Investigating the effects of removing performance-based payments from health workers on motivation in the Democratic Republic of Congo

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Executive summary

Introduction: The Democratic Republic of Congo (DRC) is a fragile state that struggles to provide basic services such as primary health care. A key obstacle to the delivery of quality health care is that public sector health workers in the DRC rarely receive their government salary. Consequently, donors are employing performance-based financing (PBF) strategies in order to motivate health workers to supply better health services. However, long-term financing of PBF by donors is not always assured, raising questions over its sustainability in the context of fragile states. Little is also known about the consequences for health worker motivation when PBF is withdrawn.

Aim: This study has two main aims: the first aim is to identify important determinants and outcomes of motivation of health workers in the DRC. Context-specific research on motivation is important given that some of the factors affecting health worker's motivation can show significant inter-country differences. It is hoped that a deeper understanding of these determinants and outcomes will inform the development of policies targeted at strengthening health worker motivation and performance, thereby improving the efficiency of health services. The second aim is to identify how the withdrawal of PBF may impact the motivation of workers. Donors and other non-state actors considering starting or ceasing support to an existing PBF programme may therefore be interested in the findings of this component of the study.

Methods: Quantitative data on health workers in facilities in ASSP areas who had previously received performance-based payments, and workers in other areas, were collected in April and May 2014 using a structured survey containing questions related to aspects of motivation with responses graded on a five point Likert scale. Exploratory factor analysis was used to identify latent constructs and the underlying factor structure of the survey questions on motivation. Scores for each latent construct were then standardised to allow for comparison between constructs, and overall scores were calculated as the sum of all sub-scores of latent factors described. A multivariate regression model was then estimated to identify relationships between health worker characteristics and latent constructs as well as the overall motivation score.

To complement that quantitative analysis, qualitative data collection was also carried out in November 2014 in the province of Kasai Occidental. Two urban and two rural health zones where workers had previously received PBF payments under the Access to Health (ATH) programme were selected as well as two urban and rural health zones which had not previously received PBF. In all sites, data collection involved in-depth interviews with selected participants using a semi-structured interview guide based around the conceptual framework of the determinants and outcomes of motivation. In particular, the perceptions of health workers were sought on: the working environment e.g. in terms of resources, relationships with colleagues and superiors, workload and the quality of services offered, barriers or facilitators in performing tasks, commitment to the job, management of the facility, behaviour of

themselves and colleagues at work, non-financial incentives such as training, financial incentives, and overall satisfaction. Those workers whom had previously received performance-based payments were asked an additional set of questions to explore their perceptions of PBF, and any changes which had occurred following the removal of PBF.

Results: The results suggest that individual traits, which included conscientiousness and self-efficacy, were significantly lower among workers who had previously been exposed to PBF. The scores for overall motivation, working environment and relationships, and perceptions of financial reward were also significantly lower in workers who were no longer receiving PBF. The loss of income from the PBF payments meant staff relied more heavily on income received from the facility, which was a much lower amount than the previous PBF payment. This may have affected relationships between staff in the facility; a common cause of disputes was the allocation of the user fee between personnel at the end of the month.

The results of the qualitative analysis also yielded a number of interesting findings. While many respondents commented that they are generally satisfied with their work as nurses and that they have good working relationships with their colleagues, all nurses expressed deep frustration with the financial compensation they receive. Some nurses mentioned that their income was not enough to pay the costs of food and other necessary household's items. Disputes about how income from user fees was divided among health workers were cited several times in the interviews. In addition, some nurses reported that they were not satisfied with the amount of training opportunities, and that the process of choosing which workers received these opportunities was unfair. In terms of ASSP workers, many respondents commented that the project has better defined their roles and responsibilities. However, some commented that they receive no extra compensation for some of the extra increased job responsibilities that have been assigned, such as reporting.

Conclusions: Overall, the findings of this study indicate a need to carefully consider the effects of withdrawing financial support from workers. In this case, the exit from a PBF programme had an impact on the livelihoods of staff, behaviour of staff, and the relationships between staff and communities. The introduction of user fees also negatively affected access to health care by communities, with many preferring to go to traditional healers, private clinics, or not access health care at all. With the benefit of hindsight, the withdrawal of PBF could have been managed more sensitively. Lessons learned going forward are to consider the effects the withdrawal of PBF may have on the health workers and the communities, and putting in place strategies to mitigate any negative consequences. For instance, monitoring staff performance at these facilities and ensuring clear communication to the community that workers are no longer receiving PBF payments. Furthermore, despite the phased withdrawal of PBF payments over a few months, the changes in livelihood experienced by workers following the removal of PBF were reportedly dramatic as these payments had previously made up the majority of their income. Future programmes considering PBF should take into account the relative contribution that PBF payments will make to overall health worker income.

Abbreviations used in the document

ASSP	*Accès Aux Soins de Santé Primaire*/Access to Primary Health-care
ATH	Access to Health
BCZ	*Bureau Central de Zone (de Santé)*/ Health Zone Central Office
DFID	Department for International Development
DRC	Democratic Republic of Congo
KMO	Kaiser-Meyer-Olkin measure
KSPH	Kinshasa School of Public Health
OLS	Ordinary Least Squares
PBF	Performance-Based Financing
PPS	Probability Proportional to Size
WHO	World Health Organization

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Introduction

Human resources for health are one of the core pillars of health systems, and the performance of health workers directly affects the quality of health services (World Health Organization, 2006). In the past, it was thought that knowledge and competency of health workers alone influenced performance and productivity. However, studies have since confirmed that there are differences in practice between what health care workers "know" should be performed, and what they actually "do", and this is termed the "know-do" gap (Maestad & Torsvik, 2008). Motivation is thought to be the bridge in overcoming this gap, and is defined as the "degree of willingness of an individual to exert and maintain an effort towards attaining organizational goals" (Leonard & Masatu, 2010; Franco, Bennett & Kanfer, 2002).

Health care delivery is labour-intensive, and in developing countries health workers face many challenges to delivering services, such as inadequate resources, supervision and training. In such settings, highly motivated workers will attempt to overcome such obstacles in order to be as productive as possible. Addressing poor health worker motivation can therefore lead to significant gains in efficiency (Hongoro & McPake, 2004; Janovsky, Peters, Arur & Sundearam, 2006; Mathauer & Imhoff, 2006). Given these potential efficiency gains, policy-makers are becoming increasingly aware of the need for strategies which enhance health worker motivation.

However, in order to ensure the effectiveness of these strategies, an understanding of the motivational process and how to measure it is necessary. Several theories explaining work motivation exist and have their origins in various disciplines including behavioural economics and psychology (Franco et al., 2002; Herzberg, Mausner, & Snyderman, 2011; Maslow, 1943; Kanfer, Bennett, & Franco, 1999; Deci & Ryan, 1985; Locke, 1997; Vroom, 1964). Franco et al. (2002) have proposed that motivation is affected by various determinants at either the individual, organisational, or societal level (Hongoro & McPake, 2004; Kanfer et al., 1999). These determinants are often described as either affecting the "will do" component of motivation which relates to whether the individual's goals are aligned with that of the organisation, or the "can do" component of motivation which refers to the ability of the individual to mobilise resources to execute a task. Motivation outcomes at the individual level are the net result of the interaction between the "can-do" and "will-do" components of motivation, and can be affective, cognitive, and behavioural. Affective outcomes concern health workers' satisfaction, cognitive outcomes relate to health workers' perceptions of their job, and behavioural outcomes relate to the performance of health workers. Another theory is that worker motivation can be either "intrinsic" or "extrinsic" (Deci & Ryan, 1985). Intrinsic motivation refers to the internal desire of health workers to perform a task, for example for reasons such as professionalism, while extrinsic motivation is affected by external characteristics of the organisation environment, community and health system. As motivation cannot be directly observed, researchers can use subjective methods such as asking workers their perceptions of motivation and what influences it, or objective measures such as the observation of various behaviours in practice (Bennett, Franco, Kanfer & Stubblebine, 2000; Kanfer et al., 1999; Mbindyo, Gilson, Blaauw & English, 2009).

One way of influencing motivation is through the use of incentives, which may be financial or non-financial. Non-financial incentives do not involve direct transfers with monetary value or equivalent to an individual or group, but often operate through a moral imperative, which may be in the form of social pressure or altruism (Adams & Hicks, 2000; Hanson, 2012). Important non-financial motivators include: career development, resource availability, hospital management, supervisory support and recognition (Dieleman, Cuong, Anh, & Martineau, 2003; Willis-Shattuck et al., 2008; Dieleman & Harnmeijer, 2006; Stilwell et al., 2004). Financial incentives, on the other hand, are monetary benefits given to a worker, and appeal to their extrinsic motivation (Lemiere, 2011).

Performance-based financing is an example of where financial incentives are employed to motivate the workforce. Personnel are funded, at least partially, on attaining a defined level of performance (Meessen, Soucat, & Sekabaraga, 2011). In some low-income countries, the effects of introducing PBF upon motivation have been documented (Toonen, Canavan, Vergeer, & Elovainio, 2009; Kalk, Friederike, & Grabosch, 2010). Workers in Rwanda and in DRC reported increased levels of motivation under a PBF scheme (Huillery & Seban, 2015). In Tanzania, workers felt that a PBF programme would serve to enhance their motivation (Songstad, Lindkvist, Moland, Chimhutu, & Blystad, 2012), and a future evaluation of a PBF scheme in this country will ensure effects on staff motivation are measured (Borghi et al., 2013). However, a concern around PBF strategies is that they underestimate the complexity of health worker motivation, and may even serve to "crowd out" intrinsic motivation (Kalk et al., 2010). Furthermore, in developing countries and fragile states where PBF is often funded by donors or organisations external to the government, long-term financing is not always assured, raising questions over the sustainability of such strategies in these contexts. Little is also known about the consequences for health worker motivation when PBF is withdrawn.

This study therefore has two main aims: the first aim is to identify important determinants and outcomes of motivation of health workers in the DRC. Context-specific research on motivation is important given that some of the factors affecting health worker's motivation can show significant inter-country differences (Fogarty et al., 2014; Bennett et al., 2000). It is hoped that a deeper understanding of these determinants and outcomes will inform the development of policies targeted at strengthening health worker motivation and performance, thereby improving the efficiency of health services. The second aim is to identify how the withdrawal of PBF may impact the motivation of workers. This is deemed important to examine given PBF is being employed widely in low-income countries as a means to enhance health worker motivation, yet such interventions cannot always be maintained long-term given their financial implications. Donors and other non-state actors considering starting or ceasing support to an existing PBF programme may therefore be interested in the findings of this component of the study.

Background

DRC context

The last civil war in the Democratic Republic of Congo (1998-2003) was reportedly one of the deadliest wars in African history, claiming millions of lives (International Rescue Committee, 2003). Yet, the negative impact on the population's mortality and health has persisted post-war, with many areas of the country receiving health care from informal providers as the public health system is poorly functional (Coghlan et al., 2006). Child and maternal mortality still rank amongst the highest in the world (World Health Organization, 2012). The public health budget mainly serves to finance workers, while very little is spent on other costs for health care delivery, such as medicines or equipment (Ministère de la Santé Publique/PNCNS, 2013). Even then, many public-sector health workers still do not receive their government salary (Maini, 2017).

As a result, there is a strong presence of the international community in the health sector. Donors supporting health systems strengthening programmes have implemented PBF in an attempt to motivate the health workforce and enhance quality of care (Soeters, Peerenboom, Mushagalusa, & Kimaunka, 2011). However, the effects of PBF on workers have been contradictory; Huillery and Seban (2015) found that motivation of staff increased under PBF while Fox, Witter, Wylde, Mufuta and Lievens (2014) found that the effects on motivation were less clear, particularly as a performance payment did not represent a dramatic increase in income when user fees were simultaneously reduced.

Although health worker motivation has previously been studied in the DRC, this study hopes to build upon this previous research by further exploring the dimensions of motivation considered to be important to health workers (Huillery & Seban, 2015; Fox et al., 2014). Huillery and Seban (2015) also compared the motivation of workers while they were receiving PBF with workers receiving a fixed government payment, and following the termination of both payments. The study found that withdrawal of PBF did reduce intrinsic motivation of workers more than in workers who had received the fixed payment, supporting the theory that extrinsic incentives may lower intrinsic motivation (Ryan & Deci, 2000). However, our study differs slightly in that it is comparing the motivation of workers who have had PBF withdrawn with workers who never had any other external financial payment withdrawn, and the data has been collected from provinces outside of Haut-Katanga.

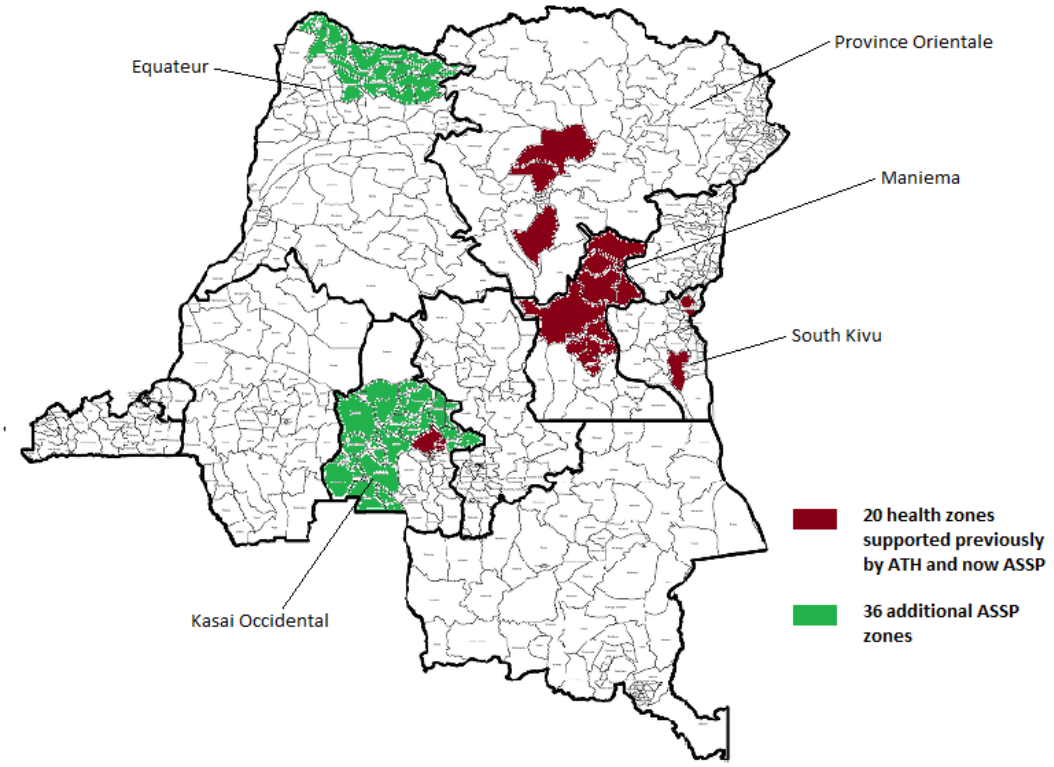
It was hypothesized that the removal of PBF is very different compared to just receiving less pay. Under PBF, workers with the highest productivity (and who are possibly the most motivated) earn more money. Therefore, removing PBF would likely disincentivise the most productive individuals and not just the average worker. Therefore, it was anticipated that removal of PBF would have a very negative effect on productivity and motivation, and different to that caused by a standard negative income shock alone.

Study setting

Between 2008 and March 2013, DFID (Department for International Development) provided funding towards a health systems strengthening programme called Access to Healthcare (ATH) in the DRC. ATH supported health centres and hospitals to deliver a package of basic primary health services (which included both preventative and curative services) in 20 health zones in the provinces of Kasai Occidental, Province Oriental, Maniema, and South Kivu (Figure 1) (Department for International Development, 2008). The interventions of ATH included: heavily subsidising user fees in order to encourage uptake of services; training health workers; constructing and rehabilitating facilities; and providing free drugs and medical equipment to facilities. DFID also implemented PBF in these 20 zones between 2008 and 2013, whereby workers received a supplemental fixed payment plus a performance-based payment linked to certain performance criteria, such as the attainment of a certain level of vaccination coverage. The fixed payment made up 70% of the total amount, which could be earned while the remaining 30%, which made up the performance payment was paid to health workers if their health facility achieved certain target indicators.

Following the end of ATH in March 2013, DFID commenced a follow-on health systems strengthening programme called Accès Aux Soins de Santé Primaire (Access to Primary Health-care or ASSP) (Department For International Development, 2012). ASSP continues to support the same interventions in the 20 health zones of ATH in order to build on DFID's previous legacy, and has also extended support to a further 36 health zones, including eleven zones in the province of Equateur and 25 zones in the province of Kasai Occidental (Figure 1). In total, 56 health zones are now receiving support from ASSP. In addition, ASSP has targeted zones where few other donors are implementing vertical or horizontal health initiatives.

