

Sources, determinants and utilization of health workers' revenues: evidence from Sierra Leone

Maria Paola Bertone^{1,2,*} and Mylene Lagarde³

¹Department of Global Health and Development, London School of Hygiene and Tropical Medicine, London, UK

²ReBUILD Research Consortium and ³Department of Global Health and Development, London School of Hygiene and Tropical Medicine, London, UK

*Corresponding author. 15-17 Tavistock Place, London WC1H 9SH, UK. E-mail: maria.bertone@lshtm.ac.uk

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Abstract

Exploring the entire set of formal and informal payments available to health workers (HWs) is critical to understand the financial incentives they face and devise effective incentive packages to motivate them. We investigate this issue in the context of Sierra Leone by collecting quantitative data through a survey and daily logbooks on the incomes of 266 HWs in three districts, and carrying out 39 qualitative in-depth interviews. We find that, while earnings related to the HWs official jobs represent the largest share, their income is fragmented and composed of a variety of payments, and there is a large heterogeneity in the importance of each income source within the total remuneration. Importantly, each income has different features in terms of regularity, reliability, ease of access, etc. Our analysis also reveals the determinants of the incomes received and their level based on individual and facility characteristics, and finds that these are not in line with HRH policies defined at national level. Additionally, from their narratives, it emerges that HWs are 'managing', in the sense both of 'getting by' and of enacting financial coping strategies, such as mental accounting (spending different incomes differently), income hiding to shelter it from family pressures, and re-investment of incomes to stabilize overall earnings over time, in order to ensure their livelihoods and those of their families. These strategies question the assumption of fungibility of incomes and the neutrality of increasing or regulating one rather than another of them. Together, our findings on earning and income use patterns have important policy implications for how we go about (re)thinking financial incentive strategies.

Key words: Human resources, incentives, income use strategies, income hiding, mental accounting, Sierra Leone

Key messages

- This study describes the incomes of primary health workers in Sierra Leone and finds that salaries make up about 60% of the total revenues, while the rest is composed by a variety of formal and informal incomes.
- Health workers' narratives reveal that the satisfaction related to the incomes does not depend only on their amounts, but also on non-financial features. Based on these features, health workers choose to assign incomes to different uses.
- These findings have policy implications for designing incentives as they call for more attention to the earning opportunities for health workers beyond formal allowances, and to the HWs own perspectives which question the assumption of income fungibility.

Introduction

In recent years, there has been an increased attention to the determinants of health workers' (HWs) motivation, and in particular the role of financial incentives (Willis-Shattuck *et al.* 2008). Some countries in sub-Saharan Africa have embarked on reforms to increase salary levels (Mueller *et al.* 2011), while new incentives such as performance-based financing are increasingly introduced (Witter *et al.* 2012). In some settings, remunerations from external sources, such as salary supplementations ('top-ups') and per diems from aid agencies, are thought to account for an important part of HWs' income (Ferrinho and Van Lerberghe 2000; Vian *et al.* 2013). Moreover, given the weak regulatory capacity of governments and the presence of informal healthcare markets in many low-income settings (Ensor and Witter 2001), HWs often engage in various other activities, including private practice, non-health activities such as trading or agriculture, informal fees requests and illegal sale of drugs (Roenen *et al.* 1997; Ferrinho and Van Lerberghe 2000). The existence of multiple sources of income, that we termed 'complex remuneration', creates a multifaceted set of incentives which may affect the motivation and performance of HWs in several ways (Bertone and Witter 2015a).

A comprehensive approach to the study of financial incentives is essential to describe the income of HWs and the relative and absolute level of each of the income components, beyond those received for their official job. However, with some exceptions (McCoy *et al.* 2008), few studies look at the entire set of earnings, and little is known about the individual and facility characteristics associated with the fragmented income structure and with the variability in income levels, or about the implications of such fragmentation in terms of HWs' views and relative satisfaction with the different components of their income. From a policy perspective, taking into account the full set of incomes of HWs is essential in order to design effective incentive packages. These issues are particularly critical, and even less studied, in post-conflict settings where the fragmentation of the health system and the presence of many, often uncoordinated, actors at local level may determine the multiplication of payment sources.

In this paper, we look at the case of healthcare providers working in public primary care facilities in three districts in Sierra Leone. Using a quantitative survey, the study aims firstly at describing the level of each source of income, and their relative importance. We then model the determinants of the incomes received to explore which factors, at individual and facility level, affect them. Finally, we explore the HWs' perceptions about each of the revenues, and how incomes are relevant to them, beyond the amount. By exploring the HWs' narratives on income use, we also investigate their financial coping strategies and the role that the different incomes play in those.

