Health and wellbeing in Udaipur and South Africa

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ABSTRACT

This paper presents a descriptive account of health and economic status in India and South Africa – countries in very different positions in the international hierarchy of life expectancy and income. The paper emphasizes the lack of any simple and reliable relationship between health and wealth between and within our sites in rural Rajasthan, in a shack township outside of Cape Town, and in a rural South African site that, until 1994, was part of a Bantustan. Income levels across our sites are roughly in the ratio of 4:2:1, with urban South Africa richest and rural Rajasthan poorest, while ownership of durable goods, often used as a short-cut measure or check of living standards, are in the ratio of 3:2:1. These differences in economic status are reflected in respondents' own reports of financial status. People know that they are poor, but appear to adapt their expectations to local conditions, at least to some extent. The South Africans are taller and heavier than the Indians—although their children are no taller at the same age. South African self-assessed physical and mental health is no better, and South Africans are more likely to report that they have to miss meals for lack of money. In spite of differences in incomes across the three sites, South Africans and Indians report a very similar list of symptoms of ill-health. Although they have much lower incomes, urban women in South Africa have fully caught up with black American women in the prevalence of obesity, and are catching up in terms of hypertension. These women have the misfortune to be experiencing many of the diseases of affluence without experiencing affluence itself.

Health and wealth are two of the most important components of wellbeing. Rankings of wellbeing based on income or on health alone will differ from more comprehensive rankings depending on the way that income and health are related. Strong causal links run in both directions between income and health, as well as through third factors, so that we cannot hope to understand one without understanding both. The availability of purchasing power parity exchange rates allows relatively sound comparisons of income across countries, while some dimensions of population health—particularly life expectancy, mortality rates of infants and children, and anthropometric measures—are also straightforward to compare across countries. Consequently, much of the research on international health and income has focused on the cross-country relationships between population health and national income. Starting from Preston (1975, 1980), these relationships have been used to investigate the causes of mortality decline, particularly the relative roles of income and of medical knowledge. And data on adult height have been used to investigate the causes of the historical decline in mortality, see in particular Robert Fogel (1997, 2004), Robert Floud, Kenneth Wachter, and Annabel Gregory (1990), and Richard Steckel (1995).

The Commission for Macroeconomics and Health (2001) used the same data to argue that it is health care, acting through health status, that is an important engine of economic growth. Another strand of research, particularly associated with Amartya Sen, e.g. Sen (1999), and embodied, for example, in the UNDP's Human Development Index, argues that cross-country comparisons of wellbeing must look at health (and education) together with national income. And Gary Becker, Tomas Philipson and Rodrigo Soares (2003) have recently argued that if national income is extended to include the value of years lived, "extended" national incomes,

unlike national incomes, are converging across countries, so that international inequality is decreasing, at least on a between-country level basis and according to their specific measure.

International comparisons of the link between health and income using data on individuals are more difficult than those using populations, if only because many "non-fatal" measures of health are not obviously comparable from place to place. Another difficulty is that, until relatively recently, surveys that collect information on income rarely collect comprehensive information on health, while most standardized health surveys, the Demographic and Health Surveys (DHS) being the most notable examples, contain at best rudimentary and unsatisfactory information on economic status. Even so, and following Deon Filmer and Lant Pritchett (2001), the information on ownership of durable goods in the DHS surveys has been widely used to construct principal component indexes, often referred to as "wealth" or "income," that have been used to document the link between various measures of health and "wealth" across many countries using the DHS surveys. But because the indexes are computed independently for each country, because the list of goods included differs from country to country, and because the relationship between the index and actual wealth or actual income cannot be documented in the absence of wealth or income data, these results, useful although they are, tell us very little about the relationship between income and health either within or between countries.

In this paper, we present largely descriptive results from three field sites in India and South Africa. We report direct comparisons of a number of objective and subjective measures of economic and health status in the sites, one in the district of Udaipur in rural Rajasthan, one in the shack township of Khayelitsha near Cape Town, and one in the demographic surveillance site of Agincourt, Limpopo Province, a rural area that was once part of a Bantustan in apartheid

South Africa. We are ultimately interested in improving our ability to make comparisons of wellbeing across such places, using both economic and health measures. We are also concerned with the relationship between income and health, and in particular with the fundamentalist "wealthier is healthier" hypothesis, that health automatically follows economic development, within and across countries. Although the term comes from the title of a paper by Pritchett and Lawrence Summers (1996), who indeed argued that it was income, not healthcare, that determined population health, the idea that income, through better nutrition, clothing, and housing, was the primary determinant of health in the history of now rich countries was argued by Thomas McKeown (1976), and more recently and, in more detail and with more nuance, by Fogel (1997, 2004). While these historical views have been convincingly challenged, most notably by Simon Szreter (1988), Sumit Guha (1994), Samuel Preston (1996), and Richard Easterlin (2004), the argument that economic growth is automatically good for health remains widely accepted, particularly among those arguing for the benefits of globalization, see for example, David Dollar (2001) and World Bank (2002). . If the "wealthier is healthier" hypothesis is *not* true, economic growth needs to be supplemented by appropriate public and private action to directly improve population health, independently of whether better health promotes better economic levels of living.

The paper is laid out as follows. Section I provides a brief background on levels and trends in population health and income in India and South Africa within the broad context of levels and trends in international health. Section II describes our three field sites, and documents various dimensions of their health and economic status. Section III analyzes the correlates of health and wellbeing in our sites. Our results show that the economically better-off South Africans are

healthier in some respects, but not in others. They are taller and heavier, but their self-assessed health is no better; they suffer from depression and anxiety to about the same degree; they have a remarkably similar pattern of prevalence of various health conditions; and both adults and children in South Africa, particularly in the urban site, are more likely to go without food for lack of money. Even if some of the self-reported deprivations, such as hunger, are assessed relative to different local expectations, the effects on anxiety and mental health appear to be absolute and absolutely comparable. Because health, like wellbeing, is multidimensional, and because the components of health do not correlate perfectly with one another, nor with income-based measures, income on its own is likely to be misleading as a short-cut measures of international health. Even within places, such as the three examined here, the links between health and wealth are far from universally strong.

I. Population health in India and South Africa

Figure 1 reports the familiar Preston curve for 2000, with life expectancy at birth plotted against GDP per capita measured in (current) purchasing power parity (PPP) dollars. The US is the richest country shown (Luxembourg is excluded, and would appear far to the right), but has lower life-expectancy than most of the other rich countries. India, with per capita income of $2,045 in 2000 is a little below the “hinge” of the Preston curve, the point at which there is a sharp fall in the slope of the regression function, and which is often identified as the point where countries cross the epidemiological transition, from infectious to chronic disease, and from childhood to old age mortality. South Africa, like several other countries in sub-Saharan Africa, lies far below the Preston curve. Together with falling life-expectancy in the countries of the

former Soviet Union, South Africa and its neighbors have caused the "dent" in the Preston curve just above the "hinge," a feature that was not present in earlier curves.

Figure 2 shows the evolution of the Preston curves by decade from 1960. India has made steady if unspectacular progress in both health and income. It is instructive to compare India with China, where progress has (sometimes) been much more rapid, leading to an almost 40 year increase in life-expectancy over the 40 year period. But much of the Chinese improvement comes from the fact that the starting point is during the famine associated with the Great Leap Forward of 1958–1961 in which it is estimated that 29 million people died, Alphonse Macdonald (2003). After 1970, (or by starting at an earlier date), China did indeed make progress in increasing life expectancy, although the most rapid progress was *prior* to the acceleration of economic growth after 1980; indeed, China provides one of the strongest counterexamples to the "wealthier is healthier" hypothesis, see in particular Jean Drèze and Amartya Sen (2002, Chapter 4). India's progress has been much steadier than China's although, like China, its health improved most rapidly during periods of relatively slow economic growth.

As can be seen from Figure 2, South Africa's history of health and income is almost as spectacular as China's. In the 1960s and 1970s, before HIV and AIDS, South Africa was well below the curve because of apartheid. Indeed, if the country had been split into two, one rich and white, one poor and black, both would have been close to the curve, although in very different positions. Put differently, the distribution of income between whites and blacks (with the mean income of whites around seven times that of blacks), makes average income a poor indicator of health, even if individual incomes were closely related to individual health. In 2000, South Africa's income per capita was $7,409, more than three times that of India in the same year. But

if we adjust the South African figure for the distribution of income between Whites and Blacks in South Africa, using the (rough) 7:1 rule, Africans in South Africa are only about 50 percent better off than Indians in terms of GDP per capita.

Figure 2 shows that, until 1990, South Africa was making gradual progress towards the curve, improving population health albeit with little growth in real income. Between 1990 and 2000, life expectancy collapsed. In 1990, life expectancy in South Africa was 3 years greater than in India while, by 2000, it was 14 years less, and the reversal would be even more dramatic if we were to exclude South African whites, for whom there has been no decrease in life expectancy.

Figure 3 shows the changes in life expectancy together with average growth rates. The left panel uses World Bank data for 1960 and 2000, while the right panel uses data from the UN population division and refers to 1955–60 to 1995–2000. One important difference is that the UN data, by averaging over years, exclude the effects of the 1960 famine in China. This change is responsible for a considerable flattening of the population weighted regression slope in the right-hand panel. Another difference that is important for our purposes is the treatment of South Africa. Because the UN data begin two and a half years earlier, the starting life expectancy is lowered and the ending life expectancy raised, so that the decline over the 40-year period is much reduced. Both figures show a substantial and statistically significant correlation between changes in life expectancy and changes in income, although there are many countries that are far away from the regression lines. The consistent progress in India is clear in both graphs; together with China, India's economic growth and its progress in health have been responsible for enormous reductions in income and health poverty for a substantial fraction of the population of the world. The catastrophe in sub-Saharan Africa is also well illustrated in the graphs. For many

countries of the region, both per capita real income and life expectancy are lower now than they were in the late 1950s; the extreme point at the bottom left of the right-hand panel is the Democratic Republic of the Congo. Yet the HIV and AIDS mortality in South Africa (for example) has little to do with the decline in income during the late apartheid years, nor with the very slow economic growth since 1994. And in the two poster countries for the "wealthier is healthier" story, India and China, decade by decade averages show, if anything, a negative correlation between economic growth and improvements in health. Almost all coherent theories of mortality decline would predict that, over a period of 40 years, there would be correlation between income and health; health services, public health, and education are all positively associated with both health and income. But, decade by decade, there is nothing to guarantee that, left to itself and unaided by public policy, economic growth will improve population health.