Figure 1: Map of DRC showing ATH and ASSP health zones

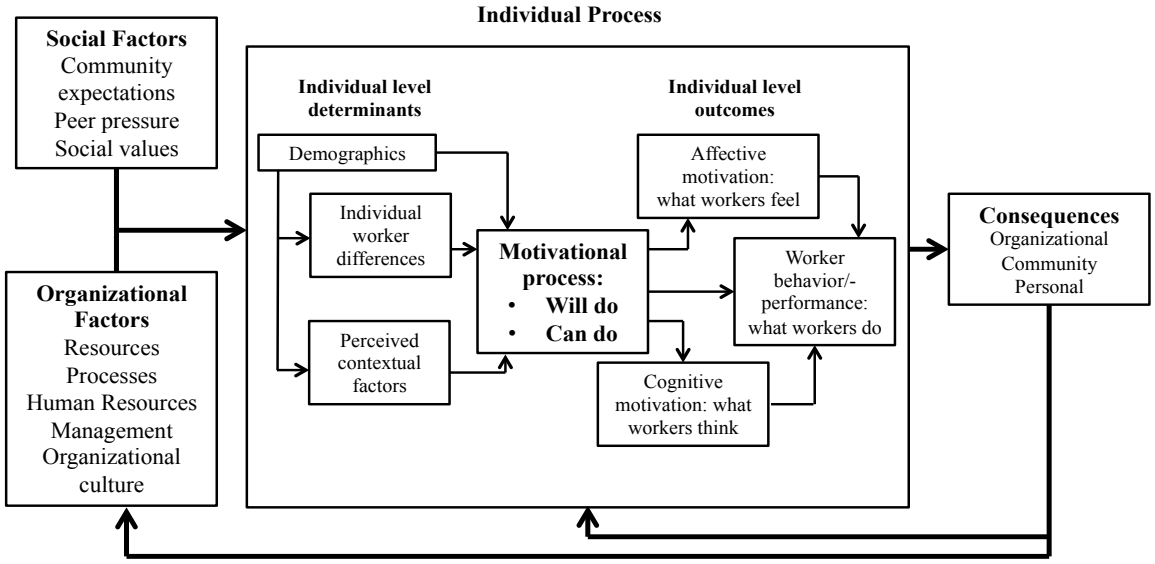


However, unlike ATH, ASSP does not provide financial incentives to health workers. Within the first year of the programme, PBF payments to health workers were gradually reduced and eventually withdrawn in the 20 health zones of the previous ATH programme.

Methods

A concurrent, transformative, mixed methods approach drawing on the theoretical framework of motivation proposed by Franco, Bennett, Kanfer and Stubblebine (2004) was employed. As depicted in Figure 2, health worker motivation is viewed as a dynamic psychological process that results from the transaction between individuals and their work environment. Motivation is determined by the congruence of worker and organizational goals ("will do" motivation) and factors that are focused on goal striving ("can do" motivation"). "Will do" motivation is influenced by a) distal determinants such as societal and cultural values, personal values, and personality tendencies, and b) proximal determinants that are more amenable to policy change, such as organizational structure and culture, management practices, financial rewards, and non-financial recognition. "Can do" motivation refers to factors that influence goal accomplishment following goal adoption, such as self-concept, work orientation, self-confidence, and self-regulatory skills. The outcomes of motivation consist of three domains: behaviour (job performance), affective (health worker satisfaction), and cognitive aspects (work attachment) of health workers.

Figure 2. Conceptual framework of the determinants and consequences of health worker motivation.



Source: Franco et al. (2004).

The study collected both quantitative and qualitative data at the same time and integrated the data at the analysis and interpretation phase in order to provide a comprehensive understanding of health worker motivation, and the effects of removing PBF on motivation.

Quantitative data

The quantitative component has been derived from a health worker motivation survey undertaken as part of the evaluation of the ASSP programme (Keating, Hotchkiss, Eisele, Kitoto, & Bertrand, 2014). Health workers in primary care health facilities were randomly sampled in provinces where the ASSP health programme was working ("intervention" areas) and areas where the ASSP programme was not working ("control" areas). The sampling frame included villages in the provinces of Equateur, Maniema, Kasai Occidental, Kasai Oriental, and Province Orientale. However, more villages were sampled in certain provinces compared to others on account of the location of the ASSP programme. Probability proportional to size (PPS) was used to ensure the probability that a sampling unit would be chosen that was proportional to the size of the population in each sampling unit. Control villages were then matched to the selected villages in intervention areas, and one facility per village was selected. Only public health centres and reference health centres were sampled as these are the main facilities involved in providing primary health care. If a selected village did not have a health centre or reference health centre, the health post was sampled. All workers providing clinical services in selected facilities and on duty on the day of the survey were interviewed using a structured close-ended survey. All workers providing clinical services in selected facilities and

on duty on the day of the survey were interviewed using the health worker survey, while the head of the facility also had to answer a separate facility survey.

Surveys

The facility survey included questions on the total number of staff, total population, the distance of the facility from the village, and the number of primary healthcare services provided. The health worker survey inquired about socio-demographic information, including age, sex, health worker position, educational attainment, the number of years worked, and the number of financial dependents.

As mentioned previously, this evaluation survey employed the Franco et al. (2004) conceptual framework of motivational determinants and outcomes. Several of the questions on motivation in the health worker survey were adapted from a similar evaluation survey conducted in Bangladesh (Khan, Hotchkiss, Dmytraczenko, & Zunaid Ahsan, 2013). In addition, the literature on health worker motivation was reviewed and further questions relating to both determinants and outcomes of motivation were selected which were deemed relevant to the DRC context (Bennett, et al., 2000; Faye et al., 2013; Prytherch et al., 2013; Agyepong et al., 2004; Penn-Kekana, Blaauw, San, Monareng, & Chege, 2005; Dieleman, Toonen, Touré & Martineau, 2006; Peters, Chakroborty, Mahapatra, & Steinhardt, 2010; Yami, Hamza, Hassen, Jira, & Sudhakar, 2011; Mutale, Ayles, Bond, Mwanamwenge, & Balabanova, 2013; Mbindyo, Blaauw, Gilson & English, 2009; Blaauw et al., 2013; Chandler, Chonya, Mtei, Reyburn, & Whitty, 2009). Constructs and questions were also discussed with partners. The survey was then pre-tested in two non-study facilities in Kinshasa and one in Bas Congo to test for clarity of quest ions and re-worded if necessary. Respondents struggled with answering negatively phrased questions, which is consistent with the findings of another similar study in a developing country context, so only two items were worded in this way in the final survey to offset any response bias (Franco et al., 2004).

The final survey contained 62 questions with nine constructs for determinants and four constructs for outcomes (Table 1). Because the survey was also used to collect facility and worker data on other topics, we were unable to include questions to measure the full set of motivational determinants and consequences included in the Franco et al. (2004) conceptual framework (as this would have made the survey too long to administer). For example, we did not collect data on various hypothesized determinants, such as expectations and emotional personality, or on some of the hypothesized outcomes of motivation, such as job performance.

Table 1: Constructs and number of items in final survey.

Determinants	Construct	Number of items
Organisational	Financial	9
	Management	3
	Job tasks	6
	Workload	5
	Training	3
	Work environment/resources	5
	Work harmony/relationships	7
Individual	Pride	3
	Self-efficacy	5
Outcomes	Timeliness/attendance	3
	Conscientiousness	6
	Commitment	3
	Satisfaction	4

Each construct contained at least three questions, as factors with fewer than three questions are considered unstable (Costello & Osborne, 2005). All questions were answered on a five point Likert scale, with certain question responses worded “strongly disagree” to “strongly agree” and others worded “very dissatisfied” to “very satisfied”. The response “not applicable” was also included for certain items where it was possible that the question may not be relevant.

Data collection

The Kinshasa School of Public Health (KSPH) in collaboration with Tulane University managed the data collection for this study. Both surveys were pre-tested with health workers in two facilities in Kinshasa and one facility in Bas Congo. Data collectors were hired from each of the provinces to ensure familiarity with the cultural context. The surveys were administered between April and May 2014 and the participation of health workers was voluntary. Data collectors explained the purpose, confidentiality, and anonymity of the study to each health worker as part of the process of obtaining informed consent to participate in the survey.

Statistical Analyses

Data collected from the surveys were double entered into the computer database CSPro for verification before being imported into and analysed in STATA 13.0. All Likert scale responses were entered as a score of 1 to 5. For positively-worded questions, the statements "strongly agree" or “very satisfied” were scored a 5, while negative questions were coded in the opposite direction, so that a score of 1 represented “strongly agree” or “very satisfied.”

Descriptive statistics were first used to explore the demographic characteristics of health workers surveyed. Means and medians of responses to questions on motivation were then examined using frequency distributions.

Internal consistency of the initially proposed constructs and overall scale was initially tested using Cronbach’s alpha using a criterion of 0.70 (Nunnaly, 1978). However, despite having

proposed motivation constructs for the survey, the purpose of the analysis was not to test hypotheses but rather to explore which dimensions are most relevant to motivation in the DRC since it has never been studied before in this context. For this reason, exploratory rather than confirmatory factor analysis was employed. Although the health workers were sampled at random, principal factor analysis was the preferred technique as the sample was not thought to be representative of the health worker population given the small sample size (Field, 2013).

When conducting the exploratory factor analysis only questions with factor loadings greater than 0.32 were included, as recommended by Costello and Osborne (2005) (Tabachnick & Fidell, 2007). The Kaiser-Meyer-Olkin test was applied to determine sample adequacy, while an eigenvalue criterion of one and Cattell screen test were used to determine the number of factors to be retained (Cattell, 1996; Kaiser, 1960). Retained factors were examined using oblique rotation, which was chosen to allow the factors to be correlated with one another (Harman, 1976). Cronbach's alpha was then recalculated for each latent factor/construct and the overall index.

Mean scores for each latent construct were calculated and an overall mean score was also calculated using the mean scores for each latent construct, with all constructs being equally weighted.

Multiple regression models were then used to identify relationships between independent health worker and health facility variables and latent constructs of motivation. Independent variables included: age, gender, health worker position/cadre, education, and years worked in the position. Independent variables from the health facility survey included location and type of facility, and whether PBF had been recently withdrawn or never introduced. Province was not included as a variable as this was highly correlated with the PBF variable. The multiple regression analysis was restricted to ASSP zones only as PBF status could only be determined accurately for these health zones. Table 2 gives some of the hypothesised relationships between motivation and the independent variables selected.

Ordinary Least Squares (OLS) were used to estimate the models. All models were clustered by facility, and violation of assumptions for full models was checked using regression diagnostics and corrected where possible in order to produce unbiased coefficients (see Appendix 2 for the list of regression diagnostics).

Table 2: Hypothesised relationship of independent variables with motivation.

Variables	Hypothesised relationship with motivation
Age	In a study by Prytherch et al. (2013), older respondents were significantly more positive in their responses to questions assessing their level of motivation. The authors postulated that older workers may receive greater respect and appreciation for their work from the community and colleagues given their greater level of experience. In other studies, older workers have been found to be more committed to working in the facility than younger workers, and more satisfied with their work overall (Fogarty et al., 2014; Blaauw et al., 2013).
Sex	A study in Zambia found female public sector health workers to be less satisfied than male workers (Gow, George, Mwamba, Ingombe, & Mutinta, 2012). However, another study found no difference in job satisfaction between males and females when controlling for other socio-demographic variables (Blaauw et al., 2013).
Number of dependents	In Tanzania, it was found that the more dependents a health worker had, the more positive they were in response to questions concerning their motivation (Prytherch et al., 2013). This may be because the income of workers becomes more important as their number of dependents increases making workers less likely to respond negatively to these questions. Workers with children have also been found to be significantly more committed to staying in a facility compared to workers without children (Fogarty et al., 2014).
Urban-rural status	Opportunities, for example for career development, may be greater in urban areas compared to rural areas which could have an effect on motivation (Kotzee & Couper, 2006). Developing countries often experience 'urban bias' whereby urban areas experience a greater provision of services and investment compared to rural areas (Lipton, 1977). The relative underinvestment in rural areas may serve to reduce the motivation of workers.
Total number of staff delivering healthcare present on the day	The number of staff working in a facility at a given time will affect the distribution of tasks and potentially the workload of personnel. This may in turn affect health worker motivation. Workload is an important motivating factor, particularly in the context of limited resources (World Health Organization, 2006).
Number of services offered	The more services offered by a facility, the greater the potential for workers to use a variety of skills and have responsibility for certain tasks. This may have the potential to affect motivation, according to the job characteristics model developed by Hackman and Oldham (1976).
Distance of the facility from the village	Distance of the facility from the village has been used here as a proxy for the remoteness of facilities. Globally, it is challenging to recruit and retain workers in remote areas (World Health Organization, 2010). Nonetheless, Stilwell found that health workers based in remote areas of Zimbabwe displayed a high level of motivation despite a lack of financial incentives compared to workers in less remote areas (Stilwell, 2001).
Education	Educational background has been shown to be a predictor of intention to leave a health facility (Tzeng, 2002).
Years in position	In Tanzania, respondents who had been working for longer tended to be less critical about the management of the facility. This may be due to their understanding and acceptance over time around the constraints faced by facilities (Prytherch et al., 2013). However, another study in Afghanistan showed that workers who had been working longer at a facility, had a lower intent to stay than those who had been working for a shorter period of time (Fogarty et al., 2014).
Type of facility	A cross-country analysis of Tanzania, South Africa and Malawi indicated that workers in public hospitals were less satisfied compared to workers in clinics or health centres (Blaauw et al., 2013). Reference facilities in the DRC are bigger than health centres and offer a broader range of services which may affect the motivation of workers.
Total population of the village	The greater the population served by a facility may result in more patients accessing the facility. The increased workload may in turn affect staff motivation.
Removal of PBF	It has been postulated that removing financial incentives may reduce pre-existing intrinsic motivation and psychology experiments have demonstrated a reduction in effort following removal of monetary incentives to perform an otherwise intrinsically rewarding task (Camerer, 2010; Deci, Koestner & Ryan, 1999; Kamenica, 2012). The effects have not been studied in depth in low-income countries, however a study in the United States confirmed a decrease in performance when incentives linked to clinical indicators were removed (Lester et al., 2010).

Qualitative data

Qualitative data collection was also carried out in November 2014 in the province of Kasai Occidental. Two urban and two rural health zones where workers had previously received PBF payments under the ATH programme were selected as well as two urban and rural health zones which had not previously received PBF. However, none of the workers in these health centres had been interviewed using the health worker survey. Two nurses (one female and one male) were then purposively selected from a health centre in each health zone, making a total of 16 nurses. In all sites, data collection involved in-depth interviews with selected participants using a semi-structured interview guide based around the conceptual framework of the determinants and outcomes of motivation. In particular, the perceptions of health workers were sought on: the working environment e.g. in terms of resources, relationships with colleagues and superiors, workload and the quality of services offered, barriers or facilitators in performing tasks, commitment to the job, management of the facility, behaviour of themselves and colleagues at work, non-financial incentives such as training, financial incentives, and overall satisfaction. Those workers whom had previously received performance-based payments were asked an additional set of questions to explore their perceptions of PBF, and any changes which had occurred following the removal of PBF. Interviews lasted between one and two hours. A local qualitative researcher performed all 16 interviews under the supervision of the Principal Investigator. Interviews were conducted in French and audio recorded.

Analysis

Audio recordings were transcribed in French by the qualitative researcher. The Principal Investigator reviewed all transcripts using the original audio recordings and familiarised herself with the data before commencing coding using NVivo 10 software. Initially, a coding frame using the original conceptual framework as proposed by Franco et al. (2002) was used and subsequently the underlying factor structure of the quantitative health worker survey was compared and triangulated with the qualitative analysis.

Ethical considerations

The study protocol was approved by the Tulane University Institutional Review Board, the Kinshasa School of Public Health Ethics Committee, and the London School of Hygiene and Tropical Medicine Research Ethics Committee. Informed consent was obtained from all participating health care providers.

Results

Quantitative analysis

A total of 485 health workers were initially interviewed and no health workers declined to participate in the survey. However, respondents who did not meet the inclusion criteria, or worked in facilities not meeting the inclusion criteria, were eliminated as well as those respondents with more than 10% of their responses missing. A further four questions where

over 10% of responses were not applicable were also dropped, leaving 58 questions in the survey for analysis. These questions and an explanation are given in Appendix 3.

For the remaining 458 respondents, out of a total of 26,564 responses (458 x 58), 39 had missing responses to all (0.15%) while 208 had not applicable responses (0.78%).

