Spatial, racial and health inequalities: the case of health gaps between Palestinians and Jews in Israel

Introduction

This research presents an analytical framework (usually overlooked by studies of health gaps between Palestinians and Jews in Israel) that emphasizes the significance of spatial segregation and inequality in understanding health inequality. The examination of spatial segregation's contribution to health inequality begins with a historical investigation of the political, social, and economic forces that shape the construction of place and generate spatial inequality in Israeli society. It focuses primarily on state policies and practices that shaped the longstanding spatial segregation of Palestinians and first provides evidence showing that Palestinian population is highly spatially, residentially, and socially segregated from the Jewish population. It also shows that this fundamental condition impedes economic development of Palestinian space and inflicts peripherality upon it. In addition, this examination reveals the relevance of these spatial inequalities to explaining Palestinians' lower health outcomes.

What first motivated this investigation was the examination of the spread and progression of coronavirus in Israel, which reveals an unexpected pattern of health inequality. For about half a year, COVID-19 incidence, morbidity, and mortality rates among the Palestinian community, a racial minority in Israel, were significantly lower than those among the dominant Jewish population. Given that by all accounts the Palestinian community has lower socio-economic, political, and health statuses relative to Jews, this community's unexpected resistance to the virus was puzzling. Yet this puzzle could be

resolved when considering the extreme spatial segregation of the Palestinian community. I argue that because Palestinians in Israel are extremely spatially and residentially, and, as a result, socially, segregated from the Jewish majority, the spread of coronavirus into their communities was delayed, leading to these unanticipated patterns of health gaps and inducing among them a false sense of immunity to COVID-19.

However, this observed advantage of the Palestinian community was only temporary; eventually, Palestinians endured higher rates of COVID-19 morbidity and mortality than Jews, consistent with their lower health and socioeconomic statuses. If fact, I argue that both observations, the supposedly health advantage of the Palestinian community in the early stage of the pandemic and its health disadvantage later on, are demonstrations of the same condition: an extreme spatial segregation.

While the unexpected COVID-19 patterns motivated this investigation and emphasized the role played by spatial segregation in explaining this unexpectedness, a key contribution of this analysis comes from analyzing health inequality between Palestinian and Jewish segregated spaces in the period before the start of the pandemic. This analysis informs us, in the first time, with two different types of spatial inequality endured by the Palestinian minority. First, Palestinians are largely segregated away from the Center region (the districts of Tel-Avis and the Center, which comprise Israel's main economic center) and are confined to Israel's geographic and social periphery. Second, within the periphery, where they are mostly concentrated, Palestinians are segregated at localities totally separate from the Jewish majority's localities. This research innovatively evaluates the relative contribution of each of these distinct dimensions of segregation to the poor health of the Palestinian community. Specifically, it suggests a method of decomposition of the total

health gap between Palestinians and Jews (using three different health indicators) into specific contribution of each of these two types of spatial inequality. The findings reveal that being segregated away from the Center accounts for more than two thirds of the examined health gaps and that being segregated within the periphery contributes about a third of the total racial health gap.

Altogether, these analyses, provide a comprehensive examination of the role of spatial segregation in generating racial health gaps. In addition, they emphasize not only the impact of a structural, "upstream" causal factor, i.e., spatial segregation, in generating racial and ethnic health inequality, but also reveal the role of state policies in generating such structural condition. In the following paragraphs, the analyses begin with a background on the history of spatial segregation in Israel and a review of segregation's consequences on health and social positions of the Palestinian community.

Background on spatial segregation of Palestinians in Israel

In Israel, the Palestinian minority (about 20 percent) and the Jewish majority (about 80 percent) are highly spatially and socially segregated. Since the establishment of the State in 1948, the majority of Palestinians, about 90 percent, live within fully segregated localities where all of the residents are Palestinian (Central Bureau of Statistics 2022). In fact, nearly all localities in Israel are either Jewish or Palestinian, and only 8 out of Israel's about 200 urban localities are administratively defined as "mixed localities" of Jews and Palestinians. In these so-called "mixed localities", Palestinians minority lives largely in segregated neighborhoods, alongside a Jewish majority. The spatial segregation is exacerbated by distinct native languages for these two groups—Jews speak Hebrew and

Palestinians speak Arabic—which leads to a near complete segregation of the school system. In fact, the separation in the school system reinforces residential segregation because Palestinian families with children are deterred from moving to Jewish localities because these localities don't offer this basic service for Arabic native speakers. In addition, these two groups and are relatively highly segregated in the labor market, where spatial and linguistic segregation of Palestinians and discrimination they face from the dominant group are among the contributing factors to this type of segregation.

The ideology of separation and segregation goes back to the early, pre-state period of the Zionist movement, in late 19th century through the 20th century. The movement's primary goal was creating a national homeland for Jews in Palestine "while ensuring separation, disengagement, and differentiation from the Palestinian population, which historically had always been the majority in the country" (Bäuml 2017:103), a goal that was achieved in 1948 with the establishment of the state of Israel. The state was established in a process of war and large population transfers; the exile of about 80 percent of Palestinians who lived in the areas that fell under Israel's control and the absorption of large waves of Jewish immigrants changed the population balance and created a new state of Jewish majority (Bäuml 2017, Boger 2008, Tzfadia 2008).

The State confined the Palestinians who remained (the subject of this study) and become citizens of the State of Israel into a set of small, segregated spaces or ghettos Boger (2008). The ghettoization not only ensured the separation between Jews and Palestinians but also enabled the State to enforce different regimes over Palestinian and Jewish spaces. During the first two decades of the State, from 1948 to 1966, Palestinian space fell under military rule, which enforced severe restrictions on this population's movement and

effectively controlled its intermittent presence within the mainstream Israeli/Jewish space (Bäuml 2017, Sa'di 1995).

The segregation fitted with Israel's main spatial policy of Judaization-dispersal (Tzfadia 2008), that is, the dispersal of Jewish immigrants into frontier and internal frontier regions to insure Jewish dominance and control of land. During the 1950s, this policy targeted Jewish immigrants who came mostly from Arab and Islamic countries in Asia and North Africa (known as Mizrahi Jews, meaning from the Orient), and a centralized real-estate regime forced them to settle in frontier and internal frontier regions, the Galilee and the Negev regions or the Northern and Sothern districts, respectively. The implementation of this policy contributed to the creation Israel's social and economic periphery (and class structure) along ethnic and racial lines. The majority of first-generation Mizrahi Jewish immigrants, together with most Palestinians, became residents of Israel's produced periphery, yet in separate localities, while Jewish immigrants originated from European countries, who arrived earlier, populated the center region predominantly (Tzfadia 2006, Tzfadia 2008, Tzfadia and Yacobi 2011).