II. Agincourt, Khayelitsha and Udaipur

We are here concerned with samples from three poor populations in India and South Africa. The first is a stratified sample of 1,000 households (more than 5,700 persons) in 100 villages in Udaipur district in India, interviewed between August 2002 and August 2003, and described by Abhijit Banerjee, Angus Deaton, and Esther Duflo (2004a, b). The second survey is of a random sample of 300 households (1,243 persons) collected between March and July 2003 in Khayelitsha, a township of approximately 500,000 people near Cape Town. The township is composed of both houses that receive services (water and electricity) and unserviced shacks. Almost all households in Khayelitsha have a family connection to the Eastern Cape (Transkei, Ciskei, and one of the poorest areas of the country), from where their families recently migrated.

The third survey, also from South Africa, is from the Demographic Surveillance Site in Agincourt in Limpopo Province, about 500 km northeast of Johannesburg, near the border with Mozambique, where one of us (Case) was part of a team that drew a stratified random sample of 475 households (with nearly 3,000 members). All resident adult members of these households were interviewed in the period from January to August, 2004. (The questionnaires for both Agincourt and Khayelitsha are available at http://www.wws.princeton.edu/rpds/sa_questionnaires.html).

The Agincourt field site is far from urban areas, and has very little infrastructure. Until 1994 it was part of a "homeland" or Bantustan that was designated by the Apartheid government as a "resettlement area" where people from the townships were "supposed" to live. It is semi-arid savannah, with low and unpredictable rainfall and, although people live by cultivation, the area is better-suited for wild game, as in the neighboring Krueger National Park. According to INDEPTH network (2002, Chapter 16), "[t]he main ethnic group is Shangaan, although Mozambicans, originally refugees, constitute more than a quarter (29 percent) of the total population. Both groups are Shangaan-speaking, and the Mozambicans are culturally affiliated with the South African host population.. . . .Unemployment is estimated at 40–50 percent. Formal-sector employment involves migrant men who work in the mines, in the manufacturing and service industries of larger towns, and on nearby game and commercial farms and timber plantations."

Survey instruments for all three sites were designed to collect information on economic and health status and, while each was adapted to its own environment, the questionnaires were developed in parallel, and contain many identical questions. In Khayelitsha and Agincourt, a

'knowledgeable household member' was first interviewed and asked questions about all persons in the household. All adults identified as household members were then interviewed separately, and asked questions about their physical and mental health, their education, income, earnings and expenditures. In Udaipur, one household member answered an abbreviated consumption questionnaire that had been used previously by the Indian National Sample Survey. Each member was asked a battery of questions on health and mental health.

Economic and educational status

A first look at our Indian and South African households is provided in Table 1, where it is apparent that our South African population is economically better-off, with the rural sample about half as well off as the urban sample, and the rural Indians less than half as well off as the rural South Africans. Monthly total expenditure per head is estimated to be 220 PPP (2003) dollars per head on average in Khayelitsha, 127.5 PPP dollars per head in Agincourt, but only 42.8 PPP dollars per head in rural Udaipur. These estimates are likely noisy, but they are not wildly out of line with other survey evidence in India (52.7 $PPP mean expenditures from the 2002–3 round of the National Sample Survey in rural Rajasthan) and South Africa (289 $PPP mean monthly income per household member (106 $PPP median) among Western Cape African households, and 185 $PPP mean monthly income per member (50 $PPP median) among Limpopo households in the 2001 South African Census). The median PPP value of food expenditure per head, which is probably more accurate, is three times as high in Khayelitsha (58 $PPP) and twice as high in Agincourt (38 $PPP) as in Udaipur (18 $PPP).

Ownership of household durable goods, which is the indicator used for analyses based on the

DHS (and many other health surveys) is higher in South Africa than in Udaipur. For a group of eight goods in both surveys, the median number owned is one among the Indian households, and three and two in the two South African sites. In both South African sites, four times as many households have electricity than in Udaipur. Telephones and cell phones (39 percent in Khayelitsha, 52 percent in Agincourt) and televisions (50 percent and 42 percent) are common in South Africa, but are rare in rural Udaipur (1 percent and 4 percent). These three sites also illustrate the danger of the mechanical use of indexes of durable goods ownership as short-cut measures of economic status. Electric appliances cannot be used where there is no electrification, nor cellphones where there is no reception (as in most of rural India today) so that, at the least, there is a danger of double counting. Bicycles are much more useful in some places than others, and are essentially useless in a shack township whose access to the city is along a busy freeway. Although it is true that, within any given site, ownership or lack of it is likely to be a useful indicator of economic status, variations in ownership across sites will also be a function of geography, prices, and public provision of complementary infrastructure.

Using simplified versions of the USDA's questions for measuring food insecurity, household respondents were asked whether there had been a time in the last year when, because of lack of money, an adult missed a meal, or had not eaten for a whole day, or whether a child had missed a meal. In spite of (or conceivably because of) their apparently better nutrition, Africans reported that adults missed meals twice as frequently, went whole days without food more than twice as frequently, and children went without food nearly four times as frequently as did the Indian children, see Table 1. While it is possible that these results have something to do with the difference between an urban, more-monetized, versus an agricultural, less-monetized

environment, anecdotal clinical evidence from Khayelitsha maintains that child malnourishment is common, and is often associated with maternal obesity, see also Doak et al (2005) who provide international evidence on the prevalence of households containing both malnourished and obese individuals..

Household respondents were also asked to rate their own economic status using a question of the form "how would this household classify its financial situation these days," using a ten rung ladder in India, and a five point scale in Khayelitsha and Agincourt. Table 1 shows that these responses are well correlated with measured expenditure per capita, and that the Indian households (correctly) characterized themselves as very poor relative to the Africans. Between the South African sites, those living in Agincourt perceive themselves as poorer on average than those in Khayelitsha. Even so, the Indian and African respondents are clearly not using the same (PPP) scale; in the 'poor' category, just above the poorest ranking, median PPP expenditures per head in Khayelitsha are twice as large as those in Agincourt, and are four times higher than those in Udaipur. Note that this apparent adaptation takes place even across the two South African sites for which the survey instruments are identical and where there is no question of the appropriateness of PPP conversions (though price levels may well differ). Respondents in Khayelitsha consistently report themselves as poorer than respondents in Agincourt at the same levels of household total consumption per capita.

Information on education and on health status of adults in our surveys is presented in Table 2, where when possible we also present statistics for US Blacks and US Whites for comparison with a much higher income environment. Until recently, women in rural Rajasthan did not go to school, and more than 90 percent of the women in the Udaipur sample are illiterate. Although

almost half of all men can read and write, average completed education is less than three years. The populations of Khayelitsha and Agincourt are better educated, although only by comparison; more than a fifth of men, and more than a third of women in Agincourt report themselves to be illiterate and, while the proportions are much lower in Khayelitsha, years of education are not very different, 8 and 9 for men and women in Khayelitsha and 8 and 7 in Agincourt.

Table 2 and Figure 4 also show the distribution of self-reported health status on a standard five point scale in which larger numbers indicate worse health. These distributions are remarkably similar across the three developing country sites but, just as with self-reported financial status, this surely reflects adaptation or lower health expectations in India and can hardly be taken as an exception to the "wealthier is healthier" rule. But while self-reported health status is adapted to people's circumstances, that adaptation is far from complete. While there is not much improvement in self-reported health status across the three developing country sites—except for men in the "excellent" category—both blacks and whites in the US report that they are much healthier: 32 percent of white women and 24 percent of black women in the US report themselves to be in excellent health, which stands in sharp contrast to reports from South Africa and India, in which only 10 percent of women report excellent health. Figure 4 also shows the that women report worse health status than men, something that appears to be a worldwide phenomenon.

Measures of health status: height, weight, body mass index and hypertension

Measures of height and weight are useful because they are directly comparable across countries and are (relatively) objective, given that they are not self-reported but measured by the survey

teams in all three sites. Adult height, which does not change much until old-age, or until differential selection by mortality or migration affects the population, provides a useful indicator of long-term nutritional status, which in turn is influenced both by the availability of food, and by the disease environment, particularly during middle infancy. Indeed, much of the variation in adult height is set by age 4, in that deficiencies in growth up to that age cannot be made up later, Nicolaus Dahlmann and Kurt Peterson (1977), so that contemporary cross-sections of adult height are informative about the epidemiological and nutritional environment many years in the past. Similarly the burden of chronic disease among contemporary middle-aged adults is likely to be higher among those whose early growth was compromised by a negative health and nutritional environment up to age 4, of which their current height is an indicator. Among adults in currently rich countries, height tends to rise most rapidly with year of birth among the older members of the population, many of whom experienced an adverse epidemiological environment in childhood, and then flatten out among the younger adults, born in a more benign environment. In Europe, Schmidt, Jørgensen, and Michaelsen (1995) have shown that the flattening out of heights among military conscripts tends to occur about two decades after the end of the decline in postneonatal mortality, itself an indication of improvements in nutrition and infections, driven both by higher living standards and public health measures such as the provision of safe drinking water.

Table 2 shows that both South African groups are taller than the Indians, and all are considerably shorter than contemporary Americans measured in the National Health and Nutrition Examination Survey (NHANES III, 1988-1994). The poorer South African group, in Agincourt, is taller (5 cm for men, and 3 cm for women) than the better-off group in Khayelitsha.