To carry out exploratory factor analysis, a common convention is to have at least 10 respondents per questionnaire item (Hu & Bentler, 1999). However, the empirical basis for this is not clear and has even been described as "sample overkill" that makes little difference to stability of factor solutions (Field, 2013; Sapnas & Zeller, 2002; Arrindell & Van der Ende, 1985). Tabachnick and Fidell (2007) suggest a sample size of 300 cases as being sufficient. When all respondents with missing values or not applicable values were dropped, this would have meant dropping a further 124 questionnaires, almost a third of the data collected. Therefore, given the loss of a large number of valid responses if question responses of "not applicable" were excluded, a neutral response (score 3) was therefore imputed for these responses, leaving a dataset of 430 completed questionnaires that excluded any questions with genuinely missing responses.

Profile of respondents

Table 3 illustrates the demographic characteristics of those responding to the health worker survey. Most workers were nurses, male and aged between 30 and 45 years old. The majority had attained some level of secondary school education and the median length of time working in their current position was six years. Most of the facilities sampled were health facilities in rural areas. Often, facilities were situated within five kilometres of the nearest village, serving a population of less than 5,000 people.

Table 3: Profile of respondents.

Characteristics	Proportion of workers
Sex	**(n=430)**
Male	69.1%
Female	30.9%
Age	**(n=430)**
<30 years	11.2%
30-44 years	59.5%
45-60 years	26.1%
>60 years	3.3%
Education	**(n=430)**
Primary school	0.5%
Secondary school	59.5%
University/Post-secondary school	33.7%
Not specified	6.3%
Position	**(n=430)**

Characteristics	Proportion of workers
Doctor	0.9%
Nurse	89.5%
Laboratory worker	1.2%
Pharmacy worker	1.4%
Traditional birth attendant	2.8%
Auxiliaries, medical and nursing assistants	4.2%
Facility location	**(n=430)**
Rural	79.8%
Urban	20.2%
Province	**(n=430)**
Equateur	21.4%
Kasai Occidental	30.0%
Kasai Orientale	5.8%
Maniema	29.1%
Province Orientale	13.7%
Type of facility	**(n=428)**
Health centre	80.7%
Reference health centre	18.1%
Health post	1.2%
Distance of facility from the village	**(n=421*)**
Less than 1 km	30.6%
Between 1 and 5km	49.2%
Between 5 and 10km	12.1%
Greater than 10km	8.1%
Number of services provided by facility*	**(n=416*)**
3 to 5 services	12.7%
6 to 9 services	75.2%
Over 10 services	12.0%
Total clinical staff present on the day	**(n=430)**
1	14.7
2	33.5
3	25.8
4	16.7
5	3.5
6	4.2
7	1.6
Population catchment for area	**(n=410*)**
Less than 5,000	48.3
5000 to 10,000	22.2
10,001 to 15,000	17.1
Greater than 15,000	12.4

Characteristics	Proportion of workers
	N, mean, SE (Median, IQR)
Number of financial dependents	416*, 8.9, 4.6 (8, 6-12)
Years worked in current position	424*. 9.1, 8.8 (6, 3-12)
*N less than 430 due to missing values for those variables. No variables had >10% of data missing.	

The mean score for each of the 58 questions is shown in Table 4. A high mean score indicated a positive response to items assessing aspects of motivation, irrespective of the original wording of the question as negative questions were reverse coded. The highest mean score was obtained for questions relating to the ability to handle work while the lowest mean score was obtained for the question inquiring whether income received adequately covered basic needs such as food and transport.

Table 4: Mean and median scores of questions for each construct

Construct	Question	Mean	Median
Financial	*The effort that we at this facility put into this job is reflected in our pay*	2.22	2
	My job offers adequate pay compared with similar jobs	2.09	2
	The income I receive is a fair reflection of my skills, knowledge and training	1.82	2
	The income that I receive from working at this facility more than covers my basic needs such as food, transport, and accommodation	1.71	2
	With this job I have worries about how to support myself and my family	2.40*	2
	How do you rate the system of compensation/motivation of personnel?	2.29	2
Resources	*How do you rate the availability of medicines in the facility?*	2.32	2
	How do you rate the availability of equipment in the facility?	2.07	2
	How do you rate the availability of medical supplies in the facility?	2.46	2
	How do you rate the physical condition of the facility building?	2.57	2
	How do you rate the number of personnel working in the facility?	2.97	3
Workload	*How do you rate the flexibility with attendance and work hours?*	3.42	4
	How do you rate the division of work between you and your colleagues?	3.70	4
	How do you rate the division of work between caring for patients and other tasks?	3.67	4
	How do you rate the help you receive from other members of your team?	3.43	4
	How do you rate your workload?	3.33	4
Management	*How do you rate the management of the facility by the MSP or health zone office?*	2.79	3
	How do you rate the transparency of the management of financial resources by the facility?	3.48	4
	How do you rate your involvement in decisions to resolve problems within the facility?	3.77	4
Training	*How do you rate your ability to put into practice what have you learned from training?*	3.81	4
	How do you rate how you and your colleagues are chosen to attend training?	3.25	4
	How do you rate your opportunities to upgrade your skills and knowledge?	3.39	4
Job description	*How do you rate the stability of your contract?*	3.37	4
	How do you rate the variety of your tasks?	3.66	4
	How do you rate your safety and security to live and practice in the community	3.74	4

Construct	Question	Mean	Median
	How do you rate your level of responsibility?	3.98	4
	How do you rate the description of your responsibilities and your tasks?	3.77	4
	How do you rate your opportunities for promotion?	3.07	3
Pride	*This facility has a good reputation in the community*	4.11	4
	It is a source of pride to get a job at this facility	3.94	4
	In this facility, providers are proud to deliver good services to patients	4.08	4
Self-efficacy	*I feel that I have control of things concerning my work*	3.71	4
	I feel that at work things are going the way I would like them to	2.84	2
	I effectively cope with any new challenges that occur in my work life	4.06	4
	I am confident about my ability to handle my work	4.21	4
	I have received sufficient training to be able to perform my job well	3.79	4
Work harmony/ Agreement	*How do you rate the level of respect accorded to you by your external supervisors in the facility?*	3.89	4
	How do you rate the respect you receive from the community?	4.15	4
	How do you rate the recognition by your superiors for a job well done?	3.72	4
	How do you rate your professional relationships with your superiors?	3.92	4
	How do you rate your professional relationships with your colleagues?	4.06	4
	How do you rate your relationships with local leaders in the community?	4.01	4
Timeliness/ Attendance	*I always arrive on time to work*	4.05	4
	I am rarely absent from work	3.99	4
	I spend my time at work on work-related activities	4.14	4
Conscientiousness	*I do things which need to be done without being asked or told*	4.06	4
	When I am not sure how to treat a patient's condition I look for information or ask for advice	4.11	4
	I am careful not to make errors at work	4.12	4
	I am a hard worker	4.14	4
	My work is consistently of a high quality	4.02	4
	I am always reliable and dependable at work	4.14	4
Satisfaction	*How do you rate your ability to provide patients with high quality care?*	3.98	4
	How do you rate your ability to satisfy the needs of the community?	4.07	4
	How do you rate your satisfaction overall with your job?	3.46	4
	I am satisfied that I am doing something important in this job	3.95	4
Commitment	*I only do this job so that I get paid at the end of the month*	3.60*	4
	I intend to leave this facility as soon as I can find another position	2.98*	4
	I would recommend this profession to my children	3.12	4

*The scale for negatively worded questions was 1(strongly agree) to 5 (strongly disagree). Thus a high score shows disagreement with a negative statement and is therefore suggestive of higher motivation.
NB Higher mean or median value indicates a more positive response

Exploratory factor analysis

Prior to factor analysis, all 58 questions taken together as a single composite measure of motivation had a Cronbach's alpha of 0.84. Constructs relating to determinants had a Cronbach's alpha of 0.83 while those relating to outcome had a Cronbach alpha of 0.60. However, individual constructs performed less well, with Cronbach's alphas ranging from 0.12 to 0.73 which may have reflected the small number of items per construct but also could suggest the imposed factor structure may not be appropriate (see Table 5) (Prytherch et al., 2013).

Table 5: Cronbach's alpha for constructs.

Construct	Cronbach's alpha
Determinants	
Financial	0.60
Management	0.48
Job description	0.57
Workload	0.67
Training	0.73
Resources	0.61
Work harmony/relationships	0.59
Pride	0.66
Self-efficacy	0.47
Outcomes	
Timeliness/attendance	0.45
Conscientiousness	0.70
Commitment	0.12
Satisfaction	0.41
Subscales	
Determinants	0.83
Outcomes	0.60
Overall scale	0.84

Exploratory factor analysis including all questions was then conducted. A total of 22 questions had factor loadings of less than 0.32 following rotation and so were dropped from the analysis. The analysis showed that five latent factors explained the majority of the variance in the data, as opposed to the 13 originally proposed constructs.

The questions clustering around the same factor suggest that factor one represents individual or personal behaviour or characteristics of health workers, factor two represents opportunities (e.g. for training and career), factor three represents features of the job, factor four relates specifically to aspects of the working environment and working relationships, while factor five represents the financial reward of the job. No items cross-loaded onto another factor indicating a strong factor structure, and there were no negative factor loadings. The Kaiser-Meyer-Olkin measure (KMO) verified the sampling adequacy for the analysis (KMO=0.80), and all KMO values for individual questions were greater than 0.69 which is well above the acceptable limit of 0.5 (Field, 2013; Kaiser, 1960). Cronbach's alpha for the overall new scale was 0.80.

Table 6 shows the factor loadings for each item, eigenvalues, percentage variance and Cronbach's alpha for the latent factors after oblique rotation.

Table 6: Summary of exploratory factor analysis results following rotation.

	Rotated Factor Loadings				
Item	**Individual factors**	**Opportunities**	**Features of the job**	**Working relationships and environment**	**Financial reward**
I am confident about my ability to handle my work	0.58				
I effectively cope with any new challenges that occur in my work life	0.45				
I am always reliable and dependable at work	0.62				
My work is consistently of a high quality	0.48				
I am a hard worker	0.50				
I always arrive on time to work	0.49				
I spend my time at work on work-related activities	0.60				
I am rarely absent from work	0.37				
I am careful not to make errors at work	0.65				
When I am not sure how to treat a patient's condition I look for information or ask for advice	0.48				
I do things which need to be done without being asked or told	0.47				
How do you rate your opportunities to upgrade your skills and knowledge		0.77			
How do you rate your ability to put into practice what you have learned from training?		0.71			
How do you rate how you and your colleagues are chosen to attend training?		0.54			
How do you rate your opportunities for promotion?		0.35			
I have received sufficient training to do my job well		0.57			
How do you rate the number of personnel working in this facility?			0.39		
How do you rate the description of your responsibilities and your tasks?			0.40		
How do you rate the flexibility with attendance and work hours?			0.48		
How do you rate your workload?			0.65		
How do you rate the division of work between you and your colleagues?			0.63		
How do you rate the division of work between caring for patients and other tasks?			0.62		
How do you rate the help you receive from other members of your team?			0.36		
How do you rate the variety of your tasks?			0.55		

How do you rate your professional relationships with your superiors?				0.46	
How do you rate your professional relationships with your colleagues?				0.48	
How do you rate the transparency of the management of financial resources by the facility?				0.51	
How do you rate your involvement in decisions to resolve problems within the facility?				0.46	
This facility has a good reputation in the community				0.44	
It is a source of pride to get a job at this facility				0.44	
The effort that we at this facility put into this job is reflected in our pay					0.73
My job offers adequate pay compared with similar jobs					0.73
The income I receive is a fair reflection of my skills, knowledge and training					0.70
The income that I receive from working at this facility more than covers my basic needs such as food, transport, and accommodation					0.55
I feel that at work things are going the way I would like them to					0.39
I only do this job so that I get paid at the end of the month					0.42
Eigenvalues	3.74	2.86	2.82	2.55	2.48
% variance	30.3%	23.2%	22.8%	20.6%	20.1%
Cronbach's alpha	0.79	0.74	0.74	0.67	0.49

Health worker and facility determinants of motivational dimensions

Overall motivation levels were significantly higher for those working in ASSP-supported facilities (β=0.52, p=0.008) and in facilities offering more services (β=0.042, p=0.039) (Table 7). It was lower for the previous PBF group compared to the non-PBF group (β=-0.26, p<0.001).

For the dimension self-efficacy and conscientiousness, scores were higher for male workers (β=0.06, p=0.086), those in facilities providing more services (β=0.03, p=0.038), workers with a higher number of dependents (β=0.01, p=0.019) located in ASSP-supported facilities (β=0.11, p=0.021). Workers in the PBF group and those with a school level of educational attainment as opposed to university education scored lower on this dimension: (β=-0.20, p<0.001) and (β=-0.01, p=0.008) respectively.

Health workers from more remote facilities and those with higher staffing levels had significantly lower scores on the dimension training and opportunities: (β=-0.02, p=0.052) and

(β=-0.09, p=0.028) and respectively. The PBF group also scored lower on this dimension (β=-0.37, p=0.013), while workers in ASSP facilities had higher scores (β=0.24, p=0.037).

Workers in health centres and facilities providing more services tended to score higher for the dimension job characteristics: (β=0.23, p=0.017) and (β=0.08, p=0.001) respectively. For working environment, scores were significantly higher for males (β=0.13, p=0.057) and those with a high number of dependents (β=0.02, p=0.008) but were lower for those in the previous PBF group (β=-0.33, p=0.001).

With respect to the dimension financial reward, workers in more remote facilities scored significantly lower (β=-0.01, p=0.009) as did workers in urban areas (β=-0.20, p=0.018). Workers no longer in receipt of PBF also scored lower on this dimension (β=-0.33, p<0.001). Those who had received a school education scored significantly higher than university-educated workers (β=0.23, p<0.001).

Table 7: OLS regression results for characteristics associated with motivation dimensions and overall motivation

	Conscientiousness and self-efficacy	Training and opportunities	Job characteristics	Working environment and relationships	Financial reward	Overall motivation
Explanatory variables	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**	**β (SE)**
Urban	-0.022 (0.049)	0.047 (0.132)	-0.083 (0.100)	-0.120 (0.103)	-0.204 (0.085)**	-0.076 (0.068)
Heath centre (vs. reference heath centre)	0.022 (0.059)	0.319 (0.178)*	0.234 (0.097)**	0.167 (0.106)	0.053 (0.084)	0.159 (0.084)*
School education (vs. university)	-0.099 (0.037)***	-0.027 (0.085)	0.041 (0.072)	-0.032 (0.070)	0.234 (0.059)***	0.024 (0.042)
Male	0.061 (0.035)**	0.141 (0.090)	-0.010 (0.066)	0.131 (0.057)**	-0.096 (0.067)	0.045 (0.041)
Age	0.002 (0.002)	0.003 (0.005)	0.007 (0.004)	0.002 (0.004)	0.002 (0.004)	0.003 (0.002)
Years in position	-0.002 (0.003)	-0.006 (0.005)	-0.002 (0.004)	-0.002 (0.004)	0.001 (0.004)	-0.002 (0.003)
Nurse (versus other positions)	0.009 (0.077)	0.229 (0.174)	0.161 (0.111)	-0.006 (0.067)	-0.023 (0.076)	0.074 (0.068)
Distance of facility from village	0.003 (0.002)	-0.020 (0.010)*	-0.003 (0.005)	-0.001 (0.005)	-0.012 (0.004)***	-0.007 (0.003)*
Number of services	0.029 (0.014)**	0.068 (0.037)* P=0.065	0.077 (0.023)***	0.027 (0.029)	0.007 (0.021)	0.042 (0.020)**
Total personnel	0.006 (0.015)	-0.089 (0.040)**	0.041 (0.031)	0.051 (0.029)*	0.005 (0.024)	0.003 (0.019)
Population served	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Number of dependents	0.009 (0.004)**	0.008 (0.008)	-0.002 (0.006)	0.016 (0.006)***	-0.004 (0.007)	0.005 (0.004)
PBF removed	-0.201 (0.055)***	-0.369 (0.147)**	-0.113 (0.100)	-0.327 (0.095)***	-0.327 (0.089)***	-0.257 (0.064)***
Presence of ASSP	0.112 (0.048)**	0.244 (0.116)**	0.151 (0.079)*	0.133 (0.079)*	0.102 (0.080)	0.148 (0.055)***
Constant	3.814 (0.339)***	1.63 (0.898)*	1.50 (0.559)***	2.761 (0.590)***	1.822 (0.464)***	2.305 (0.454)***
Pseudo R^2	0.12	0.13	0.07	0.11	0.18	0.13
Number observations	348	348	348	348	348	348

*P≤0.1 **p≤0.05 ***p≤0.01

Qualitative analysis

The qualitative analysis has been reported under construct headings arising from the factor analysis.

Individual behaviour

In general, interviewed workers felt they were conscientious and worked hard. Their definition of being conscientious was often linked to the welcoming and treating of patients, conducting awareness-raising activities with communities, following protocols, completing reports, and attending the facility on time.