The end of the military regime in 1966 terminated legal measures limiting the free movement of Palestinians, but it did not end the segregation, and Israel resorted to other measures and practices that continued the policy of Judaization-dispersal and insured the endurance of the segregation. The mid-1970s witnessed the start of suburbanization of upper-middle class Jews to peripheral regions of the Galilee and the Negev, which were at that time populated by a Palestinian majority, a process motivated by serious reduction in travel time between the periphery and the center du to new networks of roads and increasing rates of car ownership. This development was carried out by the State through

national project known as "Judaizing the Galilee" and "Judaizing the Negev" regions. To intensify Jewish control of space (and control of the Palestinian population), these projects were carried out by building new Jewish settlement located between Palestinian villages and towns to prevent the territorial continuity of Palestinian population (Plonski 2018, Yiftachel 2006). This policy, while brings Jews and Palestinians geographically closer to each another, it creates Jewish settlements that are, by design, separate from and in many cases hostile to existing Palestinian ones, as the Jewish settlement is established largely on land confiscated from Palestinian villages. In addition, many of the new settlements were devised as “communal settlements” with entry overseen by admission committees that ensured Jewish exclusivity; thus, overt practices of segregation, such the military rule, were replaced by veiled ones (Shafir 2018). If fact, the selection process and relatively high housing prices ensured exclusivity to Jewish middle- and upper-middle class families, thus intensified the separation, not only between Jews and Palestinians but also between class-based groups within the Jewish society (Tzfadia 2008).

Israel's spatial and settlement policy concerning the separation between Jews and Palestinians extends from the early years till today. A review of Israel's urban planning practices since 1948 reveals a systematic, enduring project that uses planning policies to control space and demography (Jabareen 2017). Today, the Palestinian minority owns only 2.5% of the entire land in Israel, despite constituting nearly fifth of the population, and 93% of the land belongs to and is controlled by the state (Jabareen 2020). Israel's settlement project continues relentlessly also in the West Bank since Israel's occupation of this region in 1967. It was not covered by this short review because our analysis of racial health gaps,

arguably the result of spatial segregation, focuses on the Palestinian population in Israel and does not include Palestinians in the West Bank and Gaza Strip.

Residential segregation in Israel, originated in the Zionist ideology of separation between Jews and Palestinians and instigated by various state policies and practices, is deep and enduring. Cohen and Gordon (2018) argue that residential segregation seems to be the most salient feature that organizes space in Israel. It helps Israel's bio-spatial project to ascribe and inscribe Jewishness to and in space, and constructs space as a racialized category. It thus enforces the experience of space as either Jewish or Palestinian and solidifies a complete isomorphism between space and race: place is race and race is place.

Socio-economic and health consequences of spatial segregation

Spatial segregation enables not only the implementation of separate systems of governance for Palestinians and Jews but also the implementation of disparate development policies, with clear preference of Jewish space over Palestinian ones in state investment in infrastructure, social services allocations of municipal budgets (Cohen and Gordon 2018, Khalidi and Shihadeh 2017, Wesley 2013). The new Jewish settlements, for example community settlements in the Galilee and the Negev, to make them attractive to middle-class Jewish households, are usually supported by state budgets and resources, in many cases on the expense of nearby Palestinian ones, especially with regards to lands and services (Cohen 2015, Cohen and Gordon 2018, Tzfadia 2008). Most of Palestinians towns have been excluded from industrial parks that have been developed in the periphery to stimulate local economic growth (Khalidi and Shihadeh 2017, Schnell, Benenson and Sofer 1999, Wesley 2013).

The unequal development policies across racialized space added another dimension the race-space isomorphism: a strong connection to socio-economic level. One manifestation of this connection is a clear inequality between Palestinian and Jewish localities in measures of socio-economic and peripherality levels. Using the measures developed by the Central Bureau of Statistics (CBS), which classify each locality into one of 10 clusters (more on these measures is elaborated in the methods sections), we found that Palestinian localities are highly represented at lowest clusters of socio-economic level: in 2019, 80% of localities, the home of 87% of total population of all localities, are found in lowest clusters 1-4, and none are found in three highest clusters 8-10 (CBS 2023).

In addition, research on social stratification points to the adverse impact of spatial segregation on social mobility of Palestinians. Most finding indicate that. The distance of profoundly peripheral Palestinian localities from the Israel's geographic center, which is also the economic and financial center with advanced industries, limits the access of Palestinian labor force to many advanced industries. Thus, spatial segregation confines Palestinians to limited industrial and occupational opportunities (Kraus and Yonay 2000, Shdema, Abu-Rayya and Schnell 2019, Yonay and Kraus 2001), generating inequality and segregation in the labor market between Palestinian and Jewish workers. Moreover, these inequalities seem to be largest in areas with active conflict over space and land, such as in the Southern District and East Jerusalem (Cohen 2015, Yuval and Vered 2018).

Many studies that consider residential segregation a structural condition that adversely impacts the health of racial minorities and contributes to generating racial health gaps, for example gaps between blacks and whites in the US (e.g., Anderson, Lopez and Simburger 2021, Sewell 2016, Williams and Collins 2001). Despite extreme spatial

segregation between Palestinians and Jews and clear health gaps between them—in 2017-2021, life expectancy at birth for both sexes was 79.5 years for Palestinians and 83.3 years for Jews (CBS 2023)—as well as many findings of negative impact of segregation on Palestinians' socioeconomic outcomes, research on health inequality in Israel rarely assign such a significant role to spatial segregation. The few exceptions indicate that spatial segregation of Palestinians limits their ability to access health services. Semyonov-Tal (2021) reports that length of stay in hospitals, a measure of access to advanced healthcare, is considerably shorter for Palestinians than for Jews (and among residents of the periphery than residents of the urban center) and concludes that these racial disparities are fully attributed to patterns of spatial segregation. Findings by Daoud et al. (2012) support a similar conclusion that segregation hinders access to healthcare through the examination of factors that hinder to access adequate infant care and consequently lead to poor health of children in the Negev region (Southern District)—Infant mortality rate among Palestinians in the Negev region amount to 9 deaths per 1000 births, compared to 5 and 2 deaths per 1000 live births among all Palestinians and Jews, respectively. Their findings, especially with regard to communities denied state recognition, indicate factors that highly related to the region's spatial conflict: forced displacement, land disputes, and living in temporary, "illegal" dwelling under threat of demolition.

Analysis by Saabneh (2022) of gaps in life expectancy at birth between Palestinians and Jews point to a clear spatial-racial hierarchy: the highest level of life expectancy in Israel is among Jews living in dominantly Jewish regions or in the center (87.5 years). In peripheral regions shared by Jews and Palestinians, Jews have higher life expectancy (79.9 years) than segregated Palestinians (78.7 years). These findings indicate that "the

disadvantage for Palestinians is twofold; they are confined to a space with low life expectancy (relative to the Jewish space) and, within this space, they are segregated into localities with lower life expectancy than the neighboring Jewish ones." (Saabneh 2022:9-10).