The rural Indians are shorter still, 3 cm (men) and 5cm (women) shorter than the Khayelitsha group. It is possible that there is some genetic component to height across South African ethnic groups, but it is generally believed that the genetic contribution to intergroup comparisons of height is small relative to the contribution from the nutritional and disease environment, Floud, Wachter, and Gregory (1990, Figures 5.4, 5.5, 6.1). In this context, note the very large variation in heights in all three sites compared with the US. The standard deviation of heights in India and South Africa is roughly twice that in the US, and is exceptionally large for men in Khayelitsha. A healthier environment not only improves *average* health, but it also sharply reduces disparities, because it is the poorer individuals who bear the greatest burden of infectious disease and poor nutrition. Both average height and the standard deviation of height are indicators of the health environment.

Figure 5 shows graphs of height against age for ages 0 to 50, in the top panel, and for children only, in the bottom panel. (Gaps exist between ages 13 and 18 for the South African surveys; young adults of these ages were not measured.) In order to avoid possible bias from differing proportions of men and women and different ages, we first calculated averages of women's and men's heights separately, and then took the (simple) average of these two at each age. While adult heights are higher in the two South African sites than in Udaipur, child heights in Khayelitsha and Udaipur at each age are indistinguishable. (Results are very similar when children's heights are plotted separately by sex.) Although children in Agincourt are slightly taller at each age from 4 to 10, there is no height deficit in middle infancy in Udaipur compared with Khayelitsha, suggesting that (unless the adolescent growth spurt accounts for a different proportion of adult heights in the two sites) the height discrepancy among the adults will not

exist in the next generation, and that the health environment in Udaipur has caught up with that in South Africa. Of course, we must treat these results with caution if only because, in localized sites like these, health selective migration is potentially important in a way that is not true for the population as a whole. Furthermore, as shown in Figure 7, the Indian children are lighter than the South Africans. Weight for age is usually taken to be an indicator of short-run nutritional status, but in the context of international comparisons, it is unclear why height and weight for age should give such different pictures.

Figure 6 shows heights against age for adults only. The US data at the top of the graph, taken from NHANES III, show the slow down in the growth of height for those born after about 1950, after which it is plausible that improvements in infant health had exhausted their potential for increases in adult height. The Udaipur data also show some slowdown (or even halt) in the rate of height increase for those born after around 1960. There is possibly also some flattening in the curves for Khayelitsha and Agincourt, although in both cases the samples are too small to permit definitive conclusions. (Note that, in spite of appearances, the data in the top panel of Figure 5 are the same as those in Figure 6; they look different because of the larger scale and the plotting against date of birth rather than age.)

If the height differences across the sites are large, they are dwarfed by differences in weight. Table 2 shows the distribution of body mass index (BMI) across the sites, and again presents statistics from the US for comparison. Sixty-three percent of men and 57 percent of women in rural Udaipur have BMI of less than 18.5, which is the international cutoff for *underweight*, WHO Expert Consultation (2004). Few of the South Africans are underweight, but 75 percent of the women in Khayelitsha are stage 2 (BMI between 25 and 30) or stage 3 (BMI over 30) *obese*.

In Agincourt, obesity among women is less startling, but still highly prevalent, with 47 percent of women stage 2 or 3. Men are much leaner than women, and somewhat leaner in Agincourt than in Khayelitsha. The fraction of women with BMI over 30 in Khayelitsha is close to that for black women in the US. These results are consistent with results found for a much larger, nationally representative sample of Africans measured in the 1998 South African Demographic and Health Survey (see Thandi Puoane et al. 2002). They are also consistent with the existence of substantial obesity among women, particularly urban women, in other middle-income developing countries, although none appears to approach the prevalence in South Africa, Raymond Martorell et al (2000, Table 1).,

The pronounced differences in BMI, both between countries and between men and women in South Africa, can also be seen in Figure 8, which presents the distributions of BMI by country and sex. (Agincourt is omitted for clarity, but lies between Udaipur and Khayelitsha.) In both countries, women's BMIs show greater variance than do men's, but the difference in South Africa is especially noteworthy.

Hypertension, in part associated with obesity, is also more prevalent among the South Africans, and is somewhat more prevalent among women than men in Khayelitsha and Agincourt, although perhaps less than might be expected given the gender differences in obesity. The prevalence of hypertension in urban Khayelitsha is similar to what we find in the US among whites, though it remains much lower than prevalence among US blacks (data from NHANES 1999–2002.) South African townships are already suffering from the post-transitional health problems of diabetes and stroke, which have yet to make an appearance in rural Rajasthan.

In our three sites, many respondents will not have seen a physician or health care

professional for the physical problems they face, and so asking the types of questions one finds in, say, the National Health Interview Survey on whether "a doctor or nurse or health care professional has ever told you that you have [particular chronic conditions]" is not illuminating. Instead, we ask participants about the physical symptoms they have encountered in the last 30 days. Figure 9 and Table 3 show the prevalence of 22 health conditions that were asked in all three surveys. Participants in India report more body ache, back ache, vomiting and diarrhea, and more pain in the upper abdomen. The South Africans report more chest pain, swollen ankles and weight loss. More notable is the similarity between the three different sites. Figure 9 presents prevalence rates for Udaipur and Khayelitsha; the correlation across the reported health conditions in the figure is 0.84. Americans are only half as likely to report vision problems as are South Africans or Indians, but almost as likely to report hearing problems. Perhaps vision impairment is more easily remedied than is hearing.

We also included in all three sites questions on depression and anxiety, results for which are reported in Table 4. Substantial percentages of men and women in all three poor sites reported that over the last year they had had a period of a month or longer during which they worried most of the time and, of those, between 38 and 55 percent said that this worrying had significantly interfered with their normal activities. Similarly, indicators of depression (feeling sad, crying a lot, not feeling like eating) were prevalent in the three sites, with no evidence of better mental health among the better-educated and better-off South Africans. Women consistently report worse mental health than do men, something that is also true in the US among both blacks and whites. But perhaps the most notable feature of the Table is the much better mental health of the Americans relative to both the South Africans and Indians, even when the questions "I felt sad"

or “everything was an effort” are identical. American whites are certainly economically better-off than any of the other groups, yet we find no evidence that American blacks have worse mental health than American whites nor, in our developing country data, that those who live in urban Khayelitsha have better mental health than those who live in rural Rajasthan, in spite of a fourfold difference in levels of consumption.

III. The Correlates of Health

We examine the relationship between household resources, body mass index, and hypertension in Table 5. The upper panel presents regression results in which body mass index is regressed on the number of assets owned by the household, with controls for age and sex. In all three sites, we find a significant positive relationship between BMI and assets owned. Controlling for age and sex, each additional asset is associated with an increase in BMI on the order of 0.3 to 0.5 points. This may be either because lack of resources constrains a household’s ability to purchase food, or because adults living in wealthier households are not required to do as much strenuous work. To gain a better sense of the mechanisms at play, we add to the BMI regressions a control for whether households report that “in most months” an adult went all day without eating because there wasn’t enough money for food. In all three sites adult BMI is negatively correlated with this indicator, conditional on the number of assets, age, and sex, although only significantly so in our urban Khayelitsha site. Adding this control to our regressions reduces the coefficient on assets owned, but only slightly.

That higher BMIs are associated with a greater risk of hypertension can be seen in the bottom panel of Table 5, and in Figure 10. Table 5 reports changes in the probability of being stage 1

hypertensive or higher, given a change in each of the right side variables, estimated using probit regressions. Holding constant age, sex and asset ownership, an increase in BMI of one point is associated with a one percentage point increase in the probability of hypertension in our South African sites, and a four-tenths of a percentage point increase in Udaipur. This difference across sites suggests that there might be a nonlinear response, with BMI having little effect on the risk of hypertension at low levels, but a larger effect among the obese. However, Figure 10 shows that the main difference between Udaipur and South Africa is attributed to a shift effect, whereby the Indians are at higher risk for hypertension, independently of their levels of BMI, and presumably due to some other unmeasured risk factor.

We have also looked at the effects of BMI and weight on self-reported health status. The results are strongest for the effect of weight, where the relationship differs in an interesting way across the sites. In Udaipur, where *underweight* is the main problem, greater body weight is *positively* associated with self-assessed health; conditional on age and sex, an additional kilo improves self-assessed health by 0.015 on a 5-point scale. The same effect is seen, albeit attenuated (0.005) in Agincourt, but is effectively zero in Khayelitsha. By contrast, in the US, both blacks and whites report themselves in *worse* health (–0.01) when they weigh more, an effect that is stronger among women.

One way to calibrate the effects of health conditions is to examine their impact on self-reported health status. In all three sites, virtually all health conditions have a significant deleterious effect on self-reported health status, whether or not we control for household expenditures, assets, or education. When run separately for men and women, there are a few cases in which the symptom has no significant effect, but these are relatively rare conditions, like

memory loss for women (but not men) and genital ulcers for men (but not women) in India, and genital ulcers, worms, cough with blood and vomiting for women in Khayelitsha. When all health conditions are jointly regressed on self-reported health status, the coefficients are around one third smaller than when they are regressed one at a time, as is to be expected given co-morbidities. The effects of each condition on self-reported health are typically somewhat larger in India than in South Africa, and are only weakly correlated across the sites; for example, weight loss and a cough with blood have much larger effects on health status in Udaipur, while the reverse is true for hearing problems and for diarrhea, which is much more prevalent among the Indians. (See Case and Deaton 2004 for further details on these results.)

We can also examine whether anxiety, depression and self-assessed health status have similar correlates across our sites. The first two columns of Table 6 present results for anxiety, which we model as an indicator variable equal to one if the respondent answered that he or she had experienced a period of a month or longer, in the preceding 12 months, when most of the time he or she felt worried, tense or anxious. The second set of columns examines the determinants of a depression index, which is the number of depression-related questions to which the respondent answered that he or she had felt that way some or most of the time in the past week. The last two columns examine self-reported health status on a five-point scale for the South African surveys, and a 10-point scale for the Indian survey. All indicators are such that higher values refer to worse outcomes, so that the signs are expected to be the same across all columns.

