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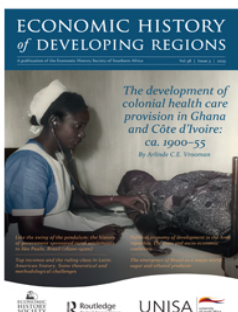
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The development of colonial health care provision in Ghana and Côte d'Ivoire: ca. 1900–55

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ABSTRACT

Colonial administrations introduced various social infrastructures in Africa. This paper analyses and compares the development of colonial governments' health care provision and policies in Ghana and Côte d'Ivoire from circa 1900 to 1955. Using qualitative and quantitative information from colonial reports, a new dataset captures the development of four factors relevant to these aims: health care expenditures, health care facilities, medical staff, and patients. Deflated health care expenditures per capita were found to be higher in Ghana than in Côte d'Ivoire in almost all years. The number of health care facilities per capita was larger in Côte d'Ivoire than in Ghana, and facilities were more geographically dispersed. Ghana had a lower number of medical staff per capita than Côte d'Ivoire as of the 1920s. Medical staff from Côte d'Ivoire formed the majority of the staff base as early as the mid-1910s. Finally, the analysis shows that the number of patients treated in health care facilities in Ghana was low until the 1920s, and took off as more facilities became available during the 1940s. These findings provide evidence that even two countries that are relatively similar (apart from their colonial history) can have different colonial health care trajectories.

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1. Introduction

In analysing the effect of colonial rule in Africa, various scholars paid attention to social development rather than economic development.¹ For sub-Saharan Africa (hereafter: Africa), part of the literature has stressed the effect of education (e.g. White 1996; Cogneau and Moradi 2014). Brown (2000, 29–31) shows that enrolment rates in

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¹See e.g. seminal papers by Grier (1999) and Acemoglu (2001, 2002), and see Michalopoulos and Papaioannou (2020) for a review of the literature on economic development.

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primary education were significantly higher in former British colonies than in former French colonies. Frankema's (2012) findings indicate that the British 'benign' educational legacy can mostly be explained by Christian missions (for the years prior to 1940), and not by particular colonial educational policies (Frankema 2012, 336, 350–352). Another part of the literature considered the effect of colonial rule in Africa on health care. Books focusing on within-country health and health care during colonial rule have been published for several African countries.² Other scholars focus on outcomes of colonial health care provision in specific regions. Huillery (2009), for example, finds that colonial health care investments in former French West Africa have a persistent effect on present-day health outcomes in the region. Some scholars single out a part of colonial health care provision. Lowes and Montero (2021) study the effect of colonial sleeping sickness campaigns on contemporary trust in medicine in Central Africa, and Iliffe (1998) describes the training and work of East African doctors, to name a few.

Throughout this paper, *colonial health care provision* is conceptualized through an adapted version of a definition by the Organisation for Economic Co-operation and Development (OECD), World Health Organization (WHO) and Eurostat (2011, 212–213): it concerns all factors of production that are employed in providing health care goods and services by the colonial administration. For example, it includes labour, capital, and clean water used in colonial health care services that were administered by colonial rulers. In this respect, the definition used in this paper solely concerns health care provided by colonial administrations, and excludes other health care providers present during colonial rule.³ Existing work suggests several general trends regarding colonial health care provision. Colonial health care was set up with the colonizer in mind. At the start of the twentieth century, the main focus was on treating European patients, who often fell ill in the African disease environment (Hailey 1938, 1119; Iliffe 1998, 27; Giles-Vernick and Webb 2013, 4). As a consequence, colonial health care facilities were introduced in locations with a large European population (Hailey 1938, 1119; Addae 1996, 30; Giles-Vernick and Webb 2013, 12). Later on, health care was extended to the African population, for either humanitarian or economic motives (Patterson 1981, 12–13; Headrick 2014, 2; Tilley 2016, 744–745). Moreover, scholars have mentioned issues concerning chronic understaffing of the colonial medical staff and a lack of funds throughout the whole colonial period (Patterson 1981, 12; Tilley 2016, 745).

The objective of this paper is twofold. On the one hand, it aims to comparatively analyse the development of colonial health care provision in Ghana and Côte d'Ivoire. Complementary to this objective, this paper also aims to study the development of colonial health care provision and colonial health care policies within each of these countries over time. To this end, four aspects of colonial health care provision introduced in Ghana and Côte d'Ivoire are researched: finance, health care facilities, medical staff, and patients. These factors tie in with this paper's research aims, since mapping the development of these four factors forms the basis of the ability to compare fundamental aspects of the development of colonial health care provision between these countries, but also over

²See Patterson (1981) and Addae (1996) for Ghana, Headrick (1994) for French Equatorial Africa, and Domergue-Cloarec (1986) for Côte d'Ivoire.

³Readers interested in a brief discussion of this topic and the implications of its exclusion in this paper are invited to refer to the next section, the data section, and the conclusion (particularly the final footnote).

time. Each factor covers an important component of the development of health care introduced by the colonial administrations in Ghana and Côte d'Ivoire. Furthermore, another motivating factor in selecting these four aspects is that they tend to be well described in colonial reports, in both qualitative and quantitative terms. It would be beyond the scope of a single paper to study other possibly relevant facets of the relationship between health care and colonial rule within the two colonies, such as (pre-)existing local health care provision(s) and missionary health care.⁴ Moreover, the data and ensuing findings cannot be generalized to the total health care system of these countries during the period, to the overall uptake of Western medicine, or to other African countries with a British or French colonial heritage.

Ghana and Côte d'Ivoire form an interesting setting for several reasons. They are neighbours, located in West Africa, and have a different colonial experience. Côte d'Ivoire was part of French West Africa, being formally colonized in 1893 during the Scramble for Africa and gaining independence in 1960. In contrast, Ghana was colonized by the UK, under the name of the Gold Coast. In 1957, it was one of the first sub-Saharan countries to gain independence. Apart from their difference in colonial experience, they are quite similar, for example in terms of geography and climate (Cogneau and Rouanet 2011, 57). Selecting two relatively similar countries with a difference in colonial history allows for an analysis of the effect of a difference in colonial experience on the development of colonial health care provisions, in line with this paper's first research aim. In addition, the two countries were economically important within the British and French colonial empires, respectively, due to their suitability for the production of profitable cash crops (such as cocoa) and the presence of valuable natural resources (e.g. gold). As a consequence, these countries are well documented during the colonial era, providing ample sources to trace the effects of colonial rule on health care provision throughout the first half of the twentieth century.

Using new datasets transcribed from colonial reports, this paper starts by studying colonial health care expenditures in Ghana and Côte d'Ivoire for 1897–1955. Both deflated colonial health care expenditures per capita (in francs) and the share of medical expenditures in the total budget in Ghana are shown to surpass those in Côte d'Ivoire. Next, the introduction and geographical distribution of different types of colonial health care facilities are presented. Côte d'Ivoire is found to have a higher number of colonial health care facilities per capita than Ghana, and a wider geographical dispersion of facilities. Subsequently, I analyse the development of colonial medical staff over time, and find that the number of colonial medical staff per capita became higher in Côte d'Ivoire compared to Ghana as of the 1920s. Results show that nurses formed a large portion of the colonial medical staff in Côte d'Ivoire due to French colonial policy, while the staff base in Ghana was more diverse. I also establish that the majority of colonial medical staff (per capita) of Côte d'Ivoire was originally from the colony by the mid-1910s. The final part of this paper studies patterns and trends in the number of patients and consults realized by colonial health care provision in the two colonies. The number of patients treated per capita in Ghana was low until approximately 1920, when the number of (out)patients started to rise. For Côte d'Ivoire, the data available is incomplete, but points to a similar trend.

⁴For instance, Good (1991) and Nunn (2010) analysed the effect of missionaries on social development in colonial Africa in greater detail.

After a review of the literature on colonial rule, health, and health care in the next section, section 3 discusses the data used. Section 4 analyses new data concerning colonial expenditures on health care, and considers colonial financial policy regarding health care. In section 5, the geographical distribution of colonial health facilities over time is analysed. The development of colonial medical staff over time and the involvement of African staff is examined in section 6. Finally, section 7 studies the uptake of colonial health care by analysing patterns and trends in the number of patients and consults, and section 8 presents the conclusion.

2. Colonial rule and health care

Previous literature has studied different aspects of colonial health care and health under colonial rule. This section reviews this literature, providing historical context and a framework for this paper. In particular, it considers literature on colonial health care, health and disease during colonial rule, and other health care providers during colonial rule.

Various scholars have shown that there was a clear relationship between colonial rule and disease. For instance, Schneider (2009, 193) examines the colonial approach to smallpox control by analysing smallpox vaccination campaigns in various countries in West, East and Central Africa from the 1920s onwards. He shows that these colonial campaigns were successful at (temporary) eradication in some countries (including Madagascar and Côte d'Ivoire), while in others smallpox could only be eradicated in the post-colonial era following international cooperation and the introduction of alternative methods of vaccination (Schneider 2009, 202–205, 217). Headrick (2014, 4–7) discusses the approaches of different colonizers in response to sleeping sickness epidemics, and describes how the number of sleeping sickness cases declined once colonial measures were taken. Worboys (1994, 2000b) also considers the effect of colonial rule on sleeping sickness, in addition to leprosy during colonial rule. Kjekshus (1996) describes the pre-colonial control over Tanzania's disease environment, and the changes posed by colonial rule. Other scholars focusing on the relationship between colonial rule and disease include Patterson (1983), Dawson (1987), Lyons (1992), Bado (1996), Doyle (2013), and Lowes and Montero (2021).

In addition, some literature has examined the development of colonial health care policies and how it affected the colonized countries. Hartwig and Patterson (1978) provide an overview of the changes in health and health care during colonial rule in Africa. They argue that the introduction of Western medicine and colonial health care policy had a disruptive effect on Africa's disease environment (Hartwig and Patterson 1978, 11). The development of colonial health care can be generalized and divided into three phases, following Worboys (2000a, 68–79): a period of imperial medicine (1900–20), followed by a period characterized by a colonial policy shift towards developments in health and welfare (1920–50), and finally a period of international and independent medicine in the colonies (1945–60). Lasker (1977) identifies a similar development over time for Côte d'Ivoire in particular. Vaughan (1991) emphasizes that the introduction and development of European medicine in Africa, and the biomedical discourse that accompanied it, were instrumental in entrenching the colonial power structure and transforming the local population into colonial subjects.

Furthermore, numerous works analyse the development of colonial health care and policy in specific countries. Some of these studies are in-depth analyses of the forces shaping the development of colonial health care services and policy over time within the selected colonies. Patterson (1981) and Addae (1996) are examples for Ghana, while Nkwam (1988) considers the development of colonial health services in all British West African colonies. Similarly, Lasker (1977) and Domergue-Cloarec (1986) focus on the development of colonial health care in Côte d'Ivoire. Elsewhere in Africa, Headrick (1994) studies former French Equatorial Africa, whereas Beck (1970) and Crozier (2007) discuss the development of the British colonial medical services in Kenya, Tanzania, and Uganda. Iliffe (1998) focuses on the development of and changes in East African colonial medical staff, as does Greenwood (2016). Other works in the broad medical history of various African regions include Shapiro (1983), Curtin (1985), Becker and Collignon (1998), Ndao (2005, 2008), Dianzinga (2009), Tilley (2011), Greene et al. (2013), Greenwood and Topiwala (2015), Rouanet (2015), and Packard (2016).

Regarding the overall effect of colonial rule on health in Africa, the literature identifies both positive and negative effects. In terms of living conditions and overall health, evidence for a positive effect is available. Comparing Ghana to Côte d'Ivoire, Cogneau and Rouanet (2011, 56–61, 71–77) demonstrate that heights – as a proxy for living conditions – increased during colonial rule, as a result of urbanization and cocoa production. For former French West Africa, Huillery (2009, 193) shows that districts with a higher number of medical staff during colonial rule had a significantly lower rate of stunting among young children in 1995. In contrast, Tilley (2016) argues that colonial rule had a negative impact on the health of African populations in many areas, through unethical colonial medical practices, insufficient availability of colonial health care services, and dismissal of traditional healing practices. Another example of the negative effect of colonial rule is the failure of certain colonial medical campaigns. Schneider (2009), as mentioned, provides evidence that colonial smallpox campaigns were not (permanently) successful in some African colonies. Moreover, Lowes and Montero (2021, 1298–1302) empirically show that colonial sleeping sickness campaigns in Cameroon and former French Equatorial Africa had long-term negative effects on trust in medicine in the visited regions.

If we consider the literature on colonial medical services outside of Africa, we find that colonial health care policies were not always successful in these regions either. Arnold (1986), for example, discusses the outbreaks of cholera in India during the nineteenth and early twentieth centuries, and the lack of response from the British colonial administration despite their recognition of the issue. Moreover, a comparison of the literature on Africa with other regions suggests that colonial policymakers did not necessarily develop a homogeneous approach to health care in their colonies. Headrick's (2014, 6–7) paper on the approaches to sleeping sickness epidemics highlights this matter for Africa by suggesting that apart from differences between colonizers, locational factors also played a role in determining colonial health care policy. At a more descriptive level, Boomgaard (1993) discusses the introduction and development of Western medicine and the Dutch colonial public health service in Indonesia. Similarly, Marcovich (1988), Bretelle-Establet (1999) and Monnais (2006) consider French colonial health care in Asia,⁵ and

⁵Marcovich (1988) also considers Algeria in Northern Africa.

Ramanna (2002), Mushtaq (2009) and Sehwat (2013) study British colonial medical services in India.

Although it is not the main focus of this paper, the literature on other health care providers during colonial rule is worth noting. Traditional medicine continued to form an important component of health care during colonial rule (Janzen 1978, 3; Giles-Vernick and Webb 2013, 4). Interplay with other health care providers during colonial rule also occurred. As discussed by Mohr (2009, 429, 437–444, 452–453), the local Akan healing practices were adopted by Basel medical missionaries before formal colonial rule; afterwards, they were rejected in favour of Western medicine by the Basel mission. Private health care,⁶ either through private practitioners or as provided by (European) companies, and non-profit organizations were also part of the overall health care system in African countries during colonial rule.

Missionaries also played an important role in providing health care services, complementary to those provided by colonial administrations. For example, Doyle, Meier zu Selhausen, and Weisdorf (2020) consider the effect of a specific mission hospital in Uganda on European medicine from 1908 to 1970. Using a new dataset based on patient registers, they show that the geographical reach of the mission hospital was substantial, that morbidity varied considerably over time, and that the number of patients increased over time while cure and mortality rates remained the same. Moreover, Calvi and Mantovanelli (2018) show that the presence of Protestant missions had positive long-term effects on health in colonial India. The effect of missionaries on health can also be observed when focusing on a single disease (see e.g. Cagé and Rueda (2020) on HIV). All in all, the body of literature⁷ on missionary health care provides evidence (a) that missionary health care played a significant role in the spread of Western medicine before and during colonial rule in Africa (see above and also e.g. Good 1991; Vaughan 1991; Hardiman 2006) and (b) that this role could be formally established within colonial administrations and was often more substantial in British African colonies (e.g. Jennings 2008, 28; Pringle 2016).