"C'est quand je fournis le rapport, je travaille et je fais le rapport en ce moment-là je peux voir que je suis vraiment compétent."

"It's when I deliver the report, I work and I do the report, and in that time I can see that I am truly competent."

Male, 40 years

However, workers were reluctant to admit to the times where they may have been less conscientious. For instance, nurses would often contradict themselves when asked whether increased financial reward would influence their conscientiousness.

I:"Comment l'argent peut changer votre travail?"
R: "Non, l'argent ne va pas changer mon comportement de travail"
I: "Donc, si vous êtes payé ou pas, vous pensez que rien va changer?"
R: "Dans notre façon, ça peut changer quand-même"
I: "Par exemple quoi?"
R: "Rien ne va changer…"

I: "How will money change your work?"
R: "No, money will not change my behaviour at work"
I: "So whether you are paid or not, you think nothing is going to change?"
R: "In a way, it can change"
I: "For example, how?"
R: "Nothing will change"

I=Interviewer
R=Respondent

Female, 38 years

Some nurses blamed their hunger on their lack of effectiveness at work.

"Ce qui nous empêche, quelqu'un, il ne peut pas travailler affame. Il faut nourrir l'organisme. Quand tu ne nourris pas l'organisme, tu n'as plus la force de travailler. ...Il y a des malades, il y a des produits, mais tu n'as pas la force de travailler parce que tu n'as pas mangé là où tu as quitte. Parce que quelqu'un ne peut faire le travail sans manger. Tu n'as pas l'argent, tu dois faire quoi?"

"What prevents us, someone, one cannot work if they are starving. You have to feed the body. When you do not feed the body, you no longer have the strength to work. There are patients, there are some medications/treatments, but you do not have the strength to work because you did not eat there where you left. Because someone cannot work without eating. You do not have money, what do you do?"

Male, 30 years

Other reasons given by respondents as to why they or their colleagues were not coming to work or were arriving late to work were due to family obligations such as looking after their children. Many were also quite frank that the lack of financial incentives would mean they were less willing to come to work.

"Ils ne viennent pas au travail parce que quelqu'un peut venir comme ça du premier au 30 pour ne recevoir que du savon ici, ça va se faire mal, en tant qu'un responsable d'une famille. Ça qui se passe vraiment ici."

"They don't come to work because someone can come (to work) between the 1st and the 30th (of the month) and receive nothing but soap here, it's going to hurt, as the head of a family. That's what really happens here."

Male, 37 years

Opportunities

When nurses were asked about the availability of opportunities for training or to carry out extra activities, many felt that the process by which these were allocated was unfair.

"D'abord…quand il y a une formation vous voyez les mêmes personnes qui partent. Vous voyez que s'il y a une formation que…vous voyez qu'on vient directement avec le véhicule, on choisit toujours les même gens-là qui partent…c'est ce que j'ai remarqué depuis je suis arrivée ici, moi je peux dire que depuis j'ai commencé à travailler ici, je n'ai jamais vacciné, comme la vaccination de campagnes je n'ai jamais fait. Alors je demandais toujours à mes collègues qui sont ailleurs, « mon cher, je veux aussi, mettre mon nom… ?...je peux aussi vacciner tant qu'on est toujours devant les gens là. "

"Firstly…when there is training you see the same people who leave. You see if there is a training ... you see that someone comes directly with the vehicle, they always choose the same folks who leave…this is what I've noticed since I arrived here, I can say that since I started working here, I have never vaccinated, such as during vaccination campaigns, I've

never done it. So I always ask my colleagues who are elsewhere "my dear, I also want to put my name ...? ... I can also vaccinate as we are always there in front of people."

Male, 32 years

There also appeared to be few opportunities for promotion with many nurses dissatisfied with the lack of career progression.

"Nous, on travaille, on a des grades, nous avons des grades de service, on n'a pas le suivi sur nos grades la, pour qu'on reçoit quelques choses."

"We are working, we have grades, we have service grades, but there is no monitoring of our grades, so that one can receive something."

Female, 60 years

"...au Congo on avait jamais promouvoir le grade pour les gens."

"...in Congo, one never promotes the grade of people"

Male, 42 years

Workload and job characteristics

Nurses did not seem to be dissatisfied with their workload and tasks. Many felt a sense of satisfaction and pride in the tasks they were carrying out.

"Puisque quand je fais les accouchements, je ne trouve pas des femmes ne font des mort-né et je vois qu'il n'y a pas des décès maternelles chez les mamans, je vois que c'est bien, seulement les matériels dont on peut travailler avec je n'en ai pas convenablement mais la façon que je travaille que je fais ça me satisfait parce que je ne cause pas des mort-né, je ne cause pas des décès maternelles depuis que je suis venu ici."

"Because when I assist deliveries, I don't find any stillbirths, and there are no maternal deaths, I see it is good, only I don't have the materials which I can work with but the way I work, makes me satisfied as I don't cause any stillbirths, I don't cause any maternal deaths since I arrived here."

Female, 60 years

Some mentioned that the benefit of the ASSP programme was that it had better defined their roles and responsibilities, particularly with respect to reporting.

"Nous trouvons qu'il y a d'autres documents qui aujourd'hui...qui était négligé, ... depuis que nous étions, nous sommes allés en formation, nous a briefer, nous a montrer comment en remplir, aujourd'hui nous sommes sensés toujours à travailler la"

"We find that there are other documents which today ... which were neglected ... since we went to training, they been briefed us, they showed us how to complete (the documents), today we know how to work"

Male, 35 years

However, some resented the amount of administrative work involved as it did not come with any extra compensation.

"Par exemple, surtout c'est le partenaire qui nous appui ou...l'appui de notre IMA, nous ajoute toujours…après la formation, on nous ajoute des activités ou les rapports. Dans ces rapports-là, il faut les faire…et maintenant, à la fin, il y a rien."

"For example, especially it's the partner who support us…the support of our IMA, adds to us always…after training, they add activities or rapports. One must do these reports…and now at the end, there is nothing."

Male, 35 years

Working relationships/environment

In general, nurses had good working relationships with their colleagues in the health facility.

"C'est puisque nous travaillons dans un endroit sanitaire, c'est pourquoi nous vivons en collaboration."

"It's because we work in a sanitary facility, it's why we work collaboratively"

Female, 38 years

"…il y a aussi de respect entre les autres, l'IT, l'IA, la matrone, toute l'équipe…il n'y a pas beaucoup de soucis quand-même…"

" There is also respect between the others, the head nurse, assistant nurse, the matron, the whole teams…there are not many concerns"

Male, 35 years

However, disputes over the allocation of user fees between staff were cited several times. Often, disputes arose because some nurses felt the amount they received from the facility was too low as the total revenue was shared amongst a high number of staff. Others felt the amount was unfair as they had worked harder than other colleagues who received the same amount.

"on dit dans toutes sociétés il y a toujours des conflits, vous voyez nous nous sommes à 15, à 15, là le prime qu'on touche là ça ce n'est pas une prime, vous pouvez parler du matin au soir, vous pouvez expliquer tout ça, vous utilisez le style démocratique là il faut les convaincre….ils vont toucher combien, 15 personnes ? Ah...c'est terrible."

"One says that in all societies there are always conflicts, you see there are 15 of us, for 15, the money from the facility we receive is not a bonus, you can talk from morning to night, you can explain all of that, you can be democratic, you need to convince them…they are going to receive how much, 15 people? Ah…it's terrible."

Male, 40 years

Nurses also described good working relationships with their superiors, and that there was a mutual respect between health facility staff and Health Zone Office staff.

"Comme je suis maman, ils (les gens au BCZ) me respectent beaucoup. Il n'y a pas de grondement, d'élévation de ton, il n'y en a pas."

"As I am a mother, they (they health zone office staff) respect me a lot. There is no grumbling, raising of the voice, there is none."

Female, 60 years

All nurses were dissatisfied with the resources available in the facility. The most common issue was the lack of medications available, in particular, medications which were desired by the community. This was also often seen as the reason why patients did not frequent the facilities. Nurses were dissatisfied at having to issue prescriptions following a consultation. Occasionally, some nurses would buy the required medications from the market.

"…d'autres critiques qu'on disait, c'est pour les médicaments que j'ai cite, ils disent qu'il y a toujours des ordonnances tout le temps."

"…other critics said, it is for the medications that I mentioned, they say there are always prescriptions all the time"

Male. 32 years

"Nous avons des partenaires, qui nous a donné les produits mais ce qui n'est pas là, nous cherchons dans la marche. On achète."

"We have partners who give us medications/supplies but for what is not there, we find it in the market. We buy it."

Female, 45 years

Other resources which were lacking in facilities included electricity, water, beds, and adequate lighting.

Financial reward

All health workers were dissatisfied with their financial compensation.

"Avec le travail qu'on fait, c'est un travail dur, tu peux te mettre debout pendant longtemps, pendant deux ou trois heures et à la fin du mois on recevait seulement 20.000 ou 30.000FC, ce n'est pas suffisant…"

"With the work one does, it's a tough job, you can be standing up for a long time during two or three hours and at the end of the month you receive only 20,000 or 30,000FC, it's not enough…"

Female, 48 years

Financial reward seemed to be very important to nurses and the word "motivation" was often used to refer to money.

"Par exemple la motivation qu'on donne…le 70.000FC, ça ne mérite pas d'atteindre un mois."

"For example the motivation one gives, the 70,000FC, it does not last one month."

Male, 32 years

An in-depth analysis of the financial compensation of workers is given in the previous report (Maini, 2015).

Consequences of removal of PBF

The consequences of PBF removal on staff behaviour and motivation were investigated. However, it became clear during interviews that the impacts were felt by the community as well as staff.

With respect to the impacts on staff, since PBF was withdrawn, many workers were not attending their work on time, and many had even permanently left the facility to look for jobs elsewhere.

"Alors… quand nous étions avec IRC, et ils sont déjà partis, alors les gens la ne peuvent pas fréquenter correctement le centre puisque ils manquent de moyens."

"So…when we were with IRC, and they had already gone, the workers could not attend the facility correctly as they did not have the means."

Male, 40 years

"*Oui cela a changé, parce qu'il y a d'autres qui ont laissé le travail, pour dire qu'on nous paye pas, on attend toujours la prime locale parce que, par exemple, vous avez 2 malades, vous êtes a 5, il faut faire le pourcentage, vous aurez combien ? Deux cas - on peut dire vous avez 5.000F, vous êtes a 10. Comment vous allez partager ça?"*

"Yes, that has changed because there are others who have left the job, saying they don't pay us, we receive always the user fee because for example, you have 2 patients, you are 6 workers, you have to calculate the percentage, you will have how much? Two cases – one can say you have 5,000FC, you are 10 workers. How are you going to share that?"

Female, 28 years

R: "Il y'avait même la révolte d'autres infirmiers pour quitter la ZS"
I: "Il y avait une révolte?"
R: "Révolte."
I: "Tu connais le nombre des infirmiers qui ont quitté?"
R: "Oui"
I: "Combien?"
R: "Il y a presque 10 dans toute la ZS."
I: "Révolte pour quoi?"
R: "Parce qu'ils ne sont pas primé, ils vont rester faire quoi?"

R: "There was even a mutiny of other nurses who left the health zone"
I: "There was a mutiny?"
R: "Mutiny"
I: "You know the number of nurses who left?"
R: "Yes"
I: "How many?"
R: "There were nearly 10 nurses in all of the health zone."
I: "Why was there a mutiny?"
R: "Because they were not receiving the prime, they were going to stay to do what?"

I=Interviewer
R=Respondent

Male, 30 years

The removal of PBF also seemed to demotivate workers and many no longer put in the requisite amount of effort required for tasks.

R: "Oui, on ne travaille pas beaucoup il y a même des centre qui font 10%, sur 100%, il fait 10%."
I: "Pourquoi il ne travaille pas beaucoup?"
R: "A cause de l'argent."

R: "Yes, one does not work a lot, there are even health centres which do 10% out of 100%, they work only 10%."
I: "Why do they not work a lot?"
R: "Because of money."

I=Interviewer
R=Respondent

Female, 27 years

The social circumstances of nurses also dramatically changed following the withdrawal of PBF. Many nurses had to borrow money from their relatives in order to pay for their children's school fees and food for their own family.

"Je me suis débrouillé, j'ai demandé l'aide à ma famille pour acheter quelques choses pour commencer à vendre pour se nourrir. Avec l'argent de ma famille ce n'est pas mon argent propre."

"I managed, I sought help from my family to buy a few things to start selling in order to feed myself. With the money from my family, it is not my own money."

Female, 28 years

"Oui, le comportement c'est différent. Vous ne voyez pas pour ce moment nous sommes sales…(laughs)…Nous sommes sales. Nous ne sommes pas propres. Nous ne sommes pas propres. Mais, avec les primes qu'on a attrapé dans la fois passe là-bas ça pouvait nous aider à l'occasion des études des enfants, tout ça."

"Yes, the behaviour, it's different. You do not see for the moment we are dirty... (laughs) ... we are dirty. We are not clean. We are not clean. But with the primes that we had in the past, that could help us for our children's education, all that."

Female, 30 years

In terms of impacts on the community, some nurses remarked that colleagues had become less welcoming and were even rude to patients since PBF had been removed.

"Ils disent même devant les malades là, le malade vient, ils disent « non quitte là, je ne peux pas te traiter parce que je ne suis pas payé."

"They say even in front of the patients there, the patient comes, they say "no, leave there, I can't treat you as I'm not paid."

Male 30 years

Since the removal of PBF also coincided with an increase in the user fee tariff, many nurses complained that the community had become used to the previous lower user fee tariff and that it meant they were less willing to pay the new tariff. As a result, many patients were not attending the facilities and instead were seeking care elsewhere, often from traditional healers or private facilities. Many nurses also complained that pregnant women were giving birth at home as opposed to in the facility because of the user fee tariff.

"Ça changé, puis que dans le temps d'IRC là, ici au CS, on avait beaucoup des malades, on peut faire 20 nouveaux cas par jour, parce que c'était la gratuité, mais pour ce dernier temps pour avoir 2 nouveaux cas par jour c'est très difficile"

"It changed because in the time of IRC here at the health centre, we had a lot of patients, we could have 20 new cases per day, because it was free, but recently to have 2 new cases a day, it is very difficult."

Female, 37 years

"Maintenant pour avoir de l'argent, pour venir au centre c'est tout un problème, ils prennent des médicaments traditionnels à la maison."

"Now to have money, to come to the centre, it's always a problem, they take traditional medicines at home."

Female, 27 years

"Puisque les gens sont déjà habitué à la gratuité, maintenant quand il voit vous demandez 1.000 FC pour la fiche, pour eux c'est un grand problème, même pour la maternité ici c'était gratuité maintenant c'est 1.500FC, mais les gens pour payer ça c'est devenir tout un problème"

"Because people are already used to the free tariff, now when he sees you ask 1,000FC for the consultation document, for them it's a huge problem, even for the maternity here it was free, now it's 1,500FC, but for people to pay that, it's becoming quite a problem."

Female, 37 years

R: "Maintenant pour avoir des accouchements au centre c'est une problème."
I: "Comme les femmes n'accouchent pas au centre, elles accouchent où?"
R: "à domicile, elles accouchent à domicile."

R: "Now having deliveries at the centre is a problem."
I: "If the women do not give birth at the centres, where do they give birth?"
R: "At home, they give birth at home."

I=Interviewer
R=Respondent

Female, 27 years

The increased tariff was also met with suspicion by some members of the community who thought the nurses had raised it for their own benefit.

"Par exemple, c'est moi qui est réceptionné le malade, si je lui dis, "donne-moi l'argent" et lui, il n'a pas l'argent, mais il y a le tarifaire là-bas, je dis ce n'est pas pour moi, c'est pour tout le monde."

"For example, it's me who greets the patient, if I say to him « give me money » and he does not have money, but the tariff is there, I say it is not for me, it's for everyone."

Female, 27 years

Some nurses felt the current policy did not distinguish between various vulnerable groups in the population. However, despite this, they would still make an effort to treat patients who could not pay.

"les adultes on n'a pas maintenant distingué qu'il y a des femmes enceintes, il y a des femmes allaitantes, il y a des indigentes, non, c'est commencé à traiter et ils payent 1.250FC, maintenant pour avoir les malades là au centre, vous pouvez faire trois jours sans traiter quelqu'un a notre centre."

"The adults, one has not yet distinguished there are pregnant women, there are breast-feeding women, there are the destitute, no, for treatment they pay 1,250FC, now to have patients at the health centre, you can go 3 days without treating someone at our centre."

Female, 27 years

"Nous le prenons en charge puisque nous avons fait longtemps nous sommes bien connus dans le quartier ici, si vous refuser de prendre en charge quelqu'un c'est très difficile, nous les prenons en charge même s'ils ne parviennent pas, maintenant ce qui est mauvais l'insolvabilité quand même de ces malades-là."