For each outcome, we examine the impact of a number of variables that we believe a priori could affect anxiety, depression and health status. These include the number of reported limitations in activities of daily living (ADL), which is the sum of the number of ADLs for which

the respondent expressed having any sort of difficulty. In addition, we include three types of economic controls: indicators that an adult or child missed a meal because there wasn't adequate money for food; the number of assets the household owns; and the years of education the respondent has completed. In each regression we also control for the respondent's age and sex.

Results are similar for our two very different South African sites. Limitations in activities of daily living have a large and significant effect on depression in both Khayelitsha and Agincourt, with an additional limitation associated with a 0.3 to 0.5 point increase in the depression index on average. In addition, ADL limitations are significantly associated with self-assessed health status, with additional limitations increasing (worsening) self assessed health in both sites by 0.2 to 0.3 points. When adults in the household skip meals, this increases the probability of reporting a period of anxiety by 12 percentage points in both South African settings. In contrast, children missing meals is not a significant determinant of anxiety in either Khayelitsha or Agincourt, but is significantly associated with depression in Agincourt. Assets appear to be protective against anxiety and depression in both sites, but have no significant association with self-assessed health. Of the socioeconomic variables included in our analyses, it is education that is significantly associated with better health in both Agincourt and Khayelitsha.

Taken together, these suggest different aspects of SES protect in different ways: education appears to protect health status, but has little effect on anxiety or depression, while assets protect against depression, but not against poor health is these sites.

In both South African sites, older adults are significantly more likely to report anxiety, depression and poor health, although changes in all three measures with age are more pronounced in Khayelitsha than in Agincourt. Women report more anxiety in both sites, and their

depression indices are 0.5 points higher on average.

Some of the results for Udaipur mirror those seen in our South African sites. Limitations to ADLs increase depression and worsen self-assessed health identically to what was seen for South Africa. Adults missing meals leads to depression in Udaipur, similar to Agincourt. However, many results for Udaipur are quite different from those observed for South Africa. Women in Udaipur report significantly *less* anxiety than do men, and their self-assessed health is no worse than men's. Anxiety and depression do not increase systematically with age in our Indian site. Education is associated with better health, but not significantly so.

IV. Conclusions

This paper has presented a descriptive account of health and economic status in three sites in rural India and in rural and urban South Africa. The broader populations of the two countries are in very different positions in the international hierarchy of life expectancy and income. While India's population health is about where it would be predicted to be given its level of GDP per capita, South Africa, like the United States, has poor health relative to its income and, because of HIV and AIDS, has a current life-expectancy that is lower than India's. But even before the onset of the epidemic, South Africa's life-expectancy was lower than would be expected from its income, largely because of the degree of inequality between its population groups. If we use mortality as a measure of economic success, Sen (1998), both South Africa and the United States are less successful than would be warranted by their resources, even without taking into account the distribution of income within them. Over the last forty years, India's population health has improved along with its levels of real income though, decade by decade, the rate of progress in

health has not been closely correlated with progress in economic growth. South Africa's population health improved through much of the same period, in spite of little or no economic growth, either under apartheid, or in the decade since. But with HIV and AIDS, it has shared in the collapse of life-expectancy that is widespread through sub-Saharan Africa.

The lack of any simple and reliable relationship between health and wealth also characterizes our three field sites, one in rural Rajasthan, and two in South Africa, one in a shack township and one a rural area that, until 1994, was a Bantustan area. Income levels across the three sites are roughly in the ratio of 4:2:1, with urban South Africa richest and rural Rajasthan poorest, while ownership of durable goods, often used as a short-cut measure or check of living standards, are in the ratio of 3:2:1. These differences in economic status are reflected in respondents own reports of financial status, although not to the same degree as the monetary measures; people know that they are poor, but appear to adapt their expectations to local conditions, at least to some extent. The South Africans are certainly taller and heavier than the Indians—although their children are no taller at the same age—but their self-assessed physical and mental health is no better, and they report that they more often have to miss meals for lack of money. And in spite of differences in incomes across the three sites, they report a very similar list of symptoms. Where the "wealthier is healthier" hypothesis seems to work is in comparisons between the three poor sites and much richer Americans. White Americans self-report better health than do black Americans, but both report substantially better physical and mental health than do South Africans and Indians in our three sites.

In spite of their much lower incomes, urban women in South Africa have fully caught up with black American women in terms of the prevalence of obesity, and are catching up in terms of

hypertension. These women have the misfortune to be experiencing many of the diseases of affluence without experiencing affluence itself.

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Table 1. Household-level Characteristics: Udaipur and Khayelitsha

	Udaipur		Agincourt		Khayelitsha	
	Mean	Median	Mean	Median	Mean	Median
Household size	5.63	5	5.49	5	4.15	4
Number of children 0 - 13	2.39	2	2.02	2	1.16	1
Expenditure per member ($PPP per month)	42.8	34.1	127.5	86.4	220.0	183.9
Food expenditure per member ($PPP per month)	20.9	17.5	53.0	38.2	71.3	57.5
Structure is electrified (percent)	21.1		83.3		84.3	
ASSETS: Percent of households owning:						
Telephone or cell phone	1.4		52.1		39.0	
Stove- electric or gas	15.0		38.5		44.0	
Stove- wood, coal or paraffin	99.1		31.0		81.3	
Television	3.7		42.5		50.3	
Radio or stereo	17.1		66.3		71.3	
Sewing machine	5.1		8.7		6.7	
Car	0.5		12.7		8.0	
Bicycle	16.3		8.9		2.0	
Number of assets owned	1.58	1	2.6	2	3.02	3
HUNGER: Percent of households reporting:						
An adult skipped a meal	28.3		39.7		59.0	
An adult went all day without eating	11.0		18.8		27.0	
A child skipped a meal	10.5		24.5		37.9	
FINANCIAL STATUS: Percent of households reporting:		Median exp per person ($PPP)		Median exp per person ($PPP)		Median exp per person ($PPP)
Wealthiest category	0.7	--	0	--	0	--
Second highest	1.7	62.8	4.8	255.0	1.0	596.9
Third highest	10.6	47.2	39.6	112.3	38.0	229.3
Fourth highest	32.2	38.7	31.9	75.1	44.0	161.3
Poorest category	54.8	31.2	23.7	46.3	17.0	121.7
Number of observations	1022	1022	469	469	300	300

Notes on Table 1. The report of children missing meals is conditional on the presence of a child less than age 14 in the household. Statistics for Udaipur and Agincourt are calculated using sampling weights. PPP conversions are made using the 2000 consumption PPPs from the Penn World Tables updated to the dates of the surveys using Indian, South African, and US CPIs.

Table 2. Individual Characteristics

Udaipur(U), Agincourt (A), Khayelitsha (K), US Black (USB) and US White (USW)

	MEN					WOMEN				
	U	A	K	USB	USW	U	A	K	USB	USW
Education:										
Illiterate (percent)	57.2	21.4	6.8			92.1	35.2	5.5		
Years completed	2.9	7.6	8.1	12.8	13.7	0.6	6.5	8.7	12.9	13.8
Anthropometrics:										
Mean height (s.d.) in centimeters	164 (7.6)	172 (7.6)	167 (12.7)	177 (4.6)	177 (4.7)	152 (7.9)	160 (6.6)	157 (7.9)	163 (3.0)	163 (2.9)
BMI<=18.5 (percent)	62.7	9.9	7.2	2.4	0.9	56.8	6.3	1.5	1.3	3.1
25<=BMI<30	0.6	14.8	19.1	34.2	41.5	1.6	28.5	27.2	28.0	26.9
30<=BMI<40	0.1	5.1	5.1			0.3	16.6	36.4		
40<=BMI	0.2	0.8	1.7			0.2	1.6	11.5		
BMI>30	0.3	5.9	6.8	27.5	28.4	0.5	18.2	47.9	48.8	31.3
Self-reported health:										
1. Excellent	12.4	15.9	18.5	30.1	35.0	8.7	10.8	10.4	24.1	32.0
2. Very good	31.9	32.4	24.2	28.1	33.8	26.5	25.8	21.0	28.5	34.4
3. Good	33.2	32.6	32.1	27.5	22.2	32.0	35.9	33.9	29.8	24.0
4. Fair	15.6	15.9	18.2	10.3	6.5	25.4	23.9	25.1	13.7	7.3
5. Poor	6.9	3.2	7.0	4.0	2.5	7.4	3.6	9.6	4.0	2.3
Mean	2.73	2.58	2.71	2.20	2.08	2.96	2.84	3.03	2.45	2.13
Blood pressure:										
Normal	55.0	54.1	48.6			61.0	57.0	45.3		
High-Normal	25.1	26.4	24.7			23.0	21.2	24.4		
Stage 1	14.0	14.4	17.6			10.3	12.8	17.9		
Stage 2	3.8	3.5	6.1			4.2	4.6	8.3		
Stage3 or higher	2.0	1.5	3.0			1.5	4.4	4.1		
Stage 1 or higher	19.8	19.4	26.7	35.8	28.1	16.0	21.8	30.3	42.0	32.8

Notes on Table 2. Maximum observations used in calculations for Udaipur are1057 men and 1242 women, for Agincourt are 529 men and 770 women, and for Khayelitsha are 309 men and 398 women. Means for Udaipur, Agincourt and the US were calculated using sampling weights. Blood pressure measures for Agincourt are based on the average of a second and third reading taken. Blood pressure is categorized as high-normal if the systolic reading is greater than 130 or the diastolic reading is greater than 80; stage 1 hypertensive if systolic is greater than 140 or diastolic is greater than 90; stage 2 hypertensive if systolic is greater than 160 or diastolic is greater than 100; stage 3 or higher if systolic is greater than 180 or diastolic is greater than 110.