Several of the previously mentioned empirical studies – in particular Doyle, Meier zu Selhausen, and Weisdorf (2020) and Lowes and Montero (2021) – indicate that colonial archival records can provide detailed data on health care and health, suited for quantitative studies on the effects of colonial rule. This paper aims to contribute to the literature focusing on the effects of colonial rule on social development, and, in particular, on health care in colonial Africa. It studies these issues from a comparative perspective, where the selected countries are similar in many respects, except in their colonial history. Newly gathered datasets allow for a comparative quantitative analysis of colonial health care provision introduced in Ghana and Côte d'Ivoire by the British and French colonial administration, respectively, during the first half of the twentieth century. By focusing on different elements of colonial health care provision (finance, health facilities, medical staff, patients) in a comparative setting, this paper offers multiple new perspectives on health care during colonial rule in two West African countries.

⁶See e.g. Heaton (2016) for a discussion on the cooperation between the colonial medical service in Nigeria and a private shipping company.

⁷Other works studying missionary health care include Ranger (1981), Good (2004), Etherington (2008), Vongsathorn (2014), Baumert (2022) and Chiseni (2022).

3. Data

Multiple primary sources were used to construct datasets for analysing the four selected topics⁸ on colonial health care in Ghana and Côte d'Ivoire. For Ghana, nearly all data is obtained from the Gold Coast Medical Reports. Local budgets and colonial medical reports form the basis of the new datasets on Côte d'Ivoire. The data includes information on colonial health care provision, as exemplified by the four selected topics. The data does not include information on other types of health care present in the two countries such as missionary care. The Data Appendix provides an overview of the sources used per topic.

Scholars have discussed multiple issues regarding data in colonial sources. Walters (2021, 188, 195–198), for instance, explains several critiques on the use of census and parish registers for population research in Africa. These problems include potential underestimation of the data, censoring and selection effects. Westland (2021) shows that the accuracy of British colonial price data as reported in the Blue Books varies considerably. To what extent are other (aspects of) colonial records – as used in this paper – reliable and accurate?

The use of data on colonial expenditures on health care falls within a line of research on colonial finance. Studies like Frankema (2011) and Gardner (2012) show that figures on colonial expenditures have been generally accepted, partly because no other data is available. Concerning information on locations of colonial health care facilities, the colonial medical reports indicate some inconsistencies in the denomination of hospitals and dispensaries⁹ for Ghana. It is difficult to assess whether the information on locations in Côte d'Ivoire is correct or not. Regarding the recordkeeping on colonial medical staff, colonial administrations had an interest in correctly measuring the number of staff employed for salary purposes. In particular, pay for European staff members was comparatively high,¹⁰ which would provide further motive to correctly record these numbers. In contrast, information on the number of African medical staff was recorded inconsistently in Ghana (as explained in the section 'Colonial medical staff'). Rouanet (2015, 22) concludes that although political incentives may have led to a deliberate upwards bias in colonial health statistics, and measurement error likely occurred, its effect on data about physicians (and hospital beds) per capita in Côte d'Ivoire is minor. Lastly, patient data inherently faces some of the issues found in African population data research. Only people who actually visited a colonial health care facility were recorded, leading to an underrepresentation of the total potential patient base. In particular, potential patients had other providers of health care, such as missionary care and local pre-existing health care providers, at their disposal. These are not (consistently) recorded in the colonial medical reports for Ghana and Côte d'Ivoire, and hence could not be included. Previous literature has shown that missionary care was generally an important factor in health systems of

⁸Even though data is available for all four topics, colonial medical records did not contain sufficient information to include analyses into other related topics such as the impact of colonial health care services, organizational structures or detailed patient information (gender, age, etc.). Whenever possible given the data available, this paper exploits the possibility to include more detailed analyses; see e.g. the sections on subdivisions in colonial medical expenditures, division of labour between function types of colonial medical staff, and African medical staff.

⁹In particular, a health care facility may be listed as a hospital in one year, become a dispensary later on, and subsequently return to being listed as a hospital. This pattern mostly concerns the so-called African hospitals and dispensaries; European hospitals were recorded more consistently.

¹⁰Patterson (1981, 14) explains that African medical officers received lower salaries than European ones.

(British) colonies (Jennings 2008, 28; Cagé and Rueda, 2020; Doyle, Meier zu Selhausen, and Weisdorf 2020¹¹). Missionaries were present in Ghana as of the early nineteenth century, but only a few missions provided health services – at least in the first decades of the twentieth century (Patterson 1981, 15; Jedwab, Meier zu Selhausen, and Moradi 2022, 150, 186). For Côte d'Ivoire, the role of missionaries in the health system during colonial rule was also comparatively small (Lasker 1977, 284). The Christian missions database by Cagé and Rueda (2016, 2020)¹² shows several Protestant (in 1903) and Catholic (in 1924) missions for Ghana and Côte d'Ivoire (Figure A1), but none of these locations had a hospital available. In that respect, the selection issue stemming from alternative health care provision by missionary care seems limited, but other providers might still be available.¹³ I believe that an analysis of the interplay between the different providers of health care in the two colonies (and other African countries), i.e. an analysis of the total health care system during colonial rule, warrants a separate study. Other selection problems, such as uneven access to health care, also play a role in this type of data. For these reasons, not all (potential) patients will show up in data transcribed from colonial sources. Data on patients in Côte d'Ivoire is very limited,¹⁴ and the interpretation of information on Ghana takes the aforementioned problems into account whenever possible.

As listed in the Data Appendix, I also use several existing datasets. The African population estimates of Frankema and Jerven (2014) are employed on various occasions to obtain per capita figures. In addition, colonial health care expenditures need to be denominated in the same currency to allow for a comparison between British and French colonial public finances, and should be deflated to correct for price inflation. African consumer price indexes (CPIs) are not available, but following the argument by Cogneau, Dupraz, and Mesplé-Somps (2018, 16), British and French CPIs serve as proxies for missing African CPIs.¹⁵ Feinstein's (1972) deflator for Ghana and Villa's¹⁶ (1994) for Côte d'Ivoire were used. Rebasing and deflating results in expenditures in prices of 1913¹⁷ on medical services for Côte d'Ivoire (in francs) and Ghana (in pounds). Following Cogneau, Dupraz, and Mesplé-Somps (2018, 16), the 1913 exchange rate from London and Cambridge Statistical Service (1973) was subsequently applied to convert the British figures from pounds to francs.¹⁸

4. Colonial expenditures on health care provision

The introduction and operation of colonial health care provision required financing. For Ghana, Patterson (1981, 12) discusses how these colonial health care finances were

¹¹Doyle, Meier zu Selhausen, and Weisdorf (2020, 955–960) provide a useful discussion on the representativeness of mission hospital patient data.

¹²Jedwab, Meier zu Selhausen, and Moradi (2022, 177) find that mission atlases significantly underreport missions for Ghana, and for Africa as a whole. However, no detailed dataset was found available for Côte d'Ivoire, hence the use of the data by Cagé and Rueda in Figure A1.

¹³Nkwam (1988, 26) indicates that the majority of health care activities in Ghana fell to colonial administrations, as formal local government institutions (so-called town councils and public health boards) were few until at least the 1930s.

¹⁴See the section 'Patients and consults'.

¹⁵See the Data Appendix for a more elaborate explanation.

¹⁶I thank Denis Cogneau for sharing his digital copy of this data.

¹⁷As argued by Dupraz (2019, 44), selecting 1913 as the base year has its benefits, since at this point in time both countries adhered to the gold standard, and exchange rates had been stable for decades.

¹⁸In 1913, the exchange rate equalled 25.56 francs to 1 pound (London and Cambridge Statistical Service 1973, 15).

limited and too little throughout the colonial period. Frankema (2011, 147–148) shows that out of seven spending categories (including public works and administration), colonial health care in Ghana received one of the lowest shares for three benchmark years. Tilley (2016, 745) also mentions that for colonial Africa in general, colonial health care expenditures rarely were sufficient to provide the necessary care. This section uses new detailed data on colonial expenditures on health care in Ghana and Côte d'Ivoire, and extends the existing literature by considering the development of colonial medical expenditures over time between and within the two countries, taking into account policy considerations and other factors influencing their development. In doing so, it also compares British to French colonial fiscal policy on health care expenditures in these colonies.

Figure 1 shows medical expenditures as a percentage of total expenditures for Ghana and Côte d'Ivoire for 1897–1955. In Ghana, the British colonial administration spent a larger share of total expenditures on health care compared to the French in Côte d'Ivoire for nearly all years. The estimated trendline is also higher for Ghana during the entire period. This finding indicates that health care was prioritized more in terms of budget by the British colonial administration in Ghana compared to the French in Côte d'Ivoire. Deflated annual medical expenditures per capita¹⁹ are shown in Figure 2. The observed general pattern in Figure 1 also holds for Figure 2: expenditures are higher in Ghana than in Côte d'Ivoire.

Potential explanations for this observed overall difference between Ghana and Côte d'Ivoire are varied. Economic factors partially explain the difference. Colonial government budgets in British and French colonies were mainly sourced from taxes raised within the colony, such as customs duties and local tax systems (Lasker 1977, 284; Frankema and van Waijenburg 2014, 372). The Gold Coast was a successful exporting economy, gaining income from the export of valuable cash crops (e.g. cocoa) and other goods (e.g. gold). The size of budgets for education (Frankema 2012, 342) and medical services depended on the total budget available, which in turn depended on the economic performance of a colony (Tilley 2016, 745). Due to its economic success, the Gold Coast yielded one of the largest amounts of gross public revenue per capita among colonies in British and French Africa (Frankema and van Waijenburg 2014, 383). Although Côte d'Ivoire was the richest country in French West Africa (Domergue-Cloarec 1986, XIII), it generated less gross public revenue per capita²⁰ than Ghana (Frankema and van Waijenburg 2014, 382–384). Other explanatory factors include a potential difference in wages between the two colonies and differences in sources of funding, and deserve a place on the future research agenda.

The remainder of this section reviews the patterns and trends of Figures 1 and 2 in more detail, focusing on interesting behaviours of the time series and taking into account colonial policy and worldwide shocks during the period. In order to further dissect the trends of Figure 2, I test for structural breaks in the per capita time series.²¹ Table A1 shows that the null hypothesis of no structural breaks can be rejected. For Côte d'Ivoire, it is estimated that a structural break exists at 1929; and for Ghana two are found, at 1910 and 1947. These findings remain robust when using a heteroskedasticity- and autocorrelation-consistent estimator (Table A1).

¹⁹Appendix B2 discusses the construction of this time series in more detail, based on the data discussed in the previous section.

²⁰Gross public revenue per capita in Ghana was on average (for the benchmark years provided by Frankema and van Waijenburg) nearly double the amount (94.72% higher) in Côte d'Ivoire.

²¹The Data Appendix provides a more detailed description of the method used.

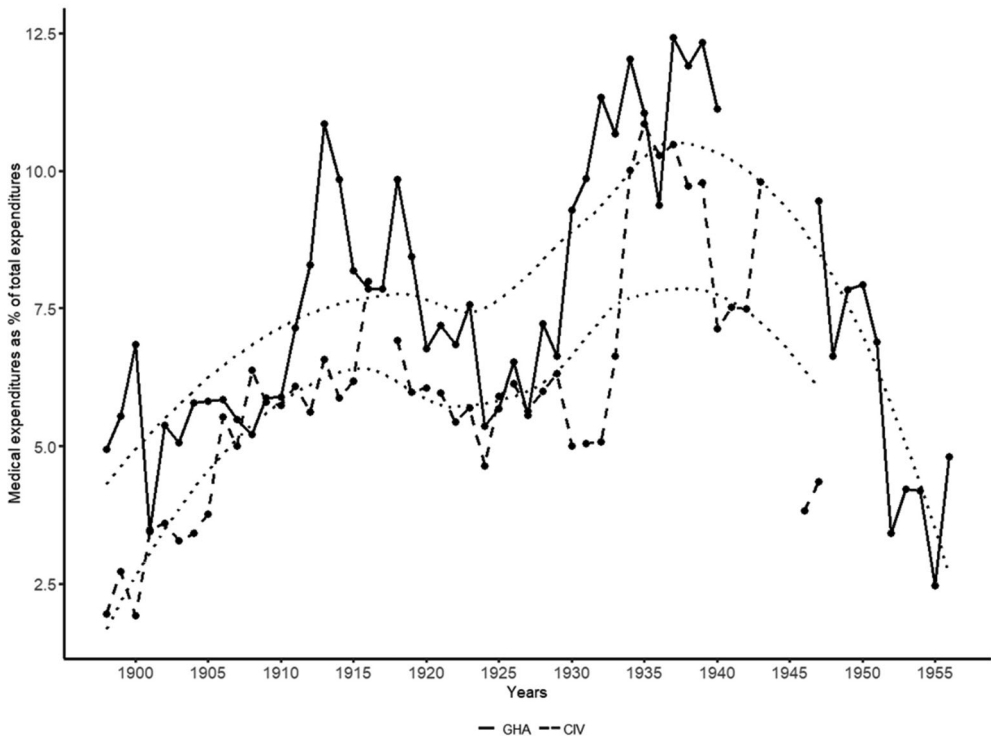


Figure 1. Total expenditures on medical services as a percentage of total annual expenditures by the colonial administrations in Ghana (GHA) and Côte d'Ivoire (CIV), 1897–1955.²² Data source: Côte d'Ivoire Local Budgets (LB) (1897–1946); Gold Coast Blue Books (BB) (1897–1938); Gold Coast Annual Medical Reports (AMR) (1907–55).

Note: The dotted lines represent the trends for Ghana and Côte d'Ivoire.

After displaying a modest upward trend in deflated medical expenditures per capita (Figure 2) in the early years of the twentieth century, expenditures start to rise more rapidly in Ghana around the first estimated trend break, while the trend for Côte d'Ivoire continues its pace. By 1914, the difference between the two countries is substantial. The British colonial administration in Ghana spent 1.17 francs per capita on health care, while just 0.34 francs per capita was spent in Côte d'Ivoire. The economic boom following an upsurge in Ghana's exports of cocoa (Austin 2007, 103–104) explains part of this difference, as increases in revenue were translated into rising (health care) expenditures. Simultaneously, the reports on Côte d'Ivoire point out that the budget available for health was far from sufficient during this period (see e.g. Côte d'Ivoire AMR 1910, 54), while this is not mentioned in the medical reports for Ghana.

Both countries experienced a drop in deflated medical expenditures per capita during World War I (WWI; Figure 2). The share of medical expenditures in total expenditures (Figure 1) also demonstrates a downward trend during WWI in both countries,

²²As the Gold Coast medical reports and the local budgets of Côte d'Ivoire lacked data for some years, I supplemented these figures with data transcribed from the Blue Books on the Gold Coast and the *Annuaire Statistique de l'Afrique Occidentale Française* for missing years.

