

Epidemiological transition and the double burden of disease in Accra, Ghana

Samuel Agyei-Mensah¹ and Ama de-Graft Aikins²

¹Department of Geography and Resource Development, University of Ghana, ²Department of Social and Developmental Psychology, University of Cambridge.

Abstract

It has long been recognised that as societies modernise, they experience significant changes in their patterns of health and disease. Despite rapid modernisation across the globe there are relatively few detailed case studies of changes in health and disease within specific countries and especially for Sub Saharan African countries. This paper presents some evidence to illustrate the nature and speed of the epidemiological transition in Accra, Ghana's capital city. As the most urbanised and modernised Ghanaian city and as the centre of multidisciplinary research since its status as Ghana's capital in 1877, Accra constitutes an important case study for understanding the epidemiological transition in African cities. Our study is still exploratory but it indicates how morbidity and mortality patterns in relation to communicable and non-communicable diseases have changed over the last century in response to demographic, economic, geo-political and sociocultural determinants.

Key words: communicable disease, chronic non-communicable disease, epidemiological transition, lifestyles, urbanization, Accra.

INTRODUCTION

It has long been recognised that as societies modernize, they experience significant changes in their patterns of health and disease (Omran 1971). Despite rapid modernization across the globe there are relatively few detailed case studies of changes in health and disease within specific countries and especially for sub Saharan African countries. This paper examines epidemiological change in Accra, Ghana's capital.

As the colonial capital after transfer from Cape Coast in 1877, Accra has always occupied a central place in the literature on Ghanaian culture, development and health, particularly during the colonial period. A wealth of information on health and disease in Accra has been produced by medical historians such as Patterson (1979) and Addae (1996), medical scientists such as Pobee (2006), sociologists and anthropologists such as Acquah (1972) and Robertson (1984) and recent multi-institutional medical and public health collaborations such as the London School of Hygiene and Tropical Medicine and the Health Research Unit of Ghana's Health Service; the Stockholm Environmental Institute and the Department of Geography Legon; and the schools of public health of Harvard University and the University of Ghana. This information remains to be synthesized in ways that illuminate epidemiological trends in Accra over a theoretically significant period of time (e.g pre and post colonial eras).

In this paper we begin the process of synthesizing insights from these existing studies as well as from our own work on Ghana's epidemiological transition (Agyei-Mensah, 2004, 2007) and burden of chronic disease (de-Graft Aikins, 2005, 2007; de-Graft Aikins and Marks, 2007).

A central argument we develop in this paper is that Accra's epidemiological transition requires a longitudinal and integrated treatment of macro- and micro-social processes, an approach that situates recent complex changes within their historical context. We begin this process by describing the evolution of Accra from a colonial town to a modern global city and the health changes it has endured through intricately connected demographic, economic, geo-political and socio-cultural processes. Our work-in-progress moves beyond description of broad trends to a deeper empirically-driven analysis of the causes and consequences of the epidemiological changes for specific communities, their implications for Accra's future health status and the potential insights this work provides for understanding the epidemiological transition in other African cities.

MODELS OF EPIDEMIOLOGICAL CHANGE

The epidemiology transition model developed by Omran (1971) focuses on the complex changes in patterns of health and disease, the interactions between these patterns, and their demographic, economic and sociological determinants and consequences. In its original form, the model proposed three stages of epidemiological transition. The first stage referred to as the Age of Pestilence and Famine was characterized by a demographic regime of high and fluctuating birth and death rates that reflected Old World epidemics of infection and famine. At this stage, high death rates kept population growth to a minimum. The second stage was the Age of Receding Pandemics, in which epidemics became less frequent, and the impact of infectious disease on death rates declined. The third stage of the transition constituted the Age of Degenerative and Man-made Diseases. This stage of transition was largely driven by social factors such as lifestyle, diet, occupation and income. Omran argued that as infectious and parasitic diseases receded, their place would be taken by a series of chronic degenerative diseases associated with ageing populations, such as cardiovascular disease, stroke and cancers: these diseases would become significant causes of mortality. More recently, two additional stages have been added to Omran's model (Applin et al, 1995). Thus a fourth stage constitutes the Age of Delayed Degenerative Diseases: here degenerative diseases such as cardiovascular diseases and cancers still remain important as major causes of death, but changes in medical technology lengthen the life expectancy of elderly people suffering from cancer and cardiovascular disease. The fifth stage referred to as the Age of Re-emerging infectious disease is characterized by the re-emergence of infectious disease. The stages proposed in Omran's original and revised models occur sequentially.

Omran's model has been adopted in numerous geographic and health related studies (see for example Fenk et al (1989), Moon and Jones (1992), Cleland (1989), and Landers (1991)). With rare exceptions, such as Feechem's (1989) edited volume on mortality change in Sub Saharan Africa, few existing studies have applied the model to the African context. While widely used, Omran's model has not escaped critique. Some critics argue that the sequential stage process proposed by the model does not reflect epidemiological changes in some societies. For example, in Fenk et al's (1989) assessment of the epidemiological transition in Latin America, they concluded that the Latin American experience does not fit the model because of the resurgence of malaria and dengue fever in the region, as well as rising differences in the two broad disease categories (infectious vs chronic degenerative) between regions and social groups. Fenk et al (1989) conceptualized the Protracted Polarised Model to describe the Latin American transition. This model proposed a co-existence of infectious and non-communicable diseases as the major causes of morbidity and mortality. This model is strongly aligned with expert discussions on

Africa's 'double burden of disease' which recognize the co-existence of communicable diseases such as malaria and tuberculosis and non-communicable diseases such as hypertension, stroke and diabetes (Cooper et al, 1998a,b; Unwin et al, 2001; <http://www.afro.who.int/>). Like the demography critics of Omran's model (cf. Caldwell and Caldwell, 1989; Landers, 1991), commentators on Africa's double burden of disease place important emphasis on multilevel factors in epidemiological changes such as the interrelationship between socioeconomic, sociopolitical, cultural and behavioural processes.