Context

After a decade of armed conflict and social and economic unrest, Sierra Leone has been rebuilding its health system since 2002. In order to increase the demand for health services and improve health outcomes, user fees for maternal and child health services were removed in April 2010 (Donnelly 2011). Given the low number of HWs (in 2011, there were an estimated 0.071 doctors and 0.631 nurses per 1000 people in the public sector) and their uneven distribution (Witter *et al.* 2016), with the launch of the Free Healthcare Initiative (FHCI), a series of reforms were designed and implemented to address the issues of distribution, retention and

motivation of the health workforce (Bertone *et al.* 2014). These reforms included the cleaning of the Ministry of Health (MoH) payroll to eliminate 'ghost workers' and add those working without salary, a salary increase and a one-off fast-track recruitment and deployment process to increase workers in rural areas. In 2011, a performance-based financing (PBF) scheme was launched which includes bonuses for individual staff based on facility performance, and in 2012 a remote allowance for those working in rural posts was introduced. In parallel, donors and most NGOs adopted measures to ensure the alignment and rationalization of the HWs' incentive package, in particular, by abolishing salary top-ups linked to vertical programs and disease-specific activities (e.g. HIV/AIDS services).

However, these reforms have only been partially implemented and many challenges remain (Witter *et al.* 2016). Since the technical assistance to the Payroll Unit ended, the MoH payroll is increasingly imprecise. An external verification of the PBF scheme, carried out in April 2014, reported delays of more than one year in the payment of PBF bonuses (Cordaid 2014). As for the remote allowance, payments stopped by the end of 2012 because of cash-flow issues (Bertone *et al.* 2014). Moreover, the implementation of policies relies on NGOs at district level, whose presence varies considerably for geographical coverage and service/disease focus. Among the three districts where the research was carried out (Bo, Kenema and Moyamba, all in the southern part of Sierra Leone), Moyamba is the most rural and poor district. Two main NGOs, focused on nutrition services only, worked there. In Bo, a wealthier and more urban district, several NGOs divided up their activities based on a geographical repartition but not all facilities were supported, and in Kenema few NGOs operated, with the leading one covering all facilities and providing support on a broad range of maternal and child health services (Bertone and Witter 2015b). Additionally, since May 2014, Sierra Leone has been afflicted by an unprecedented Ebola Virus Disease (EVD) outbreak. The epidemic started weeks after the conclusion of fieldwork for this research so that this paper reflects the situation as it was before the epidemic. However, there is emerging evidence that the EVD outbreak may have emphasized the fragmentation of HWs' remuneration.

Methods

Study design

This is a mixed-methods study carried out in three districts in Sierra Leone, which were purposefully chosen to allow for variation in number of NGOs, as well as level of poverty, urbanization and type of facilities—that we hypothesized to have an impact on the remunerations of HWs. In the districts, primary quantitative and qualitative data were collected at individual HW level. Ethical clearance was obtained from the London School of Hygiene and Tropical Medicine and the Sierra Leone Ethics and Scientific Review Committee.

Quantitative data

Quantitative data were collected between September and December 2013 by a team of ten trained enumerators. A random sample of 198 primary health facilities were chosen, out of the 346 in the three districts. The sample was constructed to include the same number of facilities in each district ($n = 66$) and to include all types of primary healthcare facility, i.e. Community Health Centers (CHC), Community Health Posts (CHP) and Maternal and Child Health Posts (MCHP). Within each facility, enumerators selected 1 or 2 workers (for MCHPs and CHCs/CHPs respectively) who were

clinically qualified and available on the day of the survey. ‘In-charges’ (i.e. managers of facilities) were interviewed before other qualified cadres. A total of 266 HWs were interviewed, encompassing two cadres of non-physician clinicians: Community Health Officers (CHOs) and Community Health Assistants (CHAs); two cadres of nurses and midwives; and a cadre of nursing aides (Maternal and Child Health Aides—MCH Aides). For the purpose of the analysis, CHAs and nurses/midwives are grouped together as they have similar grades in the MoH designation plan.

HWs were administered a face-to-face survey that included open-ended questions on the amount received monthly for the following sources of income: salary, remote allowance, individual PBF bonus, share of the user fees charged for non-exempted services, top-ups or salary supplementations, per diems and income-generating activities outside of the health sector. The questionnaire also included questions on demographic information (sex, age, marital status, cadre, education, role within facility, i.e. in-charge or staff) and facility characteristics (type of facility, remoteness level, district). In addition, at the end of the interview, HWs were given logbooks to fill daily for a prospective period of eight weeks. In their logbooks, HWs had to report their activities, as well as revenues earned each day. Each HW was visited by the same enumerator three times over the 8 weeks, and received regular calls and text reminders. We believe that this prolonged relation and the consequent increased trust may have led a higher level of disclosure of informal incomes in the logbooks (Corti 1993). Therefore, to estimate the total income, we added, to the incomes estimated in the survey, data from the logbooks for revenues from illegal sale of drugs, gifts and payments from patients and private practice.

Qualitative data

We conducted two rounds of in-depth interviews in November–December 2013 and March–April 2014, with a sub-sample of 39 HWs purposefully selected among the 266 above. HWs were chosen to reflect a wide variety of views and situations in terms of cadre, but also rural/urban, male/female, type of facility, in-charge/staff and district and to be in line with the mix of health workers in the districts (Table 1). The semi-structured interview guide was iteratively adapted during the rounds of interviews, and interviews were carried out until saturation was reached. The main issues of focus were (1) income sources, and views on level and fairness and (2)

Table 1. Characteristics of respondent sample for qualitative data collection

	CHO (n = 4)	CHA + Nurse (n = 10)	MCH Aide (n = 25)	Total (n = 39)
<i>Gender</i>				
Male	4	3	–	11
Female	–	7	25	28
<i>Age (mean)</i>	32.5	47	40.4	41.3
<i>Type of facility</i>				
CHC	4	5	4	13
CHP	–	4	3	7
MCHP	–	1	18	19
<i>Location</i>				
Urban	3	6	4	13
Rural	1	4	21	26
<i>District</i>				
Bo	3	1	8	12
Kenema	–	4	9	13
Moyamba	1	5	8	14

strategies for the maximization, stabilization and use of income(s), including at individual, household and facility level.