Building upon Saabneh's (2022) findings, this study distinguishes between two different types of spatial inequality endured by Palestinians. The first type is that Palestinians are excluded from the regions that constitute the economic and industrial centers of Israel and are confined to peripheral, less developed ones. This type of spatial inequality was largely achieved upon the establishment of Israel in 1948 when Palestinians were displaced and excluded from the center regions, which became predominantly Jewish. The other type of spatial inequality happens within the peripheral and less developed regions, were the vast majority of Palestinians reside. It was reinforced by state-led settlement and development efforts in these regions that established and supported new Jewish settlement geographically close to but separate from existing Palestinian ones. The result is the production of a peripheral regions shared by Palestinians and Jews, but Palestinians are segregated into less developed localities with lower socio-economic levels than the neighboring Jewish ones.

The distinction between these two types, (a) exclusion from the center and confinement to the periphery and (b) segregation within the geographic and social periphery, was not clearly articulated by previous research concerning consequences of spatial segregation on socioeconomic and health outcomes of Palestinians and is suggested here as an analytical tool that could shed more light on the mechanisms through which spatial segregation impacts health (and socioeconomic) outcomes. In addition, in the

methods and analysis section, we suggest a novel decomposition of the total racial health gap into two components, each measures the contributions of one of these two type of spatial inequality to the total gap.

Method and results

First analysis compared between two defined spaces, Jewish and Palestinian, in trends of COVID-19 incidence, hospitalizations and death rates over the first 18 months of pandemic. The Palestinian space is defined as the aggregate of all Palestinian localities. The Jewish space is defined as the aggregate of all Jewish localities and mixed cities (of mixed Jewish and Palestinians populations, yet with a Jewish majority and a Palestinian minority), excluding the Palestinian community of these cities. To distinguish the Palestinians neighborhoods from the dominant Jewish space in mixed cities, we use data at the level of a statistical area[1] (SA), an administrative geographic unit that is part of a locality and consists of approximately 3,000-5,000 residents. We also use the racial composition of each SA's population for the year 2020 (CBS 2021). Classified as Palestinian SAs are those with more than 70% Palestinian residents, and similarly classified as Jewish SAs are ones with more than 70% Jewish residents. A small number of SAs that include close proportions of Palestinians and Jews were excluded from the analysis. In addition, excluded from the dominant Jewish space are Haredi neighborhoods. Haredi Jews

[1] According to the Israel Central Bureau of Statistics a statistical area is defined as "a continuous unit of land deriving from the geographical-statistical division within localities with more than 10,000 residents. A statistical area usually consists of 3,000-5,000 residents. […] A statistical area is the smallest geographic unit in the hierarchical division of localities (by population size)." (Central Bureau of Statistics 2020).

are considered a distinct group within the Jewish society. Because of their strict adherence to Jewish law and traditions and high religiosity, Haredi Jews prefer to live in separate neighborhoods from other secular Jews, thus they form another residentially segregated group. The identification of Haredi SAs relies on the results of the national elections to the Israeli parliament, which are published at the level of SAs. Haredi SAs are defined as those where 70% or more of the votes in the 2015 national elections were registered for Haredi parties.

While these classifications, based on race, space, and religiosity among Jews, create four space-population groups, we compare between two of them: the non-Haredi Jewish majority, comprising about 89% of all Jews, and Palestinians living in separate Palestinian localities, comprising about 91% of all Palestinians. Excluded from analysis are Haredi Jews (about 11 percent of all Jews) and Palestinians living in separate neighborhoods in the mixed cities (about 9 percent of all Palestinians).

Data on COVID-19 was obtained from the Ministry of Health[2] (MoH). The data consists of administrative registration of daily counts of verified cases of infection, hospitalization and mortality from COVID-19 over the first 19 months of the pandemic, which start on March 11, 2020 till September 30, 2021. Because the spatial units that define each space-population group are localities and SAs, I use daily counts by localities and, where required, by SAs. Rates are calculated using the daily counts of these events at the level of locality or SA (the numerator) and estimates of the 2020 population of localities and statistical areas (the denominator). The use of administrative data and three different

[2] Data was downloaded from the website of the Ministry of Health: https://data.gov.il/dataset/covid-19

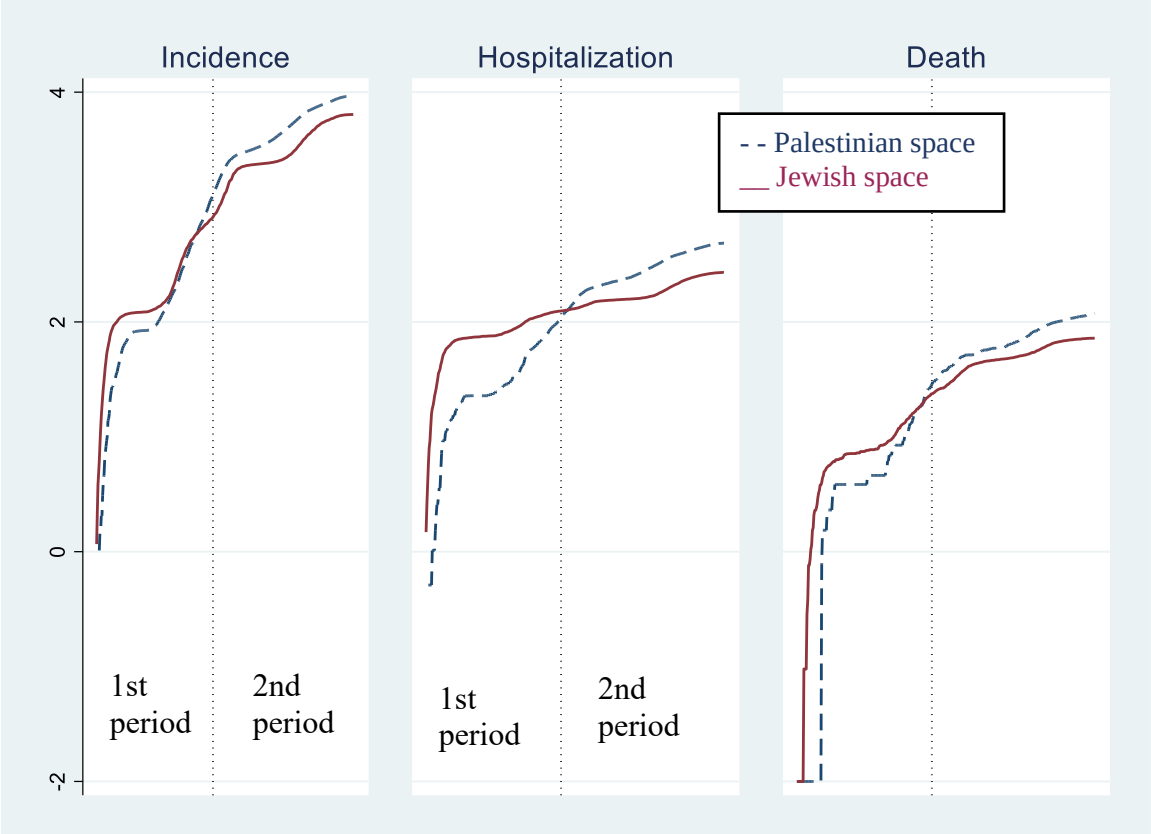
Covid19-related outcomes ensures that the estimated patterns are not biased because of reporting problems (as would be the case if only incidence rates were used).