In our description and preliminary analysis of epidemiological changes in Accra we draw on Fenk et al's (1989) Protracted Polarised Model and the African epidemiological discussions. We aim to demonstrate that Accra's epidemiological changes are a product of complex dynamic macro and micro social processes and that the stages of change, rather than proceeding in a sequential manner, have overlapped over a significant period of time.

ACCRA IN TRANSITION, 1877 - 2007

Accra is the capital of Ghana and is located in the Greater Accra Region, the most urbanized region among the country's 10 administrative regions. Geographically, Accra is bounded on the north by latitude 5 41. 4N, on the south by the Gulf of Guinea, on the east by Longitude 00 01E and on the west by Longitude 00 21.5. It covers an area of about 420 square kilometers. With an estimated population of 1.7 million in 2000, Accra contains 70 percent of the total population of Greater Accra Region, and accounts for 30 percent of the urban population of Ghana, and 10 percent of the total population of Ghana.

Colonial Accra, 1877 – 1957

Historians note that the Accra plains was a vibrant traditional economy inhabited by Le and Kpeshie peoples as early as the 13th century (Alhassan, 2006). These earliest known settlers were absorbed by Gas who, different historical versions claim, either migrated to Accra in the 13th century from ancient Israel, through Egypt and Nigeria or arrived in Accra in the 16th century from much closer origins in Benin or Ife (Alhassan, 2006). Like other coastal areas of the then Gold Coast, Accra became host and facilitator to European commercial activities, including the slave trade. About eight of the Gold Coast's sixty former European castles, forts and lodges were located along the Accra coast: Christianborg castle, James and Ussher Forts, and five unnamed Dutch, Danish and Portuguese lodges (Dantzig, 1980). The 16th and 17th century saw rapid population growth of Ga towns and their transformation into urban centres by the mid-17th century (Kea, 1982). Well known areas in Accra today such as La, Teshie, Abossey Okai and

Mamprobi were then popular markets for livestock, fish and general goods. The early half of the 19th century deepened Accra's growing status as a trading centre. Geopolitical factors also contributed to Accra's growth during this period. For example historians document the immigration – and deportation, after the failed “Revolt of the Males” - of freed Africans and slaves from Brazil to Accra and other West African towns such as Ouidah, Badagry and Lagos in the 1820s and 1830s (Akyeampong, 2007). In 1877, Accra became the administrative capital of the Gold Coast, taking over from Cape Coast. Socioeconomic and infrastructural developments led to increased immigration of people from other parts of Gold Coast as well as from French West Africa, Liberia, Nigeria and Sierra Leone. These developments led to a change in the population structure of Accra, from a Ga-dominated town into an urban complex consisting of many indigenous ethnic groups and foreign migrants.

The people of Accra experienced a number of health-related crises between 1890 and 1919 which caused wide population fluctuations. The crises included a devastating fire in 1894, an earthquake in 1906, the bubonic plague in 1908, and the influenza epidemic of 1918-1919 (Robertson, 1984). The plague in 1908 killed 127 people in the city. The devastation caused by the plague exposed the extent of the city's underdevelopment. Accra Town Council was declared a failure in its role as a sanitation board by an independent inquiry led by Simpson. The publication of the Simpson inquiry report and the measures taken thereafter led to the first serious efforts to improve health conditions for all inhabitants (Patterson, 1979). Prior to this period significant attention was paid to the health of the European population with comparative neglect of the health of the people of Gold Coast (Addae, 1996).

Pipeborne water was one of the colonial government's major contributions to public health in Accra. In 1904 the construction of the Accra waterworks began at Weija: this was completed in 1914 (Robertson, 1972). People had earlier depended on rainwater from rooftop storage tanks or on water from polluted wells. The introduction of pipeborne water helped reduce the incidence of many water-borne diseases such as guinea worm, typhoid fever and dysentery (Patterson, 1979).

Expansion of health services also contributed indirectly to public health improvements. In 1882, Accra Hospital was built: it had 40 to 46 beds for Africans and a smaller number of beds for Europeans. In 1916, an European hospital - now called Ridge Hospital - was built in the Ridge Area, an exclusively European residential area. In 1924 the Gold Coast Hospital – now the Korle Bu Teaching Hospital – was completed at Korle Bu. Its initial capacity was for 96 patients. The 1920s generally saw sweeping changes to public policies initiated by the governor of the period, Sir Gordon Guggisberg. Guggisberg produced the first ten year development plan, launched in 1924 to improve health, educational and economic

development across the colony. Part of this plan included a policy statement, issued in 1927, to ensure the treatment of both natives of Gold Coast and the Europeans.