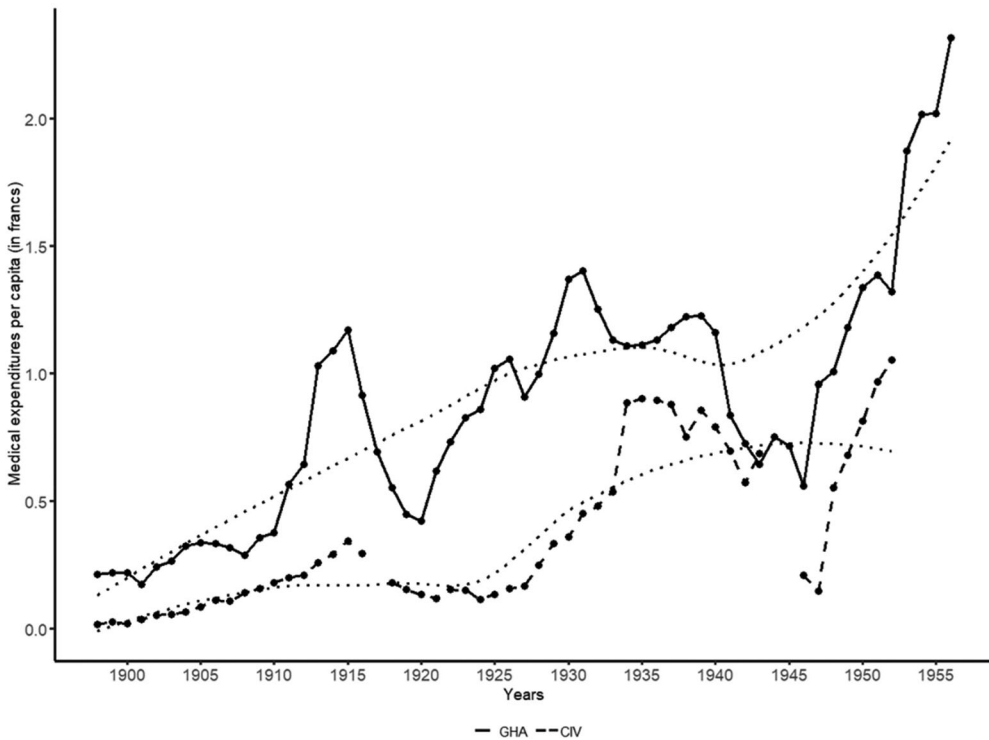


Figure 2. Deflated annual expenditures on medical services per capita in Ghana (GHA) and Côte d'Ivoire (CIV) (in francs), 1897–1955. Data sources: Côte d'Ivoire Local Budgets (1897–1946); Gold Coast Blue Books (BB) (1897–1927); Gold Coast Annual Medical Reports (AMR) (1907–55); *Annuaire Statistique de l'Afrique Occidentale Française* (AOF AS) (1950–54).

Note: The dotted lines represent the trends for Ghana and Côte d'Ivoire.

which continues until approximately 1925. The Gold Coast medical reports discuss the direct influence of WWI on colonial health care. Staff shortages and a lack of access to building materials in Ghana were attributed to the effect of WWI (Gold Coast AMR 1917, 15). Moreover, health care expenditures in Ghana were hit through the war's effect on trade prices. Gardner (2012, 63) explains that colonial revenues in British colonies depended majorly on exports from the territories due to the introduced colonial fiscal systems. In periods of declining commodity prices, colonial administrations received fewer tax incomes, thereby limiting their spending abilities (Gardner 2012, 63). The outbreak of WWI led to trade disruptions (Gardner 2012, 68), which translated into decreases in colonial (medical) expenditures through this mechanism based on trade prices. The effect of WWI on the observed patterns for Côte d'Ivoire in Figure 2 is less clear, since the colonial reports and literature do not provide a conclusive reasoning for this pattern, and the use of French CPIs influences the presented time series.²³ The similar observed decreasing pattern in Figure 1, however, suggests that the

²³As discussed in the Data Appendix, the use of British and French CPIs as a proxy for African CPIs is based on the assumption that inflation rates in African countries follow similar patterns to those of their colonizers. Cogneau, Dupraz, and Mesplé-Soms (2018, 16) discuss that this assumption potentially does not hold during the periods of the world wars.

economic effect of WWI also contributed to health care receiving less priority in the colonial budget of Côte d'Ivoire.

By 1929, the estimated break point for Côte d'Ivoire, deflated medical expenditures per capita start to increase at a higher pace in Côte d'Ivoire (Figure 2). Policy changes contributed to this trend break. Lasker (1977, 282–283) discusses that the colonial imperative to develop Ivorian economic activity becomes larger after WWI. Having been hit hard financially by the war, French colonies provided a market for imports of goods within the same monetary zone, and a major export market; and in order to attain economic growth, healthy labourers were required (Lasker 1977, 282–283). In addition, the provision of health care was considered part of the French colonial duty, and health care provision expanded considerably during the 1930s as a result (Lasker 1977, 283–284). The upwards trend in medical expenditures continues throughout the 1930s (Figure 2). Figure 1 shows that these policy changes were also reflected in budget allocation: the share of medical expenditures in terms of total expenditures increases during the early 1930s.

Deflated medical expenditures per capita (Figure 2) rose in the 1920s in Ghana, concurring with shifts in British colonial policy. During the 1920s, discussions geared British colonial policy towards a focus on African development (Abbott 1971, 69–70). In the face of economic downturn in Britain following WWI (Gardner 2012, 65), the British Colonial Development Act of 1929 formalized this colonial policy shift. The act allowed for providing funding into various fields (e.g. infrastructure and agriculture) that could promote development in the colonies, and it was hoped that this would also stimulate the British economy (Colonial Development Act 1929, s1). Public health was formally included as one of the ways in which development in the colonies could be promoted (Colonial Development Act 1929, s1.1). As a result of this act, investments in social development were propelled in many British African colonies (Frankema 2011, 144–145). Figure 1 reflects the change in British colonial policy during this period; it shows that an increasing proportion of the total budget was spent on health care in Ghana in the late 1920s and early 1930s.

The trend towards increased colonial medical expenditures during the 1920s for Ghana, as observed in Figure 2, was reversed in the early 1930s due to the Great Depression. The effect of this economic crisis on colonial health care provision in Ghana was considerable. The Gold Coast Medical report of 1931 mentions how 'financial stringency has prevented any extensions or enlargements being made [to European Hospitals] this year' (Gold Coast AMR 1931–32, 37). It also partially attributes a decrease in the number of patients for the year to the trade depression (Gold Coast AMR 1931–32, iii). The observed pattern in Figure 2 is in line with Frankema's (2011) findings. He shows that the budgets allocated to education and health declined in Ghana during the 1930s, and that they were affected more heavily by the Great Depression than in most British colonies in Africa (Frankema 2011, 144–145). Figure 2 shows that the Great Depression also had a more substantial effect on colonial health care expenditures in Ghana than in Côte d'Ivoire, as the latter continued its upward trend despite the economic crisis. In that respect, colonial health expenditures in Côte d'Ivoire developed similarly to Frankema's (2011, 144–145) findings for Nyasaland and Uganda.

After a decline during World War II (WWII), expenditures recover in the two countries around the same time (Figure 2). Having dropped to approximately their 1920 levels, medical expenditures per capita start to rise rapidly in Ghana during the final years of colonial rule (Figure 2). The estimated structural break at 1947 for Ghana concurs with this accelerating trend. After WWII, British colonial policy concentrated on broadening colonial health care, for example through the introduction of a system of medical field units (MFUs; Patterson 1981, 25–26). A focus on recovery in the aftermath of the Great Depression, followed by WWII, also contributed to rising expenditures. The estimated trend line for Côte d'Ivoire also increases but does not match Ghana's pace (Figure 2). The period was characterized by economic growth and political changes, including the abolition of forced labour, which translated into a French colonial policy focusing on the expansion of medical services (Lasker 1977, 285–286). An important change in French colonial policy was marked by the creation of the *Fond d'Investissement pour le Développement Economique et Social* (FIDES) in 1946. The FIDES allowed French colonies to be granted subsidies for funding investments aimed at economic and social development projects (Lois et Décrets 1946, 3655).

Figure 1 shows a contrasting trend to Figure 2: medical expenditures as a share of total expenditures decline rapidly after WWII. For Ghana, this pattern can be explained by considerable increases in total expenditures due to major developmental spending in this period (Patterson 1981, 27). The share becomes skewed because the development of medical expenditures did not match the increase in total expenditures. Moreover, the allocation of funds was fixed by the British colonial government in 1952, with health care receiving a fixed 4.2% of total expenditures (Government of the Gold Coast AMR 1953, 27). Data on Côte d'Ivoire for this period is too sparse to allow for a meaningful analysis; the figures on the latest year available (1946) could still reflect a downward shift relating to WWII.

Summing up, the development of colonial expenditures on health care was influenced by colonial policy considerations and (worldwide) economic shocks. The British colonial administration in Ghana spent more on medical care than the French in Côte d'Ivoire (Figure 2), and also spent a relatively larger percentage of the total budget on health care than other British colonies did (Patterson 1981, 27). Nonetheless, its budget was far from sufficient to provide extensive health care to its inhabitants (Patterson 1981, 31).

Subcategories

Colonial health care budgets in both countries were reported according to several subcategories. In Ghana, these categories represented the structure of the medical services introduced by British colonial administrators. As shown in Figure 3, the Medical Branch (MB)²⁴ received the largest share of total expenditures on colonial health care. The share of the Sanitary Branch (SB)²⁵ was low at the start of the twentieth century and caught up during the 1910s, but eventually stabilized at a lower percentage than the share of expenditures on the MB (around 40% vs. around 57%; Figure 3). This result is

²⁴This branch concerned all matters related to colonial health care facilities, plus the collection of meteorological data and (until 1920) animal health (Patterson 1981, 11).

²⁵The SB was responsible for sanitary and preventive measures, and vaccination programmes (Gold Coast AMR 1910, 46–55). Despite its official creation occurring in 1909 (Gold Coast AMR 1909, 11), earlier reports already provide separate figures for the SB. It was renamed the Health Branch in 1929 (Gold Coast AMR 1929–30, 1).

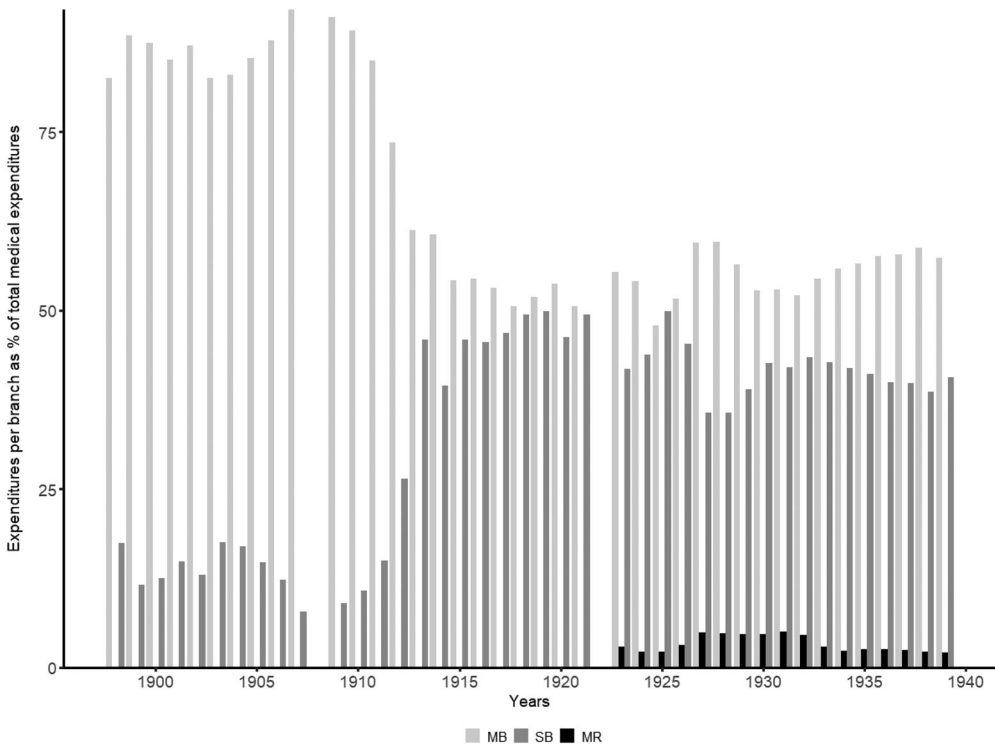


Figure 3. Expenditures on medical services per branch (as a percentage of total medical expenditures) in Ghana, 1897–1938.²⁶ Data sources: Gold Coast Blue Books (1897–1927); Gold Coast Annual Medical Reports (1907–38).

Note: Branches are the Medical Branch (MB), Sanitary/Health Branch (SB) and the medical research branch (MR).

in line with Patterson (1981, 21) who discusses that curative care (by the MB) received preference by British colonial policy in Ghana over preventive care (by the SB), as the former led to more immediate and perceptible results than the latter. Only a small fraction (approximately 2–5%) of total funds for medical services was designated for the third branch (medical research, MR)²⁷ during its existence (Figure 3). This centralized subdivision of colonial health care at the national level differs from British colonial policy in certain other regions; Mushtaq (2009, 6–7) discusses that colonial medical services in India were decentralized at the provincial level.

Although the colonial medical service in Côte d'Ivoire also distinguishes between medical and sanitary activities in its medical reports, this is not reflected in different budget allocations as in Ghana, but in expenditures on staff²⁸ and *matériel*²⁹ (materials

²⁶For 1918 and 1937, the data on the different subcategories do not add up to exactly 100%, but show a slight deviation (at most 1.7 percentage points). The sources did not contain enough information to determine the exact cause(s) of these slight deviations.

²⁷First named the Medical Research Institute, and later Laboratory Research, this branch was responsible for scientific research on health and disease in Ghana (Patterson 1981, 11).

²⁸Including the salaries of doctors, nurses, pharmacists, and other staff working in health facilities, pharmacies, or the sanitary service (Côte d'Ivoire LB 1919, 74–79).

²⁹Including operating costs, expenditures on renovations to health facilities, and the costs incurred in constructing new health facilities (Côte d'Ivoire LB 1919, 84–86).