Data for the US are for non-hispanic white and black adults aged 20-74. Data on heights, BMI and blood pressure for the US are based on published tables from NHANES 1999-2002. US hypertension results are reported for all individuals stage 1 hypertensive or higher, which include all persons currently taking antihypertensive medication. Data on educational attainment and self-reported health status are from the National Health Interview Survey 2001. Standard deviations for heights in the US were approximated using a design effect of 2.50.

Table 3. Physical Symptoms
Udaipur(U), Agincourt (A), Khayelitsha (K) and US

	Men				Women			
	U	A	K	US	U	A	K	US
SYMPTOMS								
Percent of adults reporting:								
Cold/flu	36.8	42.5	47.2	12.2	31.8	38.2	52.9	13.3
Fever	30.7	6.2	51.6		35.9	7.5	57.0	
Persistent cough	--	12.9	23.2		--	11.4	24.6	
Dry cough	25.5	--	--		16.6	--	--	
Productive cough	8.8	--	--		13.1	--	--	
Cough with blood	1.5	1.1	3.6		1.1	0.9	3.5	
Chest pain	11.9	12.0	19.4		12.4	17.7	22.1	
Body ache	32.3	15.8	28.1		53.7	28.8	38.5	
Head ache	37.0	41.8	33.9	11.0	49.6	54.2	53.7	23.1
Back ache	27.8	12.9	20.0	28.6	40.7	21.1	30.9	34.2
Vomiting	7.0	2.1	4.2	4.0	10.8	3.6	4.5	5.6
Diarrhea	15.5	10.9	7.1		17.5	10.3	8.8	
Weakness	22.1	13.5	16.8		26.2	19.3	16.4	
Worms in stool	2.9	2.2	3.9		3.3	0.7	4.0	
Pain in upper abdomen	18.9	10.1	11.3		27.5	10.5	16.1	
Pain in lower abdomen	10.1	6.0	6.5		14.7	15.7	29.0	
Genital ulcers	0.5	--	0.6		2.2	--	3.0	
Painful urination	11.6	8.0	6.5		8.8	7.3	13.1	
Swollen ankles	1.0	4.3	3.9		2.2	5.4	8.1	
Severe weight loss	1.7	7.5	14.6		3.4	9.5	16.1	
Memory loss	1.2	9.4	12.0		2.0	11.3	15.9	
Vision	14.7	11.2	19.1	7.4	15.6	18.1	21.2	10.5
Hearing	3.3	3.3	4.5	3.7	4.4	5.2	6.0	2.5
Tuberculosis	3.9	4.6	10.0		1.4	2.0	6.3	

Notes on Table 3. Reports refer to symptoms the respondent has experienced in the past 30 days, with the following exceptions. Reports for tuberculosis refer to whether a doctor, nurse or a staff member at a clinic or hospital has ever told the respondent that he or she has TB. For Khayelitsha and Agincourt, vision and hearing impairment is for current vision and hearing, with glasses or a hearing aid. The Udaipur survey asked whether the respondent had experienced "weight loss" in the past 30 days; the South African surveys asked about "severe weight loss." The US statistics are calculated from National Health Interview Surveys 2002 and 2003. For the US, vomiting includes vomiting and diarrhea. The numbers of responses for the Indian survey range from 1050 to 1055 for men, and from 1238 to 1242 for women. Numbers of responses for the Khayelitsha survey range from 308 to 310 for men, and from 395 to 398 for women, and for the Agincourt survey are 529 for men and 769 for women. The number of responses for the NHIS range from 26872 to 26913 for men, and from 34885 to 34942 for women. Means for Udaipur, Agincourt and the US are weighted using sampling weights.

Table 4. Depression and Anxiety

Udaipur (U), Agincourt (A), Khayelitsha (K), US Whites (USW), and US Blacks (USB)

	Men					Women				
	U	A	K	USW	USB	U	A	K	USW	USB
DEPRESSION										
Percent of adults who report that *some or most of the time* they:										
Cried a lot	7.4	2.9	11.3			30.2	14.2	27.9		
Felt sad	31.9	29.9	37.2	8.1	11.5	49.0	40.4	38.9	12.6	17.1
Did not feel like eating	25.3	22.4	31.4			39.4	31.0	35.4		
Did not feel like working	28.7	--	--			46.7	--	--		
Could not get going	--	18.9	31.7			--	29.4	37.9		
Everything was an effort	--	24.0	39.5	10.7	13.4	--	32.0	47.7	13.9	18.3
Sleep was restless	21.2	33.6	44.3			36.1	45.4	47.2		
Restless or fidgety				14.8	14.1				18.1	18.7
Nervous				12.6	11.2				18.4	16.2
Hopeless				4.9	5.4				7.1	8.4
Worthless				4.3	4.7				6.0	6.6
Conditional on answering some or most of the time: this interfered with life or activities “a lot”				11.4	11.9				12.6	13.0
ANXIETY										
Percent of adults reporting										
A period of 1 month or longer worried most of the time	30.8	33.8	22.0			24.3	40.9	30.9		
Conditional on worrying: this interfered with normal activity “a lot”	46.0	52.0	52.3			37.6	55.2	46.2		

Notes to Table 4. Among those who report a period of one month or longer of worry, reported is the fraction who said this interfered with their ability to carry out normal activities “a lot.” Means for Udaipur, Agincourt and the US are weighted using sampling weights.

Table 5. Hypertension, Body Mass Index and Economic Status

	Udaipur			Agincourt			Khayelitsha		
Dependent Variable: Body Mass Index									
An adult went all day without eating in most months	--	-.662 (.370)	-.375 (.759)	--	-2.645 (1.075)	-1.463 (1.089)	--	-2.287 (.855)	-1.792 (.869)
Number assets	.393 (.083)	--	.387 (.084)	.301 (.054)	--	.285 (.056)	.378 (.116)	--	.328 (.118)
Age	.014 (.008)	.013 (.008)	.014 (.008)	.066 (.008)	.062 (.009)	.066 (.008)	.122 (.019)	.123 (.019)	.124 (.019)
Female	.480 (.234)	.511 (.235)	.482 (.234)	2.567 (.302)	2.533 (.305)	2.571 (.302)	7.149 (.480)	7.155 (.482)	7.155 (.479)
Number obs	2118	2125	2118	1257	1257	1257	683	683	683
Dependent Variable: High Blood Pressure									
BMI			.004 (.001)			.010 (.002)			.009 (.003)
Number assets			.004 (.006)			.005 (.004)			-.018 (.009)
Age			.004 (.001)			.008 (.001)			.015 (.001)
Female			-.039 (.017)			-.037 (.023)			-.027 (.042)
Number obs			2082			1244			668

Notes on Table 5. Body mass index coefficients were estimated from OLS regressions, and blood pressure coefficients from probit regressions. In the lower panel, we report changes in the probability of Stage 1 hypertension or higher, given a change in each right side variable. Standard errors are reported in parentheses. Regressions for Udaipur and Agincourt are weighted using sampling weights.

Table 6. Anxiety, Depression and Self-Reported Health Status

	Khayelitsha					
	Anxiety		Depression		Health status	
Number of limitations in ADLS	.005 (.017)	.006 (.017)	.452 (.107)	.451 (.107)	.206 (.047)	.204 (.047)
Indicator: Adults skipped meals	.122 (.037)	.123 (.037)	−.059 (.226)	−.064 (.227)	.089 (.093)	.083 (.093)
Indicator: Children skipped meals	.052 (.043)	.050 (.042)	.091 (.249)	.094 (.249)	−.063 (.103)	−.059 (.103)
Number of assets owned	−.012 (.008)	−.014 (.008)	−.121 (.048)	−.117 (.048)	.001 (.020)	.007 (.020)
Years of completed education	--	.011 (.007)	--	−.021 (.039)	--	−.031 (.016)
Age	.005 (.001)	.007 (.001)	.038 (.008)	.036 (.010)	.029 (.004)	.025 (.004)
Indicator: female	.078 (.033)	.072 (.033)	.517 (.196)	.531 (.198)	.293 (.081)	.315 (.082)
Number of observations	706	706	701	701	696	696
	Agincourt					
	Anxiety		Depression		Health status	
Number of limitations in ADLS	.017 (.013)	.017 (.013)	.332 (.061)	.332 (.061)	.281 (.032)	.282 (.032)
Indicator: Adults skipped meals	.118 (.037)	.114 (.037)	.532 (.170)	.488 (.170)	.275 (.079)	.259 (.080)
Indicator: Children skipped meals	−.032 (.039)	−.028 (.039)	.330 (.184)	.331 (.184)	−.082 (.086)	−.087 (.086)
Number of assets owned	−.011 (.005)	−.011 (.006)	−.084 (.025)	−.066 (.026)	−.008 (.012)	.001 (.012)
Years of completed education	--	.000 (.004)	--	−.046 (.018)	--	−.023 (.009)
Age	.002 (.001)	.002 (.001)	.019 (.004)	.011 (.005)	.018 (.002)	.014 (.002)
Indicator: female	.066 (.028)	.068 (.028)	.543 (.133)	.536 (.133)	.188 (.062)	.183 (.062)
Number of observations	1207	1206	1210	1209	1211	1210

Table 6 (continued). Anxiety, Depression and Self-Reported Health Status

	Udaipur					
	Anxiety		Depression		Health status	
Number of limitations in ADLS	.020 (.007)	.020 (.007)	.369 (.029)	.368 (.029)	.196 (.021)	.198 (.021)
Indicator: Adults skipped meals	.043 (.025)	.046 (.026)	.383 (.095)	.380 (.095)	.091 (.062)	.081 (.062)
Indicator: Children skipped meals	.170 (.044)	.169 (.043)	−.222 (.150)	−.222 (.150)	.149 (.100)	.151 (.100)
Number of assets owned	.002 (.007)	−.001 (.007)	−.030 (.030)	−.028 (.028)	−.077 (.017)	−.070 (.018)
Years of completed education	--	.006 (.004)	--	−.003 (.014)	--	−.014 (.008)
Age	.001 (.001)	.002 (.001)	.004 (.003)	.003 (.003)	.008 (.002)	.007 (.002)
Indicator: female	−.101 (.022)	−.086 (.024)	.383 (.085)	.377 (.092)	−.045 (.057)	−.081 (.062)
Number of observations	2193	2190	2196	2193	1805	1802

Notes to Table 6. Anxiety refers to an indicator variable that the respondent reported a period of one month or longer in the past 12 months in which he or she "felt worried, tense or anxious." Estimates for anxiety are from a probit regressions. We report the change in the probability of reporting anxiety, given a change in each right side variable. Depression is the simple sum of the number of times the respondent answered that "some or most of the time" he or she had the depression symptoms. For Agincourt and Khayelitsha, these refer to the following eight depressive symptoms: feeling sad, miserable, depressed, that everything was an effort, sleep was restless, respondent did not feel like eating, could not get going, and the respondent cried a lot. For Udaipur, these refer to the following five depressive symptoms: feeling sad, did not feel like working, sleep was restless, did not feel like eating, and the respondent cried a lot.