Accra's population continued to grow. From 18, 574 in 1911, Accra's population rose to 38, 049 in 1921, to 61, 558 in 1931 and by 1948 - the defining period of the Gold Coast's independence struggles - the population was 135, 926. Population increase led to the gradual expansion of the city's administrative boundaries in the 1930s. The Ga community gradually lost majority status after this period: in 1948, the Ga constituted 51.6 percent of the population of Accra, by 1960 it constituted 37.5 percent of the population (Lisowska, 1984). The first plan for Accra was prepared in 1944. This plan was revised twice: in 1958 and 1961. These plans provided for a spacious city with well defined roads and public services at a standard in keeping with the expectations of a city at the time. However the plans did not anticipate a rapid increase in population (Domfeh, 1999).

Available mortality statistics for the period indicate that mortality rates were relatively high at the turn of the 20th century. In 1910 the crude death rate was estimated at 50 per 1000 of the total population; by 1930, the death rate had reduced to 21 deaths per 1000; a further reduction to 18.1 per 1000 was recorded in 1945. The reductions in mortality were due largely to improvements in public health, education and nutrition (Patterson, 1979). However records on causes of death in the 1950s showed the co-existence of both infectious communicable diseases and chronic non-communicable diseases as causes of death. Acquah's (1972) social survey of Accra in the 1950s revealed that infectious and parasitic diseases were the major causes of death followed by diseases of: (2) infancy; (3) respiratory systems; (4) digestive systems; (5) nervous systems; (6) old age; (7) circulatory systems; (8) pregnancy and (9) injuries resulting from violence (see Table 1, page 14). The co-existence of infectious communicable diseases and chronic non-communicable diseases had been recorded at Korle Bu as early as the 1920s with stroke cases assuming importance as causes of disability and death (Pobee, 2006).

World War II and its aftermath had a major impact on the demography of Accra. It brought a large influx of immigrants into the city. Like previous periods these new inhabitants came from other parts of the country and from the African continent. New urban settlements were created for the rising population. These included Nima, Accra New Town, Asylum Down, Tesano, and Odorkor. Between 1948 and 1960, the population of Accra increased almost 3-fold from 135,926 to 364,719 (Robertson, 1984).

Post Independence Accra, 1957 -1982

At independence, Ghana inherited the colonial health infrastructure which was mainly curative and a public health approach that was limited to control of major outbreaks of epidemic diseases such as smallpox and yellow fever (Addae, 1996). The socialist regime of Kwame Nkrumah aimed to accelerate the pace of socioeconomic development and to improve the general welfare of Ghanaians. Health and education became centerpieces of state reforms. Investments made in public health promoted sweeping changes in health policy and administration. The University of Ghana Medical School was established in 1962 to train more Ghanaian doctors on home soil. Several government polyclinics were established and there was widespread growth in the private medical industry. Healthcare became virtually free for all segments of Ghanaian society. As the capital, Accra benefited from these state initiatives.

Because of Accra's growing position as an industrial, administrative and industrial centre, the city attracted large numbers of people who came in search for jobs and to experience urban life. Geo-political factors also contributed to Accra's status as an increasingly cosmopolitan city. Ghana's status as the first black sub Saharan African country to gain political independence coupled with Nkrumah's pan-Africanist project attracted a considerable number of Africans, African Americans, and Caribbeans to the country and to Accra in particular (Akyeampong, 2007). Accra's population grew at an annual rate of 5.1 percent between 1960 (364,719) and 1970 (617,415) and 3.1 percent between 1970 and 1984 (956,157).

Austin Tetteh (1972), an architect, notes that Accra's increasing population created severe housing shortages. According to the 1960 census of Ghana, 60 percent of the urban population lived with three more persons per room while 40 percent lived with four or five persons per room. In the case of Accra about 60 percent of the population lived with four persons per room. Housing shortages and increased overcrowding in limited spaces had clear implications on sanitation and health.

Miltenyi's (1967) work provides information on causes of death during the 1960s. Infectious and parasitic diseases were ranked as top causes of death, followed by diseases of: (2) early infancy; (3) digestive system; (4) respiratory system; (5) senility; (6) injuries caused through accidents and violence; diseases of (7) the nervous system; (8) nutritional and (9) circulatory diseases (see Table 1, page 14). It is worth noting that the two top causes of death in the 1960s were identical to Acquah's (1972) reported top two causes of death in the early 1950s and also that circulatory diseases remained significant causes of death.

Hospital-based and community-based studies on chronic non-communicable diseases in Ghana increased during the 1950s and 1960s (de-Graft Aikins, 2007). This body of work revealed quantifiable changes in terms of the increasing burden of chronic non-communicable diseases in Accra. In the 1960s, 35 percent of cases presented at the Korle-Bu were due to hypertension (Amanor and Martinson, 1969). Between 1960 and 1968 strokes accounted for 8% of medical admissions and 6-10% adult deaths in Korle Bu: hypertension, diabetes and obesity constituted important associated factors (Haddock, 1970). By 1972 strokes constituted 10.4% of all medical admissions and 21.4% of all deaths – female admissions and deaths (8.6% and 24.6% respectively) far outnumbered male admissions and deaths (1.8% and 20% respectively). Cancer cases – especially breast and cervical cancer – also increased during this period (Aidoo, 1973; Anim and Laing, 1972).