Quantitative data analysis

Income data were converted to monthly equivalents and used to construct the total income of HWs. We calculated the average monthly amount for each income and its importance relative to total income. Then, we estimate two types of multivariate regressions. The first estimates a logistic regression to explore the determinants of the likelihood of receiving each type of income (the dependent variable is equal to 1 if the HW declared to have received some revenue from that particular source in the past month). In the second model, we run a linear regression model to estimate the determinants of the level of each type of income, and total income received (the dependent variables are log-transformed income amounts). For both models, we explore the influence of individual (i.e. gender, age, cadre/qualification, role within facility), as well as facility characteristics (i.e. type of facility, urban/rural, district).

Qualitative data analysis

Qualitative interviews were recorded, transcribed and manually analysed using content framework analysis (Ritchie and Lewis 2003). Qualitative data were explored in complementarity to quantitative data, in a deductive and inductive way, i.e. both to confirm and further explore issues emerging from quantitative analysis (such as, HWs’ views and perceptions).

Results

Health workers’ remuneration: income components and fragmentation

The characteristics of the sample of HWs surveyed are summarized in Table 2. Overall, results show that the monthly income of primary HWs are 164 USD for MCH Aides, 235 USD for CHAs/nurses and 314 USD for CHOs (Figure 1). They also point to the fact that HWs’ remuneration is complex and fragmented, with revenue from official job activities (salary, remote allowance, user fees and PBF) contributing to 71% of total income for CHOs, 66% for CHAs/nurses and 76% for MCH Aides. Governmental salary is the major source of income for public primary healthcare workers, although it represents only slightly more than half of their total income. The second major source of income are the per diems paid by the MoH or external organizations for activities such as attending trainings, taking part in or supervising immunization campaigns. Per diems make up between 15% and 21% of total income depending on the HW cadre. The next most importance source of revenue is PBF bonuses received, providing about 10% of the total income for all cadres, while top-ups seem to represent very limited additional revenue for HWs. Because of the exemptions under the FHCI, user fees also represent a small share of HW revenue (1–3% of total income), with only 27% of HWs declaring to have received revenue from user fees. Similarly, revenues from under-the-counter sale of drugs and other items and private practice represent a negligible proportion of HW income (all <1%). In contrast, although incomes declared as ‘gifts and payments from patients’ may be underestimating the under-the-table payments for health services still illegally charged to patients (as partially documented in Denney and Mallett 2014), the fact that 74% of workers declared to be receiving them and their estimate at 3–5% of total revenues seems to be reliable with reference to another aspect of the relation between HWs and patients/communities. Indeed, it emerged from the interviews that under this category

Table 2. Characteristics of respondent sample for quantitative data collection

	CHO (n = 30)	CHA+Nurse (n = 76)	MCH Aide (n = 160)	Total (n = 266)	Statistical Significance of difference in proportions/means	Test used
<i>Gender</i>						
Male	73%	42%	–	20%	$p < 0.0001$	Chi2
Female	27%	58%	100%	80%		
<i>Age (mean)</i>						
	41.4	40.8	40.9	41	$p = 0.946$	Bonferroni
<i>Role in facility</i>						
In-charge	90%	67%	49%	59%	$p < 0.0001$	Chi2
Staff	10%	33%	51%	41%		
<i>Type of facility</i>						
CHC	97%	51%	16%	35%	$p < 0.0001$	Chi2
CHP	–	42%	29%	30%		
MCHP	3%	7%	55%	35%		
<i>Location</i>						
Urban	30%	32%	21%	25%	$p = 0.106$	Chi2
Rural	70%	68%	79%	75%		
<i>District</i>						
Bo	60%	30%	34%	36%	$p = 0.020$	Chi2
Kenema	20%	44%	32%	34%		
Moyamba	20%	26%	34%	30%		