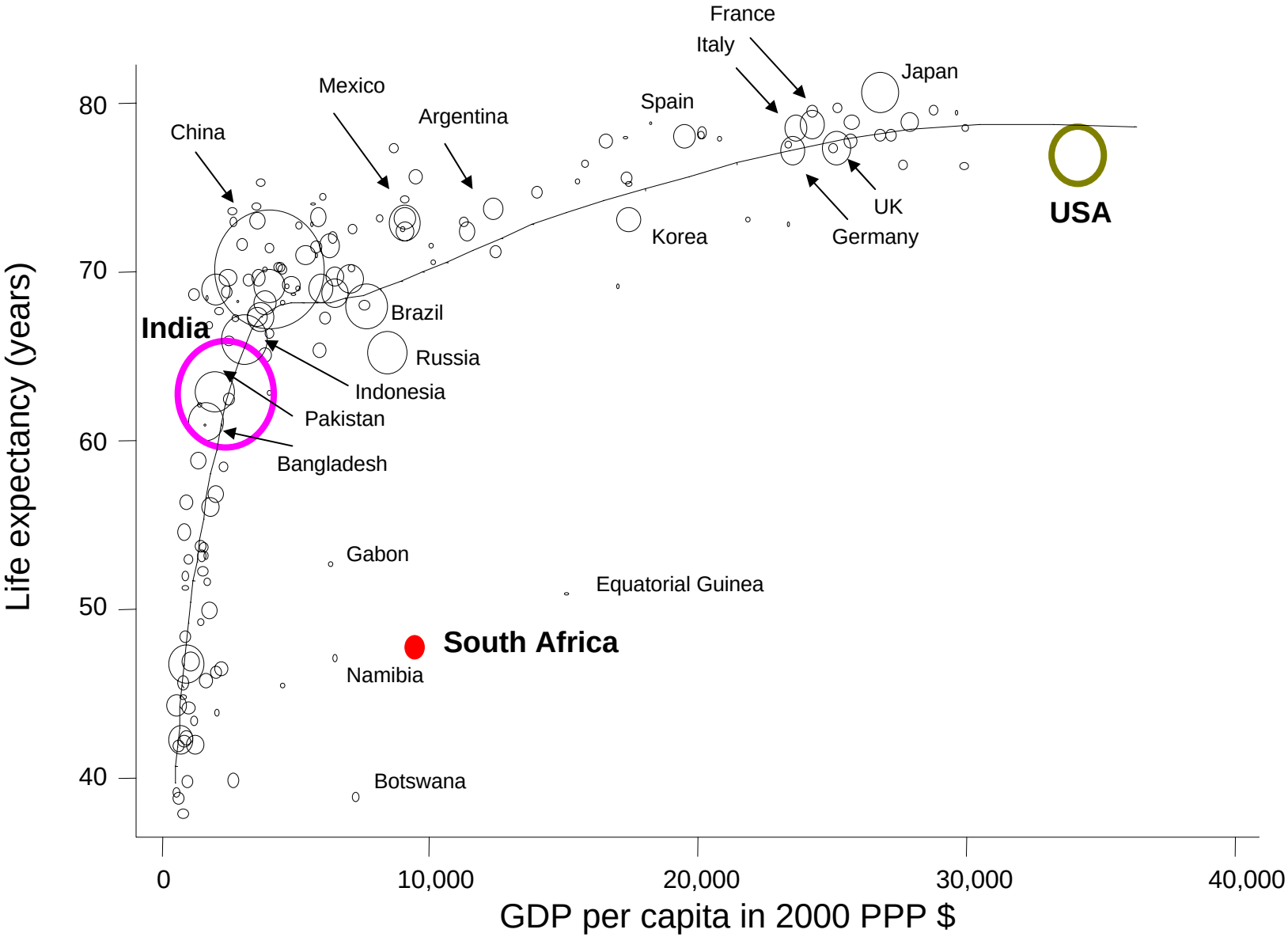

Figure 1: The Preston curve in 2000 (World Bank and Penn World Table data)

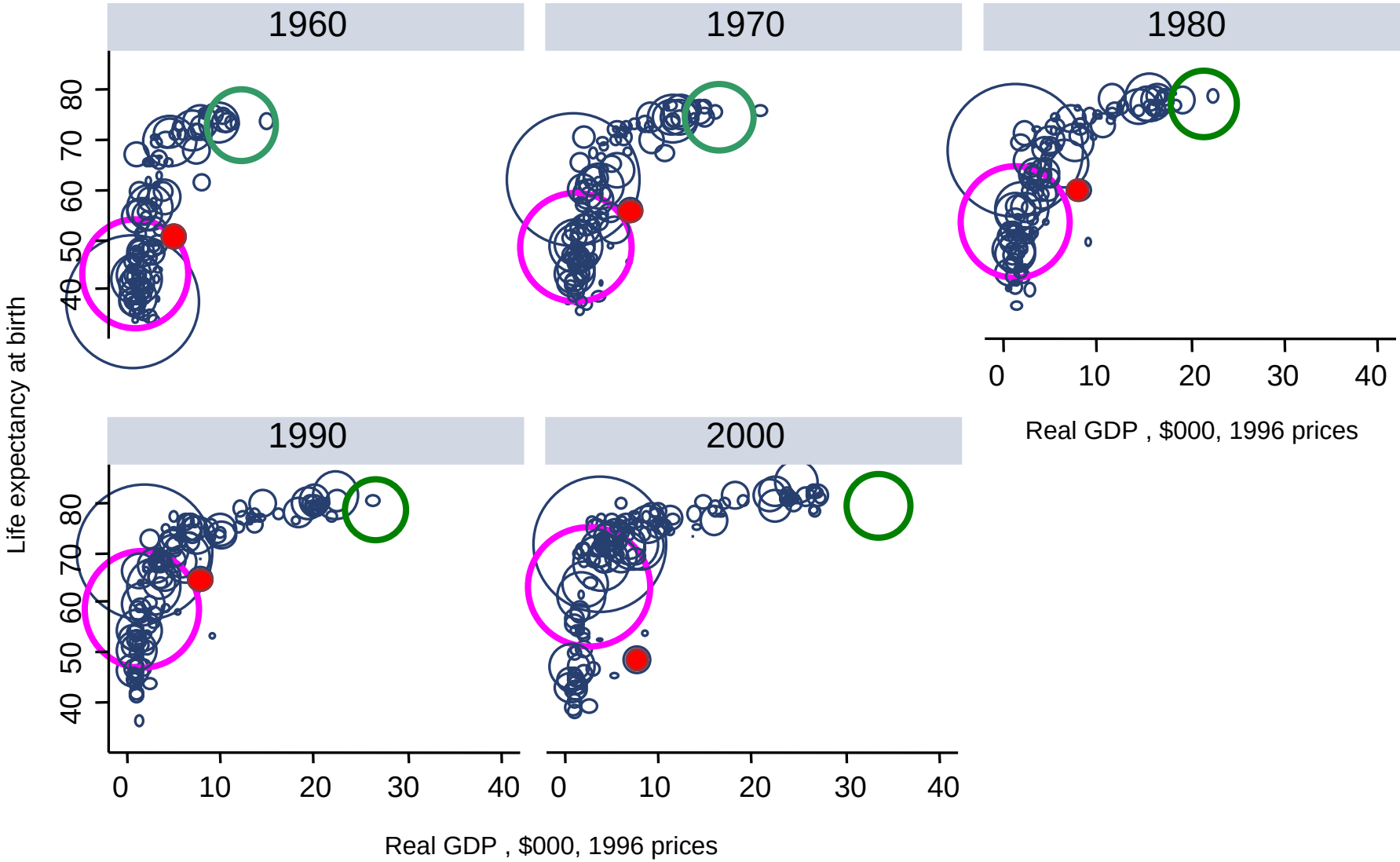

Figure 2: Preston Curves 1960 to 2000 (India, South Africa, and US highlighted)