A WHO community based study begun at Mamprobi, a suburb of Accra, in the 1970s. This study provided the first documented evidence on community-based cardiovascular prevalence rates and predisposing factors. The study researchers recorded hypertension prevalence of 13% in the community (Ikeme, Pole, Pobee et al, 1978). Two further important trends were recorded. Infections were a common cause of death in the younger age group, while non-communicable diseases were commoner in the older age group. Infections were twice more likely to cause death in low-income groups than in the middle and high income groups; non-communicable diseases were four times more likely to cause death in the middle and high income groups compared to the low-income groups (Pobee, 2006).

Despite increased reports of chronic diseases, the public health approach was still limited to prevention of communicable diseases. Efforts were made to improve infrastructural services and to eradicate endemic and epidemic diseases. Major water supply schemes were established at Kpong dam/water works (80km east of Accra) and at Weiija Dam/waterworks (15km west of Accra) to provide water services to the city. These had long term benefits to health standards in the city. Immunization programmes were also carried out in the country. In 1977 the Ghana Health Assessment Project ranked measles second to malaria in terms of the burden of disease (Bosu, 2003). Measles vaccine was introduced in selected districts in Ghana as part of the Expanded Programme on Immunization (EPI) in 1978. After a major epidemic involving 64,557 reported cases in 1985, a mass measles vaccination campaign was organized targeting children below the age of 5.

1970s Accra experienced a general economic decline like that experienced in other African cities such as Lagos and Freetown. The decline was attributed to the depressed state of the international economy and declining earnings from the commodity and export markets as a result of falling prices in major exports

(Konadu-Agyemang, 2000; Potts, 1996). This period also ushered in the era of military rule and of political instability. Between 1972 and 1982 Ghana had no fewer than six governments¹; with the exception of one, they were all military governments who came into power through coup d'états (Agyei-Mensah, 1997). The medical historian, Stephen Addae (1996: 277) notes that the period of political instability was 'disastrous' for medical services because successive governments "lost their ability to maintain, improve or expand public health institutions and physical facilities". This period also led to widespread developmental crises, as Konadu-Agyemang (2000) acutely describes:

"Between 1970 and 1983, import volumes declined by over 33%, real export earnings fell by 52% while domestic savings and investments dropped from 12% of GDP to almost zero, and an unprecedented number of Ghanaians-artisans, teachers, and medical professional, as well as the unskilled – left the country. By the early 1980s, the inflation rate was in excess of 100%, the per capita GDP had fallen from its 1960 level of US\$1009 to \$739, and the nation was going through one of the worst droughts and famine in its history. As if these troubles were not enough, the Nigerian government suddenly repatriated well over one million Ghanaians whose arrival worsened the already chaotic socioeconomic environment...It was this bleak and dismal economic situation that led to the "invitation" of the twin Bretton Woods "doctors" the IMF and World Bank, by the Provisional National Defense Council (PNDC) government (which in any case has caused part of the problem) in 1983 to provide solutions." (p. 473)

The solutions offered by the IMF and World Bank to Ghana's developmental crises set the geo-political and socio-economic tone for the country, and its capital Accra, for the 1980s and 1990s.

Post Adjustment Accra, 1983 -2007

The 'solutions' proposed by the IMF and World Bank to the PNDC government for Ghana's economic crisis constituted Structural Adjustment Programmes (SAPs). These programmes were identical to that developed by the IMF and World Bank for other Third World countries. They constituted:

"a package of actions that included currency devaluation, reducing inflation, downsizing the public service, drastic cutbacks on government expenditure on education, health and welfare,

¹ The governments were the National Redemption Council (1972-1975), the Supreme Military council I (1976 – 1978), the Supreme Military Council II (1978-79), the Armed Forces Defence Council (June-September 1989), Peoples National Party (1979-81), and the Provisional National Defence Council (Agyei-Mensah, 1997: 83).

financial reforms, privatization of public enterprises, export promotion, and other policies geared to enhancing economic growth” (Konadu-Agyemang, 2000, p. 473).

At the macro level, the SAPs are reported to have “rescued Ghana’s economy from complete collapse” (Konadu-Agyemang, 2000: 474). For example Ghana’s negative GDP growth of the 1970s was reversed, inflation dropped from 123% in the early 1980s to 32% in 1991, and pre1980s ailing industries improved their production capacity to between 35% and 40%. At the micro-level, the impact of SAPs was not as positive. The prescribed “drastic cutbacks on government expenditure on education, health and welfare” (Konadu-Agyemang, 2000, p. 473) had significant implications on the health and livelihoods of many Ghanaians and especially the rural poor. This was compounded by public service downsizing which saw the retrenchment of over 300,000 public sector workers. Hardship and poverty characterized everyday life for many Ghanaians. One visible impact of these trends on the demography and health status of Accra was increased migration of individuals from the country’s three northern regions and impoverished regions of the south such as Central and Volta regions to the southern urban cities of Accra, Kumasi and Takoradi. A large proportion of rural migrants, especially those from the north, settled in slum and squatter settlements. These settlements were often built on areas reserved for schools, institutions and other public services, as well on water courses. They were of poor quality, overcrowded and unsanitary. The Accra Metropolitan Assembly (AMA), successor of the Accra Town Council of the early 19th century, struggled to maintain sanitary conditions in the city. Addae (1996: 282-283) discusses a number of challenges that faced the AMA and the city in the 1980s and 1990s: “building regulation and control was in a state of total paralysis and collapse”; “drain construction was extraordinarily slow”; refuse generation by an expanding population generated large amounts of refuse that became difficult to collect and dispose of; and an increasing number of inhabitants of Accra, particularly in poor areas, lacked access to safe potable water. Thus environmental degradation, poor sanitation and lack of safe drinking water contributed significantly to diseases especially among Accra’s poor communities.