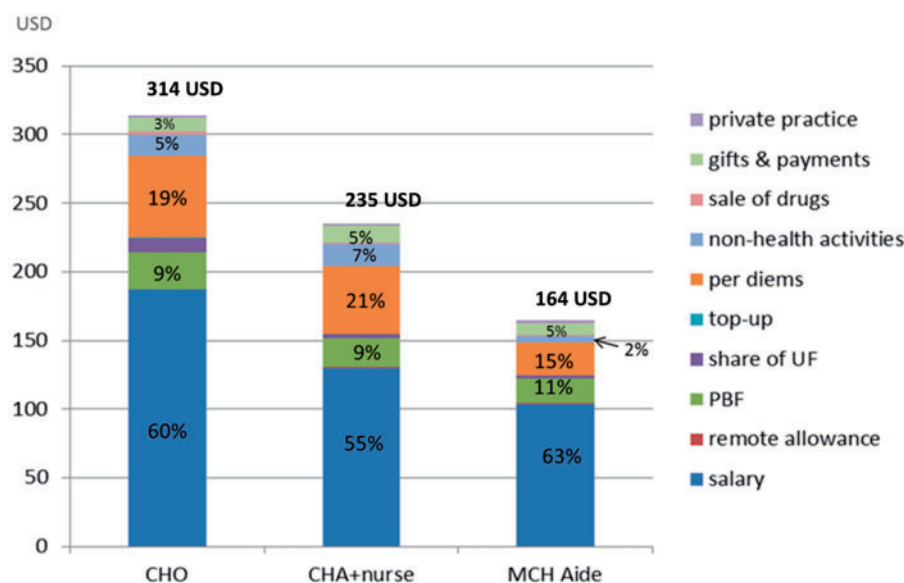


Figure 1. Absolute and relative mean income by cadre and by component. Note: Exchange rate: 1 USD = 4270 Leones (October 2013)

HWs report gifts usually in-kind (rice, palm oil, cassava, yam, charcoal, chicken, etc.) that patients and communities provide them with. Finally, income through activities outside of the health sector (most frequently: farming, small trading and businesses including buying palm oil to resell when prices are higher, or credit groups) represents 2–7% of the income. However, for the 21% of HWs reporting such earnings, they represent a substantial revenue, amounting to 20, 23 and 11% of the total income for CHOs, CHAs/nurse and MCH Aides respectively.

The determinants of remuneration

Beyond the issue of income fragmentation, the analysis of survey data reveals that there is much heterogeneity in total income as well as in the revenue breakdown. To explore whether or not differences are linked to justifiable and observed individual characteristics (e.g.

higher cadres or older HWs earning more) or to HRH policies (e.g. allowances to HWs in rural areas), we estimated a multivariate regression model of the different income levels. Table 3 presents the results of the analysis exploring factors associated with earnings from the main sources of revenue. We find that the odds of earning income from selling drugs are almost 20 times larger for CHOs compared to CHAs/nurses and MCH Aides (col.6). The odds of receiving a salary are 11 times larger (col.1) for in-charges (i.e. the facility managers) compared to staff workers. Their odds of receiving PBF bonus almost 4 times larger (col.2) and odds of receiving gifts from patients 3 times higher (col.7). Being young decreases the likelihood of receiving a salary (OR: 0.206, col.1) but increases the likelihood of taking up income generating activities outside of the health sector (OR: 2.014, col.5). Looking at facility characteristics, those working in CHPs are more likely to receive a salary (OR: 5.702, col.1) and

Table 3. Odds of receiving revenues from a particular source (logistic regressions)

	(1) Received Salary	(2) Received PBF	(3) Received user fees	(4) Received per diems	(5) Received income from non-health activities	(6) Received income from sale of drugs	(7) Received gifts
HW characteristics							
<i>Cadre (omitted category: MCH Aide)</i>							
CHO	n/a	0.413 (0.290)	2.441 (1.793)	0.332 (0.263)	0.276 (0.238)	19.081 (19.033)	*** 0.985 (0.750)
CHA+nurse	0.913 (0.783)	0.348 (0.154)	** 1.966 (0.966)	1.125 (0.535)	0.520 (0.289)	2.128 (1.358)	1.350 (0.683)
In-charge (<i>omitted category: staff</i>)	11.348 (7.627)	*** 3.825 (1.476)	*** 0.878 (0.354)	1.852 (0.757)	2.526 (1.226)	1.384 (0.751)	2.731 (1.139)
Male (<i>omitted category: female</i>)	0.370 (0.353)	1.578 (0.721)	1.801 (0.829)	2.804 (1.641)	2.060 (1.066)	0.221 (0.157)	** 0.296 (0.156)
Aged <35	0.206 (0.103)	*** 0.711 (0.218)	1.694 (0.561)	0.982 (0.338)	2.014 (0.710)	** 1.529 (0.702)	1.247 (0.434)
Facility characteristics							
<i>Urban (omitted category: rural)</i>							
Urban	3.831 (2.966)	1.208 (0.432)	0.931 (0.348)	0.316 (0.116)	*** 1.575 (0.623)	0.819 (0.427)	0.467 (0.168)
<i>Type of facility (omitted category: MCHP)</i>							
Community Health Center	3.899 (3.000)	2.085 (1.055)	0.284 (0.162)	** 1.823 (1.024)	1.764 (1.141)	0.309 (0.243)	1.907 (1.044)
Community Health Post	5.702 (3.916)	** 2.509 (1.040)	** 0.296 (0.137)	*** 1.223 (0.526)	1.988 (1.000)	0.379 (0.238)	1.595 (0.716)
<i>District (omitted category: Moyamba)</i>							
Bo	0.397 (0.248)	0.819 (0.269)	1.780 (0.666)	2.121 (0.825)	1.872 (0.780)	0.771 (0.428)	0.623 (0.230)
Kenema	0.770 (0.505)	1.969 (0.691)	1.664 (0.634)	0.950 (0.341)	2.028 (0.851)	2.227 (1.089)	0.906 (0.354)
Observations	236	266	266	266	266	266	266

Note: Standard errors in parenthesis.