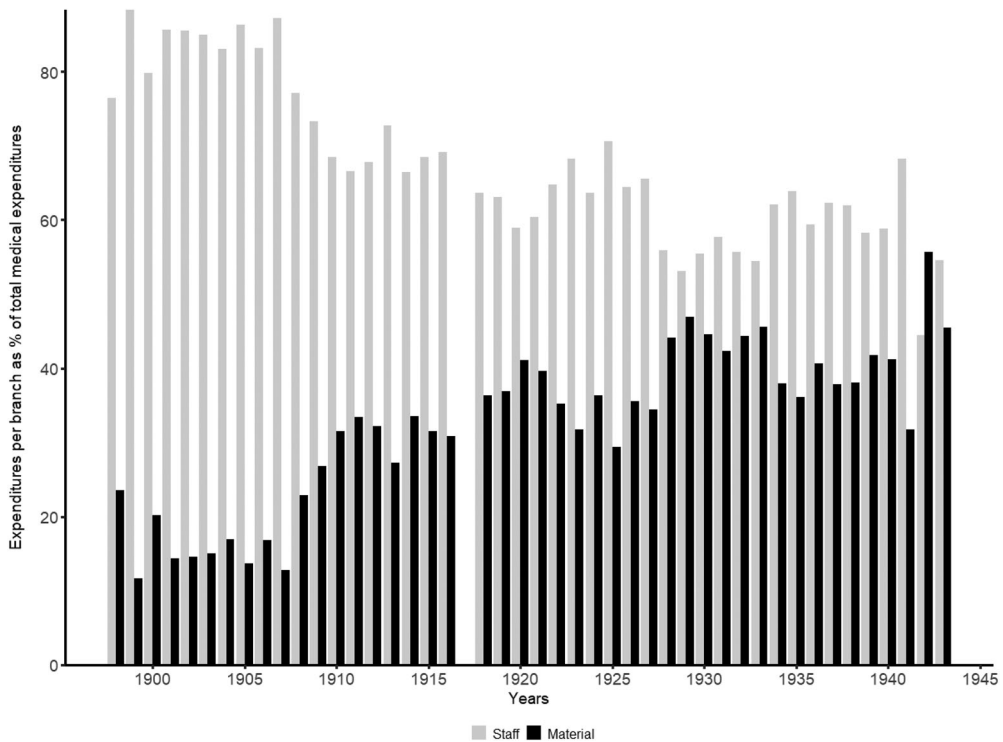


Figure 4. Medical expenditures on staff and material (as a percentage of total medical expenditures) in Côte d'Ivoire, 1897–1942. Data source: Côte d'Ivoire Local Budgets (1897–1946).

or equipment). In the first decade of the twentieth century, the majority of health care funds in Côte d'Ivoire was spent on personnel expenses (Figure 4). Early medical reports discuss that *infirmaries-ambulances* (infirmary-ambulances) were introduced, and point out that these smaller and less expensive facilities were sufficient for the needs of the medical services at the time (Côte d'Ivoire AMR 1910, 2), while establishing a hospital was deemed very costly (Côte d'Ivoire AMR 1911, 2–3). This French colonial policy of limiting expenditures on constructing larger colonial health care facilities implies that a large part of funds went to personnel costs during this period. Expenditures on *matériel* start to increase in later decades, concurring with a change in colonial policy that allowed for an expansion of the number of health facilities³⁰ (Figures 6 and 7; Lasker 1977, 281, 284), but personnel expenditures continue to receive the largest part of the budget for medical services in Côte d'Ivoire for nearly all years.

³⁰Apart from the increased number of health care facilities explaining an overall increasing weight for expenditures on *matériel* displayed in Figure 4, changes in personnel costs were also a reason. As shown in the section on colonial medical staff, increases in the staff number were mainly driven by the hiring of Ivorians. Previous literature by, for example, Patterson (1981, 14) and Frankema (2012, 343) has discussed that African staff received lower salaries than European staff in the colonies. As a result, increases in personnel costs were relatively lower than if hiring additional staff in Europe, thereby contributing to the relatively large weight observed for *matériel*.

5. Colonial health care facilities

Colonial health care expenditures were in part used to finance colonial health care facilities. During the first half of the twentieth century, colonial administrations introduced various types of facilities in Ghana and Côte d'Ivoire. A newly gathered dataset was used to map locations of these colonial health care facilities in QGIS, where a subset of Müller-Crepon's (2020b) data on colonial districts served as a base map. Figures 5–7 show the geographical distribution of colonial health care facilities for three benchmarks (1905, 1931, and 1940/1952).

The total number of colonial health care facilities established in the two countries was similar and low in 1905 (10 in Côte d'Ivoire, 11 in Ghana; Figure 5; Table A2). This finding is in line with previous literature, which has discussed that colonial policy on providing health care mainly catered to Europeans in the early years of colonial rule (Hailey 1938, 1119; Lasker 1977, 280; Giles-Vernick and Webb 2013, 4). In addition, financial and personnel constraints hampered the expansion of colonial health care provision during this period in Ghana and Côte d'Ivoire (Figures 2 and 8; Patterson 1981, 12; Tilley 2016, 745). The quality of these facilities and their services varied considerably. For example, the hospital in Accra was deemed 'in fairly good repair' (Gold Coast AMR 1905, 11) and had access to clean water and an ice room, while in the colonial hospital in Axim 'in

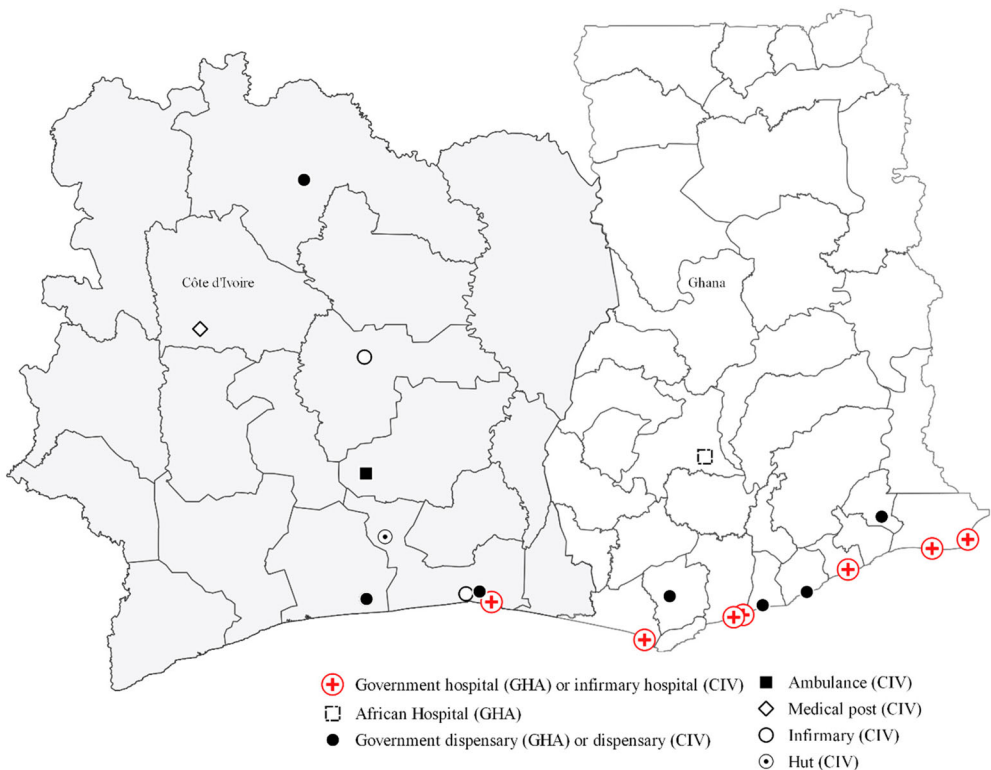


Figure 5. Colonial health care facilities in Ghana (GHA) and Côte d'Ivoire (CIV) in 1905. Data sources: Côte d'Ivoire *Rapport Annuel du Service de Santé* (RASS) (1905); Gold Coast Annual Medical Reports (1905).

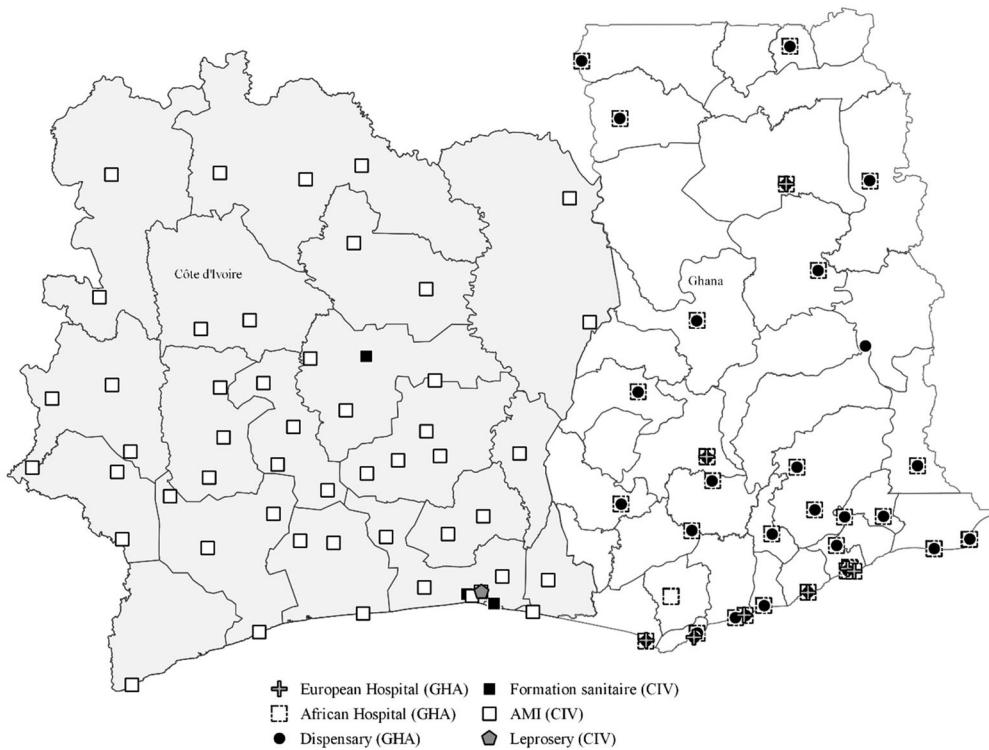


Figure 6. Colonial health care facilities in Ghana (GHA) and Côte d'Ivoire (CIV) in 1931. Data sources: Côte d'Ivoire Local Budgets (1931); Gold Coast Annual Medical Reports (1931–32).

many places the wood is rotting for want of paint. There is no operation room, nor consulting room. The patients are seen in the native ward' (Gold Coast AMR 1903, 23). For Côte d'Ivoire, large contrasts are also described. The hospital in Bassam, for instance, consisted of several pavilions. The pavilion for European patients had two floors, and 'was surrounded by spacious porches, which each included four bedrooms that were suitably ventilated' (Côte d'Ivoire RASS 1906, 31). The pavilions used to treat Ivorians were 'small wooden pavilions, with metal frames, one of which is old, sordid, and dilapidated' (Côte d'Ivoire RASS 1906, 32).

The map of 1905 (Figure 5) shows two distinctions between the colonies. Firstly, the geographical distribution of colonial health care facilities differed considerably at the start of the twentieth century. All health care facilities in Ghana were located in the southern part of the colony in 1905 (Figure 5). Colonial health care facilities were more dispersed in Côte d'Ivoire, with a dispensary located as far north as Korhogo (Figure 5). The history of colonization of Ghana explains part of this difference. Although the colony of the Gold Coast was established in the nineteenth century, it took until 1902 for the middle and northern part³¹ of present-day Ghana to be formally annexed by British colonizers (Gocking 2005, xviii). As a possible consequence, colonial health care provision had not yet expanded broadly outside the southern regions by 1905. Within

³¹These parts of the country were referred to as Ashanti and the Northern Territories under colonial rule.

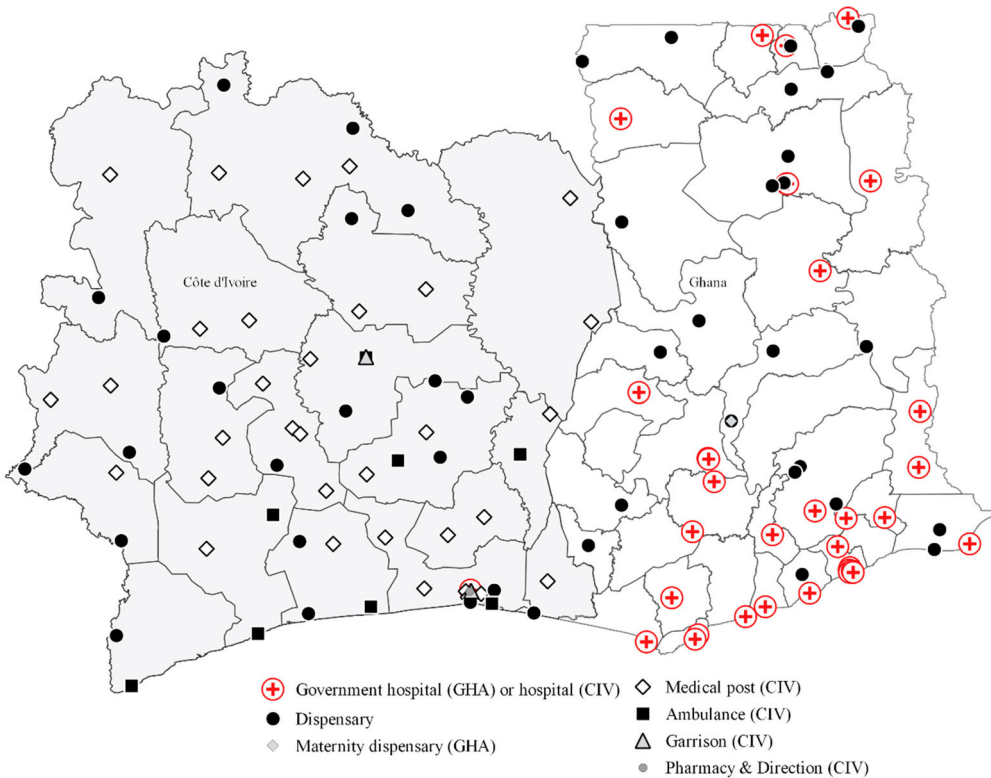


Figure 7. Colonial health care facilities in Côte d'Ivoire (CIV) for 1940,³² and in Ghana (GHA) for 1952. Data sources: Côte d'Ivoire Local Budgets (1940); Gold Coast Annual Medical Reports (1952).

the southern regions of Ghana, colonial health care facilities had been introduced at locations with a sizeable European population (e.g. Accra, Axim and Cape Coast; Gold Coast AMR 1910, 64–80; Addae 1996, 61). British colonial policy in West Africa focused on setting up health care facilities in locations where government officials were stationed (Nkwam 1988, 19).

The presence of Europeans was also a factor in the choice by French colonial administrators of certain locations for colonial health care facilities in Côte d'Ivoire during this period, in response to the high disease burden among the French located in the colony (Lasker 1977, 279–280). Moreover, policymakers considered the economic importance of a location (Becker and Collignon 1998, 414), resulting in the introduction of small health care facilities in the Ivorian inland at locations of administrative and military importance (Lasker 1977, 280). The pattern in Figure 5 supports Lasker's suggested motives for locational choices of colonial health care facilities in Côte d'Ivoire. Lastly, overall French colonial policy in Africa was more geared towards providing rural health care (albeit not always successfully) (Hartwig and Patterson 1978, 16), also contributing to the observed difference in spatial dispersion between Ghana and Côte d'Ivoire in Figure 5.

³²The latest available source that included a complete overview of facilities was Côte d'Ivoire LB (1940).