The late 1990s marked a transition in government. The NDC government lost democratic elections to an NPP government led by John A. Kuffour. Kuffour’s government inherited the development policies of the previous government and continued to be significantly reliant on foreign aid. However the emphasis of international developments policies shifted, subtly, from ‘economic growth’ to ‘poverty reduction’. The World Bank and IMF project of relieving debt for Heavily Indebted Poor Countries (HIPC) constituted a key model within this poverty reduction strategy. Amidst much public debate, the government signed Ghana up to HIPC status and received a comprehensive debt reduction package in 2002 (World Bank, 2002). The last seven years have seen a variety of international community led initiatives – e.g debt

cancellation from the G8, the Millenium Challenge account, spearheaded by the United States government - aimed at reducing poverty and improving livelihoods of people in poor countries including African countries. As a poster country for the success of the SAPs in Africa (Konadu-Agyemang, 2000), and through the NPP government's active courting of foreign partnership and aid in development, Ghana has become an integral part of this new global economic order.

The macro-level successes of the SAPs in the 1980s and 1990s and the poverty reduction schemes of the 2000s have transformed Accra into a modern global city and the vibrant hub of Ghana's post adjustment economic, social and political life. Foreign investment has increased since the late 1980s. In 1988, the Accor Group of Hotels built the first multi-national hotel, Novotel, in Accra. Other foreign investors followed suit and invested in hotels, gated communities, and luxury apartments, often built on state lands in old desirable residential areas such as Ridge and Cantonments and in emerging areas such as East Legon and East Airport.

The fast food industry followed the real estate developers. In the early 1990s, Papaye restaurant introduced the fast food culture to Accra². Papaye was located on Accra's historic Cantonment's Road, renamed Oxford Street after London's famous shopping street. Serving the ubiquitous hamburgers and coke, as well as 'Ghanaianised' meals such as fried rice and chicken with local pepper sauces, Papaye fast became the hub of evening and weekend social meetings, particularly among the youth and the working classes. Papaye's success encouraged a fast food boom in Accra. Today, fast food places range from expensive restaurant style services such as Frankies, the Sherrif, Nandos, Bonjour (On the Run) usually located in wealthy neighbourhoods, shopping districts or at petrol stations and serving up market clientele, to affordable kiosk versions - termed 'check check' - usually located within markets, lorry stations and along Accra's busy roads serving the less wealthy.

Other markers of globalization arrived, such as a multi-million dollar mobile telephony and entertainment industries consisting of international companies such as Scancom (MTN) and Millicom (tigo), and DSTV, a South African television broadcaster. The majority of global businesses, including the aforementioned located their headquarters in Accra, and attracted highly educated and skilled individuals into its middle and senior management streams, thus creating a visible group of wealthy, cosmopolitan consumers of Accra's global products.

² There were antecedents to Papaye in the restaurants of the State owned and private hotels of the late 1960s and 1970s as well as smaller eateries such as Bus Stop on Accra's Ring Road. In addition, caterers during this period offered 'international' fare to public events and to store shelves that bordered on what we might call fast foods now: fat and sugar rich snacks such as cakes, cookies, club sandwiches and hamburgers.

Geopolitical and socioeconomic trends over the last 20 years have resulted in the co-existence of extreme wealth and extreme poverty in Accra. The spatial arrangement of wealth and poverty is markedly different from the pre and post colonial arrangement where poor areas were geographically distinct from wealthy areas. Rural migrants do not only rely on existing slum settlements when they arrive in Accra, they also set up squatter settlements in new wealthy suburbs such as East Legon and West Legon which have fallow and partially built areas (de-Graft Aikins and Ofori-Atta, 2007). This creates enclaves of poor settlements within wealthy suburbs.

How have these demographic and socio-economic arrangements affected the health of Accra's inhabitants? Health researchers record three trends in Accra's disease profile: (1) the persistence of communicable diseases as major causes of disability and death; (2) the increasing prevalence of non-communicable diseases and their impact on morbidity and mortality; and (3) the arrival and increased impact of the HIV/AIDS epidemic.