Incomes from remote allowance, top-ups, private practice not shown.

*** $p < 0.01$.

** $p < 0.05$.

PBF bonus (OR: 2.509, col.2) than those in MCHPs, but both those working in CHCs and CHPs are less likely to receive a share of user fees (OR respectively: 0.284 and 0.296, col.3). HWs working in urban areas are less likely to receive per diems from external organizations (OR: 0.316, col.4) or gifts from patients (OR: 0.467, col.7), compared to those working in rural areas. In-depth interviews suggested that this is because most of the gifts received in these rural, farming areas are in-kind, since this is what patients and communities have easier access to.

Table 4 reports factors associated with receiving a higher income for certain sources. As expected, we find that HWs of higher cadres receive significantly higher salary compared to MCH Aides (col.2). CHOs also have a higher income from user fees (col.4). Facility in-charges are shown to earn higher PBF bonuses, and significantly higher overall income compared to workers in staff positions (col.1). Workers in higher level facility receive a lower income from gifts from patients (col.7), but overall have a higher income (significantly for those in CHCs) (col.1). There is also some heterogeneity across districts, as workers in Bo receive less PBF payments and per diems (col.3,5) than those in the other districts, while in Kenema PBF payments received are higher (col.5). This results in a significantly higher overall income for HWs in Kenema (col.1).

Health workers' satisfaction with their incomes

HWs interviewed overall agreed that their salary was the most important and dependable source of income. However, the majority

expressed dissatisfaction with their salary level stating that is was 'not enough' (mentioned by eight HWs), 'small for the job' (five HWs), or 'not satisfying' (one HW). The only HWs who had relatively positive views were those already employed before the FCHI, as they were comparing their current salary level to that before. While salary payments were reported to be made on time and regularly, HWs mentioned that salaries can only be accessed through the local branch of banks located in the main towns, far from the rural facilities where they work. Moreover, because of the issue with the payroll, all interviewed HWs who (re)trained after 2010 mentioned they did not receive their salary or received the payment corresponding to their old cadre.

In contrast, HWs' narratives were overwhelmingly positive when discussing performance-based payments. PBF was said to 'help' (three HWs), to be 'good money' (two HWs), or 'really enough' (one HW). While these comments were in stark contrast with the views on salary and at odds with PBF relatively limited contribution to the overall income, positive remarks have to be understood in the context of the entire set of payments, and their features. The rather unpredictable timing and the yearly delays of the PBF payments (which delink it from the activities performed and the effort exerted at the time) make the bonuses seen as a gift, with less sense of entitlement compared to the salary. It also emerged that PBF was perceived as a complement to the salary. HWs admitted that:

I am happy with it because my salary is so small so if I am getting that [PBF], I am happy with the government (MCH Aide in Kenema)

Table 4. Determinants of amount of revenue from a particular source (linear regressions)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total income	Salary	PBF	User fees	Per diems	Sale of drugs	Gifts
HW characteristics							
<i>Cadre (omitted category: MCH Aide)</i>							
CHO	0.283 (0.193)	0.450 *** (0.047)	0.118 (0.283)	1.215 ** (0.596)	0.500 (0.309)	-1.664 (1.537)	-0.331 (0.415)
CHA+nurse	0.116 (0.123)	0.161 *** (0.030)	0.054 (0.186)	0.758 (0.395)	0.141 (0.198)	-0.924 (1.192)	0.044 (0.276)
In-charge (<i>omitted category: staff</i>)	0.529 *** (0.105)	-0.003 (0.027)	0.332 (0.158)	0.082 ** (0.295)	0.132 (0.171)	0.292 (0.532)	0.459 (0.237)
Male (<i>omitted category: female</i>)	0.035 (0.126)	-0.012 (0.030)	0.266 (0.173)	-0.317 (0.390)	0.195 (0.195)	0.073 (0.661)	0.016 (0.277)
Facility characteristics							
Urban (<i>omitted category: rural</i>)	-0.012 (0.099)	0.018 (0.024)	0.109 (0.141)	0.039 (0.303)	-0.626 *** (0.174)	0.946 (0.563)	-0.320 (0.240)
<i>Type of facility (omitted category: MCHP)</i>							
Community Health Center	0.352 ** (0.143)	0.021 (0.037)	0.022 (0.214)	0.003 (0.400)	0.283 (0.231)	2.106 (1.451)	0.107 (0.324)
Community Health Post	0.166 (0.114)	0.003 (0.029)	-0.126 (0.161)	0.064 (0.360)	0.054 (0.184)	1.701 (1.052)	-0.590 ** (0.260)
<i>District (omitted category: Moyamba)</i>							
Bo	0.034 (0.094)	0.027 (0.023)	-0.656 *** (0.136)	0.138 (0.311)	-0.441 *** (0.149)	-1.509 ** (0.612)	0.388 (0.211)
Kenema	0.204 ** (0.095)	0.028 (0.023)	-0.160 (0.128)	-0.109 (0.322)	0.541 *** (0.159)	-1.614 ** (0.580)	0.226 (0.205)
Observations	266	241	163	72	198	34	197
R-squared	0.242	0.558	0.240	0.190	0.316	0.357	0.113

Note: Standard errors in parenthesis.