"We take care of them as we have been here for a long time and are well known in the neighborhood here, if you refuse to take care of someone that is very difficult, we take care of them even if they can't pay, now what is bad is the inability to pay of these patients."

Male, 40 years

Discussion

Based on existing conceptual and empirical work, we developed a questionnaire to assess the motivation of health workers in the Democratic Republic of Congo. Qualitative work alongside the quantitative analysis was conducted to better understand the domains of motivation identified through factor analysis. From our results, it would appear that the intrinsic and extrinsic motivation framework is more appropriate than the determinants and outcomes framework for describing the dimensions of motivation important to workers in the DRC. These dimensions include: self-efficacy and conscientiousness, opportunities, working environment and relations, job characteristics, and financial reward.

Health worker and facility characteristics associated with scores for overall motivation and each construct were also explored but with a particular regard for any differences between workers who had previously received PBF and workers who had not. Similar to Huillery and Seban (2015), this study found that individual traits, which included conscientiousness and self-efficacy, were significantly lower among workers who had previously been exposed to PBF. This also lends weight to the hypothesis that extrinsic factors can crowd out the intrinsic motivation of individuals.

The scores for overall motivation, working environment and relationships and perceptions of financial reward were also significantly lower in workers who were no longer receiving PBF. It should be noted that in the ASSP areas, health workers received PBF payments until April 2013 (one year before the survey), at which point IMA gradually phased out the payments over a six to twelve month period. As such, PBF had been dropped by the time the baseline survey was administered in April and May 2014. While our results suggest that the withdrawal of PBF may have adversely affected health worker motivation, we are unable to empirically assess the

impact of the withdrawal of payments on the levels of the motivational factors, and how these changed since the time the payments were removed. However, the fact that the qualitative interviews, which were conducted six months *after* the quantitative surveys, revealed that nurses remain deeply dissatisfied with the lost of income due to PBF payments being removed, suggests that the withdrawal of PBF has had persistent and substantial effects over a relatively long period of time. The loss of income from the PBF payments meant staff relied more heavily on income received from the facility, which was a much lower amount than the previous PBF payment (Maini et al, 2017). This may have impacted relationships between staff in the facility; a common cause of disputes was the allocation of the user fee between personnel at the end of the month.

Health worker and facility characteristics associated with scores for overall motivation and each factor were explored. In terms of health worker characteristics, significant gender differences were observed with males reporting significantly higher levels of conscientiousness and satisfaction with working environment and relationships. The reasons for these differences are not clear and warrant further investigation, however, the existing gender imbalance in Congolese society may partially explain lower scores among females. Chandler et al. did not find gender to be significantly associated with motivation factor scores in Tanzania (Chandler et al., 2009) but Bennett et al. found significant differences between gender groups for scores on motivation determinants in Jordan (Bennett et al., 2000)

University-educated workers were more likely to report higher levels of conscientiousness but were less satisfied with their financial compensation. Workers who seek education beyond secondary school may be more committed to their job as they have invested in further education to progress their career yet may feel they have not received the financial return they expected given their level of skills and experience. However this contrasts with findings in Cambodian primary care health workers which showed no significant association between level of educational attainment and job motivation (Khim, 2016).

Having a high number of dependents was significantly associated with higher scores on the dimensions conscientiousness and self-efficacy, and working environment and relationships which is consistent with findings from Tanzania (Prytherch et al., 2013). Having a job is more important to this group given their responsibilities, and so may cause them to offer more socially desirable answers if they are concerned that negative responses could jeopardise their employment.

In terms of facility characteristics, a high number of staff was significantly associated with lower scores for the dimension training and opportunities. A reason for this may be that opportunities to attend training or participate in activities e.g. vaccination campaigns, will be lower if there are more staff eligible to attend. ASSP was also significantly associated with higher scores for this dimension which could be explained by the extensive training provided to facilities as part of the programme. Higher scores for conscientiousness and efficacy, job characteristics and working relationships and environment were also observed in ASSP facilities, which was expected given the programme's aim is to support facilities to provide preventative and curative care, particularly through the provision of resources which would have otherwise been lacking in unsupported facilities. The more services provided by a facility,

the more likely they were to score highly on the factor job characteristics. This may be because workers are able to engage in a greater variety of tasks in the context of a large number of services.

The results of the qualitative analysis also yielded a number of interesting findings. While many respondents commented that they are generally satisfied with their work as nurses and that they have good working relationships with their colleagues, all nurses expressed deep frustration with the financial compensation they receive. Some nurses mentioned that their income was not enough to pay the costs of food and other necessary household's items. Disputes about how income from user fees was divided among health workers were cited several times in the interviews. In addition, some nurses reported that they were not satisfied with the amount of training opportunities, and that the process of choosing which workers received these opportunities was unfair. In terms of ASSP workers, many respondents commented that the project has better defined their roles and responsibilities. However, some commented that they receive no extra compensation for some of the extra increased job responsibilities that have been assigned, such as reporting.

Overall, the findings of this study indicate a need to carefully consider the effects of withdrawing financial support from workers. In this case, the exit from a PBF programme had an impact on the livelihoods of staff, behaviour of staff, and the relationships between staff and communities. The introduction of user fees also negatively affected access to health care by communities, with many preferring to go to traditional healers, private clinics, or not access health care at all. With the benefit of hindsight, the withdrawal of PBF could have been managed more sensitively. Lessons learned going forward are to consider the effects the withdrawal of PBF may have on the health workers and the communities, and putting in place strategies to mitigate any negative consequences. For instance, monitoring staff performance at these facilities and ensuring clear communication to the community that workers are no longer receiving PBF payments. Furthermore, despite the phased withdrawal of PBF payments over a few months, the changes in livelihood experienced by workers following the removal of PBF were reportedly dramatic as these payments had previously made up the majority of their income (Maini, 2015). Future programmes considering PBF should take into account the relative contribution that PBF payments will make to overall health worker income. Given the financial shock experienced by workers on termination of PBF payments, it may have been advisable for partners to consider extending other benefits to these workers such as a contribution towards rent or children's school fees. In addition, according to the ASSP workshop to define tariffs for user fees in Kasai Occidental, zones previously supported by PBF actually charged lower user fee tariffs than the other ASSP zones, so these workers would have earned less for the same number of consultations than their counterparts in other zones (Division Provincial de la Santé du Kasai Occidental, 2013).

Strengths and limitations of the study

A key strength of the study is that it employed factor analysis to identify constructs of motivation deemed important to workers in the DRC. This is an objective and mathematical method which has been widely used to study the dimensionality of a set of variables. It is also

a powerful data reduction tool, allowing us to measure the core elements of motivation which are most relevant to workers in the DRC and not focus on any redundant attributes. Following factor analysis, we now have a more conservative, parsimonious tool of 36 questions for measuring motivation in the future. The qualitative interviews also helped to identify why dimensions of motivation were important to workers, and corroborated well with the constructs identified by the factor analysis.

However, there were several limitations to this study. Firstly, the health worker survey only recruited workers present on the day of the survey. It is possible that the motivation of workers who are likely to be present in facilities differs from that of workers who are less frequently working in facilities, yet the extent of this selection bias could not be determined. Secondly, the study was subject to certain biases, including social desirability bias where respondents' perceptions of what constitutes an acceptable answer or what they think the researcher wishes to hear may have influenced their responses. Thirdly, since we did not have any prior experience of assessing motivation in this context, a broad range of constructs were initially included. However, this had to be traded off against having a questionnaire of manageable length so only a few items could be included per construct. Due to resource constraints, interviews could only be conducted in one province. An important limitation therefore was that the results of removing PBF from workers in the provinces examined here may not be representative of all workers, or generalizable to other DRC provinces or even outside of the DRC. Future research would be needed to examine whether the effects described here occur in different country contexts.

It would have been useful to have undertaken qualitative work to inform the development of the survey tool, but this was not possible within the timeframe of implementing the survey. A significant limitation of the study is that it is cross-sectional and, as such, we were not able to attribute causality between the removal of PBF payments and effect on motivation. Once the protocol for this study had been accepted, the removal of PBF payments had already commenced and so the motivation of workers during the PBF payments could not be measured.

Conclusions

There are no gold standard tools to measure motivation. However, it is hoped that this tool is relevant to the DRC context and will be used in subsequent studies to measure any changes in motivation experienced by workers over the ASSP programme. In the DRC and other low-income countries, many donors are implementing PBF programmes in order to improve the delivery of health services. PBF is thought to achieve this by providing financial incentives in order to increase the motivation of workers and therefore their performance. However, these programmes are not sustainable in a context like the DRC where PBF is wholly reliant on donor funding, and it is hoped that the lessons learned from this study will inform the actions of other donors wishing to exit from PBF programmes. It is also recommended that further work is undertaken to validate the motivation survey. This could be performed on the midline health worker survey using confirmatory factor analysis of our hypothesised factor structure. A validated tool to measure health worker motivation in the DRC would be useful in order to

robustly evaluate the effects of future interventions in the ASSP programme which may affect health worker motivation.

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Appendices

Appendix 1: Original survey items and constructs

Construct	Question
Financial	*The effort that we at this facility put into this job is reflected in our pay*
	My job offers adequate pay compared with similar jobs
	The income I receive is a fair reflection of my skills, knowledge and training
	The income that I receive from working at this facility more than covers my basic needs such as food, transport, and accommodation
	With this job I have worries about how to support myself and my family
	How do you rate your salary with respect to your workload?
	How do you rate your salary with respect to your competencies/ability?
	How do you rate your salary with respect to your allowances (travel allowance, bonus, medical care)?
	How do you rate the system of compensation/motivation of personnel?
Resources	*How do you rate the availability of medicines in the facility?*
	How do you rate the availability of equipment in the facility?
	How do you rate the availability of medical supplies in the facility?
	How do you rate the physical condition of the facility building?
	How do you rate the number of personnel working in the facility?
Workload	*How do you rate the flexibility with attendance and work hours?*
	How do you rate the division of work between you and your colleagues?
	How do you rate the division of work between caring for patients and other tasks?
	How do you rate the help you receive from other members of your team?
	How do you rate your workload?
Management	*How do you rate the management of the facility by the MSP or health zone office?*
	How do you rate the transparency of the management of financial resources by the facility?
	How do you rate your involvement in decisions to resolve problems within the facility?
Training	*How do you rate your ability to put into practice what have you learned from training?*
	How do you rate how you and your colleagues are chosen to attend training?
	How do you rate your opportunities to upgrade your skills and knowledge?
Job description	*How do you rate the stability of your contract?*
	How do you rate the variety of your tasks?
	How do you rate your safety and security to live and practice in the community
	How do you rate your level of responsibility?
	How do you rate the description of your responsibilities and your tasks?
	How do you rate your opportunities for promotion?
Pride	*This facility has a good reputation in the community*
	It is a source of pride to get a job at this facility
	In this facility, providers are proud to deliver good services to patients
Self-efficacy	*I feel that I have control of things concerning my work*
	I feel that at work things are going the way I would like them to
	I effectively cope with any new challenges that occur in my work life
	I am confident about my ability to handle my work
	I have received sufficient training to be able to perform my job well
Work harmony/ agreement	*How do you rate the level of respect accorded to you by your external supervisors in the facility?*
	How do you rate the respect you receive from the community?
	How do you rate the recognition by your superiors for a job well done?
	How do you rate your professional relationships with your superiors?

Construct	Question
	How do you rate your professional relationships with your colleagues?
	How do you rate your relationships with local leaders in the community?
	How do you rate the level of respect accorded to you by your internal supervisors in the facility?
Timeliness/ attendance	*I always arrive on time to work*
	I am rarely absent from work
	I spend my time at work on work-related activities
Conscientiousness	*I do things which need to be done without being asked or told*
	When I am not sure how to treat a patient's condition I look for information or ask for advice
	I am careful not to make errors at work
	I am a hard worker
	My work is consistently of a high quality
	I am always reliable and dependable at work
Satisfaction	*How do you rate your ability to provide patients with high quality care?*
	How do you rate your ability to satisfy the needs of the community?
	How do you rate your satisfaction overall with your job?
	I am satisfied that I am doing something important in this job
Commitment	*I only do this job so that I get paid at the end of the month*
	I intend to leave this facility as soon as I can find another position
	I would recommend this profession to my children

Appendix 2: Regression diagnostics applied to test assumptions of OLS models

Regression diagnostics*	**Assumptions tested**
Ramsay RESET test	Functional misspecification
Breusch-Pagan / Cook Weisberg test	Homoskedasticity
VIF test	Multicollinearity

*Normality of residuals not tested as over 200 observations for each model. The central limit theorem states that the distribution of the sum (or average) of a large number of independent, identically distributed variables will be approximately normal, regardless of the underlying distribution.

Appendix 3: Questions dropped due to high proportion of respondents answering "not applicable"

Construct	**Question**	**Reason for high number of not applicable answers**
Financial	*How do you rate your salary with respect to your workload?*	Salaries received by small number of workers.
Financial	*How do you rate your salary with respect to your competencies/ability?*	Salaries received by small number of workers.
Financial	*How do you rate your salary with respect to your allowances (travel allowance, bonus, medical care)?*	Allowances not routinely received by workers.
Work harmony/agreement	*How do you rate the level of respect accorded to you by your internal supervisors in the facility?*	Many workers interviewed would have been the head of the facility and therefore not had an internal supervisor.

Appendix 4: Proposed ASSP Operations Research Concept Note, Health Worker Motivation Study

2nd May 2014

Background

The performance and benefits produced by the health system depend heavily on the knowledge, skills and motivation of its workforce (WHO, 2000). Health workers are also critically important to the functioning of a health system as they manage and coordinate other important elements, including technology and infrastructure (WHO, 2006). In the Democratic Republic of Congo (DRC), several challenges exist in relation to human resources for health. One of the most significant challenges is that the public sector wage system no longer functions effectively, which has important implications for health worker motivation and performance (World Bank, 2008). In general, there is a lack of transparency on what health workers receive and what they should actually be paid by government; a large proportion of health workers do not receive a salary at all (Fox et al., 2013). In addition, the payment of health workers is not limited to salaries; workers may receive complementary remuneration in the form of user fees and/or informal payments from patients, and per diems and/or salary supplements from both government and organisations external to the government such as donors and non-governmental organisations (NGOs). Many health workers may also supplement their income by engaging in private practice or non-health related income-generating activities. The existence of such a complex remuneration structure can have significant repercussions for the motivation and behaviour of health workers within the public sector health system.

Interventions affecting health workers in Accès Aux Soins de Santé Primaires (ASSP)

In the twenty health zones which were previously receiving financial and technical assistance from DFID, ASSP has eliminated the payment of salary supplements or "primes" (previously financed by DFID) to heath workers over the past year. The reasoning for this was that the payment of primes by donors is not viewed as a sustainable solution to strengthening the health system, and to an extent relinquishes government of its responsibility to pay health worker salaries. According to the results of a health needs assessment conducted by IMA in ASSP zones in early 2013, in areas where projects have not been paying primes, 30% of the workforce is registered on the government payroll system. Yet in areas where donor-financed primes have been operating, only 3% of the workforce is on the government payroll.

As part of ASSP, all health workers will be receiving training and supervision which could affect health worker motivation. However, in addition a package of interventions aimed at strengthening information on human resources for health and improving the management and potentially the payment of health workers will be piloted in the province of Kasai Occidental. This package of interventions will be jointly implemented by IMA and the subcontracted technical partner IntraHealth. The pilot will also be implemented alongside the World Bank, who will be conducting a census of all other civil servants in certain other target sectors including agriculture and environment as part of their Governance Capacity-Building project or "Projet de renforcement des capacités en gouvernance".

During the pilot, which is due to commence in June 2014, the following activities will occur:

- Census of all health workers working in Kasai Occidental health zones (June to July 2014).
- WISN (Workload Indicator of Staffing Needs) methodology applied to selected health zones by Intrahealth, IMA and the Ministry if Health, to calculate the number and types of staff needed in health facilities.
- Development of national norms on staffing of facilities during a national workshop using results obtained from the WISN methodology followed by the elaboration of a plan to rationalise and/or redeploy staff.
- Information on health workers in pilot health zones e.g. qualifications, biometric data etc. will be recorded on iHRIS software (an open source human resources information system), which will be deployed in all Kasai Occidental health zones, at the district provincial levels and at the central level of the Ministry of Health.
- Prior to the setting of the 2015 health budget and provided the Ministry of Public sector is content with the census and data validation process above, the information on Kasai Occidental health workers will be used to "clean" the current staff payroll by eliminating "ghost" workers for these pilot health zones and implementing the rationalisation plan.
- Prior to the setting of the 2015 health budget and provided the Ministry of Health is content with the census and data validation process, the information on Kasai Occidental will also be used to "clean" the list of workers receiving "primes de risques".
- As part of the pilot, there may be some scope to work with partners on "bancarisation" to improve the transparency and transfer of salaries/"primes de risques" to health workers, but this is not confirmed.