Secondly, the type of colonial health care facilities differed in 1905. In Ghana, a distinction was made between dispensaries and hospitals. Colonial hospitals focused on treating afflictions in their outpatient clinics, which did not require admission, and provided beds to inpatients who needed more serious care (Patterson 1981, 17; Addae 1996, 60). Colonial dispensaries were smaller facilities managed by African dispensers, which treated mostly outpatients in more rural areas (Patterson 1981, 17). In 1905, seven out of 11 health care facilities were hospitals (including one African hospital in Kumasi; Gold Coast AMR 1905, 10–15). A more diverse selection of health care facilities is listed in the colonial reports for Côte d'Ivoire: dispensaries, medical posts, infirmaries, a pharmacy, and a hospital in Grand-Bassam. In contrast to Ghana, infirmaries, ambulances, and dispensaries made up the majority of the colonial health care facilities in Côte d'Ivoire (Figure 5). Ambulances served as austere hospitals, while medical posts only treated patients who did not require an overnight stay (Domergue-Cloarec 1986, 73). Two of the colonial infirmaries shown in Figure 5 were led by the military, while the third was part of the railways (Côte d'Ivoire RASS 1905, 19–20). The focus on smaller and more mobile facilities in Côte d'Ivoire can be explained by French colonial policy. As mentioned in the previous section, a colonial hospital was deemed too expensive and unnecessary by colonial administrators (Côte d'Ivoire AMR 1911, 2–3), and the smaller health care facilities already 'sufficiently met the colony's needs and resources' (Côte d'Ivoire AMR 1910, 2). Furthermore, medical reports discuss the continuing uncertainty surrounding the decision of the French colonial administration on which town in Côte d'Ivoire would become the main centre of the colony, and would thus be eligible for the establishment of a hospital (Côte d'Ivoire AMR 1912, 3). This focus of French colonial medical policy on the establishment of smaller facilities during the early period of colonial rule also occurred in other areas, for instance in China as discussed by Bretelle-Establet (1999, 171–172).

By 1931, the number of colonial health care facilities had increased considerably in both countries (Figure 6; Table A2). The absolute number of health care facilities continued to be larger in Ghana than in Côte d'Ivoire (86 vs. 53 facilities; Table A2), but the number of health care facilities per capita remained higher in Côte d'Ivoire (2.22 vs. 2.87 health facilities per 100,000 people; Table A2). Compared to 1905, colonial health care provision had been extended beyond the southern regions of Ghana (Figure 6). Despite the completion of a basic structure of hospitals by the end of the 1920s with the opening of the Gold Coast Hospital in Accra (Patterson 1981, 17), multiple Ghanaian districts still lacked access to colonial health care in 1931, and fewer facilities were located in the north compared to the south (Figure 6). Following several epidemics in British West Africa during the 1920s, British colonial policy shifted towards increasing the number of health care facilities in urban areas (Nkwam 1988, 19–21). Provision of health care in rural areas fell to local native authorities who lacked the financial means to invest in setting up health care facilities (Nkwam 1988, 27). Although Côte d'Ivoire had fewer facilities in absolute terms than Ghana, all colonial districts had at least one colonial health care unit by 1931. The observed pattern in Figure 6 is in line with a general difference between British and French colonial policy during this period described by Worboys (2000b, 77): health care facilities in British African colonies served as centralized medical centres to which the patients travelled, while colonial health care facilities in French African colonies were used as a base from which colonial medical staff operated and visited patients in the surrounding region.

Considering the types of colonial health care facilities, changes also occurred. The British colonial administration now distinguished between so-called 'European' and 'African' hospitals in the Gold Coast medical records (Gold Coast AMR 1931–32, 85). Most 'European' hospitals were located in the south of Ghana (Figure 6), which concurs with locations of sizeable European communities (Gold Coast AMR 1928–29, 94). 'African' hospitals were more scattered, but the majority were also located in the south (Figure 6). The colonial reports do not distinguish between 'African' and 'European' for dispensaries. Most dispensaries were located in places with either an 'African' or 'European' hospital, except for Kete Krachi, which only had a dispensary (Figure 6).

Organizational changes were reflected in the types of facilities available in 1931 in Côte d'Ivoire. The creation of the *Assistance Médicale Indigène* (indigenous medical assistance, AMI) by an order of the general governor on 8 February 1905 (Côte d'Ivoire RASS 1905, 27) resulted in an expansion of facilities aimed towards Ivorians. At its conception, this service was tasked with providing free medical care to Ivorians who visited medical staff for a consultation, making home visits, and administering small pox vaccinations (Côte d'Ivoire RASS 1905, 27; Domergue-Cloarec 1986, 74). Domergue-Cloarec (1986, 74) describes that the AMI posts were usually dispensaries with a pharmacy, visiting room, and store-room, but if necessary could also possess an infirmary to treat more serious cases. By 1931, these AMI posts formed the majority of colonial health care facilities in Côte d'Ivoire (Figure 6).

Towards the closing decades of colonial rule, the number of colonial health care facilities was higher in Côte d'Ivoire than in Ghana (in both absolute and per capita terms; Table A2; Figure 7). Policies by each colonial administration play a major role in this reversal. The number of facilities had increased in Côte d'Ivoire by 1940 (Table A2; Figure 7), following higher medical expenditures, and also following a policy change after WWI and the Great Depression as discussed in the previous section (Figures 1 and 2; Lasker 1977, 282–284). Simultaneously, the number of government hospitals in Ghana declined due to the abolishment of separate European and African hospitals in 1944 (Patterson 1981, 18). Moreover, WWII and its aftermath caused issues in obtaining building materials for the construction of new colonial health care facilities in Ghana (Gold Coast AMR 1946, 5; Gold Coast AMR 1947, 3). As a result of these developments, Figure 7 does not provide evidence that the overall British policy shift towards social development (British Colonial Development Act of 1929) led to a more expansive network of colonial health care facilities by the 1950s in the case of Ghana.

Comparing the types of facilities, it becomes clear that the colonial health care network in Ghana still relied more heavily on hospitals than in Côte d'Ivoire at this time (Figure 7). Ghana had 33 government hospitals, in addition to 23 dispensaries and dressing stations, and one maternity dispensary in Mampong. The system of colonial health care facilities in Côte d'Ivoire instead relied most on medical posts (33 in total) and dispensaries (21 in total). The network of colonial health care facilities in Côte d'Ivoire as represented on the map (Figure 7) conforms to instructions given by the general governor in 1926 (Domergue-Cloarec 1986, 246–248). These required a central hospital in the capital of the colony, dispensaries located in important agglomerations, and medical posts in locations with a large population (Domergue-Cloarec 1986, 248). The implementation of this policy (as shown in Figure 7) is an explanatory factor for the observed lack of hospitals in Côte d'Ivoire compared to Ghana.

6. Colonial medical staff

This section compares a third factor in colonial health care provision in Ghana and Côte d'Ivoire: the development of colonial medical staff. Seminal work by Iliffe (1998, 1–2) has detailed the evolution of 'modern doctors' in Uganda, Kenya and Tanzania from the 1870s onwards. This section takes on a different perspective, as it analyses the development of colonial medical staff in two West African countries. It focuses on a narrower time frame than Iliffe – spanning from the end of the nineteenth century to the final decades of colonial rule – but extends the type of medical staff studied from doctors to all colonial health care practitioners mentioned by the colonial reports.

Figure 8 presents the development of colonial medical staff per capita in Ghana and Côte d'Ivoire for 1897–1942, with trend lines plotted. The data concerns all staff mentioned for the colonial medical services in both countries, including doctors, nurses, and support staff (of African and European origin; see also Figures 9–11). Figure 8 shows that the number of colonial medical staff (per capita) was considerably higher in Ghana than in Côte d'Ivoire at the end of the nineteenth century (respectively, 4.47 and 0.36 medical staff per 100,000 people in 1897). Two distinctions in colonial policy contribute to this difference. Although colonial health care facilities were few in both

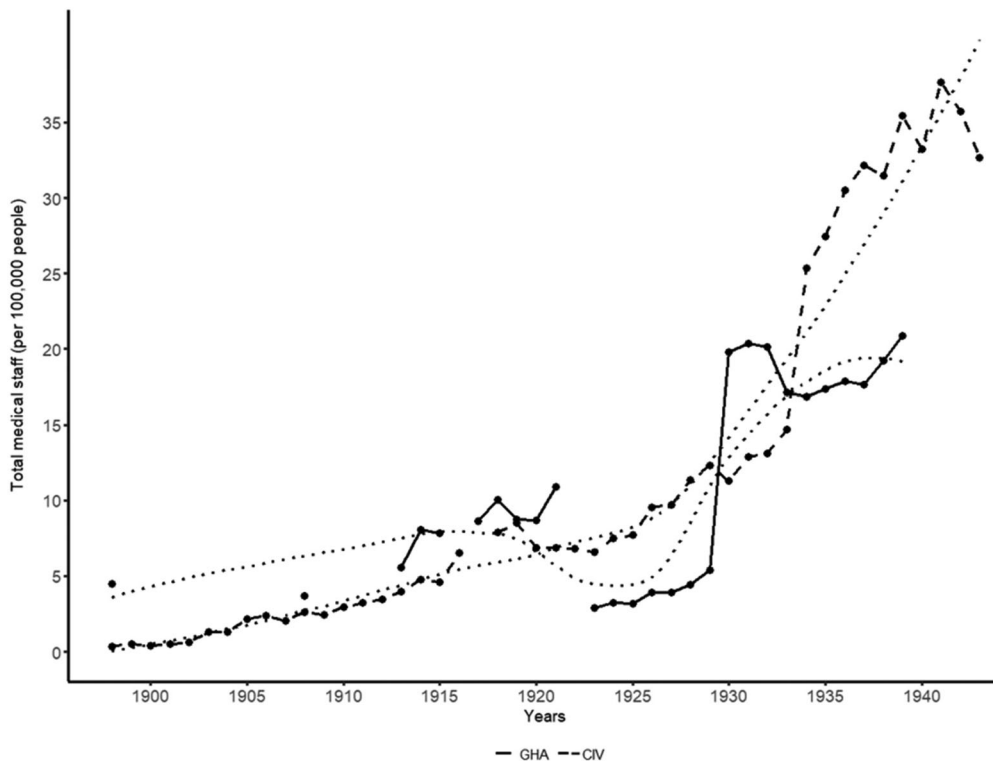


Figure 8. Total number of colonial medical staff per 100,000 people in Ghana (GHA) and Côte d'Ivoire (CIV): 1897–1942. Data sources: Côte d'Ivoire Local Budgets (1897–1915, 1917–42); Gold Coast Annual Medical Reports (1897, 1907, 1912–1938).

Note: The dotted lines represent the trends for Ghana and Côte d'Ivoire.

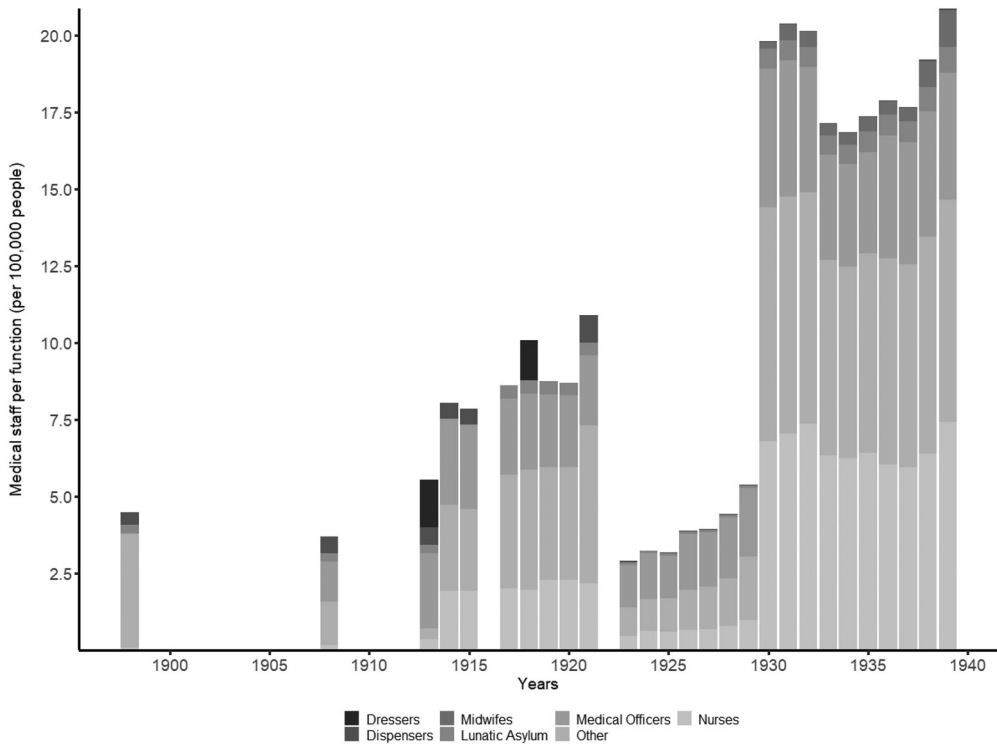


Figure 9. Colonial medical staff per function (per 100,000 people) in Ghana, 1897–1938. Data sources: Gold Coast Annual Medical Reports (1897, 1907, 1912–38).

countries at this time (Figure 5; Table A2; Lasker 1977, 280; Patterson 1981, 114), it took until 1902 for colonial administration in Côte d'Ivoire to set up bigger infirmaries, and until 1918 for the first major hospital for European patients to be built (Lasker 1977, 280). Moreover, Domergue-Cloarec (1986, XIV) discusses how the medical service was idle in Côte d'Ivoire for the years 1893–1905 (when the AMI was created), lacking both means and personnel, whereas British colonial policy in Ghana allocated comparatively more finances around this time as shown in Figures 1 and 2.

During the first three decades of the twentieth century, the gap in the number of colonial medical staff (per capita) between the two countries decreased (Figure 8). Data on Ghana is incomplete during this the period, due to missing staff lists in the reports for various years.³³ Moreover, a change in the level of reporting³⁴ results in a potential under-representation of the total number of staff from 1915 to 1928 in Ghana. The latter implies that no meaningful comparison can be made between the two countries for these years. Notwithstanding these issues, some general observations can be made.

³³No (complete) information was available for 1898–1906, 1908–11, 1915, and 1921. For Côte d'Ivoire, no local budget report was available for 1916.

³⁴The Gold Coast medical reports only document the number of 'principal subordinate members' of medical staff during this period. As a result, large categories – such as the number of 'second class (native) nurses' (accounting for about 200 staff members by 1929) – are not recorded for these years. As of 1922, the number of staff roles considered 'principal members of the subordinate staff' becomes even more limited, which (in part) causes the drastic drop shown in Figure 8 for 1922 compared to 1920.