Incomes from remote allowance, top-ups, private practice and non-health income generating activities not shown.

*** $p < 0.01$.

** $p < 0.05$.

[PBF] helps me because if you are getting your salary, then you have a small amount adding to that (MCH Aide in Kenema).

My salary is acceptable to me with the help of PBF (MCH Aide in Moyamba)

However, the positive views of PBF payments were mitigated by their non-financial features, such as the irregularity, the delays in payment and the complicated and opaque sharing practices which were caused by those delays (Bertone 2015).

Although some HWs complained that per diems were sometimes not sufficient to cover transport to and lodging in the place of training, most agreed that a proportion could be saved and represented a net revenue. As suggested by the quantitative evidence, interviews confirmed that per diems were far from being negligible, and sometimes even substantial. One HW recounted, '[Once] we had about 600 000 Le. [140 USD] for 5 days. I was joyful!' (CHA/nurse in Moyamba). Others said that DSA (acronym for Daily Subsistence Allowance, which is how per diems are referred to in Sierra Leone) 'is a good thing' (MCH Aide in Moyamba), 'is important for us' (MCH Aide in Kenema). On the other hand, per diems were seen as unstable and unpredictable, and difficult to depend on for regular expenditures.

Finally, most HWs viewed engaging in income-generating activities as a necessary 'back up' to complement their revenues. Some HWs reported to be setting up, or planning to set up, a small business or petty trading, once possible. When that was not possible, many chose to engage in agriculture activities.

500,000 [Leones - MCH Aide salary] is very small, so we have to do business! (MCH Aide in Moyamba)

I am doing petty trading to back up (CHA/nurse in Moyamba)

I have a cassava field in the backyard. To do business here is impossible (MCH Aide in Bo).

Overall, it emerged from the HWs accounts that financial issues were a major concern for most, and some mentioned income fragmentation as a specific problem. When asked about their financial coping strategies, HWs recurrently said that they 'manage':

Well, if I gather everything together at the same time it helps [i.e. my income is enough], but the money does not come together [at the same time], it comes in little bits. So what I have at the moment, I manage with it. I have no other way to do it (CHA/nurse in Kenema).

I have to manage my life with it [my income] (MCH Aide in Moyamba)

Well it is not easy. You have to manage yourself (CHA/nurse in Moyamba)

'To manage' can be rightfully interpreted in the sense that they survive, they 'get by', but also that they actively administer and organize their different incomes and spend them differently in order to maximize financial options, deal with income instability and ensure their subsistence and the livelihoods of their families.

Differential utilization of incomes

In-depth interviews provided evidence of the HWs' differential utilization of their revenues, revealing how they take advantage of the features of each income to choose how and what to use them for. The general practice seemed to use the salary (i.e. the highest and

most stable source of revenue) for expenditures that are large and recurrent, such as school/college fees for children and supporting the (extended) family's financial needs and requests:

I use it [salary] to provide for my family. Sometimes 50,000 [Leones] remains with me after having spent everything [I need to take care of the family], so that I buy food and bring it here for myself (CHA/nurse in Kenema)

[After collecting my salary], I will always see my family and address problems there before (CHA/nurse in Moyama).

Even yesterday, [...] one of my daughters called me for a certain amount of money. I went down to the bank and collected the money and sent it to her in Freetown (MCH Aide in Bo).

Like, the school fees and the college fees depend on the salary. The side [incomes], I keep them for their feeding and all the minor things at home (CHA/nurse in Moyamba).

Moreover, salaries are paid into bank accounts located in district towns. HWs with these accounts were likely to be subject to the immediate financial demands of family members living there. In some cases, financial pressures exerted on the salary were unavoidable due to the family's knowledge (or rumors) of its amount. One HW recounted:

When the free health care came in action, we were told that our salary scale will be close to 1 million. This is creating a big problem in our marital home. Like... our husbands, some are not educated, some did not go to school, so hearing this rumor, they said it's true. Then sometime in May-June, something was added to our salary, so that month we got 1 million, and that rumor went around. People were saying that our salary is now, that this is what we are earning. So then when we received our normal salary [about 500,000 Le.], when I got home I told my husband, 'here is the salary', and he said, 'this is a big lie'. So I told him, 'let's go to the bank, there you will find out if it is true or a lie' (Female MCH Aide in Kenema).

In contrast, revenues from per diems, activities outside of the health sector and in-kind gifts were used for the personal subsistence and to address 'emergency' issues. Moreover, irregular incomes of an unknown amount (such as per diems and PBF) have the advantage of being more easily 'hidden' from family pressures, and revenues paid in cash (i.e. per diems) are readily available to HWs and appear essential for the subsistence of those in rural posts and those not receiving a salary:

[interviewer] What do you mean, this [per diems] is the only money you have? You have your salary as well. No. I mean, for here. Because our salary is paid in our account. For here, we don't have any other way to have money' (MCH Aide in rural Moyamba).

[I use per diems because] I need things here. We don't have access to bank so we find things difficult (CHA/nurse in rural Moyamba).