The analysis uses measures of socio-economic level (SEL) and peripherality of each locality developed by the Israel Central Bureau of Statistics: Peripherality Index of localities in Israel 2015 (Central Bureau of Statistics 2019b) and the Socio-economic Index of localities 2017 (Central Bureau of Statistics 2021). Peripherality reflects two elements: locality's geographic proximity to the boundary of the Tel Aviv District (defined as most central district) and the proximity to every one of the other localities, where these distances are weighted by localities' size. SE index represents locality's level in different socio-economic aspects such as education, employment, income, standard of living, and demographic composition, etc. (for detailed description on these indices see Appendix 1). According to its index values (which is a continuous standardized indicator), each locality is classified as belonging to one of 10 clusters of socioeconomic levels (where cluster 1 is the lowest level and 10 is the highest level) and one of 10 clusters of peripherality (where cluster 1 includes most peripheral localities and cluster 10 includes least peripheral ones).

COVID-19 patterns

A comparison between Palestinian and Jewish spaces in trends of cumulative COVID-19 infection, hospitalization and death rates over the first 18 months of pandemic is first reported (see Figure 1). The findings characterize two periods. In the early period, between March and September 2020, rates among the Palestinian communities are lower than those among Jewish ones. In the second, late period, between September 2020 and September 2021, however, we see a reversal in these gaps; rates among Palestinian localities exceed those among Jewish ones.

Figure 1: Incidence, hospitalization and death rates per 100,000 persons from Covid-19, a log scale, March 2020 –Sept. 2021



A second analysis examines the association between locality's SL and rates of incidence and hospitalization at three different times: June 2020 (in the first period), September 2020, and June 2021 (in the second period), while distinguishing between Jewish and Palestinian localities (see Figure 2). (Death rates at the level of locality are not presented because of small number of cases, especially in small localities).

The results show that during the first period there is no clear pattern of association between localities' socio-economic levels and rates of incidence and hospitalization (see Figures 2a and 2b). Only in the later period, a clear negative pattern emerges: as expected, the higher the socio-economic level, the lower the incidence and hospitalization rates. The

distinction between Palestinian and Jewish localities shows that the negative pattern forges earlier and is stronger among Jewish localities compared to Palestinian ones. It seems that what obscures the appearance in the early period of the pandemic of a robust association between socioeconomic levels (SE) and these health measures are observations from Palestinian localities. Although they are concentrated in the lower socioeconomic clusters, Palestinian localities experienced lower rates of incidence and hospitalization. Later when the rates among these localities rise, consistent with these localities' socio-economic levels, the expected SE-health association is revealed.

Figure 2a: Incidence rates per 100,000 persons, log scale, different times

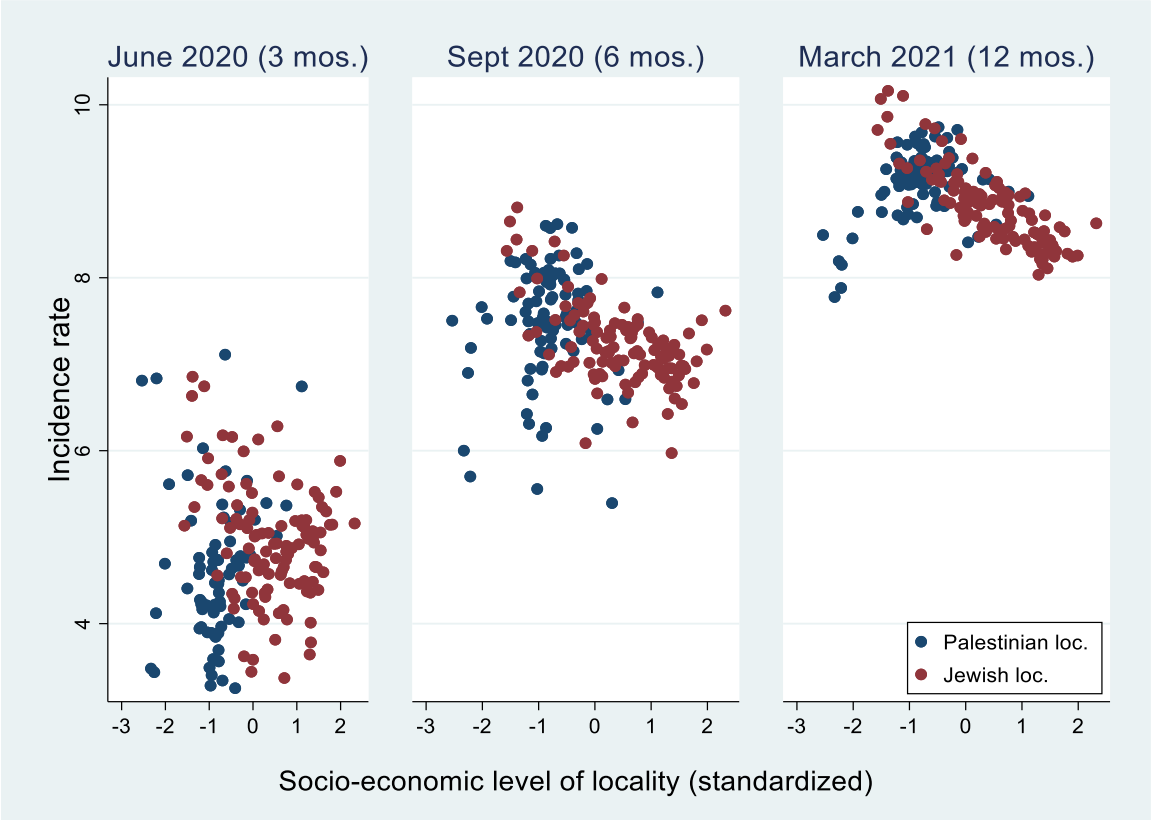
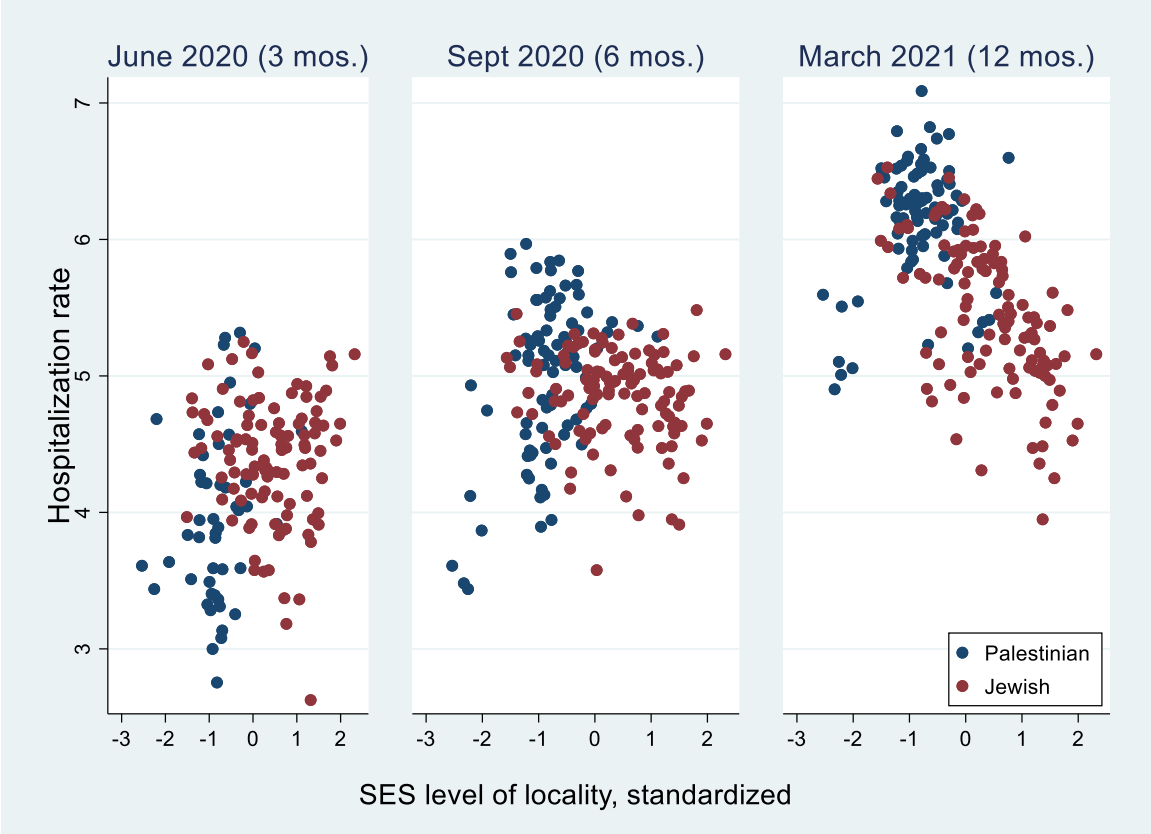