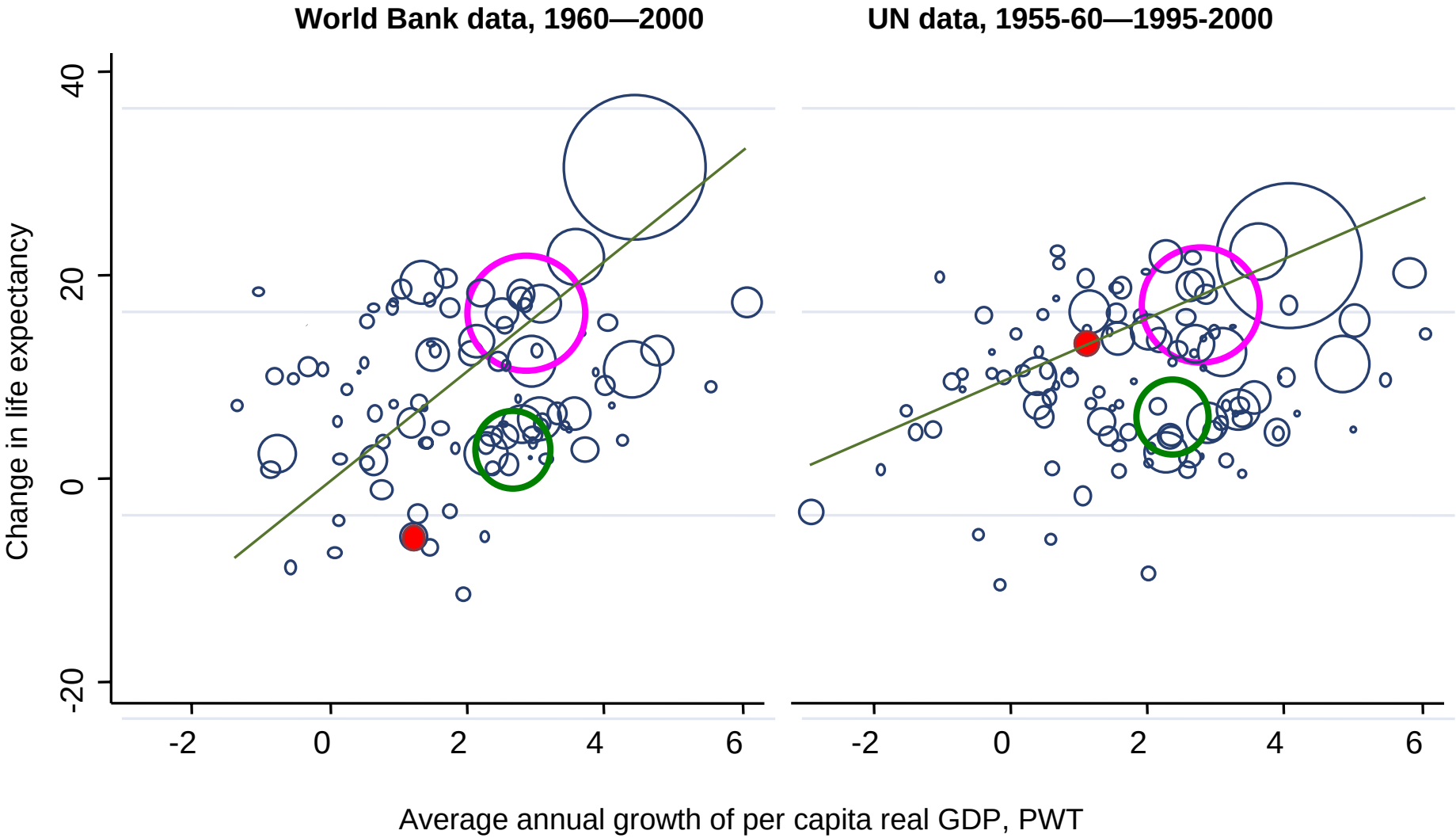

Figure 3: Changes in Life Expectancy v. GDP growth, World Bank & UN data

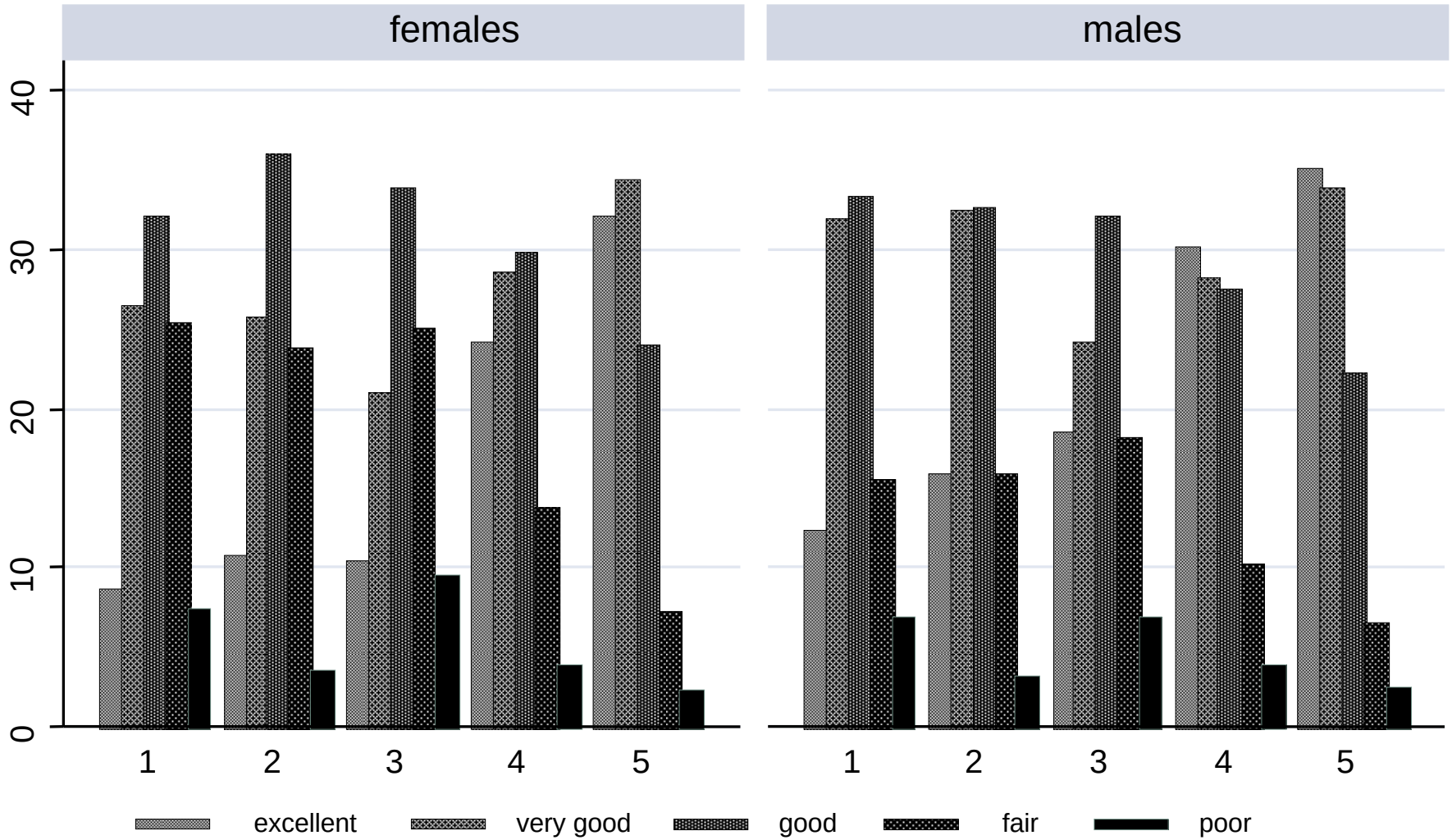

Figure 4: Self-reported health status in 5 populations: 1 Udaipur, 2 Agincourt, 3 Khayelitsha, 4 US Blacks, 5 US Whites