Sometimes DSA is useful because it is no easy to get money here, because I am not on payroll. It is useful, it helps me (MCH Aide in rural Bo)

Some HWs recounted using per diems specifically for themselves, in contrast to other incomes that can be shared with the family. They said that with per diems 'I can buy something for myself' (MCH Aide in Kenema) or 'I buy anything I want' (MCH Aide in Kenema).

Income from activities outside of the health sector had also an important function as it could provide flexible financial resources which worked as a mechanism to smooth income and deal with the irregularity of other revenues. Similarly to per diems, income from

non-health activities was also reported to provide a personal, less visible allowance. Some mentioned:

I can use this if I run short of money (MCH Aide in Moyamba)

I have to do some little business, because if there are problems I can solve my problems *quietly* (MCH Aide in Kenema—emphasis added).

In turn, however, the possibility of carrying out business-related non-health activities depended on having substantial amount of unspent money from other sources to be re-invested. PBF, which can represent a considerable amount paid at once, was seen as useful in this sense. The emerging hypothesis that non-health income opportunities are more likely to be available for those with higher incomes on PBF was tested using survey data, by regressing the amounts earned from non-health activities on PBF amounts, controlling for variables at individual and facility level. We found a positive and significant coefficient ($P=0.05$), which confirmed the hypothesis.

Discussion

This study set out to explore the remunerations of public primary HWs in three districts of Sierra Leone and to investigate the individual and facility determinants of the income levels, and the implications that income fragmentation has for HWs. The results confirm that the remuneration of HWs is made up of different sources, beyond the salary and incomes related to their official job. We found that governmental payments (which include primarily salary and PBF, as the remote allowance had been discontinued in 2012) represent the main share of HWs monthly income. This result is similar to findings in Ghana, Burkina Faso and Nigeria (McCoy *et al.* 2008; Akwataghibe *et al.* 2013). The high share of government pay reflects the efforts towards harmonization and alignment of remuneration undertaken by external actors (donors and NGOs) in Sierra Leone around the launch of the FHCI. In particular, top-ups are found to represent a very limited additional revenue (only one NGO in Bo was still providing them at the time of the research). The harmonization of incentives in Sierra Leone stands in contrast to the experience of other countries where the introduction of fee exemptions did not entail major reforms to ensure incentive alignment (Witter *et al.* 2016). On the other hand, the share of other incomes remain important for HWs. In particular, per diems account for an essential part of their income (15–21%), and non-health activities seem quite relevant for some workers, with 21% who declare engaging in them. This compares with 42% of HWs practicing non-medical businesses in Nigeria (Akwataghibe *et al.* 2013). In contrast with some of the literature (Ferrinho *et al.* 2004a; Akwataghibe *et al.* 2013; McPake *et al.* 2014), revenues from health-related private practice are found to be limited. Although this could reflect underreporting, the finding is likely to be explained by the fact that our sample includes lower cadres of HWs, such as nursing aides, rather than doctors (the focus of much literature on dual practice), posted in rural areas. In those settings, HWs often live and work in the same building and do not have the possibility of practicing in a separate facility. Potential earnings from outreach or home visits would have been accounted under 'gifts and payments from patients'. Also, studies exploring health seeking behavior in Sierra Leone stress that the alternative to treatment in public facilities are traditional healers or drug peddlers, rather than the private healthcare sector, which is underdeveloped outside the capital (Scott *et al.* 2014).

Our results also show that in the three study districts there exist differences between HWs which are explained by individual and

facility characteristics, as well as differences across districts. In particular, we found that CHOs are more likely to sell drugs, possibly given their position within the facility which allows better control of drug stocks (Ferrinho *et al.* 2004b). HWs (re)trained after 2010 did not receive the correct salary for their qualification and younger ones were less likely to receive a salary, revealing the problems in the Ministry payroll. In terms of rural-urban posting, we did not find significant differences in the HWs overall income, despite some literature suggesting that HWs prefer urban posts as they can earn additional income in monetized urban economies (Witter *et al.* 2011). In fact, our findings show that per diems and gifts from patients were higher for those in rural areas, and there were no differences in earnings from non-health activities, which were often linked to agriculture and not viable in towns. However, in the interviews HWs stressed their preference for business-related activities where possible. Again, the absence of a rural-urban divide in incomes may be related to the sample which includes lower cadres in mostly rural areas or smaller towns. A preference for posting in urban areas remained in the narrative of the HWs, and it is likely to be linked to factors such as transport and communication issues (and related costs), working conditions, housing, social relations, etc. While our results show no unfair economic advantage for HWs in rural posts, they highlight the absence of specific incentives to compensate the difficulties of those posts, which had in theory been introduced with the remote allowance (then discontinued). Finally, there were important income differences based on the district of posting, which seems related to the presence of NGOs in the districts (Bertone and Witter 2015b). All these differences are not in line with the HRH strategies established at central level, and may have potential negative effects on recruitment, distribution and motivation of HWs.