Out patient statistics for Accra for the period spanning 1987 and 1993 show that malaria, diarrhoea, parasitic infections and respiratory infections were among the top ten conditions presented at health centres. Communicable diseases like measles, whooping cough and tetanus were not among the top 10 causes of outpatient morbidity. Possible reasons may be that immunization services introduced in the late post-colonial period had been successful and had led to considerable reduction in these conditions. The major causes of death in post adjustment Accra were no longer parasitic and infectious diseases as was the case in the 1950s and 1960s. At the beginning of the 1990s, circulatory diseases were the major causes of death (Stephens et al, 1990). 26 percent of all male deaths and 24 percent of all female deaths were due to circulatory diseases. Crucially, poor communities were affected by both communicable and circulatory diseases (Stephens et al, 1990). There is growing evidence to show that some infectious diseases precipitate chronic diseases (Pobee, 2006) and that some chronic conditions place sufferers at risk of infectious diseases (Unwin and Alberti, 2006). These reciprocal relationships may explain the double burden of communicable and non-communicable diseases within poor communities who are exposed to risk factors of both categories of diseases.

Following the 1970s trend, the chronic disease burden has increased exponentially during the post adjustment period. Epidemiological studies show increased prevalence of chronic diseases such as hypertension (Amoah et al, 1998) and diabetes (Dodu et al, 1967; Amoah et al, 2002) and increased mortality from these conditions across the country. Greater Accra Region bears a significant burden of the country's chronic disease problem. Prevalence rates of hypertension and diabetes in Accra, for example

exceed the national prevalence and the prevalence rates recorded in other major cities such as Kumasi and Takoradi. Risk factors for chronic diseases are also higher in Accra than elsewhere. Obesity levels in Ghana increased 2.5 fold between 1993 and 2003: from 10% to 25.3% (GSS et al, 1993, 2003). In 2003 Greater Accra Region had the highest proportion of the national prevalence at 45.3 percent. The rates for obesity chime with existing data on food consumption patterns. Recent evidence suggests that individuals across the country are spending significant proportions of their monthly budgets on out-of-home breakfasts and lunches. Greater Accra's expenditure constitutes the largest proportion of the national expenditure (Research International, 2004).

Within Accra, key differences in health profile across wealth, education and gender have been reported. The trends reported in the Mamprobi studies of the 1970s persist to the present day with wealthier educated groups, and especially women, constituting high risk groups for conditions like hypertension and diabetes. The Accra Women's Health Study conducted by the schools of public health of Harvard University and University of Ghana documented important trends in women's health status. Amongst a representative sampling of 1300 adult women residing in Accra in 2003, 57.2% were either overweight or obese by anthropometric measurements, over 55% were hypertensive, and the prevalence of diabetes among women aged over 55 was 8.7 percent (Agyei-Mensah et al, 2004; Duda et al., 2006).

Recent analyses of causes of death in Accra from the births and deaths registry show that in 2001 circulatory diseases were the major causes of death, followed by infectious and communicable diseases, diseases of the respiratory system, neoplasms and injury and poisoning. By 2003, two chronic diseases become top ten causes of death in the Greater Accra Region: stroke at number two, hypertension at number six (Bosu, 2007). In 2007, hypertension had become the second cause of death in Accra (Daily Graphic, 2007).

Table 1. Rank distribution of causes of death in Accra, 1953, 1966, 1991, 2001

1953	1966	1991	2001
[1] Infectious and parasitic	Infectious and parasitic	Circulatory (24.2)	Circulatory (30.4)
[2] Diseases of early infancy	Diseases of early infancy	Infectious and parasitic (18.2)	Infectious and parasitic (15.7)
[3] Respiratory	Digestive system	Respiratory (12.0)	Respiratory (15.6)
[4] Digestive system	Respiratory	Anaemia (6.9)	Neoplasms (5.8)
[5] Nervous system	Senility	Neoplasms (6.3)	Injury and poisoning (5.5)
[6] Old age	Accidents and emergency	Digestive system (5.4)	Digestive (5.1)
[7] Circulatory system	Nervous system	Nervous system (4.5)	Abnormal (4.2)
[8] Pregnancy	Nutritional	External (4.0)	Nervous (3.7)
[9] Violence	Circulatory	Genito-urinary system (3.8)	Blood forming (3.5)

Source: 1953, 1966, 1991 (Stephens et al. 1991); 2001 (Agyei-Mensah, 2007)

It is important to comment on newly emerging diseases during Accra's post adjustment period such as HIV/AIDS. The city of Accra has three sentinel sites for assessing the magnitude of HIV infection. The sites are at Adabraka, Maamobi and Korle Bu. The prevalence rates recorded at these sites have been low compared to rates recorded across the country. The 2002 sentinel report indicates that the rate for Korle Bu was 2.2, Adabraka was 4.0, and for Maamobi 4.2. The summary measure for Accra was approximately 3.5 percent; this was close to the median for the country at 3.4 percent (Ghana Health Service/Republic of Ghana, 2003). The sentinel figures compared sharply with other sites such as Agomanya (7.0), Koforidua (8.5), Tema (6.5) and Eikwe (6.0). One of the reasons cited for Greater Accra Region's low HIV prevalence is the high literacy of the populace. Writers note that a literate population is more likely to adopt preventive sexual health practices. However the preliminary results of the Women's Health Survey of Accra show that HIV positive results significantly correlated with unprotected sexual intercourse and lifetime number of partners suggesting that in spite of the widespread HIV/AIDS education campaigns individuals still engage in unprotected sexual intercourse (Duda, 2004). Four years later, the 2006 sentinel report shows that the summary measure for Accra has reduced to 3 percent although HIV prevalence has decreased in Adabraka (2.0) and Maamobi (2.6), but has increased in Korle Bu (4.2).