Literature review and research gaps

Despite the existence of a significant body of qualitative literature on the complex remuneration structures of health workers in post-conflict states (Roenen et al., 1997; Smith, 2003; Muula and Maseko, 2006; Vian and Bukuluki, 2011), little quantitative data on health worker financial remuneration and its effects on health worker practices and performance exists (McCoy et al., 2008; Witter, Kusi and Aikins, 2007). Such information would be important in informing national discussions on health worker salary policy and coordinating the efforts of the government and other partners involved in health worker remuneration. This information will also contribute to ASSP in understanding the baseline situation of financial payments to health workers prior to implementing a package of human resources (HR) interventions. In addition, the factors that influence health worker motivation (including both financial and non-financial incentives) have never been examined in the DRC. A deeper understanding of these influences may allow ASSP and the government to refine interventions aimed at strengthening the motivation and performance of health workers.

Previous attempts to withdraw the payment of salary supplements by external partners have proven to be difficult in other fragile states; for instance, in 2006 the NGO Merlin had to reinstate the payment of salary supplements to health workers in Liberia as staff were selling drug supplies to private clinics to supplement their income when salary supplements were initially withdrawn (DFID, 2011). Therefore, the effects of a strategy to eliminate salary supplements within ASSP may have important programmatic implications on account of the pivotal role played by health workers in health service delivery.

In contrast to the recent proliferation of studies evaluating "pay for performance" strategies in low-income countries (Borghi et al., 2013; Ssengooba, McPake and Palmer, 2012; Witter et al., 2012), there is little robust evidence in the academic and grey literature on how strengthening human resource information systems (HRIS) can improve the state's management and payment of its workforce. Although HRIS make it possible to plan for health worker requirements and are a step towards improving the processing of payments (Perry, 2005; Ferrinho and Omar, 2006; Gilson and

Erasmus, 2005), a recent systematic review identified a lack of rigorous research on HRIS implementation in developing countries (Riley et al., 2012). It also concluded that a disappointingly small number of countries actually used the data generated by the system in decision-making over human resources. There is also little evidence on how to overcome the challenges impeding the effective management and payment of human resources for health in fragile states; these challenges include inaccurate payroll information, inadequate national budget allocations for salaries, logistical challenges, corruption, poor leadership, and weak governance (Goldsmith, 2010). Hence, the generation of more evidence in this area will aid understanding on how best to transition towards a more sustainable model of financing health systems in fragile states. This research will also be of relevance to similar interventions in other public sectors such as education.

Overall aim

The overarching aim of this research is to describe the environment in which health workers currently operate, and the importance of both financial and non-financial incentives in influencing motivation. The effects of a package of interventions to improve the management and payment of the health workforce will also be investigated.

Research questions

Phase 1:

1. What are the different sources and levels of income currently received by health workers in the DRC?

2. Which characteristics of health workers are significantly associated with receiving a low level of income?

3. To what extent do health workers receive a government salary and does the amount received concur with the current salary policy?

Phase 2:

4. What are the determinants of health worker motivation and behaviour? (e.g. pride, perceived self-efficacy, perceived conscientiousness, financial reward etc.)

5. Does health worker motivation and behaviour in ASSP zones where salary supplements have been gradually removed differ from that in ASSP zones where salary supplements were never operational? If so, how?

Phase 3:

6. Using a theory of change approach, what are the facilitators and bottlenecks at different levels of the health system in the implementation of a package of interventions to improve the management and payment of health workers?

7. Is the package of HR interventions being implemented as planned and are the expected changes occurring?

8. What are the intended and unintended consequences observed when implementing a package of HR interventions?

9. Have the HR interventions improved government payments to health workers?

10. Have the HR interventions improved motivation and behaviour of health workers?

N.B. For phase 3 of the study, research questions 7 and 8 will be further clarified following the articulation of a theory of change for the package of HR interventions as described in the following sections.

Methodology

This study will be based on 1) quantitative data from the ASSP baseline surveys (mainly health facility, health worker and household surveys), 2) qualitative data from in-depth interviews with a variety of key stakeholders, 3) document review and direct observation of meetings and workshops within ASSP, and 4) routine monitoring data collected by the ASSP programme.

Phase 1:

Data: Data for this descriptive phase will be obtained directly from the health facility and health worker questionnaires in the baseline survey. The health facility survey will provide detailed information on the characteristics of official health centres while the health worker survey will contain questions on demographic characteristics and levels and sources of income. Data collection will take place from March to May 2014.

Sample Size: The total sample size for the health facility survey will be 210 facilities, while the total sample size for the health worker survey will be all health workers working on the day of the survey in these facilities.

Phase 2:

This phase will employ a mixed methods approach to explore the determinants of health worker motivation and behaviour, and also differences between zones where health workers received primes in the past compared to zones where primes were never operational.

Data: Data on health worker motivation will be collected from the health worker survey. Likert scales of 1 to 5 have been used (strongly agree to strongly disagree) in the health worker survey to inquire about levels of motivation. The questions selected are based upon previous tools and themes identified in the literature, and anecdotal reports from implementing partners and health workers. Items with negative statements will be reverse coded when calculating scores. Data on behaviour will be obtained from both the health worker survey and household survey (which will be linked to the health worker survey). Behaviour measures include: the number of hours worked, reported absenteeism, time spent on provision of services, and satisfaction reported by patients on the quality of care received. Data collection will take place from March to May 2014.

In-depth interviews inquiring about levels of motivation and behaviour will also be conducted with a purposive sample of nurses and doctors in zones where primes were operational and zones where primes were not operational. Data collection will take place from August 2014.

Sample Size: The total number of household surveys will be 4200. The sample size for the health worker survey is given in Phase 1 above. Four nurses and four doctors at facilities previously receiving primes will be interviewed and four nurses and four doctors at facilities which have never received primes will be interviewed.

Phase 3:

This phase will include a theory-based process evaluation and controlled before and after study.

Data: Process data concerning implementation of the intervention will be both quantitative and qualitative. A plausible theory of change narrative will first be developed with stakeholders in order to determine the links between the intervention activities and intended outcomes. This theory of change will also inform the choice of indicators to be measured during the evaluation process. Qualitative data will be collected from participants in the form of in-depth interviews during at least two intervals during the pilot intervention activities, in order to understand the fidelity of the implementation process, as well as potential facilitators and bottlenecks. Information will be collected on the intended and any unintended consequences. Study participants from each of the stakeholder groups specified in table 1 below will be purposively selected on the basis of their involvement in the intervention.

Table 1: Stakeholder Groups involved in the intervention

Stakeholder Group	Role
DFID	Donor of funds to ASSP programme.
Ministry of Health and its department for human resources at the central level	Central Ministry of Health and department on human resources sets overarching policy on human resources for health.
Ministry of Health: provincial/district and zone levels	Provincial levels supervise zonal level, and zonal levels are expected to implement the national policy.
Ministry of Public Sector Reform	Leads on civil service reform and is in charge of the civil service payroll.
IntraHealth	Technical partner responsible for implementing HRIS software.
Ministry of Finance	Proposes economic and financial policy, leads on public financial management and manages tax collection.
Ministry of Budget	Controls government expenditure.
IMA WorldHealth	Lead partner in implementing the ASSP programme,
NGO implementing partners of ASSP programme – World Vision, Caritas, SANRU	Work closely to support health workers to deliver the ASSP programme.
Other donors/NGOs	Donors such as the World Bank are also engaged HR strengthening programmes in the DRC
Health workers	Directly affected by any changes in human resources policy.

Relevant documents will be reviewed (e.g., progress reports), and the researcher will attend relevant meetings and workshops in order to observe both the discussion and implementation of HR activities.

For the controlled before and after study, ASSP health zones in Kasai Occidental will be considered to be the "intervention zones" and ASSP health zones in Equateur where the pilot will not be implemented, will be considered to be "control zones". Prior to the pilot, surveys as part of the baseline for the ASSP impact evaluation will have been undertaken in Kasai Occidental and Equateur. Midline surveys of the same health facilities (again as part of the midline impact evaluation of ASSP) in both Equateur and Kasai Occidental will be conducted in October 2015, following implementation of the HR activities in Kasai Occidental.

Quantitative data on variables to be collected and their sources are given in the table below:

Variables	Source
Motivation scores of health workers	Health worker survey (baseline and midline)
Health worker productivity, number of hours worked	Utilisation rates from routine health information data Health worker survey (baseline and midline)
Number of workers receiving government payment – salaries and/or "primes de risques"	Health worker survey (baseline and midline) Payroll/Intrahealth data

Sample size: For the process evaluation, a minimum of 22 interviews will be conducted with key stakeholders. The sample size for the before and after controlled study will be determined by the number of health workers and facilities sampled in the baseline and midline survey.

Phase 1:

Descriptive statistics will be used to explore the following: demographic characteristics of health workers answering the survey, the amount health workers receive for each different source of income and/or in allowances, the proportion of health workers receiving income/allowances from different sources, the average number of income sources received by health workers, and the frequency of different payments to health workers.

In addition, multivariate regression analysis of the data using levels for each source of income as the dependent variables will be performed. Independent variables from the health worker survey will include: age, marital status, gender, health worker position/cadre, qualifications, years worked at facility, number of financial dependents, number of hours worked per week, number of income sources, and presence of the ASSP programme. Independent variables from the health facility survey will include: location and type of facility, total number of staff, facility volume or number of patients seen, and services offered. Discrepancies between the official amount to be paid and actual pay from the government will also be quantified and described.

Phase 2:

Exploratory factor analysis techniques will be employed to identify the number of latent constructs and the underlying factor structure of the health worker motivation survey questions. Items with loadings less than 0.32 will be dropped. Internal consistency of each component of the instrument will be assessed using Cronbach's alpha. A coefficient value of > 0.70 will be required for a component to be considered as being consistent.

Scores for each latent construct will be standardised to 100 to allow for comparison between other constructs. Overall scores will be calculated as the sum of all sub-scores of latent factors described. Univariate analyses and a multiple regression model will be used to identify relationships between independent variables and motivation. Independent variables will include: age, marital status, gender, health worker position/cadre, qualifications, years worked at facility, number of financial dependents, number of hours worked per week, number of income sources, and presence of the ASSP programme. Independent variables from the health facility survey will include: location and type of facility, total number of staff, facility volume or number of patients seen, and services offered.

Data on overall motivation in the baseline health worker survey will then be calculated by the sum of all sub-scores of latent constructs identified for groups receiving salary supplements and groups not receiving salary supplements. Data on the sub-scores of latent constructs for both groups will

also be calculated. Multivariate regression will be used to compare motivation scores for individual constructs and overall motivation scores in both groups. The model will contain a dummy variable indicating whether health workers used to receive salary supplements or did not. The following independent variables will also be included: age, marital status, gender, health worker position/cadre, qualifications, years worked at facility, number of financial dependents, number of hours worked per week, and number of income sources, location and type of facility, total number of staff, facility volume or number of patients seen, and services offered.

For the qualitative data analysis, once the health worker in-depth interviews are transcribed and entered into Microsoft Word, transcripts will be reviewed and a coding system will be developed. Coding categories will be derived from the initial research themes and questions, as well as key concepts that emerge during data collection. Coding of the interview transcripts will be done on ATLAS.ti, a text-organizing software. Content analysis will be used to identify trends of concepts in and across individual codes. Data triangulation will be used to ensure that the findings are validated across different respondents. Efforts will also be made to identify direct quotations that illuminate key data findings.

Phase 3:

For the process evaluation, participant observations during the implementation activities, review of relevant documents, and in-depth interviews will be used to understand the design, decision processes and rationale for participants' responses. Thematic analysis of responses during qualitative interviews will be undertaken using an inductive technique to construct plausible explanations of participant's responses to the package of interventions. Repeat interviews will permit validation of explanations of the mechanism by which the package of interventions works. The analysis will also depend on the other indicators which will be developed following the construction of a theory of change, and test whether the package of interventions works according to the theory of change articulated from the outset.

For the controlled before and after study, a comparison of all variables between intervention and control arms will be made at baseline. Tests of differences in means of motivation scores, number of hours worked, number of workers receiving government payment, and health worker productivity between intervention and control groups for both the baseline and midline surveys will be conducted, and t-tests undertaken to assess whether the differences are statistically significant. A difference-in-difference regression analysis will also be conducted to assess the independent effect of the intervention on each of the outcome variables, controlling for factors which may influence the given outcome.

A limitation of this approach is that the before-and-after study will not be conducted within the same province and there may be other contextual factors explaining the differences between the two areas. However, this was not avoidable as the pilot needed to cover all of Kasai Occidental in order to effectively coordinate with the World Bank's project.

Research staff

The study will be co-led by Drs. Rishma Maini and David Hotchkiss. Dr. Maini is a public health registrar who has been working in the DRC for the past 1.5 years and is a PhD student with the London School of Hygiene and Tropical Medicine. She will also be receiving supervisory support from Drs. Natasha Palmer and Josephine Borghi, both health economists with extensive research experience in countries in sub-Saharan Africa. Dr. Hotchkiss is a health economist with research expertise in health care financing issues in low- and middle-income countries. He is also a faculty

member of Tulane University's School of Public Health and Tropical Medicine and the Technical Lead on the Operation Research and Impact Assessment component of the ASSP Project.

Research assistance for the qualitative component of the study will be provided by Anicet Yemweni and Cele Manianga, lecturers at the University of Kinshasa who have training in medical anthropology and extensive experience in qualitative data collection.

Ethics

This is minimal risk study. The researchers will obtain informed consent from all study participants. Ethical approval of the study and data collection procedures will be obtained from the Institutional Review Boards of Tulane and the Kinshasa School of Public Health before data collection commences.

Deliverables

Two technical reports to be disseminated to all stakeholders. The first technical report will be based on phases 1 and 2 of the OR study and the second technical report will be based on phase 3 of the study.

Timeline

See table below.

Estimated costs

The total estimated cost for this research is approximately $70,000 (excludes costs of baseline and midline surveys).

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Timeline

Operational Research Steps and Milestones

Programme:	ASSP - OR
Study Topic:	Health worker motivation
DFID Adviser(s):	Sarah Goldsmith, Lizz Frost Yocum
Implementer:	Tulane

	Steps and Milestones (marked in *)	**Expected**	**Completed**	**Notes**
1	**Identifying Research Topics**			
	Study topics proposed to DFID	Dec 2013	Dec 2013	
*	DFID APPROVAL : Study topic agreed by DFID (with input from IMA)	Jan 2014	Jan 2014	
2	**Drafting Concept Note**			
	Discussions with DFID, gov and other stakeholders on research questions for the study completed	Feb 2014		
	Development of study concept note	Feb, 2014		
	Submission of Concept Note to DFID	2 May, 2014		
*	DFID APPROVAL: Concept Note approved by DFID (OR STUDIES ONLY)	June, 2014		
*	DFID APPROVAL: CV of lead researcher agreed by DFID	June, 2014		
3	**Developing Study Protocol**			
	Protocol and instruments completed	July, 2014		
	Submission of Study Protocol to DFID	July 14, 2014		
	DFID review and QA	July 14 - 28, 2014		
*	DFID APPROVAL: When protocol has passed QA	July 28, 2014		
	Authorisation in writing from DFID to start research implementation	August 18, 2014		
	Tulane IRB approval given	August 11, 2014		
	Local IRB approval given	August 11, 2014		
4	**Implementing Study**			
	Field workers trained	August 30, 2014		
	Field work/ secondary data collection completed.	June 2015		Phase 1 collection completed by August 2014 (baseline survey) Phase 2 collection completed by October 2014 Phase 3 collection completed by April 2015
	Analysis of data completed	Sept 30, 2015		Phase 1 analysis completed by October 2014 Phase 2 analysis completed by January 2015

	Steps and Milestones (marked in *)	Expected	Completed	Notes
				Phase 3 analysis completed by December 2015.
5	**Reporting,**			
	Preliminary findings presented in routine meetings with IMA and DFID	Ongoing		Fieldwork briefs will be submitted upon completion of data collection in each province. This will include a discussion of the preliminary findings.
	Drafting preliminary report	December 2015		
	Preliminary report submitted	January 2016		
	Dissemination and uptake plan, based on dissemination strategy in study protocol approved earlier by DFID (following QA), submitted	January 2016		
*	DFID APPROVAL: Preliminary report	February 15 2016		
*	DFID APPROVAL: Dissemination and uptake plan	February 15 2016		
	Final report revisions	February - March 14, 2016		
	Final report submitted to DFID for approval	March 14, 2016		
	DFID review and final report	March 14-28, 2016		
*	DFID APPROVAL: Final report	March 28, 2016		
6	**Dissemination, Uptake**			
	Publication paper(s) reviewed by DFID	TBD		
	Dissemination activities conducted	March 2016		
	Study submitted for publication	In 2016/2017		

Appendix 5: Research Protocol, Health Worker Motivation in the DRC

Date: 7th August 2014

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Executive Summary

Study objectives and research questions: The overarching objectives of this operational research study are to describe the environment in which health workers currently operate, and the importance of both financial and non-financial incentives in influencing health worker motivation. The effects of a package of interventions to improve the organisation, management and payment of the health workforce will also be evaluated.