Qualitative interviews showed that features of payments, such as regularity, reliability, ease of access, etc., are critical to define how HWs perceive and value each income. It emerged that HWs do not see incomes as perfect substitutes or fungible. Depending on their features, revenues will be used differently. This echoes the literature on 'mental accounting', which looks at the practice of assigning financial activities to specific accounts, by labelling sources and uses of funds and grouping them in categories constrained by mental budgets (Thaler 1999). The main consequence of this practice is that income in one category can be differently perceived from income in another (for example, regular income is considered different from a one-off windfall) and the assumption of fungibility of income becomes open for debate, with potential consequences on how we think about individuals' and households' financial decision-making. The existence of mental accounting has been confirmed in low-income settings (Duflo and Udry 2003; Davies *et al.* 2009; Villa *et al.* 2011). We also identified practices to deal with financial pressures from the extended family. These are in line with rich ethnographic work on moral and affective economy in Africa (Hyden 2006) and economics research exploring the effects of kin on financial choices (Hoff and Sen 2005; La Ferrara 2007). In particular, the practice of 'income hiding' to avoid predatory demands from family members has been documented in sub-Saharan settings, with qualitative and experimental methods (Baland *et al.* 2011; Jakiela and Ozier 2012; Beekman *et al.* 2015).

Our study has some limitations. Results are not representative of the entire country, although they cover 57% of all primary care facilities in three of fourteen districts, and our sample may slightly over-represent in-charges compared to staff HWs. Moreover, HWs incomes were estimated using methods and data sources with varying levels of reliability. Despite the longitudinal logbook method and the

thorough enumerators' training adopted to limit response bias, it is possible that certain revenues, and in particular the most sensitive ones, such as those derived from user fees, illicit sale of drugs or under-the-table payments, were underreported for fear of consequences (in the case of illegal activities) and because of the negative perceptions of the public around user fees even for non-exempted services (Denney and Mallett 2014). However, although those amounts are likely to be lower-end estimates, they are still far from negligible for many respondents, and we are able to derive valuable information about their existence within the remunerations of HWs.

Together, our findings have important policy implications for how we go about (re)thinking the design of financial incentive strategies. While salary in Sierra Leone represents more than half of the HWs monthly revenues and remains their main income, the rest of the remuneration is made up of sources for which there is no routine information available and which often escape central-level actors during the decision-making processes on financial incentive packages. As a consequence, these incomes can be subject to erroneous perceptions. For example, despite the widespread views of actors at central level of the relevance and distorting effects of salary supplementations, our research reveals that this practice had been almost completely discontinued for primary HWs in the study districts at the time of the research. Notwithstanding the obvious difficulties in collecting reliable routine data on all incomes, looking at salaries, even in conjunction with other official allowances and bonuses may not be enough to understand what financial incentives HWs face, and how attractive or not some posts may be. A better knowledge of the income structure and income opportunities for HWs is essential to set rules and establish the right incentive environment to address retention, distribution and motivation issues. In particular, there seems to be room for coordination with donors and NGOs to align remunerations from top-ups (as effectively done in the study districts), as well as per diems (which remain problematic) and reduce unfair differences among HWs deriving from those payments.

Importantly, it emerged from our study that HWs use different incomes in different ways to such extent that incomes are not fully fungible and the marginal effect of increasing one income source will not necessarily be equivalent to the marginal effect of increasing another source. How HWs value their revenue, in relation with one another and within the broader incentive environment, should be carefully considered. For example, salary increments could have little effect if appropriated by the extended family. On the other hand, while per diems have perverse effects (Vian *et al.* 2013) that must undoubtedly be addressed, they could play a particular role as a salary complement that is easily accessible and can be sheltered from family pressures. Similarly, activities outside of the health sector may have negative effects as they increase absenteeism (Van Lerberghe *et al.* 2002), but their revenues have an important role to deal with income instability.

This study reflects the situation as it was in Sierra Leone before the ongoing EVD outbreak. While at the time of the research most of the top-ups from external organizations had been eliminated, with the outbreak new payments have been introduced. A substantial hazard pay of 196–495 USD/month has been added to the remuneration of HWs involved in the EVD response (NERC 2015) and NGOs and donors are reportedly paying a variety of financial incentives in the specific sites where they operate. These allowances are poorly mastered at central level and their impact on the motivation of workers is undocumented. Additionally, they raise questions about the effects of their discontinuation, especially given their considerable amount. The post-EVD reconstruction phase will undoubtedly require new approaches to health system strengthening, taking

into account the role of incentives for HWs. This study can provide useful lessons in this sense. It stresses the importance of rationalization and alignment of incentives under the MoH lead, as well as the need for an increased consideration of the underlying potential to motivate HWs via financial and non-financial features of payments.

Conclusions

This paper highlights a series of important and understudied issues about the remuneration of HWs, which are likely to have a profound impact on retention and motivation and are of key policy relevance. In particular, it stresses the importance of understanding (and the potential for harmonization of) financial incentives beyond those usually known and analyzed at central level, in order to reduce unjustifiable income differences between HWs, which could have negative effects on their distribution, motivation and performance. Additionally, we provide evidence that incomes are not fungible in the views of HWs, so that the same increase in different income components may not have the same effects. Reflecting on the features and uses of incomes from a micro-level perspective is necessary to better understand how changes in incomes' level affect HWs.

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