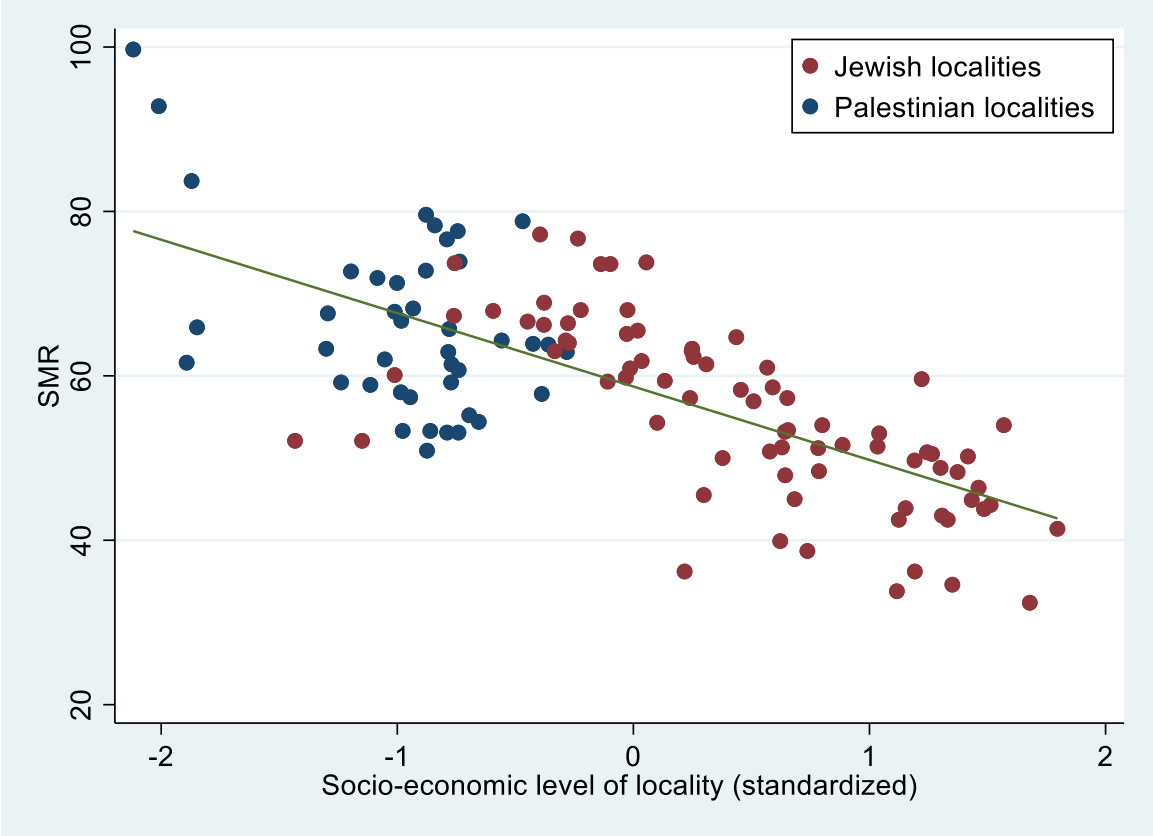
Figure 2b: Hospitalization rates per 100,000 persons, log scale, different times



To support the argument that spatial segregation of Palestinians communities delayed arrival of the virus to these communities and, for half a year, generated novel patterns: a reverse of the racial gap and a distortion of the robust association between socioeconomic level and health outcomes (that was restored only in more advanced periods of the pandemic), a third analysis examines the association between localities' socio-economic and mortality levels in period before the start of the pandemic, thus provides another reference against which the novelty of the early period of the pandemic is evaluated. The results indicate a clear negative association. In 2017 localities with higher socio-economic levels, mainly Jewish ones, show lower levels of all-cause mortality (see figure 3). Palestinian localities are concentrated at lower socio-economic levels with high

levels of all-cause mortality. This pattern is consistent with what we see in the late period of the pandemic and in contrast with observations from the first period.