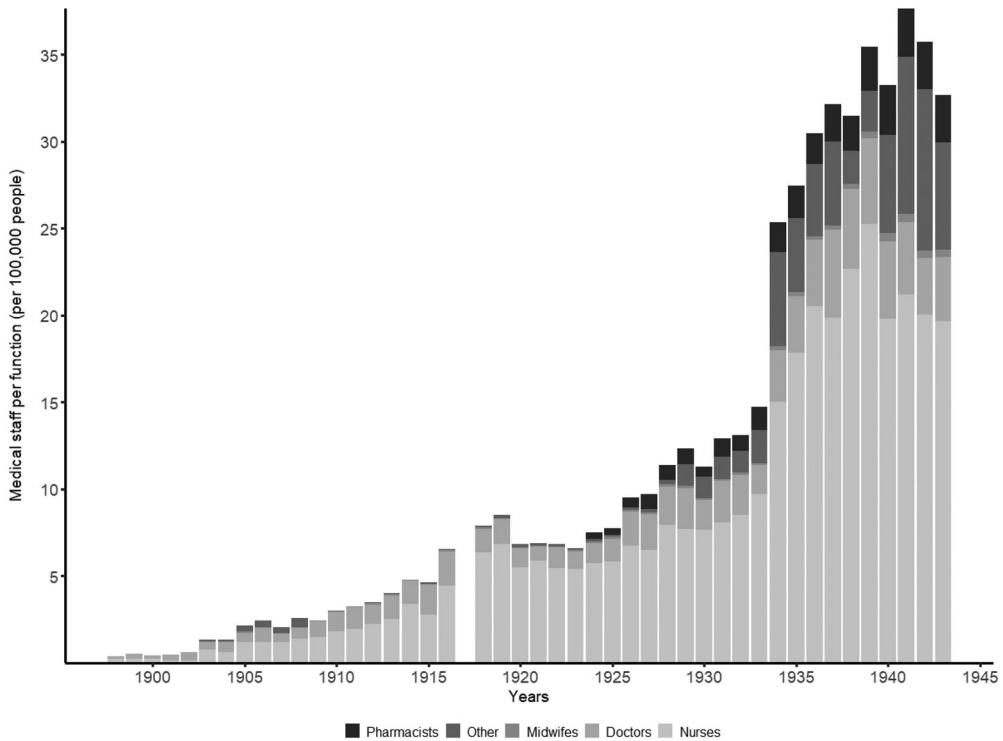


Figure 10. Colonial medical staff per function (per 100,000 people) in Côte d'Ivoire: 1897–1942. Data sources: Côte d'Ivoire Local Budgets (1897–1942).

Both countries experienced an increase in the total number of colonial medical staff until 1930. Addae (1996, 202–203) attributes this increasing trend to four causes related to British colonial policy in Ghana: the establishment of tropical medical schools in the UK by the end of the nineteenth century, the introduction of the West African Medical Service in 1902, improvements in the financial status of the colony, and the introduction of the Sanitary Branch and Pathological Laboratory services in Ghana during the 1910s. Moreover, Nkwam (1988, 21) links increases in the number of medical officers in British West Africa to changes in colonial policy following several epidemics in the region. In Côte d'Ivoire, colonial policy relating to medical schooling also contributed to the observed rise: the supply of qualified medical staff expanded after a medical school in Dakar opened in 1918, which trained Africans to provide colonial medical care (Lasker 1977, 281). Moreover, the number of health care facilities increased in Côte d'Ivoire (Lasker 1977, 280–281; Figures 5 and 6; Table A2), which required additional medical staff. Despite showing increasing overall figures of colonial medical staff in Ghana and Côte d'Ivoire, colonial medical reports also discuss staff shortages during this period (see e.g. Gold Coast AMR 1900, 18–19; Gold Coast AMR 1913, 7, 18; Côte d'Ivoire AMR 1914, 22). Colonial policy was affected by WWI in both colonies; medical staff was redistributed outside of the colonies, worsening the existing shortages within Ghana and Côte d'Ivoire (Côte d'Ivoire AMR 1914, 22; Gold Coast AMR 1914, 29; Gold Coast AMR 1917, 15).

The division of labour between staff functions varied in Ghana and Côte d'Ivoire (Figures 9 and 10). Medical officers and nurses formed the largest group in Ghana by

1930, followed by various other roles (Figure 9). In Côte d'Ivoire, nurses formed the large majority of colonial medical staff during the first three decades of the twentieth century (Figure 10). Several factors relating to differences between British and French colonial policy contribute to this difference. Firstly, a local decree was issued in Côte d'Ivoire on 8 May 1911, ensuring better salary conditions for the corps of 'indigenous nurses' in order to attract more young graduates to the nursing staff (Côte d'Ivoire AMR 1911, 8). Domergue-Cloarec (1986, 75) mentions that French colonial policy required all dispensaries to be led by nurses in Côte d'Ivoire, while dispensers were appointed in Ghana following British colonial policy (Patterson 1981, 17), affecting the division of labour accordingly. Colonial medical reports also mention, on various occasions, difficulties in hiring and retaining nurses in Ghana.³⁵ The reports of 1900 and 1912 attribute this issue to four causes: the low wage offered to Ghanaian nurses, the availability of positions outside of nursing which were financially more attractive, a lack of suitable candidates, and the perceived low status of the job (Gold Coast AMR 1900, 19; Gold Coast AMR 1912, 6). The medical report of 1914 on Côte d'Ivoire discusses how a medical staff shortage was especially present among doctors (Côte d'Ivoire AMR 1914, 22) rather than nurses, which also skews the distribution of medical staff. This shortage cannot be directly linked to French colonial policy. It should be noted that the broadening of the division of labour between function types mirrored developments in Europe; Larkin (2000, 531–532) describes how the division of labour widened during the twentieth century due to new medical technology requiring different staff and a move to specialization.

Although colonial health care provision in Côte d'Ivoire relied more heavily on nurses compared to Ghana (Figures 9 and 10), nurses were not necessarily the driving forces in the increase in total medical staff in Côte d'Ivoire during the first three decades of the twentieth century. The hiring of additional nurses mostly accounted for the (moderate) rise in colonial medical staff in the 1910s, but the 1920s present a different picture (Figure 10). The number of doctors more than doubled, from 0.83 doctors per 100,000 people in 1920 to 2.41 in 1930. In addition, the hiring of pharmacists and midwives (as of 1923) also accounted for some of the widening staff base. These findings are in line with Lasker (1977) and Domergue-Cloarec (1986). They discuss how the French colonial administration's motive to provide medical care in Côte d'Ivoire changes after WWI (Lasker 1977, 282–283; Domergue-Cloarec 1986, 201–204). During the early decades of colonial rule, medical care was used as a tool in conquest, in addition to providing care to the European population in the colony (Lasker 1977, 280, 282–283). Economic motives took over during the 1920s. The poor economic situation of France following WWI led French policymakers to turn to its colonies as a solution (Lasker 1977, 282; Domergue-Cloarec 1986, 201). The expansion of economic activities in the colonies required improvements in human capital (Domergue-Cloarec 1986, 204). A policy of prevention, improved hygiene, and mass campaigns combatting endemic diseases replaced the previous focus on curative care and occasional vaccination programmes (Lasker 1977, 283). The administrative organization of health care in Côte d'Ivoire also materialized during the 1920s (Lasker 1977, 283). As a result of these shifting conditions, increases in the colonial medical staff required more varied types of staff.

³⁵See e.g. Gold Coast AMR 1900, 19; Gold Coast AMR 1903, 20; Gold Coast AMR 1905, 9; and Gold Coast AMR 1912, 6.

Figure 8 shows that by the 1930s, the increasing trend in the total number of colonial medical staff halts in Ghana. This is in accordance with several factors indicative of changing circumstances in Ghana. Firstly, the Great Depression caused a decline in revenue in Ghana (Addae 1996, 205), which translated into a decline in (deflated) medical expenditures per capita during the 1930s (Figure 2). Staff cuts among members of the medical staff followed, including considerable layoffs at the Sanitary Branch and the Medical Research Institute (Patterson 1981, 12; Addae 1996, 205). Secondly, the West African Medical Service was replaced by the Colonial Medical Service in 1934 (Addae 1996, 204). As a result of this modification in British colonial policy, pay and pension conditions became less attractive for prospective staff members, leading to recruitment issues and early retirements (Patterson 1981, 12; Addae 1996, 205–206). Finally, the outbreak of WWII induced further recruitment problems, with around 25% of medical staff becoming deployed (Addae 1996, 206). Medical officers and African nurses in particular became involved in wartime services (Gold Coast AMR 1939, 1).

Contrary to Ghana, the upward trend continues in Côte d'Ivoire, accelerating further during the mid-1930s (Figure 8). Increases in Côte d'Ivoire were in part driven by an upsurge in the number of nurses (from 8.06 nurses per 100,000 people in 1930 to 21.19 nurses per 100,000 people in 1940; Figure 10). Likewise, the number of doctors per capita also doubled on average during the 1930s, and the number of pharmacists and midwives showed increases too (Figure 10). In 1933, the number of total colonial medical staff per capita in Côte d'Ivoire became higher than in Ghana. In addition to the changing circumstances in Ghana, three aspects concerning Côte d'Ivoire played a role in this reversal. The shift in motive to provide health care – as a policy tool to improve human capital – continued to have its effect in Côte d'Ivoire during the 1930s (Lasker 1977, 284). In addition, new medical centres were rapidly introduced in the colony from 1930 to 1940 by the French colonial administration (Figures 6 and 7; Table A2; Lasker 1977, 284), and as a result the demand for medical staff increased. Deflated medical expenditures per capita and especially medical expenditures as a percentage of total expenditures also increased during this decade (Figures 1 and 2).

African staff

Previous research has found that the introduction of various social infrastructures during colonial rule required the hiring of African staff. As discussed by Frankema (2012, 341), the inclusion of African staff was a necessary condition for the expansion of the mission schools' enrolment in British Africa during the first half of the twentieth century. For Ghana, Patterson (1981, 25–26) mentions that the use of African medical personnel was key to the system of MFUs – an organization for mobile teams combatting various diseases. The personnel lists in the local budgets on Côte d'Ivoire include the nationality of staff members for many types of functions, and therefore allow for an analysis of the involvement of African staff in colonial medical care in the colony. It was not possible to compare this data with figures on Ghana, as the Gold Coast Medical reports included many positions with an undefined origin of staff (80.76% unknown on average).

Figure 11 shows that the employment of African staff was a precondition for the growing provision of colonial health care in Côte d'Ivoire. Domergue-Cloarec (1986, 59) explains how

the number of initially employed military doctors was insufficient to meet the demand for health care. As a consequence, the medical service required the use of Ivorian staff already by the end of the nineteenth century (Figure 11; Domergue-Cloarec 1986, 59). Lasker (1977, 280–281) points out that an increased demand for health care led to the addition of African staff to aid French doctors in the early 1900s. In 1906, a corps of ‘native assistant doctors’ was installed by the governor of French West Africa (Lasker 1977, 281), further increasing the number of Africans employed as medical staff.

As of the mid-1910s, the majority of medical staff was composed of Ivorians (Figure 11). The introduction of a medical school in 1918 in Dakar to train African auxiliary doctors, auxiliary midwives, and pharmacists led to an influx of African medical staff (Lasker 1977, 281). Nevertheless, Ivorians employed in the colonial medical service faced discrimination during colonial rule. Lasker (1977, 292) describes how an emphasis on French medical training prohibited Ivorians from entering certain jobs and tasks. It becomes clear from Figure 11 that in the years before the outbreak of WWII, the vast increases in medical staff (Figure 8) were in fact driven by the hiring of Ivorians to fill different roles.

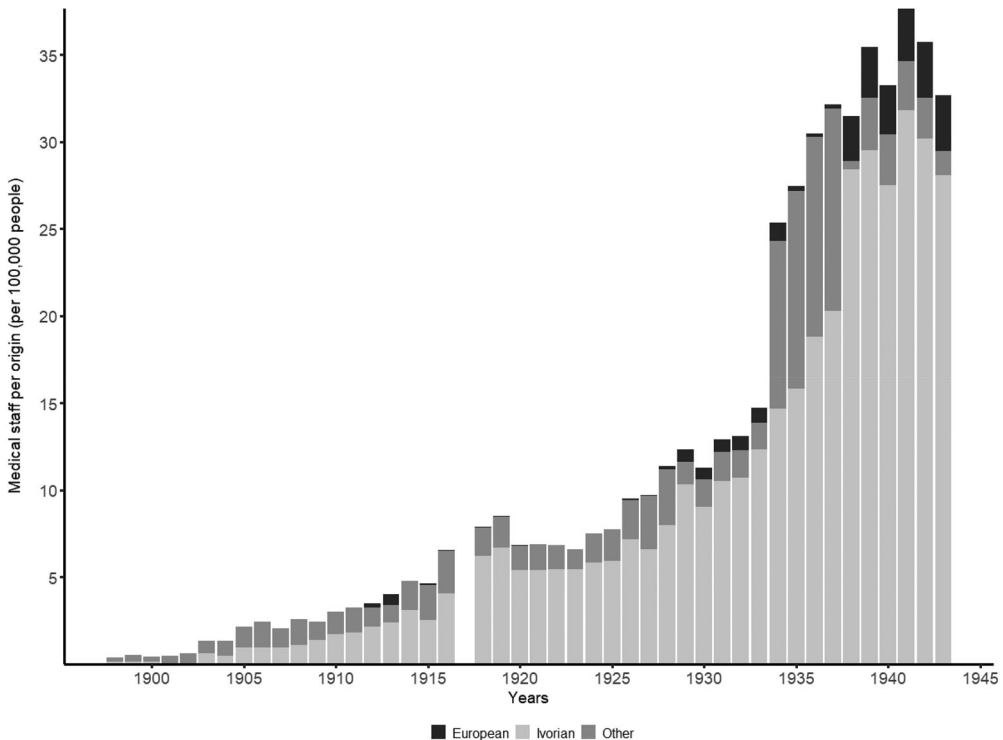


Figure 11. Colonial medical staff by origin (per 100,000 people) in Côte d'Ivoire: 1897–1942. Data sources: Côte d'Ivoire Local Budgets (1897–1942).³⁶

³⁶In 1933–35 the number of ‘other’ medical staff increases substantially. This category is mainly composed of medical staff with an undefined origin. During these years the local budgets remain unclear about the nationality of staff members in various categories. However, it seems plausible that a portion of these ‘other’ staff members were in fact Ivorians. The medical reports do not mention a major influx of European medical staff (or other nationalities) for these years. Moreover, the years before and after this period show that a considerable portion of the medical staff was Ivorian.

Although the information in the Gold Coast medical reports included many positions not defined by nationality, previous research suggests a different picture for Ghana. Despite the employment of African medical personnel by the end of the nineteenth century, racism played a major role in impediments for Africans to enter the colonial medical staff in the first half of the twentieth century (Patterson 1981, 13). At its introduction in 1902, the West African Medical Service was formally restricted to people of European descent (Patterson 1981, 13), making it the only explicitly racist department at the time among all British colonies (Johnson 2010, 237). Even as more Africans became qualified doctors by the 1930s, only few ended up becoming part of the colonial medical department in Ghana (Addae 1996, 207). Those who did, experienced worse employment conditions including lower salary scales, and were put on separate staff lists until the late 1940s (Patterson 1981, 14; Addae 1996, 217). A British colonial policy shift in the 1950s allowed Ghanaians to take up more prominent roles in the colonial health care services, fulfilling more senior functions such as principal medical officer (Addae 1996, 218).

7. Patients and consults

This section presents a short analysis of the number of patients treated by the colonial health care provision in Ghana and Côte d'Ivoire. The data available in the colonial reports for Côte d'Ivoire does not allow for a year-by-year comparison of patient data with Ghana. Therefore, this section starts by reviewing the number of patients treated within colonial health care facilities³⁷ in Ghana using a new dataset of annual patient figures. Subsequently, a brief review based on qualitative sources supplemented with some newly transcribed quantitative data depicts the situation in Côte d'Ivoire.

The Gold Coast medical reports mention patient data for almost all years. These figures include in- and outpatients treated in colonial hospitals and dispensaries. By distinguishing between types of patients, the data reflects part of the structure of colonial health care provision in Ghana. Inpatients refers to patients treated inside a health facility, who were required to stay overnight. The majority of inpatients were treated in hospitals, but some dispensaries also had a couple of beds available for this type of patient. In contrast, outpatients came in for treatment at health facilities, but were not admitted to wards. Most outpatients were treated in dispensaries, but more serious cases were referred to colonial hospitals (Patterson 1981, 17).