The following are the principal research questions that will be investigated:

Phase One

11. What are the different sources and levels of income currently received by health workers in the DRC?

12. Which characteristics of health workers are significantly associated with receiving a low level of income (e.g. gender)?

13. What proportion of health workers receive a government salary and, for those that do, does the amount received concur with the current salary policy?

Phase Two

14. What are the determinants of health worker motivation and behaviour? (e.g. pride, perceived self-efficacy, perceived conscientiousness, financial reward etc.)

15. Does health worker motivation and behaviour in ASSP zones where salary supplements have been gradually removed differ from that in ASSP zones where salary supplements were never operational? If so, how?

Phase Three

16. Using a theory of change approach, what are the facilitators and bottlenecks at different levels of the health system in the implementation of a complex HR intervention to improve the organisation, management and payment of health workers?

17. Is the package of HR interventions being implemented as planned and are the expected changes occurring?

18. What are the intended and unintended consequences observed when implementing a package of HR interventions?
19. Have the HR interventions improved government payments to health workers, relative to areas where the HR interventions were not carried out?

20. Have the HR interventions improved motivation and behaviour of health workers, relative to the areas where HR interventions were not carried out?

Study design/methodology: The study will have three main phases.

Phase one: This will involve a cross-sectional descriptive analysis of data relating to income sources and levels collected from health workers during the baseline surveys of ASSP. This phase will address research questions 1-3.

Phase two: As in phase one, data on determinants of motivation from a cross-section of health workers in ASSP and non-ASSP supported zones will be obtained from the baseline survey. In addition, a purposive sample of at least 16 nurses who used to receive salary supplements or never received salary supplements within the ASSP programme will be interviewed. This phase will address research questions 4 and 5.

Phase three: This phase will involve a theory-based process evaluation of the HR interventions and incorporate a controlled before-and-after study. A plausible theory of change narrative will first be developed with key stakeholders in order to determine the links between the HR intervention activities and intended outcomes. Process data relating to the implementation of HR interventions will be collected from a range of sources, including documents, qualitative in-depth interviews, programme data, meetings and workshops. For the controlled before and after study, data collected from the midline and baseline surveys will be used to compare outcomes relating to motivation and payment of workers in HR intervention areas in ASSP with areas in ASSP which are not receiving the HR interventions. This phase will address research questions 6-10.

Target population: The target population consists of health workers participating in both ASSP and non-ASSP zones in Maniema, Province Orientale, Kasai Occidental and Equateur.

Sampling method and sample size: For the surveys within the ASSP baseline evaluation, the full methodology is given in the protocol for the ASSP baseline evaluation. For the qualitative study component in phase two, purposive sampling will be used to identify nurses. In phase three, two interviews will be conducted with a member of each key stakeholder group affected by the HR interventions.

Statistical and analytic plan:
Phase 1: Descriptive analysis will be used to explore key indicators captured in the health worker survey on income. Multivariate regression analysis of the data using levels for each source of income as the dependent variables will also be performed.

Phase 2: Exploratory factor analysis techniques will be employed to identify the number of latent constructs and the underlying factor structure of the health worker motivation survey questions. Overall scores will be calculated as the sum of all sub-scores of latent factors described. Univariate analyses and a multiple regression model will be used to identify relationships between independent variables and motivation. Multivariate regression will also be used to compare motivation scores for individual constructs and overall motivation scores between health workers who used to receive salary supplements and health workers who never received salary supplements. For the qualitative component, content analysis will be used to identify trends of concepts in and across individual codes identified through the qualitative study.

Phase 3: For the process evaluation, thematic analysis of responses during qualitative interviews will be undertaken using an inductive technique to construct plausible explanations of participant's responses to the package of interventions. The analysis will also depend on the other indicators which will be developed following the construction of a theory of change, and test whether the package of interventions works according to the theory of change articulated from the outset. For the controlled before and after study, tests of differences in outcomes between intervention and control groups for both the baseline and midline surveys will be conducted, and t-tests undertaken to assess whether the differences are statistically significant. A difference-in-difference regression analysis will also be conducted to assess the independent effect of the intervention on each of the outcome variables, controlling for factors which may influence the given outcome.

Limitations: Much of the data on income and motivation will rely on self-report by health workers which may be vulnerable to response bias. In phase three, the intervention and control areas of the before-and-after controlled study will be in different provinces, meaning other contextual factors could potentially explain any differences in outcomes observed.

Ethics: Ethical approval of the study and data collection procedures will be obtained from the Institutional Review Boards of Tulane and the Kinshasa School of Public Health before data collection commences. Oral and written informed consent will first be obtained from all participants in the qualitative study.

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    Appendix 1: Modifications made to original health worker survey
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    Appendix 3: Interview Guides for Phase Three

Appendix 4: Consent form for Phase Two In-Depth Interviews
Appendix 5: Consent form for Phase Three In-Depth Interviews
References

Background and ASSP Project Description

Health workers in the DRC

The performance and benefits produced by the health system depend heavily on the knowledge, skills and motivation of its workforce (1). Health workers are also critically important to the functioning of a health system as they manage and coordinate other important elements, including technology and infrastructure (2). In the Democratic Republic of Congo (DRC), several challenges exist in relation to human resources for health. One of the most significant challenges is that the public sector wage system no longer functions effectively, which has important implications for health worker motivation and performance. In general, there is a lack of transparency on what health workers receive and what they should actually be paid by the government; a large proportion of health workers do not receive a salary at all from government (3). This is in part due to new workers not being registered onto a payroll which is plagued by "ghost workers", which are individuals listed on the payroll to receive a salary but not currently practicing in health facilities (4). The reasons behind this are multiple: the government has failed to maintain the payroll so many workers registered on it have left the country, died, or changed occupation; corruption has allowed the proliferation of many unofficial appointments; and many registered workers are now of retirement age but in the absence of a pension system, continue to receive a salary instead.

In addition, the payment of health workers is not limited to salaries; workers may receive complementary remuneration in the form of user fees and/or informal payments from patients, and per diems and/or salary supplements from organisations external to the government such as donors and non-governmental organisations (NGOs). Many health workers may also supplement their income by engaging in private practice or non-health related income-generating activities. The existence of such a complex remuneration structure can have significant repercussions for the motivation and behaviour of health workers within the public sector health system.

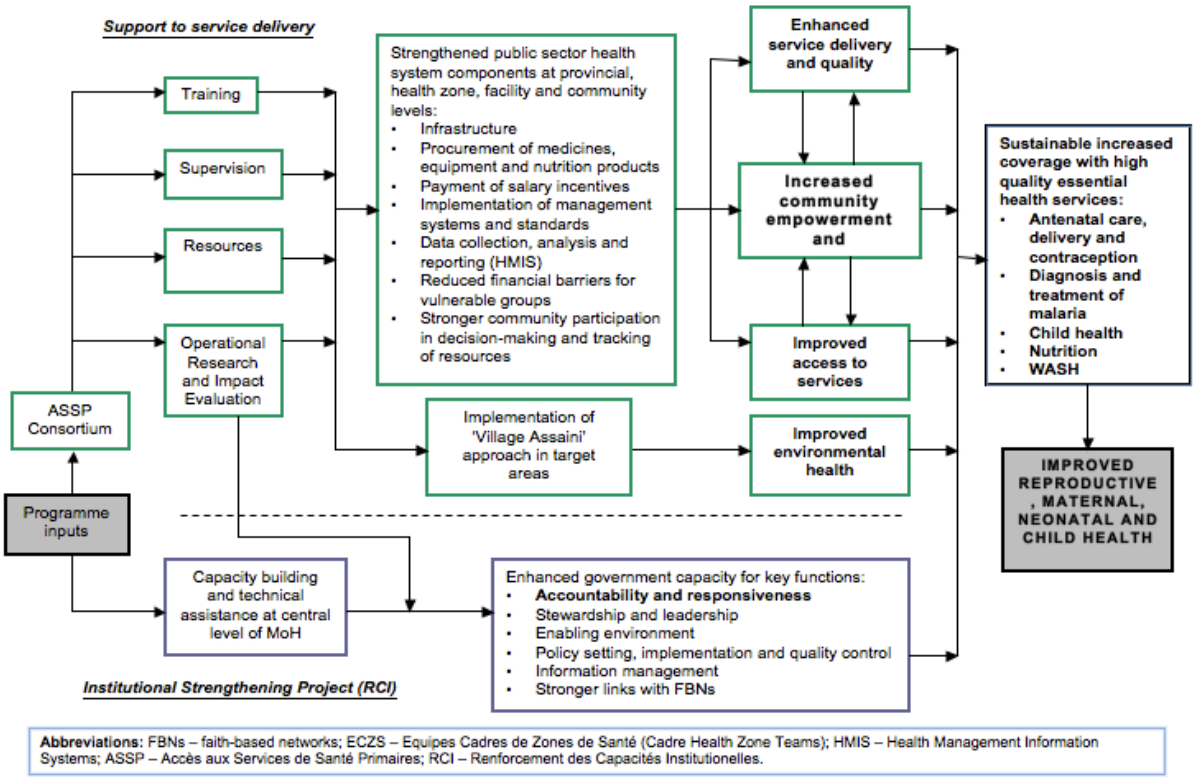
Overview of the Accès aux Soins de Santé Primaire (ASSP) project

In an effort to strengthen the health care delivery system and increase service utilisation, the DRC's Ministry of Health has developed a five-year health development plan, which is being implemented with support from a number of international health partners, including the United Kingdom's Department for International Development (DFID) (5). The DRC government's National Health Development Plan for the period 2011-2015 defines eight priority pillars: governance, human resources for health, medicines and specific inputs, health financing, health information management system, infrastructure and equipment, health service delivery and collaboration with related sectors (5).

As part of its programme to assist the government in strengthening the country's health system, DFID awarded the five-year ASSP (Accès aux Soins de Santé Primaire) project to IMA World Health and its implementing partners and subcontractors in late 2012. ASSP is a health systems strengthening project tasked with working in 56 health zones in Equateur, Orientale, Kasai-Occidental and Maniema provinces of the DRC. As shown in the Theory of Change (Figure 1), ASSP consists of a broad range of facility- and community-based health interventions designed to:

1. Strengthen the public health sector at the provincial, health zone, facility and community level though improved availability of infrastructure, equipment, supplies, improved supervision, training and management of health workers, and improved financial and managerial practices.
2. Improve environmental health in targeted areas via the introduction of "Village Assaini," a water, sanitation, and hygiene (WASH) approach
3. Broaden key governance functions, including accountability, governance, stewardship and leadership.

Figure 1: Theory of Change for ASSP project



Abbreviations: FBNs – faith-based networks; ECZS – Equipes Cadres de Zones de Santé (Cadre Health Zone Teams); HMIS – Health Management Information Systems; ASSP – Accès aux Services de Santé Primaires; RCI – Renforcement des Capacités Institutionelles.

Human Resources (HR) intervention

As part of the ASSP programme, there will be interventions which also directly affect human resources for health.

Across all ASSP areas, health workers will receive extensive training as well as equipment and resources in order to enable them to carry out their job effectively.

However, for the twenty health zones which were previously receiving financial and technical assistance from DFID's previous Access to Health-care programme (ATH) between 2008 and 2013, the ASSP programme has already eliminated the payment of salary supplements or "primes" that had been paid by ATH to heath workers. The reasoning for this was that the payment of primes by donors does not represent a sustainable solution to strengthening the health system, and to an extent relinquishes government of its responsibility to pay health worker salaries. According to the results of a health needs

assessment conducted by IMA in ASSP zones in early 2013, in areas where projects have not been paying primes, 30% of the workforce is registered on the government payroll system.[1] Yet in areas where donor-financed primes have been operating, only 3% of the workforce is on the government payroll. In order to develop a more sustainable approach to manage and pay health workers, IMA will pilot a novel Human Resources (HR) intervention in all 28 of the Kasai Occidental ASSP zones which aims to facilitate government payments to health workers. IMA has sub-contracted the technical partner IntraHealth to assist with the implementation of this intervention, which will involve a package of activities described below. The Ministry of Health and Ministry of Public Sector will be involved in the pilot, as well as the World Bank who will be implementing similar activities in other sectors, including agriculture and environment, as part of their Governance Capacity-Building Project (6).

In July/August 2014, IMA plans to conduct a headcount of health workers in ASSP zones of Kasai Occidental and will record the details for each health worker currently working in health facilities, including their qualifications and biometric data in the form of photographs. This list will then be cross-checked against the list of workers on the staff payroll and the list of workers receiving a government risk allowance or "prime de risque." Provided the Ministry of Health and Ministry of Public Sector are satisfied by the process, this information will be used to "clean" the payroll and "prime de risque" list. The payment of any salaries or "prime de risque" to any identified "ghost" workers will then be terminated. Instead, salaries and a "prime de risque" will be paid to those workers who should legitimately be receiving them. It is expected that these activities will occur before the agreement of the next national health budget, so that health workers will expect to see an improvement in their payments (in terms of being paid on time as well as being paid the correct amount) from the government by the beginning of 2015.

The data obtained on health workers during July and August will also eventually be recorded on a Human Resource Information System (HRIS). Managerial staff will be trained in the use of iHRIS software (an open source HRIS), which is to be deployed in all Kasai Occidental health zones, as well as the provincial and central levels of the Ministry of Health. This will enable managerial staff to have accurate information on the workforce as well as ensure it remains up to date.

In addition, IMA and Intrahealth will assess the staffing needs of health facilities using the WISN (Workload Indicator of Staffing Needs) methodology (planned for August 2014), in order to update guidelines on the normal numbers of staff required per facility. A plan will then be developed on how to retire or redeploy excess staff, in order to improve the planning and management of the health workforce. It is anticipated that the updated guidelines on staffing norms and the retirement/redeployment plan will be agreed and adopted by the Ministry of Health nationally.

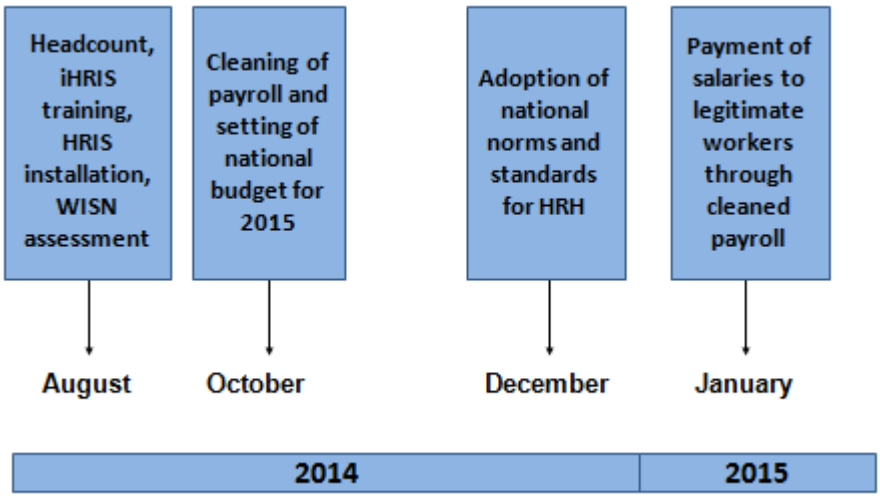
Finally, there may be scope as part of the pilot to work on mobile banking to improve the transfer of salaries and/or "primes de risques" to health workers, but this is not yet confirmed.

As this pilot is relatively innovative, it is anticipated that the intervention itself will be dynamic and may evolve and change over time. Nonetheless, research is needed to track the implementation process, identify implementation successes and failures, determine what the effects are, and document any unintended consequences.

A summary of the steps and timeline of the intervention is provided in Figure 2 below:

[1] Taken from IMA paper submitted to DFID on policy for primes and user fees in ASSP.