Figure 3: Standardized mortality rate (SMR) by socio-economic level of locality



The fact that an association between localities' socioeconomic level (SE) and COVID-19 outcomes, which is expected based on a robust association between SE and many health indicators, was not observed in the first period of the pandemic, but is evident in the period before the pandemic and in the later period of the pandemic, in addition to the finding that what caused this "break down" of this association are observations from Palestinian localities, all push us to believe that common causes of racial health gaps such as inequality in access to health care and socioeconomic measures cannot alone describe

these novel patterns. Our argument that spatial segregation played a "protective" role in the early period of the pandemic thus created a novel context in which the impact of these common causes was temporarily halted agrees with basic observation about the virus: that it spreads over time and space and through social networks, that it came from outside of the country, and that it appeared first in Jewish space and only later appeared significantly in the Palestinian space. In fact, the main effort of this investigation is to explain why it took the virus more than six months to appear in the Palestinian space at rates higher than those among the Jewish space as one would expect given previous finding of higher morbidity and mortality among Palestinians. The simple answer is that these are segregated spaces, spatially and socially. (Of, course the segregation has deepened in during the pandemic due to frequent lockdowns and caution measures of keeping a social distance from others).

Decomposition of pre-pandemic trends

The impact of spatial segregation on health is not specific to morbidity or mortality from COVID-19. In fact, the novel patterns of COVID-19 morbidity and mortality evoked the motivation to seriously consider spatial inequality as a determinant of health inequality. I argued earlier that Palestinians endure two different types of spatial inequality; they are confined to peripheral, less developed regions relative to the more developed, predominantly Jewish Center, and within these peripheral regions, they are segregated into localities with lower socio-economic levels relative to neighboring Jewish ones. In the following analysis, I examine the patterning of various health indicators, in the period before the start of the pandemic, according to the two types of spatial inequality.

The health indicators, calculated at the locality level and fully available for urban localities of 10,000 residents or more include: standardized death rates (per 10,000 persons) in 2016-2020, hospitalization rates (per 1000 persons) in 2017-2019, and rates of prevalence of diabetes (per 1000 persons) in 2019-2017. For the purpose of this analysis, the city of Jerusalem is excluded because it has a large Palestinian population (close to 40% of all residents) with a different civic status than other Palestinians in Israel; they are permanent residents but not citizens, which hampers their life chances, including socio-economic and health statuses, relative to the rest of Palestinian citizens and Jews of course. Three mixed localities of small Palestinian population (less than 15%) are considered Jewish ones. Two mixed localities with a Palestinian population ranging between 15-30% are excluded (including them as Jewish ones does not change the results).

To test health gaps according to the two types of spatial inequality, we conduct various comparisons in the three health indicators (and in socio-economic and peripherality levels). First, we compare between all Jewish and Arab localities, where localities are weighted by the size of their population, and provide an estimate of the total national Palestinian-Jewish gap. The results point to clear racial health gaps in the three health indicators (see table 1, line H). Annual all-cause mortality rate (per 10,000 persons) among Palestinian localities is 662 deaths compared to 551 deaths in Jewish localities, a gap of 111 deaths per 10,000 persons[3]. In addition, Palestinian localities show higher rats of hospitalization (a gap of 41 cases per 1,000 persons) and prevalence of diabetes (a gap of 36 cases per 1000 persons).

[3] Significant tests are not reported because we use administrative data that covers the entire population, not a sample, of all localities above 10,000 residents.

Table 1: regional, racial and regional-racial gaps in various health indicators and peripherality and socioeconomic levels

Line	Group of localities		N	Mortality rate per 10,000 persons	Hospitalization rate per 1,000 persons	Diabetes rates per 1,000 persons	Socioeconomic level	Peripherality level
A	All Jewish localities		86	551	145	54	6.0	201
B	All Palestinian localities		49	662	185	90	2.6	122
C	Center, all localities		43	529	137	52	6.7	236
D	Periphery, all localities		92	609	164	67	4.3	140
E	Center, Jewish localities		38	522	135	50	6.9	237
F	Periphery, Jewish localities		48	591	157	58	4.9	152
G	Palestinian localities, periphery		44	656	184	89	2.5	110
H	*Total racial gap: B-A*			*111*	*41*	*36*	*-3.4*	*-78.9*
	Center-periphery gap: C-D			*80*	*27*	*15*	*-2.5*	*-95.9*
	Jewish Center-periphery gap: E-F			*69*	*22*	*8*	*-1.9*	*-85.7*
The decomposition of total racial gap into two type of spatial inequality								
Unweighted absolute gaps		*First type: B-E*		141	50	40	-4.2	-115.5
		Second type, B-F		71	28	32	-2.3	-29.8
Absolute contribution to the total gap		*First type: 0.57*(B-E)*		80	29	23	-2.4	-66.0
		Second type: 0.43(B-F)*		31	12	14	-1.0	-12.8
Relative contribution to the total gap		*First type: 0.57*(B-E)/H*		72%	71%	63%	71%	84%
		Second type: 0.43(B-F)/H*		28%	29%	37%	29%	16%

Notes: Peripherality level is measured by the peripherality index. Socio-economic level is measured on a 1-10 scale, where 1 is lowest level and 10 is highest.

The total racial gap is then decomposed into the two types of spatial inequality (see Appendix 2). Racial health gap due to the first type of spatial inequality is estimated as the difference between Palestinian localities (almost all of which are peripheral) and the Jewish center (almost all localities in the center are Jewish). Racial health gaps due to the second type of spatial inequality are indicated by gaps between peripheral Palestinian and Jewish localities. According to this decomposition, the total gap is represented as a weighted average of these two types of gaps, where the weights are the proportions from the total Jewish population of Jewish population in the center (0.57) and Jewish population in the periphery (0.43). That is, the total gap is a sum of two gaps: the absolute gap due to exclusion from the center weighted by the proportion of Jewish population in the center and the absolute gap due to segregation within the periphery weighted by the proportion of Jewish population in the periphery.

The results of the decomposition are summarized in Table 1. Concerning the mortality gap, they show that the unweighted absolute gap due to the first type of spatial inequality (141 per 10,000 persons) is higher than the gap due to the second type (71 deaths per 10,000 persons). When weighted, the two gaps add up to the total gap. The total gap of 111 deaths per 10,000 persons is decomposed into 80 deaths per 10,000 persons contributed by first type of spatial inequality and 31 deaths per 10,000 persons contributed by the second type of spatial inequality. In percentages, exclusion from the center contributes 72% of the total mortality gap while segregation within the periphery contributes 28% of the total mortality gap.