As the disease profile of Ghana has changed from the solitary burden of communicable disease to the double burden of communicable and non-communicable diseases, the Ministry of Health has gradually

shifted towards a public health, rather than a curative paradigm (MOH, 2001, 2006). In 1992 a non-communicable disease programme was established to tackle the growing burden of non-communicable diseases. This programme has suffered a lack of funds and human resources throughout its 15 year history. This is symptomatic of a broader problem of increased loss of labour from the health sector as well as diminished funding for the health sector (Nyonator and Delanyo, 2005). Thus like many African countries, non-communicable disease policies and plans are yet to be developed and implemented. For Accra, which bears a significant proportion of the country's double burden of disease, this lack of concrete health sector intervention has important implications.

CONCLUSIONS

We have attempted to describe epidemiological changes in colonial, post-colonial and post adjustment Accra as an important first step towards deeper analysis of the causes and consequences of these changes for specific communities and of their implications for Accra's future health profile. Accra's epidemiological change fits the protracted polarized model, with a co-existence of infectious and chronic diseases as significant causes of morbidity and mortality, especially in the last thirty years. Structural level factors underpin these changes: increased urbanization and migration has led to an expanded population with implications on sanitation and environmental health, geo-political factors have deepened poverty for a growing number of rural migrants who are at risk of living with and dying prematurely from communicable and non-communicable diseases, globalization has created a growing community of wealthy elites whose work demands and lifestyles place them at risk for chronic diseases. Group level factors also play a role in Accra's epidemiological changes: processes of social mobility and westernization have deepened group and individual preferences for western cultural products, such as foods, technology and language. These structural and group levels factors are intricately linked. For example urbanization and modernization has led to changing living and work arrangements: as Accra has expanded its residential boundaries, distances between work and home have increased for a growing number of people and former patterns of family life and health, such as sharing meals at home, have changed. These concrete changes in lifestyle patterns are implicated in the rising prevalence of lifestyle diseases and their risk factors such as hypertension, diabetes and obesity. This complex relationship between urbanization, globalization and health has been reported in European cities (Times, 2007).

What are the implications of current epidemiological knowledge for Accra's future health profile? The factors underpinning Accra's epidemiological transition over the last thirty years are unlikely to change

imminently. Rural-urban migration continues to rise and globalization processes continue to intensify. Ghana's health sector, like that of many African countries, is ill-equipped to deal with the country's double burden of disease.

Clearly more research is needed to understand not only the role of population increase and urbanization on disease patterns, but also of micro-social processes such the inter-relationship between changing lifestyles, diet and overnutrition among all classes. Specific attention needs to be paid to poor communities and to women, as they constitute high risk groups. Crucially, it is important that future research treats communicable and non-communicable diseases as potentially interrelated and mutually reinforcing (Unwin and Alberti, 2006). This approach will facilitate deeper understandings of why poor communities in Accra bear the brunt of the double burden of communicable and non-communicable diseases or how chronic diseases among women undermine their reproductive health. Nuanced understandings will inform the development of target-specific preventive and curative services for identified communities at risk.

REFERENCES

- Acquah, I. (1958). *Accra Survey*. London: University of London Press.
- Addae, S. (1996). *History of Western Medicine in Ghana, 1880 – 1960*. Durham: Durham Academic Press.
- Agyei-Mensah, S (2007). Epidemiological transition and the double burden of disease in Accra. Paper presented at the 1st Annual Workshop, British Academy UK-Africa partnership on Chronic Disease in Africa, Noguchi Memorial Institute for Medical Research (12th April 2007).
- Agyei-Mensah, S. (2004). Accra (Ghana) in Transition: Epidemiological change at the turn of the 21st century. Paper presented at the Seminar on Health in African Cities, Harvard Centre for Population Studies, Harvard University, Cambridge (31st March 2004).
- Aidoo, M. (1973). Some of the types of breast diseases at Korle Bu hospital during the period 1968-71 with emphasis on breast cancer – a preliminary study. *Ghana Medical Journal*, 12, 233-236.
- Alhassan, O. (2006). Land use and environment in early Accra (1300 to 1800 AD). *Research Review Supplement* 17, 21 – 36.
- Amanor, B. and Martinson, V. (1969). Is hypertension increasing in Ghana? *Ghana Medical Journal*, 8, 279-280.
- Amoah, A.G.B, Owusu, K.O., and Adjei, S (2002). Diabetes in Ghana: a community prevalence study in Greater Accra. *Diabetes Research and Clinical Practice*, 56: 197-205.