Figure 12 shows that the number of patients treated per capita in colonial hospitals and dispensaries was relatively low in Ghana at the start of the twentieth century. The presence of health care facilities and colonial health care policy provide two explanations for this observation. Few colonial health facilities were established at this time, and the existing facilities were spread unevenly across the country (Figure 5). As a consequence, few people had access to health care provided by the colonial administration (Patterson 1981, 18). Moreover, previous literature has found that the focus of colonial health care lay on providing care to Europeans resident in colonies at the beginning of colonial rule, even

³⁷As discussed more elaborately in the Data section, this data includes only information on the colonial health care facilities and does not capture other health care providers such as missionary care present in the two countries during colonial rule.

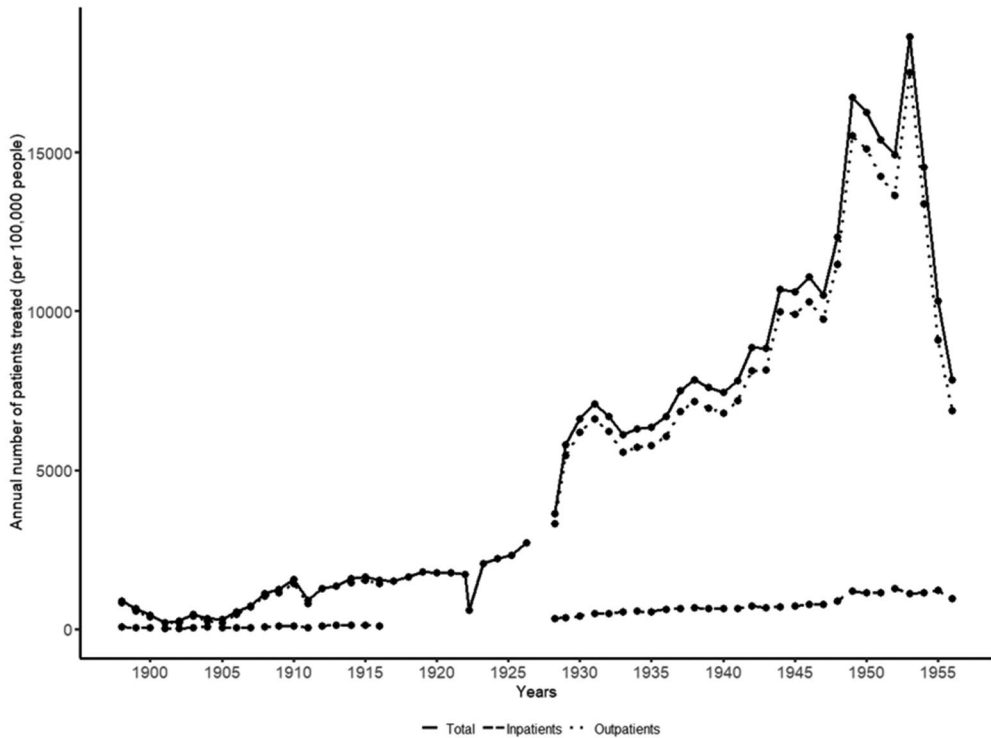


Figure 12. Total, in- and outpatients treated (per 100,000 people) in colonial hospitals and dispensaries in Ghana, 1897–1955. Data sources: Gold Coast Annual Medical Reports (1897–1955).

though non-European patients were sometimes cared for (Lasker 1977, 280; Headrick 1994, 47; Iliffe 1998, 27). Since the number of Europeans was relatively small (about 1900 people in 1905; Gold Coast AMR 1905, 2), few colonial health care facilities were required to meet this goal. As a result, the number of patients (per capita) treated by colonial health care provision can be expected to have remained low during the first decades of the twentieth century.

From the 1930s onwards, the number of outpatients treated started to rise rapidly, which translated into a rise in total patients per capita (Figure 12). The total number of patients treated per colonial health care facility increased to over double their number in 1905 (Table A3). An increase in the absolute number of patients is noted in the medical report of 1933–34, which provides three explanatory circumstances. The willingness to be treated by colonial health care provision had increased among Ghanaians, as a result of the spread of education (Gold Coast AMR 1933–34, 4). In addition, improvements in the transportation network allowed medical officers to be more mobile (Gold Coast AMR 1933–34, 4). Lastly, medical officers were said to have ‘willingly undertaken far greater burdens’ than before due to the previous two factors (Gold Coast AMR 1933–34, 4). The observed increasing pattern in Figure 12 also coincides with the shift in British colonial policy towards social development during this time, as formalized by the Colonial Development Act of 1929.

The increase in outpatients treated per capita accelerated after WWII (Figure 12). Paterson (1981, 17) notes that the number of colonial dispensaries rose considerably in the

period from 1939 to 1952 (from 28 in 1939 to 124 in 1952). The number of total (out)patients treated increased accordingly, until hitting a peak in 1952 (Figure 12; at 18,224 patients per colonial health care facility; Table A3). This finding concurs with global strides in Western biomedicine, where new drugs (e.g. penicillin) and vaccinations (e.g. against yellow fever) were discovered and distributed as of the 1940s (Acemoglu and Johnson 2007, 935). A shift in ‘universal values’ meant that developments in health technology in one country were quickly transmitted globally, according to Preston (1975, 243). These developments also reached African countries; penicillin, for example, was tried in the 1940s in Ghana (Gold Coast AMR 1944, 4), and was used widely in colonial health care provision by 1953 (Patterson 1981, 78–79). Developments in Western biomedicine could thus lead to increases in the number of patients treated in African colonies.

From 1953 to 1955, patient levels declined drastically, putting 1955 at the same level of total patients treated by colonial health care provision as about a decade earlier. Part of this drop can be explained by a departmental policy change in the early 1950s, which implied an increased focus on MFUs (Patterson 1981, 25–26). As of 1953 these MFUs ‘saw the beginning of a fuller development’ (Gold Coast AMR 1953, 31), and examined and treated many cases³⁸ of diseases, such as sleeping sickness, yaws, and leprosy (Gold Coast AMR 1953, 32–37). These figures do not seem to be counted in the official patient data used for Figure 12, although the reports for these years are vague on who is included in the numbers.

Throughout the first half of the twentieth century, the number of inpatients (per capita) treated remains relatively stable (Figure 12), and accounts for only a small portion of the total patients treated by colonial health care provision (on average about 8.5%). Colonial medical reports discuss that Ghanaians tended to avoid inpatient care, unless deemed absolutely necessary, due to the food provided in colonial health facilities and the lack of communication with family and friends (Gold Coast AMR 1913, 8). Patterson (1981, 19) also points out that overcrowding was a major and continuous problem in colonial hospitals, with only the most serious cases being admitted to inpatient care.

Information on patients treated by colonial health care provision in Côte d’Ivoire is much less complete. Nevertheless, Tables A4 and A5³⁹ in the Appendix report some figures based on new data. Since patient data is missing for 1907–17, Table A4 reports the number of consults during this period. This figure concerns only the consults at the AMI, as the total is unavailable. Table A5 presents the total number of consults and patients in colonial health care facilities for 1931–40.

Trend wise, the number of consults by the AMI increases considerably over the period 1907–17 (Table A4). Three factors explain this trend. During the early period of colonial rule, colonial health care was restricted mostly to the French present in Côte d’Ivoire, but around 1910 the imperative to provide health care to the local population became stronger (Lasker 1977, 281). During the 1910s, medical expenditures per capita also slowly rose (Figure 2), with medical expenditures taking up an increasing share of total expenditures (Figure 1). Finally, towards the 1920s, the number of colonial health care facilities started to rise (Lasker 1977, 281), which allowed more patients to be treated.

³⁸For example, a total of 243,816 persons were seen in field surveys in the regions North-West, Northern Territories and Ashanti in 1953 (Gold Coast AMR 1953, 32).

³⁹Data for these figures again concern only colonial health care provision, not including e.g. missionary care. See the Data section.

A rapidly increasing trend in the numbers of consults and patients treated in colonial health care facilities is found for the period 1931–40 (Table A5). This concurs with increases in expenditures on medical services (Figure 2) and considerable increases in the number of health facilities during this period (Table A2; Figure 7; Lasker 1977, 286). The data also allows for an analysis of the share of European patients (Table A5, figures in brackets). Worth noting is that European patients make up a comparatively small part of the total patient figures treated in colonial health care facilities during this time (on average 0.40% of total patients for 1932–40). However, the share of European inpatients in total inpatients is considerably larger (on average 7.2% of the total number inpatients for 1931–40).

Comparing the figures on Ghana and Côte d'Ivoire with respect to British and French colonial policy is complicated by the lack of data on the latter country. However, summarizing the findings of this section shows that the development of the number of patients treated in both colonies is indicative of a similar trend in the two countries. The number of patients treated in colonial health care facilities starts out low at the beginning of the twentieth century, with figures rising (rapidly) towards the end of colonial rule following changes in colonial policy and developments in Western biomedicine. This increasing trend in patient figures is also found by Doyle, Meier zu Selhausen and Weisdorf (2020) for a mission hospital in Uganda, suggesting that demand for European medicine in general rose towards the mid-twentieth century in African countries.

8. Conclusion

Various types of social infrastructures introduced by colonial administrations in Africa have received academic attention, including research on health care. New data transcribed from colonial reports has allowed this paper to study four aspects of colonial health care provision introduced by the British and French colonial administrations in Ghana and Côte d'Ivoire during the first half of the twentieth century. In doing so, British colonial health care policy in Ghana is compared to French colonial health care policy in Côte d'Ivoire. Moreover, this paper has researched the expansion and development of colonial health care policies and colonial health care provision within these two countries over time.

Colonial health care expenditures per capita have been shown to be higher in Ghana than in Côte d'Ivoire during almost all years from 1897 to 1955. Health care expenditures as a share of total expenditures were more similar between the two countries, although the share was found to be lower in Côte d'Ivoire than in Ghana for a majority of the years. Health care expenditure patterns were influenced by worldwide economic shocks such as WWI and WWII and the Great Depression, but also by differences in British and French colonial policy relating to overall fiscal capacity and varying priorities within budgets allocated to health care in the two colonies.

Information on subcategories of the budget allocated to health care provided further insights into colonial fiscal policy on health care. The structure of the colonial health care services in Ghana is reflected in the budget. A distinction was made among three branches. During the first decade, the MB was prioritized in terms of budget. After 1910, the shares of budget allocated to the MB and the SB started to converge rapidly, before somewhat diverging again after 1925. The MR received

comparatively little funding throughout its existence. The budget for Côte d'Ivoire only distinguished between expenditures on staff and equipment. Expenditures on staff form the largest share of total expenditures on health care in nearly all years from 1897 to 1942. As the number of colonial health care facilities rose over time following a shift in French colonial policy, expenditures on *matériel* took up an increasing share of the budget.

Colonial health care facilities were found to be few in 1905, and the geographical distribution differed between Ghana and Côte d'Ivoire. Facilities in Ghana were concentrated in the south, while the network of colonial health care facilities in Côte d'Ivoire reached farther north. By 1931, the colonial health care network had expanded considerably in both countries, and the difference in geographical distribution became less prominent. Towards the end of colonial rule, the number of facilities in Côte d'Ivoire continued to rise. In contrast, the number of health care facilities decreased in Ghana, in part due to the 1944 abolition of British colonial policy that separated hospitals for Europeans and Africans (Patterson 1981, 17). Access to health care remained unequal, however: several colonial districts in Ghana still lacked colonial health care facilities by 1952, while in Côte d'Ivoire all districts already had access to at least one facility in 1931. Results also indicate that by the final decades of colonial rule, the majority of the health care infrastructure of Ghana was composed of colonial hospitals. In Côte d'Ivoire, hospitals accounted for only a small part of the colonial health care facilities, as a result of a French colonial policy change in 1926.

Section 6 showed that a substantially larger number of colonial medical staff was employed in Ghana compared to Côte d'Ivoire by the end of the nineteenth century. During the first decades of the twentieth century, nurses formed the majority of the colonial medical workforce in Côte d'Ivoire, following French colonial policy measures focusing on the employment of nurses. The division of labour in medical staff in Ghana was more diverse. Both countries display a relatively low but steady increasing trend in the total number of colonial medical staff per capita until 1920, with Côte d'Ivoire somewhat catching up to Ghana.

Conditions changed in both countries during the 1920s and 1930s. In line with Lasker (1977) and Domergue-Cloarec (1986), I find that the medical staff base began to increase substantially as colonial health care policy changes occurred in Côte d'Ivoire. For Ghana, the Great Depression, the introduction of the Colonial Medical Service and the outbreak of WWII imposed staff cuts and recruitment issues, causing the upward trend to slow, and to halt by the mid-1930s. Consequently, a larger number of colonial medical staff (per capita) was employed in Côte d'Ivoire than in Ghana at the eve of WWII. While medical officers, nurses and other medical staff accounted for similar shares of the workforce in Ghana, nurses formed the majority of the medical staff in Côte d'Ivoire.

Section 6 also discussed how the involvement of African medical staff differed between Côte d'Ivoire and Ghana. New data showed that hiring Ivorian staff was already common by the early twentieth century. From the mid-1910s onwards, the majority of the colonial medical staff was Ivorian. The vast increases in the colonial medical staff (per capita) in Côte d'Ivoire during the decades leading up to WWII were found to be driven by the hiring of Ivorians. Conversely, previous literature has showed that it took until the 1940s and 1950s for Ghanaians to take up a more substantial role in the colonial medical staff, having faced racism throughout the previous decades.

Lastly, results indicate that the annual number of patients treated in colonial health care facilities in Ghana started to increase rapidly in the late 1920s. After accelerating around 1940, the total number of patients treated reached a peak in the 1950s. This increase was mostly driven by the rising number of outpatients. Unfortunately, the data available for Côte d'Ivoire in the colonial reports is limited and not without problems. A full comparison with the patient data on Ghana is therefore impossible. However, an analysis of the available data on consults and patients seems to point towards a similar trend in the two colonies: after an initial low number of consults and patients in colonial health care facilities at the start of the twentieth century, the figures increase rapidly towards the final decades of colonial rule, following changes in colonial policy and Western biomedicine.

To what extent was colonial rule able to positively contribute to the overall health conditions in Ghana and Côte d'Ivoire? The findings in this paper show that colonial health care provision expanded over time, especially after colonial policy changes in the 1920s and 1930s. Despite these improvements over time, access to colonial health care remained limited and unequally distributed in both colonies. Colonial health care provision was unable to meet the complete health demands of the population throughout the period (Lasker 1977, 286; Patterson 1981, 12, 16, 18). It was also characterized by disparities. At independence, geographical access in Côte d'Ivoire was uneven: residents in the south of Côte d'Ivoire and in rural areas were favoured in terms of access to health facilities (Figure 7; Lasker 1977, 288). Discrimination based on class or race also translated into health inequalities by the end of colonial rule (Lasker 1977, 289–290). Similar forces were in play in Ghana (Figure 7; Patterson 1981, 12–13, 18–19).