Results regarding gaps in rates of hospitalization and diabetes show similar relative contributions of each type of spatial inequality to the total respective health gap. The

relative contributions of the first and second types of inequality to the total racial gap in hospitalization are 71% and 29%, respectively. The figures regarding the total racial gap in prevalence of diabetes are 63% and 29%, respectively. To sum, the decomposition of the racial gap in various health indicators suggest that both types of spatial inequality contribute to the health gap between Palestinians and Jews, yet the contribution of the first type (i.e., segregation for the center) is more prominent than that of the second type (i.e., segregation within the periphery).

In addition, the decomposition method is applied to racial gaps in SE and peripherality. Estimates of the contribution of each type of spatial inequality to the total racial gaps in SE and peripherality help us to understand the mechanism through which segregation impact health. The findings show that the contribution of exclusion from the central regions makes about 72% of the total gap in localities' SE. The contribution of the same type of spatial inequality to the total gap in peripherality is of course higher, 84%. Yet notice that 16% of the peripherality gap between Palestinians and Jewish localities comes from the peripheral regions, meaning that within these regions, the peripherality of Palestinian localities is deeper.

Center-periphery gaps

The various estimates in Table 1 (lines A-G) enable an estimation of other relevant health gaps. For example, by comparing between localities in central and peripheral districts, we derive an estimate of center-periphery health gaps in Israel, regardless of locality's racial composition. The results indicate substantial gaps between the geographic center and periphery in Israel. Regardless of their racial composition, localities in the periphery are of lower socioeconomic level (and of course more peripheral) and have

higher rates of mortality, hospitalization, and diabetes (see table 1). For example, annual all-cause mortality rate (per 10,000 persons) in the center is 529 deaths compared to 609 deaths in the periphery, a gap of 80 deaths per 10,000 persons.

These center-periphery health gaps are also observed when limiting the comparison to Jewish localities only, yet they are smaller than the general center-periphery gaps: 87%, 82%, and 55% of death, hospitalization, and diabetes gaps, respectively. This result indicates that the general center-periphery health gaps are only partially confounded by racial health gaps. In general, the results point to significant center-periphery health gaps. They also point to that Palestinians and Jews are not equal in their exposure to this type of inequality; almost all Palestinians but less than half of Jews are subject to harmful effects of peripherality.

Discussion

While the motivation for this study was the observation in the early stage of the coronavirus pandemic of unexpected, lower patterns of COVID-19 mortality and morbidity among the Palestinian communities in Israel despite their longstanding lower socio-economic and health statuses, a more profound impetus lies in providing an analytical framework through which this unforeseen outcome and racial health gaps in general are explained. It presents a framework, usually overlooked by studies of health gaps between Palestinians and Jews in Israel, that emphasizes the significance of spatial inequality and segregation in understanding health inequality. The examination of spatial segregation's contribution to health inequalities begins with a historical investigation of political, social, and economic forces that shaped the construction of place and generated spatial inequality in Israeli

society. It focused primarily on state practices and policies that shaped the longstanding spatial segregation of Palestinians. It first provides evidence showing that Palestinian population is highly spatially, residentially, and socially segregated from the Jewish population. It then shows that this fundamental condition impedes economic development of Palestinian space and inflicts peripherality upon it. Third, this examination reveals the relevance of these spatial inequalities to explaining Palestinians' lower health outcomes. Reports of the MoH acknowledge various regional health inequality, in mortality, morbidity and provision of healthcare services (MoH 2020, 2021). Same reports also point to various health gaps between Palestinians and Jews. Nonetheless, they discuss the two types of inequality separately. The contribution of this examination lies in innovatively revealing the strong, intricate connections between space and race in Israel and thus between spatial and racial health inequalities.

Sewell (2016) argues that the segregation of the black community in the US is not the factor that causes racial inequality, but the forces that instigate segregation are the "true causes" of racial inequality. Accordingly, this study aimed at revealing "the ways political, societal, and economic forces and conditions intersect in contributing to observed health inequalities between a dominant majority and a subordinate minority in a given society" (Sewell 2016:400). Specifically, it pointed to state policies and practices that aimed at controlling space and population, including policies of settlement and economic development, as major forces that instigate segregation. Plans of urban and economic development become tools to control and racialize space. Policies of population transfer, displacement, and distribution and policies of (de-)development are seen as a consort of processes that create separate, racialized, and unequal spaces. Health inequality is then

conceptualized not as an outcome of segregation per se but of forces and powers that instigate spatial segregation and inequality.

The analysis of COVID-19 patterns provides a unique opportunity to test arguments about the impact of segregation on health. The unexpected pattern, in the first half-year of the pandemic, of lower morbidity and mortality rates among Palestinians raised a serious challenge to explanations that rely on Palestinian minority's low socio-economic status (e.g., lower levels of income, educations, and employment) and lower health status (e.g., higher rates of morbidity and lower life expectancy) because these conditions predict outcomes totally opposite from the observed ones. Only when considering the extreme spatial, social and residential segregations of the Palestinian communities, the unique time-space dynamic of spreading the virus is revealed. It is the spatial-temporal pattern of the progression of the pandemic—started from the Jewish space and moved towards the Palestinian one—that gave residential segregation a dual role. It first played a "protective" factor by delaying the arrival of the virus for few months, during which the manifestation of common health determinants such as socioeconomic factors was stalled. Eventually, with the increase of infection rates, the impact of Palestinian communities' lower socioeconomic and health statuses on COVID-19 outcomes came about demonstrating the long-term, harmful impact of the segregation.

While unexpected COVID-19 patterns motivated this investigation and emphasized the role played by residential segregation and the policies instigating it in explaining this unexpectedness, a key contribution of this analysis comes from analyzing health inequality between Palestinian and Jewish spaces in the period before the start of the pandemic. This analysis informs us with two different conceptions of spatial segregation. The distinction

between being segregated away from the center and being segregated within the periphery is novel and cannot be found in the few studies that referred to segregation's harmful impact on social and health outcomes in Israel (e.g., Saabneh 2022, Semyonov-Tal 2021). In addition, this research innovatively evaluates the impact of each of these distinct dimensions of segregation on the poor health of the Palestinian community and reveals that being segregated away from the center and confinement to the geographic periphery, a dimension of segregation that originally proposed in this research, contributes significantly to the poor health and low socioeconomic level of the Palestinian space. Based on the decomposition method and the specific health measures used in this study, being segregated away from the center accounts for more than two thirds of the examined health gaps. Of course, the impact of being segregated within the periphery should not be ignored, even though it is of a smaller magnitude.

