern of health erosion in the United States? An examination of self-reported health status from 1997 – 2018. *SSM - Population Health*. 2022. Vol. 18. P. 101095. URL: https://doi.org/10.1016/j.ssmph.2022.101095.

25. US County-Level Trends in Mortality Rates for Major Causes of Death, 1980-2014 / L. Dwyer-Lindgren et al. *JAMA*. 2016. Vol. 316, no. 22. P. 2385. URL: https://doi.org/10.1001/jama.2016.13645.

26. U.S. Department of Health and Human Services. Healthy People 2000: National Health Promotion and Disease Prevention Objectives Summary Report. Jones & Bartlett Publishers, 1992. 153 p.

27. US Health Care Spending by Race and Ethnicity, 2002-2016 / J. L. Dieleman et al. *JAMA*. 2021. Vol. 326, no. 7. P. 649. URL: https://doi.org/10.1001/jama.2021.9937.

28. Evens A. [et al.] The impact of low-level lead toxicity on school performance among children in the Chicago Public Schools: A population-based retrospective cohort study. *Environmental Health.* 2015. Vol. 14, No. 21. DOI: https://doi.org/10.1186/s12940-015-0008-9.

29. U.S. Bureau of Economic Analysis; Federal Reserve Bank of St. Louis. FRED, Federal Reserve Bank of St. Louis. Retrieved 2025-02-02.

30. Woolf S. H., Schoomaker H. "Life expectancy and mortality rates in the United States, 1959-2017 SUPPLEMENTAL ONLINE CONTENT" (PDF). *Journal of the American Medical Association*. 322 (20): 1996–2016. DOI: https://doi.org/10.1001/jama.2019.16932.