At a higher level, this research shows that health care provisions are a key element in analysing the effect of colonial rule on social development in Africa. An important objective in future research might be to focus on disentangling whether colonizers followed different models throughout Africa and beyond, and whether the health care system at home influenced their decisions.⁴⁰ A more salient result is that even two countries as relatively similar as Ghana and Côte d'Ivoire (apart from their colonial history) show different trajectories of colonial health care provisions. One would expect that differences would be even greater in other parts of the respective colonial empires (including Asia) where local conditions are not quite as similar. As a consequence of the observed difference in colonial health care provisions, Ghana and Côte d'Ivoire had different starting points in health care after independence. This finding and its implications for other former colonies is relevant for the future research agenda.

⁴⁰Future research could also study the overall health system in African colonies, which is outside the scope of this paper (as discussed previously). Building on the results in this paper, it can be hypothesized that adding missionary care to the analyses would not lead to major changes in the findings, as the role of missionary health care was small in Ghana and Côte d'Ivoire (at least in the first few decades of colonial rule). In this respect, Ghana especially deviates from the pattern observed in other British colonies, where missionary health care played a greater role. The inclusion of other types of health care provision, in particular traditional medicine, could provide supportive evidence that the health system in African countries under colonial rule was of a pluralist nature: health care services managed by colonial administrations and traditional medicine were complementary aspects in the overall health care system. Future research could focus on further disentangling this system.

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Appendix

A. Additional graphs and tables

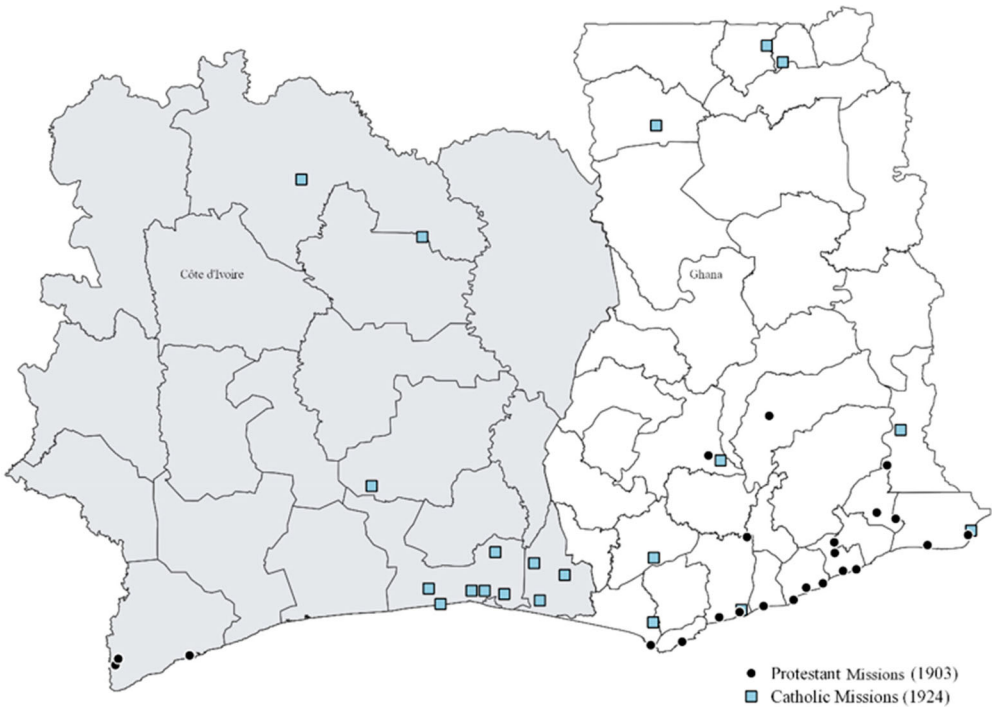


Figure A1. Locations of Protestant (1903) and Catholic (1924) missions in Ghana and Côte d'Ivoire, all without a mission hospital. Data source: Cagé and Rueda (2016, 2020).

Table A1. Testing for structural breaks in deflated annual medical expenditures per capita.

Test	Côte d'Ivoire	Ghana
H_0 : no breaks, H_1 : $1 \leq s \leq 5$	Test statistic: UDmax(τ) = 138.35, estimated break point at 1929	Test statistic: UDmax(τ) = 73.58, estimated break points at 1910 and 1947
H_0 : no breaks, H_1 : $1 \leq s \leq 5$ HAC consistent estimator	Test statistic: supW(τ) = 46.55, estimated break point at 1929	Test statistic: supW(τ) = 45.80, estimated break points at 1910 and 1947

Table A2. Total number of colonial health care facilities in Ghana and Côte d'Ivoire, 1905–52. Data sources: Gold Coast Annual Medical reports (1905, 1931–32, 1952); Côte d'Ivoire *Rapport Annuel du Service de Santé* (1905); Côte d'Ivoire (1931, 1940).

Year	Country	Total number of colonial health care facilities (per 100,000 people in parentheses, rounded to two decimal places)
1905	Ghana	11 (0.38)
	Côte d'Ivoire	10 (0.70)
1931	Ghana	86 (2.22)
	Côte d'Ivoire	53 (2.87)
1940	Côte d'Ivoire	66 (3.15)
1952	Ghana	57 (1.02)

Table A3. Total number of patients per total number of colonial health care facilities in Ghana, 1905–52. Data sources: Gold Coast Annual Medical Reports (1905, 1931–32, 1952).

Year	Total number of patients (in- and out-patients) per total number of colonial health care facilities (rounded to two decimals)
1905	1,453.18
1931	3,012.41
1952	18,224.33

Table A4. Côte d'Ivoire: Consults Assistance Médicale Indigène (AMI), 1907–17. Data sources: Côte d'Ivoire *Rapport Annuel d'Ensemble* (RAE) (1911); Côte d'Ivoire Annual Medical Reports (1911, 1912, 1916–17).

Year	Total number of consults at AMI
1907	40,227
1908	74,284
1909	114,812
1910	100,170
1911	-
1912	512,456
1913	563,878
1914	492,701
1915	498,816
1916	569,835
1917	588,530

Table A5. Côte d'Ivoire: Total consults, *entrants* (in-patients) and *consultants* (patients) treated in colonial health care facilities, 1931–40 (% European consults/patients out of total in parentheses, rounded to two decimal places). Data sources: Côte d'Ivoire Annual Medical Reports (1931–37, 1939); Côte d'Ivoire *Rapport Annuel du Service de Santé* (1938, 1940).

Year	Consults	Entrants	Consultants
1931	-	1,423 (3.79%)	30,955 (0.05%)
1932	802,869 (0.00%)	3,324 (14.02%)	184,834 (0.49%)
1933	1,127,973 (0.40%)	3,827 (8.96%)	263,237 (1.10%)
1934	1,154,960 (0.51%)	4,875 (8.16%)	290,352 (1.35%)
1935	2,218,761 (0.43%)	9,395 (6.54%)	552,420 (0.94%)
1936	3,637,147 (0.24%)	10,699 (6.15%)	962,515 (0.53%)
1937	3,355,645 (0.42%)	14,048 (6.01%)	922,502 (0.44%)
1938	4,024,594 (0.48%)	15,354 (6.08%)	1,075,924 (0.38%)
1939	3,905,857 (0.59%)	20,241 (7.04%)	1,109,268 (0.33%)
1940	4,790,666 (0.55%)	27,527 (5.38%)	1,271,483 (0.41%)

B. Data appendix

B1 Overview

*Finance.*⁴¹ For Ghana, I obtained expenditures on medical services by the colonial administration from colonial medical reports (Gold Coast Annual Medical Reports, 1897–1955). I supplemented this data with data transcribed from the Gold Coast Blue Books (1897–1939) for years with missing information. Total expenditures by the colonial administration and the subcategories of medical expenditures were transcribed from the same sources.

For Côte d'Ivoire, I obtained expenditures on medical services from various years of the *Budget du Service Local* (1897–1946).⁴² I transcribed the data on total expenditures and subcategories of medical expenditures from the same source. I supplemented the data on total expenditures with data from the *Annuaire Statistique de l'Afrique Occidentale Française 1950–1954* for 1947–1951.

Apart from these newly transcribed time series, I also used several other datasets in the section on finance. As mentioned previously, I use Feinstein's (1972) deflator for Ghana, and Villa's (1994) deflator for Côte d'Ivoire, when deflating using consumer price indexes. I subsequently use the 1913 exchange rate from London and Cambridge Statistical Service (1973) and the African population estimates of Frankema and Jerven (2014) to obtain per capita figures in francs.

Health care facilities. For Ghana, information on 1905, 1931 and 1952⁴³ was transcribed from the corresponding Gold Coast Medical Reports. For Côte d'Ivoire, information on 1905 was transcribed from the *Rapport Annuel du Service de Santé*. The locations for 1931 and 1940 were transcribed from the corresponding local budgets. In addition to these new datasets, I use a subset of Müller-Crepon's (2020a; 2020b) data⁴⁴ on various colonial districts in Africa as a base map for districts in Ghana and Côte d'Ivoire during colonial rule.

Staff. The data on colonial medical staff⁴⁵ in Ghana were transcribed from the Gold Coast Medical Reports. For Côte d'Ivoire, the *Budgets du Service Local* were used.⁴⁶ To get per capita figures, I again use the African population estimates of Frankema and Jerven (2014).

⁴¹Future research on colonial health care expenditures based on this dataset may study several matters following this paper's findings. Firstly, research may assess whether the difference between direct and indirect colonial rule plays a role in explaining the higher level of expenditures on health care in Ghana, or whether other factors, such as priority given to other budget categories and/or importance attributed to health care under different colonizers may explain this finding. Secondly, one could examine whether it is correct that administrative costs took up a larger share of the total colonial budget in Côte d'Ivoire (due to its indirect colonial policy), by analysing the shares for all categories of colonial expenditures (including health care expenditures) for both Ghana and Côte d'Ivoire.

⁴²Due to the structure of the French colonial budgets in Côte d'Ivoire, expenditures on medical services fell under the local budget. This budget financed all colonization expenses in the colony, including health expenditures (Huillery 2009, 181–182). The other two budgets – the budget of the French Ministry of colonies and the federal budget of French West Africa – concerned only military expenses and expenditures relating to large public works (Huillery 2009, 181–182).

⁴³These benchmarks were chosen for different reasons. For 1905, representing the early period of colonial rule, data availability was the main factor, as it is the first year for which both countries had an overview available. The year 1931 was selected to represent the more or less mid-way point of colonial rule. The last map (Figure 7) concerns 1940 for Côte d'Ivoire and 1952 for Ghana, which were the last years that provided full overviews on health care facilities in the colonial reports.

⁴⁴Müller-Crepon (2020a, A10) uses Huillery's (2009) data on districts for Côte d'Ivoire, and transcribed information from British War Office documents to obtain districts in Ghana under colonial rule. His dataset reports district borders in Côte d'Ivoire for 1925, and in Ghana for 1927 (Müller-Crepon 2020a, A10).

⁴⁵The colonial medical reports provide annual staff lists for the staff employed in the Medical Branch, including medical officers, nurses and support staff. The data on medical officers concerns all staff members classified as some type of medical officer. The majority is composed of 'Medical Officers' but the data also includes e.g. senior and provincial medical officers.

⁴⁶Future research might focus on the difference in accuracy and consistency in recording European vs. African medical staff. For example, one could measure total salaries paid to European medical staff, and compare this to total medical expenditures on personnel, to assess whether the remaining funds could have been enough to support the listed number of African medical staff. This analysis could also provide a way to give insights in the potential size of the African staff base in Ghana.

Patients. The figures on in- and outpatients,⁴⁷ and the total number of patients for Ghana were transcribed from the Gold Coast Medical Reports. The data on consults and patients for Côte d'Ivoire were transcribed from the *Rapport Medical Annuel: Côte d'Ivoire* and the *Rapport Annuel d'Ensemble: Côte d'Ivoire*.⁴⁸ I also use the population estimates by Frankema and Jerven (2014) to transform the data in per capita terms.

B2 Expenditures data and structural break analysis

Expenditures. As mentioned before, the newly gathered data on colonial health care expenditures needs to be denominated in the same currency and deflated. Cogneau, Dupraz and Mesplé-Somps (2018, 16) explain that no systematic overview of African consumer price indexes exists. For French former colonies in particular, the data available in primary sources is too scarce to allow for a construction of a CPI (Cogneau, Dupraz, and Mesplé-Somps 2018, 16). Cogneau, Dupraz and Mesplé-Somps (2018, 16) propose the use of British and French CPIs during the period of colonial rule as an alternative. Based on their argument, British and French CPIs are valid proxies for missing African CPIs, if one assumes that differences in inflation between Côte d'Ivoire and France, and between Ghana and the UK were moderate. This assumption is reasonable for periods during which no wars took place, but might not hold during WWI and WWII (Cogneau, Dupraz, and Mesplé-Somps 2018, 16). Using Feinstein's (1972) deflator for Ghana, and Villa's deflator (1994) for Côte d'Ivoire, I first rebase and deflate the new time series on colonial health care expenditures. Next, I use the 1913 exchange rate from London and Cambridge Statistical Service (1973) to convert the British figures to francs. I divide this data by the African population estimates of Frankema and Jerven (2014) to obtain the time series presented in Figure 2: deflated colonial health care expenditures per capita in francs.

Structural breaks. In order to dissect the trends of Figure 2 further, I test for structural breaks. I use the `xtbreak` package and method suggested by Ditzen, Karavias and Westerlund (2020, 2021).⁴⁹ Three missing values are present in the time series for Côte d'Ivoire (for the years 1916, 1943 and 1944). To prevent the package from deleting their corresponding rows, I replace these missing values with the last available observation.⁵⁰ The number of structural breaks is unknown. The package allows for a maximum of five possible structural breaks, and I therefore test H_0 : no breaks against H_1 : $1 \leq s \leq 5$, with s being the number of structural breaks. I follow the method suggested by Ditzen, Karavias and Westerlund (2020, 19, 21) to obtain heteroskedasticity and autocorrelation robust estimates.

⁴⁷For various reports, the type of facility is not mentioned specifically. However, since a column in the tables often mentions the number of patients 'remaining in hospital' for the specific year (e.g. Government of the Gold Coast AMR 1936, 73), and the structure has remained the same throughout, it seems safe to assume that all documents report figures on patients treated in hospitals and dispensaries. This is supported by a summary of figures for several years in the 1932 medical report, which are attributed to the 'government hospitals and dispensaries' (Government of the Gold Coast AMR 1932, 4), and correspond with the transcribed data used.

⁴⁸The medical reports on Côte d'Ivoire only sporadically report the number of patients treated (for several years in the late 1900s to the early 1910s and in the 1930s). Unfortunately, even for years which include patients treated, the data is too patchy to be used in a year-by-year comparison with the data for Ghana. Problems include changes in the level of facility reported, lack of information on where these patients were treated, and changes in structure of the reported figures.

⁴⁹I opt for the package and method by Ditzen, Karavias and Westerlund (2020, 2021) as it provides an easy way to test for unknown structural breaks in a time series in Stata. This package is based on tests proposed by Bai and Perron (1998, 56–58), who extend Andrews' (1993) test to include multiple unknown structural breaks and provide critical values.

⁵⁰I use this method as only few values are missing, and it is an easy way to deal with this. For example, I replace the missing value for 1916 with the observation for 1915.