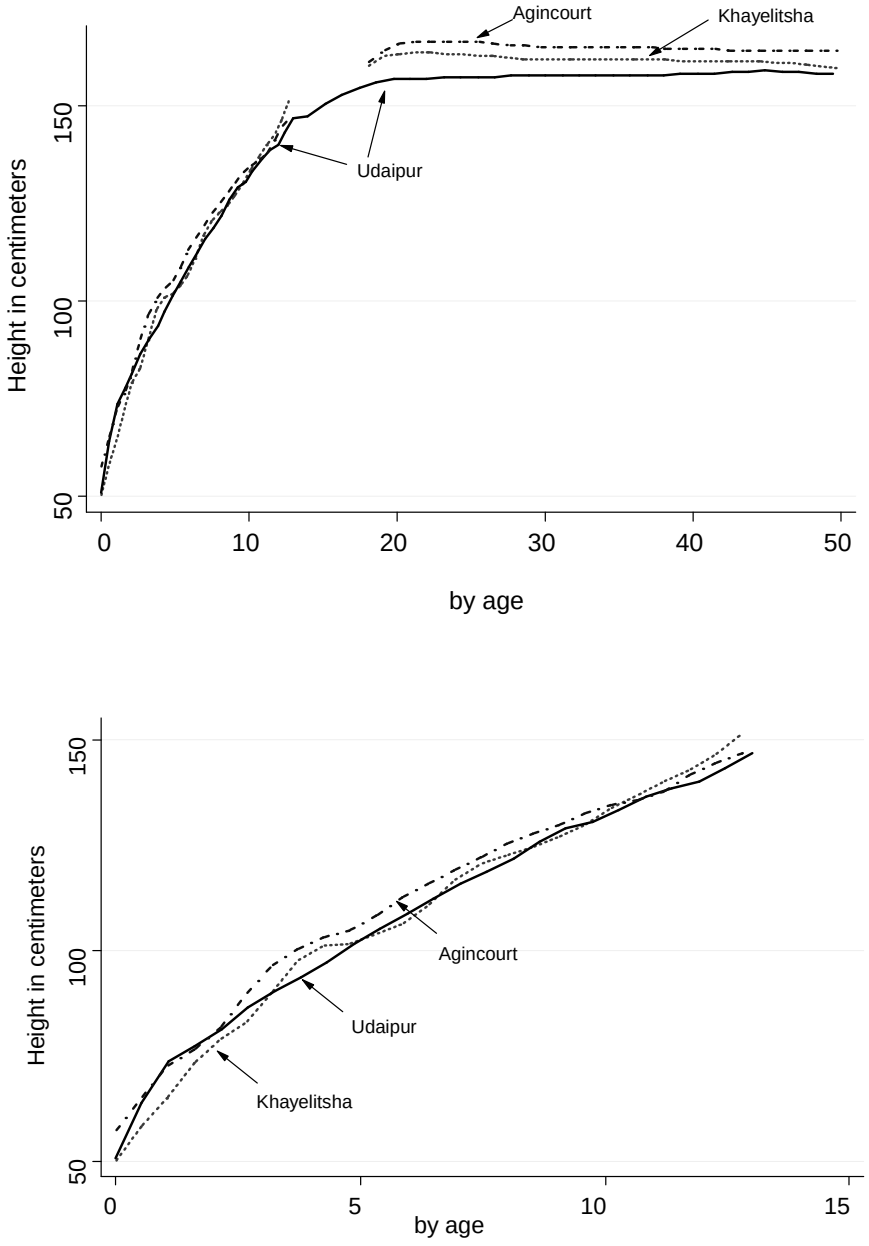

Figure 5: Heights by age in Udaipur, Agincourt, and Khayelitsha

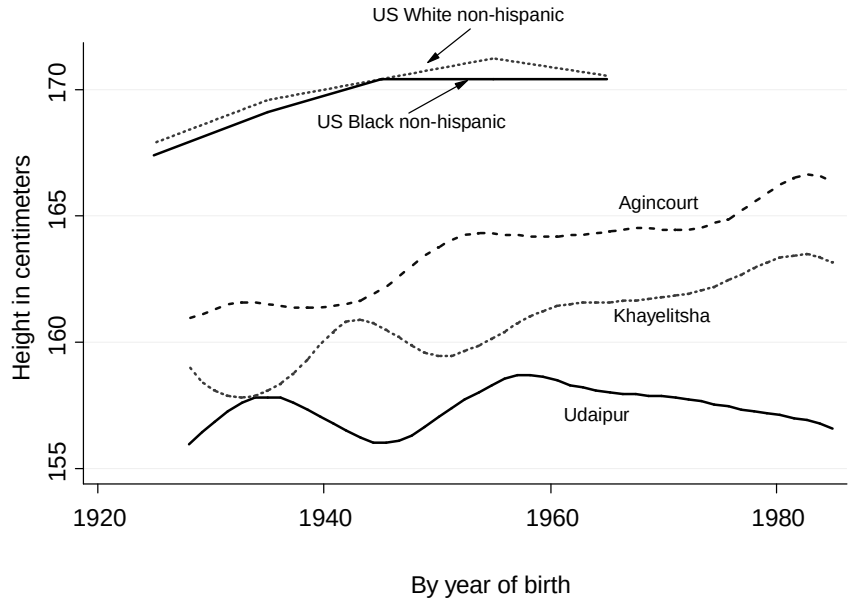

Figure 6: Heights of adults by year of birth in India, South Africa, and the US

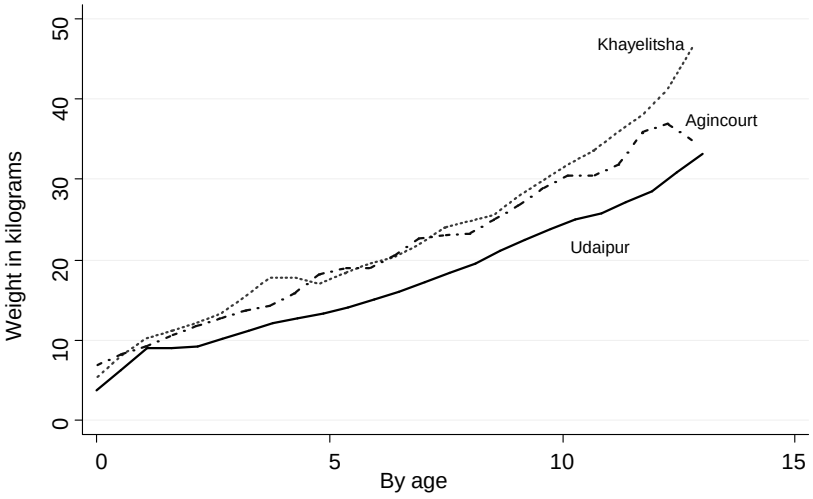

Figure 7: Children's weights by age. Udaipur, Agincourt, and Khayelitsha

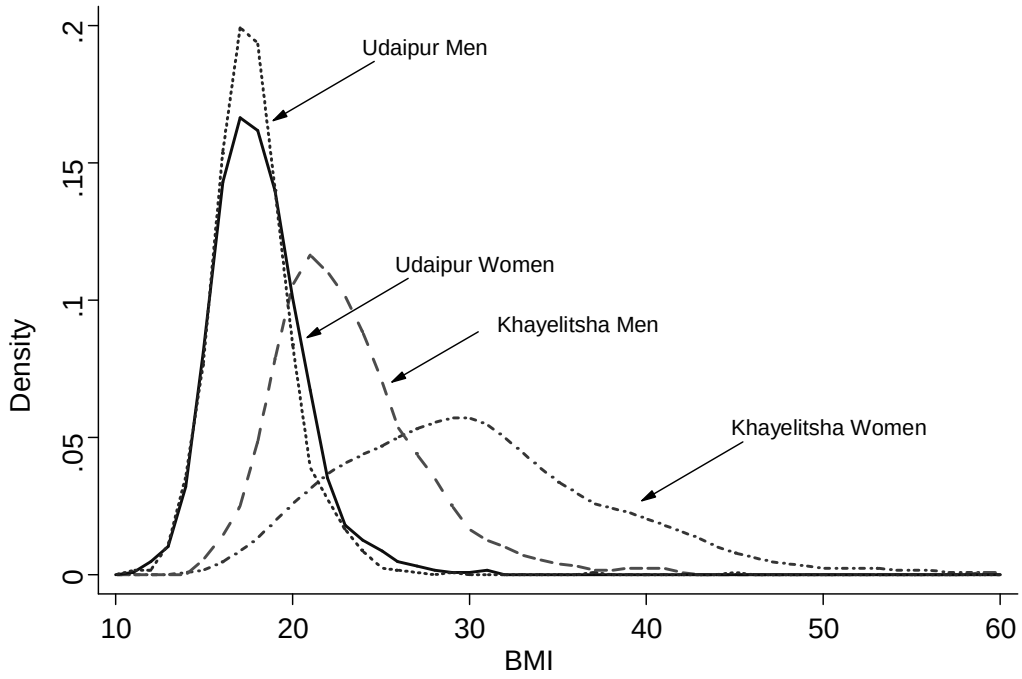

Figure 8: Body-mass indices by sex: Udaipur and Khayelitsha

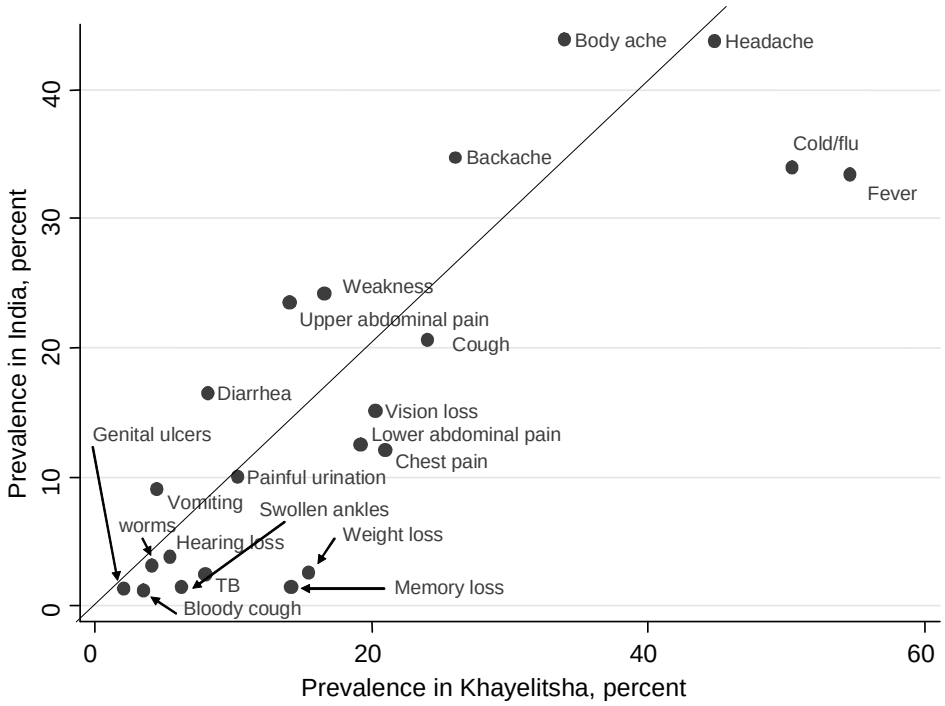

Figure 9: Prevalence of conditions in Udaipur and Khayelitsha

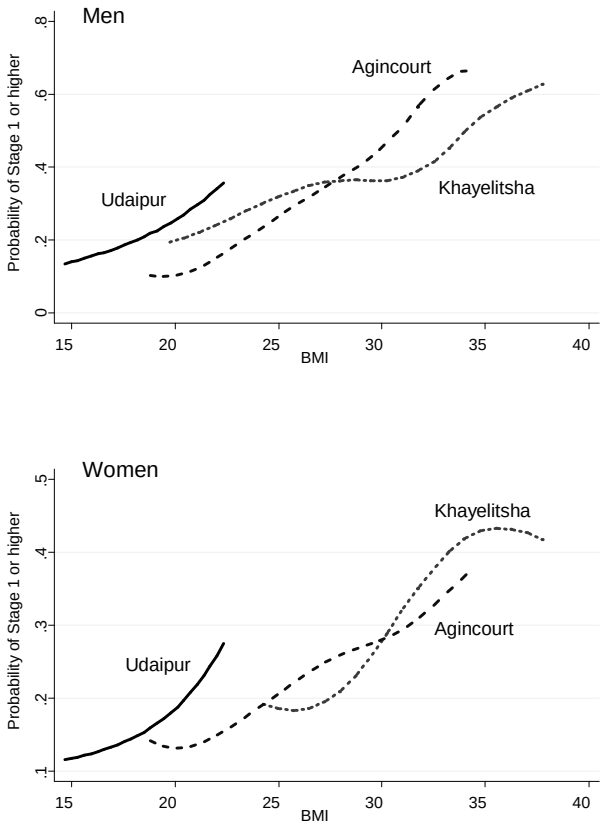

Figure 10: Body mass index and hypertension