One may argue against considering the segregation away from the center as a dimension of spatial segregation and assert in treating it as geographic peripherality, which characterizes both Palestinians and Jews. Yet, notice that both of these types of spatial inequality (or dimensions of segregation) were motivated by same ideology of separation (the Zionist ideology), created by the same forces (State institutions and agents), and materialized through the same policies and practices of space production (population transfers, new settlement and economic development of space). Thus, segregation is not the mere fact that Palestinians and Jews live largely in separate localities or, in the few cases of mixed localities, in separate neighborhoods, which in itself is very profound and fundamental social fact. It is the combination of the two types of spatial inequality: being pushed away from the center (that is, segregated from the center's Jewish population and

social networks, labor market, health care, and other services) and being segregated from Jewish settlements within the Jewish periphery that makes the segregation of Palestinians as well as the forces and powers that instigated the segregation fundamental causes of health (Sewell 2016, Williams and Collins 2001).

In addition, the proposed decomposition assists in identifying and evaluating the mechanisms linking spatial segregation to health outcomes. Williams and Collins (2001) consider residential segregation of racial ethnic minorities (with emphasis of the black community in the US) as a "fundamental cause" of health—meaning that it is related to poor health outcomes via multiple mechanisms and for multiple disease outcomes—that has strong ties to socioeconomic achievements and overall life chances of member of the segregated racial minority. They describe several mechanisms through which segregation is related to poor health outcomes: it limits access to high quality education and labor markets, constrains access to a variety of key community resources such as health care and public services, and increases exposure to environmental dangers and crime. Many studies agree with Williams and Collins conception of segregation as a fundamental cause of poor health (e.g., Anderson and Ray-Warren 2022, Karbeah and Hacker 2023). My findings show that spatial segregation of Palestinians localities contributes to their lower socioeconomic levels compared to Jewish ones, which could be a mechanism that links the segregation of Palestinian communities to their poor health outcomes. The findings further elaborate that the racial socioeconomic gap is largely contributed by the exclusion of Palestinians from the center and suggest that the limited access of Palestinians to dominant labor market found in center region (e.g., Kraus and Yonay 2000, Yuval and Vered 2018)

as well as the relatively low economic development of their peripheral localities operate as significant mechanisms that links their segregation with their poor health.

Another mechanism that explains gaps in health is differential access to healthcare and health services (Anderson, Lopez and Simburger 2021, Anderson and Ray-Warren 2022, Williams and Collins 2001). Consistent with previous reports, our findings identify geographic differences in health services in Israel, where the population in the center enjoys higher access and more advanced services than residents of the periphery (MoH 2020, 2021). Our findings show that Palestinians are much more exposed to peripherality than Jews and thus are subject to limited access to health services at higher rates. Additionally, it is equally important that this analysis provides the historical context that produced and maintained Palestinian communities' forced peripherality. Ignoring this context naturalizes race in the sense of encouraging the wrong perception that Palestinians are ordinarily peripheral. It also wrongly encourages the perception that center-periphery gaps in health (and other outcomes) in Israel are merely geographic and race neutral.

To summarize, this research has several theoretical and methodological contributions. First it presents an analytical spatial perspective to explaining racial health inequality that is usually overlooked by studies of health gaps between Palestinians and Jews in Israel. It provides a comprehensive examination of spatial policies and practices, points to the forces that instigated and maintained spatial segregation of Palestinians, and elaborates the role of segregation in generating health gaps between the segregated racial minority and the dominant majority. In addition, this research suggests a novel operationalization of the impact of segregation on health outcomes; it proposed a model of two types of spatial inequality and devised a decomposition method that evaluates the

relative contribution of each type to the total health gap between these two groups. The findings point to that the segregation of Palestinians from the center and their confinement to peripheral regions is a crucial determinant of their poor health outcomes. They also point to that the segregation of Palestinian community within the geographic periphery also contributes to lower levels of health.

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Appendix 1

The index value is calculated as a weighted total of two components: potential accessibility (2/3 weight) and proximity to the boundary of the Tel Aviv District (1/3 weight). The potential accessibility component reflects the proximity of a given locality to every one of the other localities. These proximities between localities are weighted by the size of the population of each locality, assuming that the size of the population represents the intensity of the opportunities, the activities, and the assets in the locality. The component of proximity to the boundary of the Tel Aviv District reflects Israel's monocentric structure, in which the Tel Aviv District is the economic and business centre of the county. The Peripherality Index 2015 was calculated for 1,210 localities, and the values of the index ranged between -2.544, the most peripheral locality, and 4.708, the most central one (Central Bureau of Statistics 2019b).

The index is calculated as a weighted sum of selected variables that measure the level of the population of each locality in different socio-economic aspects: schooling and education, employment and benefits and standard of living, and demography (i.e., dependency ratio). The values of the index are standardized, meaning that the socio-economic level of a locality is relative to the levels of all other localities. In 2017 the index ranges from -2.815, the lowest level, to 2.32, the highest level (Central Bureau of Statistics 2021).

Appendix 2

This appendix suggests a decomposition of the total health gap between the Palestinian minority and the Jews majority into two components that correspond to two different types of spatial inequality. The first type is defined as the exclusion of Palestinians from the center and confinement to the periphery. Almost all Palestinian localities are located in peripheral districts, and only five localities are located what is considered central districts. The second type of spatial inequality occurs within the peripheral districts and is defined as the segregation of Palestinians into separate localities.

The total racial health gap in any health indicator is defined as: *J-P,* where J denotes the estimate of any health indicator among all Jewish localities and *P* denotes the estimate of the same health indicator among all Palestinian localities.

The value J can be written as $wc*Jc + wp*Jp$, where *Jc* and *Jp* are the values the health outcome in the center and periphery, respectively. The values *wc* and *wp* are weights that sum to 1 ($wc+wp=1$), where *wc* is the proportion of Jewish population that resides in the center, and wp is the proportion of Jewish population in the periphery.

Then, the total racial health gap can be expressed as:

(1) $J - P = wc*Jc + wp*Jp - P$

Because *P can be written as wcP + wpP, equation (1) can be expressed as:*

(2) $J - P = wc*Jc + wp*Jp - (wcP + wpP) =$

$$wcJc - wcP + wpJp - wpP =$$

(3) $$wc(Jc - P) + wp(Jp - P)$$

The component *wc(Jc – P)* in (3) represents as the difference in the health outcome between Palestinian localities and Jewish localities in the center region, weighted by the proportion of Jewish localities in center region *(wc).* Because localities in the center region are basically Jewish localities, *Jc ≈ Center,* the expression approximately represents the gap between Palestinian localities and the center region and can be written as: *wc(Center – P).*

The second component in (3), *wp(Jp – P),* represents the difference in the health outcome between Palestinian localities and Jewish peripheral ones, weighted by the proportion of Jewish localities in the periphery. It represents the second type of spatial inequality, that is, the segregation within the periphery. Notice that since the vast majority of Palestinian localities are in the periphery, then *P ≈ Pp,* and the second component could be written as: *(Jp – Pp),* or the differences between Jewish and Palestinian localities within the periphery.

Thus, the decomposition in (3) could be written as:

(4) $J - P \approx wc(Center - P) + wp(Jp - Pp)$