- Anim, J.T. and Laing, W.N. (1972). Cancer of the cervix – a review of surgical material at the Korle Bu teaching hospital, Accra for the years 1966-1970. *Ghana Medical Journal*, 11, 118-121.
- Applin, G; Beggs, P; Brierley, G; Cleugh, H; Cursin, P; Mitchell, P; Pitman, A; and Rich, D. (1999). *Global Environmental Crises. An Australian Perspective*. Oxford University Press.
- Caldwell et al. (1989). Introductory thoughts on health transition. Health Transition Series, No 2, vol 1, xi-xiii.
- Cooper, R.S., Osotimehin, B., Kaufman, J.S. and Forrester, T. (1998a). Disease burden in sub-Saharan Africa: what should we conclude in the absence of data? *Lancet*, 351(9097): 208-10.
- Cooper, R.S., Rotomi, C.N., Kaufman, J.S., Muna, W.F.T and Mensah, G.A.(1998b). Hypertension treatment and control in sub-Saharan Africa: the epidemiological basis for policy. *British Medical Journal*, 316: 614-17
- Daily Graphic (2007). Hypertension ranks second in Greater Accra. (Lucy Adoma Yeboah) p. 43.
- Dantzig, A. van (1980). *Forts and castles of Ghana*. Accra: Sedco Publishing Limited.
- de-Graft Aikins, A (2005). Healer-shopping in Africa: new evidence from a rural-urban qualitative study of Ghanaian diabetes experiences. *British Medical Journal*, 331, 737.
- de-Graft Aikins, A (2007). Everyday experiences of diabetes in Ghana: challenges for self-care, psychosocial support and advocacy. Paper presented at the 1st Annual Workshop, British Academy UK-Africa Academic Partnership on Chronic Disease in Africa, Noguchi Memorial Institute for Medical Research. (12th April 2007)
- de-Graft Aikins, A & Marks, D.F. (2007). Health, disease and healthcare in Africa. *Journal of Health Psychology*, 12(3), 387-402.
- de-Graft Aikins, A. & Ofori-Atta, A. (2007) Homelessness and mental health in Ghana: everyday experiences of Accra's migrant squatters. *Journal of Health Psychology*, 12(5), 761-778.
- Duda, R.B; N.A. Juma; A.G.Hill; J. Seffah; R. Biritwum. (2006). Interest in healthy living outweighs presumed cultural norms for obesity for Ghanaian women. *Health and Quality of Life Outcomes*, 4: 44.
- Fayorsey, C.F. (1992/1993). Commoditization of childbirth: Female strategies towards autonomy among the Ga of southern Ghana. *Cambridge Anthropology*, 16: 3, 19 – 45.
- Frenk et al. (1989). Health Transition in middle-income countries: new challenges for health care. *Health Policy and Planning* 4 (1): 29-39.
- Kea, R.A. (1982). *Settlements, Trade, and Politics in 17th Century Gold Coast*. Baltimore and London: Johns Hopkins University.
- Konadu-Agyemang, K. (2000). The best of times and the worst of times: structural adjustment programs and uneven development in Africa: the case of Ghana. *Professional Geographer*, 52(3), 469-483.

- Lassey AT, Wilson JB. (1998). Trends in maternal mortality in Korle Bu Hospital, 1984-1994. *Ghana Medical Journal*, 32a: 910-916
- Levine, C.E., Ruel, M.T., Morris, S.S., Maxwell, D.G., Armar-Klemesu, M, and Ahiadeke, C. (1999). Working women in an urban setting: Traders, Vendors and Food security in Accra. *World Development*, 27 (11), 1977-1991.
- Nyonator, F. and Delanyo, D. (2005). The health of the nation and the brain drain in the health sector. In T. Manuh (Ed), *At home in the world?: International Migration and Development in Contemporary Ghana and West Africa*. Accra: Sub-Saharan Publishers. (pp. 227 – 249).
- Omran, A.R. (1971). The epidemiological transition theory: a theory of the epidemiology of population change. *Milbank Memorial Fund Quarterly*, 49: 6-47.
- Omran, A.R. (1983). The epidemiologic transition theory: A preliminary update. *Journal of Tropical Paediatrics*, 29: 305-16.
- Patterson, K. (1979). Health in Urban Ghana: The case of Accra, 1900-1940. *Social Science and Medicine*, 13B: 251-268.
- Patterson, K. (1981). Health in Colonial Ghana: Disease, Medicine, and Socio-economic Change 1900-1955.
- Pobee, J.O.M. (2006). The Heart of the Matter. Community Profile of Cardiovascular Diseases of a sub-Saharan African Country. Accra: Commercial Associates Ltd.
- Roberston, C. (1976). Ga women and socioeconomic change in Accra, Ghana. In N.J. Hafkin and E.G.Bay (Eds), *Women in Africa*. Stanford: Stanford University Press.
- Robertson, C, (1984). *Sharing the same bowl: a socioeconomic history of women and class in Accra, Ghana*. Bloomington: Indiana University Press.
- Savy, M., Martin-Prével, Y., Traissac, P., and Delpeuch, F. (2007). Measuring dietary diversity in rural Burkina Faso: comparison of a 1-day and a 3-day dietary recall. *Public Health Nutrition*: 10(1), 71–78.
- Stephens, C, et al. (1994). Environment and Health in Developing Countries: An Analysis of Intra-Urban Differentials Using Existing Data. London School of Hygiene and Tropical Medicine. Fundacao Seade, Republic of Ghana.
- Unwin, N. and Alberti, K.G.M.M (2006). Chronic non-communicable diseases. *Annals of Tropical Medicine and Pharmacology*, 100 (5 & 6), 455-464.
- Unwin, N., Setel, P., Rashid, S., Mugusi, F., Mbanya, J., Kitange, H., Hayes, L., Edwards, R., Aspray, T. and Alberti, K.G.M.M. (2001). Noncommunicable diseases in sub-Saharan Africa: where do they feature in the health research agenda? *Bulletin of the World Health Organisation*, 79(10), 947-953.