Figure 2: Summary of HR intervention steps



Previous Research on Health Worker Payment and Motivation

Despite the existence of a significant body of qualitative literature on the complex remuneration structures of health workers in post-conflict states (7-10), there is comparatively little quantitative data on health worker financial remuneration and its effects on health worker practices and performance (11, 12). Such information would be important in informing national discussions on health worker salary policy and coordinating the efforts of the government and other partners involved in health worker remuneration. This information would also contribute to ASSP in understanding the baseline situation of financial payments to health workers prior to implementing a complex HR intervention. In addition, the factors that influence health worker motivation (including both financial and non-financial incentives) and therefore performance have never been examined in the DRC. A deeper understanding of these influences may allow ASSP and the government to refine interventions aimed at strengthening the motivation and performance of health workers.
Previous attempts to withdraw the payment of salary supplements by external partners have proven to be difficult in other fragile states; for instance, in 2006 the NGO Merlin had to reinstate the payment of salary supplements to health workers in Liberia as staff were selling drug supplies to private clinics to supplement their income when salary supplements were initially withdrawn (13). Therefore, the effects of a strategy to eliminate salary supplements within ASSP may have important programmatic implications on account of the pivotal role played by health workers in health service delivery.

In contrast to the recent proliferation of studies evaluating “pay for performance” strategies in low-income countries (14-16), there is little robust evidence in the academic and grey literature on how the activities which are included in this complex HR intervention can contribute to an improvement in the state’s ability to manage and pay its workforce. For example, although HRIS make it possible to plan for health worker requirements and are a step towards improving the processing of payments (17-19), a recent systematic review identified a lack of rigorous research on HRIS implementation in developing countries (20). It also concluded that a disappointingly small number of countries actually used the data generated by the system in decision-making over human resources. There is also little evidence on how

to overcome the challenges impeding the effective management and payment of human resources for health in fragile states; these challenges include inaccurate payroll information, inadequate national budget allocations for salaries, logistical challenges, corruption, poor leadership, and weak governance (21). Hence, the generation of more evidence in this area will aid understanding on how best to transition towards a more sustainable model of financing health systems in fragile states.

Study Objectives and Research Questions

Under the ASSP project, Tulane University's School of Public Health and Tropical Medicine (Tulane) is responsible for developing and carrying out the study which will be divided into three phases. The objectives and research questions for each phase are given below.

Objectives:

Phase One

1. To describe and quantify the different sources and levels of income for health workers in a sample of public facilities, and explore the discrepancy between what health workers expect to be paid and what they are actually paid by the government.

Phase Two

2. To understand the main determinants of health worker motivation in the DRC, and quantify the differences in motivation of health workers where salary supplements paid by the donor have been recently removed compared to motivation of health workers in zones where salary supplements were never operational.

Phase Three

3. To undertake a theory-based process evaluation with a controlled before and after study, to understand the facilitators and bottlenecks at different levels of the health system of an intervention to facilitate the management and organization of health workers, and overall impact of the intervention on health worker motivation, behaviour and payment.

Research Questions:

Phase One

1. What are the different sources and levels of income currently received by health workers in the DRC?

2. Which characteristics of health workers are significantly associated with receiving a low level of income (e.g. gender)?

3. What proportion of health workers receive a government salary and, for those that do, does the amount received concur with the current salary policy?

Phase Two

4. What are the determinants of health worker motivation and behaviour? (e.g. pride, perceived self-efficacy, perceived conscientiousness, financial reward etc.)

5. Does health worker motivation and behaviour in ASSP zones where salary supplements have been gradually removed differ from that in ASSP zones where salary supplements were never operational? If so, how?

Phase Three

6. Using a theory of change approach, what are the facilitators and bottlenecks at different levels of the health system in the implementation of a complex HR intervention to improve the organisation, management and payment of health workers?
7. Is the package of HR interventions being implemented as planned and are the expected changes occurring?

8. What are the intended and unintended consequences observed when implementing a package of HR interventions?

9. Have the HR interventions improved government payments to health workers, relative to areas where the HR interventions were not carried out?

10. Have the HR interventions improved motivation and behaviour of health workers, relative to the areas where HR interventions were not carried out?

The analysis will address gender disparities in several ways. The quantitative analysis will determine whether there are any notable differences in income levels, behavior, motivation levels and motivational determinants between men and women. The qualitative methods will examine the perceptions of health workers, and how the perceptions of women differ from those of men.

In designing the study, Tulane is committed to adhering to the OECD DAC criteria for evaluating programmes and projects (relevance, effectiveness, efficiency, impact, and sustainability).

Study Methodology

Sampling, recruitment and data collection

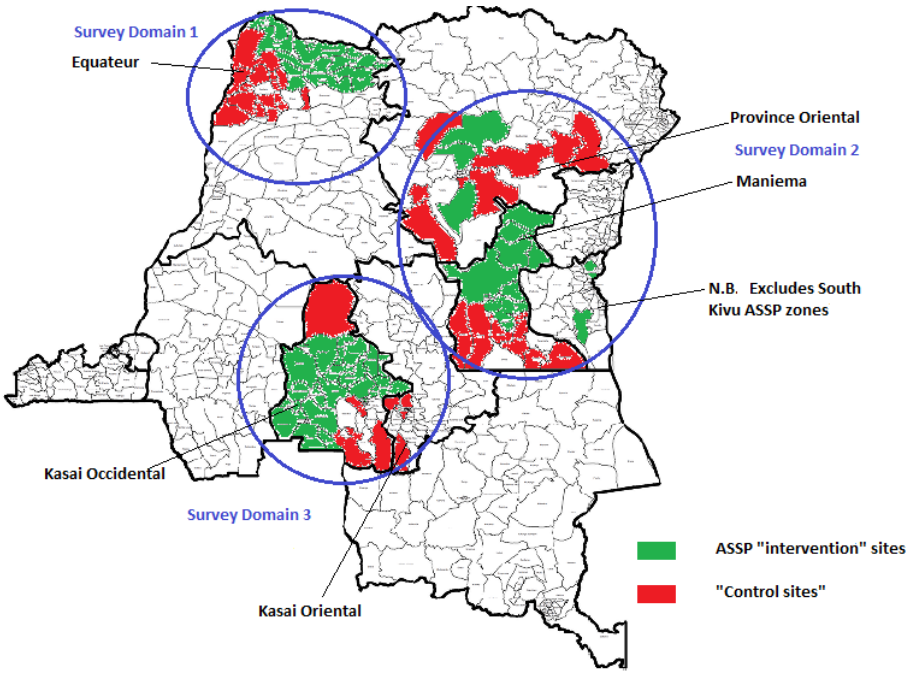
This operational research study, which is nested within the larger baseline and midline evaluation study of the ASSP programme, will employ a mixed-methods approach.

Quantitative data

Quantitative data for phases 1, 2 and 3 will be collected from the ASSP baseline and/or midline evaluation surveys. The sampling frame for the ASSP baseline evaluation is all facilities in provinces covered by ASSP with the exception of South Kivu (Figure 3). Province Oriental and Maniema will be combined to make one survey domain, Kasai Occidental and Kasai Oriental will be another, and Equateur will constitute its own survey domain. For each survey domain, data will be collected from ASSP “intervention” sites and “control” sites which do not receive ASSP support. Therefore, data will be collected from six distinct strata. Further information on the sampling and methodology for the baseline survey is given in the ASSP baseline impact evaluation protocol.

The Kinshasa School of Public Health is taking a lead role in overseeing the fieldwork and data entry for the baseline survey for the impact evaluation. They have been responsible for recruiting and training interviewers; pre-testing the instruments; supervising the fieldwork; overseeing the data entry, cleaning and processing; and producing preliminary tables. Data collectors will be hired from each of the provinces to ensure appropriate language skills and familiarity with the cultural context.

Figure 3: Survey domains for ASSP impact evaluation



Data: During April to May 2014, baseline health worker and health facility surveys were conducted within each survey domain described above. Data were collected from 35 ASSP-supported facilities (intervention sites) and 35 facilities where ASSP was not operating (control sites). In total, 210 health facility surveys were conducted, and all doctors, midwifes or nurses working in a selected health facility on the day of the surveys were interviewed using the health worker survey. For the midline evaluation in October 2015, data for the health worker and health facility surveys will be collected in ASSP-supported facilities only (i.e. control sites will not be sampled).

Qualitative data

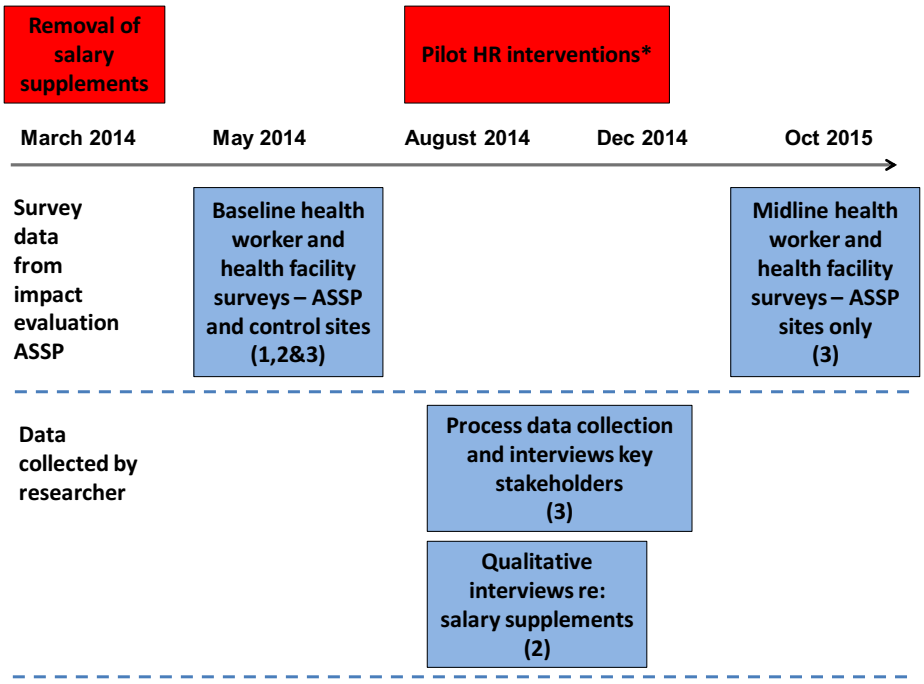
Qualitative data will be collected for phases 2 and 3 in the form of tape-recorded in-depth qualitative interviews with purposively selected individuals.

The Principal Investigator has developed the tools which will then be translated into French and then independently back-translated into English to check for consistency with the original tools (see Appendix 2). The Principal Investigator will participate in all interviews; two Congolese medical anthropologists will conduct interviews with French-speakers with the Principal Investigator as an observer, while interviews in English will be conducted by the Principal Investigator. Interviews undertaken by the anthropologists will be first transcribed into French and the Principal Investigator will review and translate all transcripts into English before commencing coding.

Prior to data collection, a 3-day training will be held which will include sessions on the qualitative data collection techniques employed during the study, with a focus on open-ended questioning, approaches used when interacting with respondents, and research ethics and ethical procedures. The training will be conducted by the Principal Investigator.

Figure 4 summarises the different time points of data collection for the study. Interventions affecting health workers are in red boxes. The blue boxes show the relationship between data sources and the different phases which are in brackets.

Figure 4: Time-frames for data collection



*Pilot HR intervention described in Background section. See figure 2 for summary of components.
N.B. Numbers in brackets refer relevant phases

Phase One

Objective: To describe and quantify the different sources and levels of income for health workers in a sample of public facilities, and explore the discrepancy between what health workers expect to be paid and what they are actually paid by the government.

Design: A cross-sectional descriptive study of secondary data collected from the baseline surveys.

Target population: Health workers in both ASSP and matched non-ASSP facilities.

Research Questions: 1-3

Source of data: Data from the health worker survey conducted during the baseline evaluation has been collected on health worker income sources and levels. Demographic and work history variables are also included at the start of the questionnaire, as well as a unique facility identifier which can enable linking of the health worker survey to a separate health facility survey which contains variables relating to facility characteristics.

Phase Two

Objective: To understand the main determinants of health worker motivation in the DRC, and quantify the differences in motivation of health workers where salary supplements paid by the donor have been recently removed compared to motivation of health workers in zones where salary supplements were never operational.

Design: A mixed-methods cross-sectional descriptive study.

Target population:
Quantitative analysis **-** Health workers in both ASSP and matched non-ASSP facilities.
Qualitative analysis – Nurses in rural ASSP zones only.

Research Questions: 4-5

Method: For the quantitative analysis, data will be collected from the baseline health worker surveys will be used. The content of the questions in the survey around motivation is based upon: previous tools and themes identified in the literature, anecdotal reports and contextual information from implementing partners, and discussions with experts who have previously developed similar tools. More detail on the sources drawn upon for the motivation questions is given in Appendix 1. The survey includes measures of determinants of motivation (intrinsic and extrinsic), job satisfaction, cognitive outcomes and behavioural outcomes, such as number of hours worked and staff attendance. Likert scales of 1 to 5 have been used (strongly agree to strongly disagree) to inquire about levels of motivation and satisfaction. Items with negative statements will be reverse coded when calculating scores.

For the qualitative component, a purposive sample of 16 nurses in eight rural facilities will be selected for in-depth interviews, as nurses are typically the main type of staff working in health centres, and ASSP is focused in rural areas. Eight nurses (two nurses from four facilities) who previously received salary supplements from the ATH programme will be interviewed as well as another eight nurses (two nurses from four facilities) who have never received salary supplements from the programme between September and October 2014. It is likely that the nurses will come from the province of Kasai Occidental as this province has facilities which were previously supported by ATH as well as facilities which were not previously supported by ATH and are now supported by ASSP. Core questions for the interview study guide are given in the Appendix 2.

Phase Three

Objective: To undertake a theory-based process evaluation with a controlled before and after study, to understand the facilitators and bottlenecks at different levels of the health system of an intervention to facilitate the management and organisation of health workers, and overall impact of the intervention on health worker motivation, behaviour and payment.

Design: Theory-based process evaluation and controlled before and after study.

Target population:

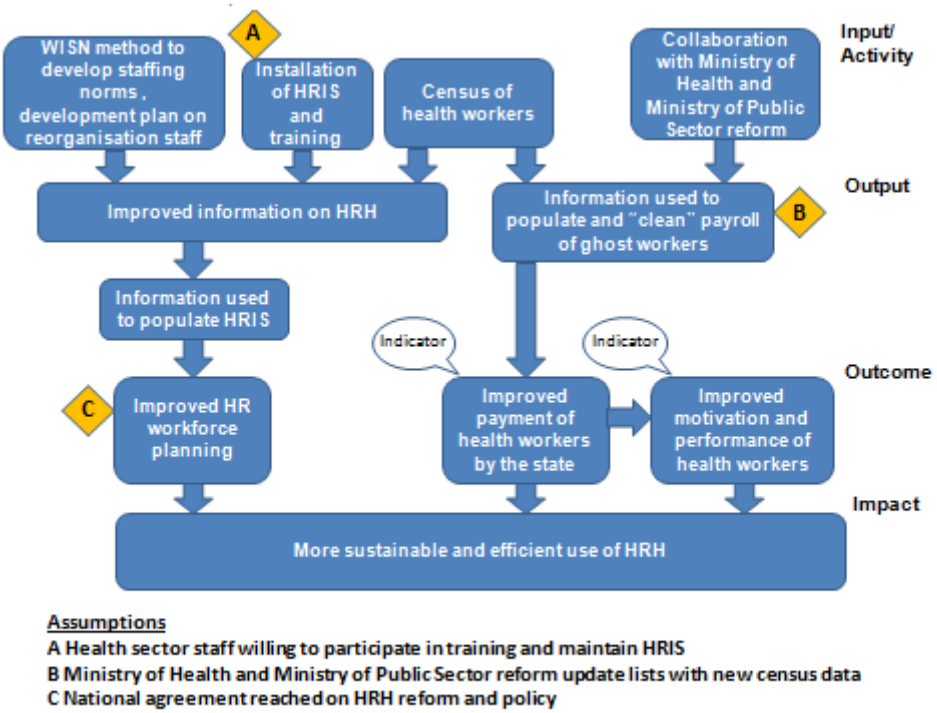
Process evaluation – Key stakeholders involved or affected by the pilot HR intervention.
Before and after controlled study – Health workers in ASSP-supported facilities in Kasai Occidental and Equateur.

Method: For the controlled before and after study, survey data from the baseline and midline evaluation health worker and health facility surveys in ASSP sites only will be used (Figure 4). However, the sampling frame will be restricted to two survey domains, namely: ASSP-supported facilities in the survey domain of Kasai Occidental (green areas in survey domain 3 in Figure 3) which will be considered to be "intervention" sites as the pilot will be implemented in this province only, and ASSP-supported facilities in the survey domain of Equateur province (green areas in survey domain 1 in Figure 3) where the HR pilot will not be implemented, which will be considered to be "control" sites. Main outcome variables which will be compared include: motivation scores of health workers obtained from the health worker surveys, provision of health services (obtained from the health facility survey) which will serve as a proxy measure of health worker productivity, and the number of health workers receiving a form of payment from the government.

Data to assess the process of implementing the intervention will be quantitative and qualitative. In September 2014, a detailed theory of change (building on and revising as needed the high-level

theory of change in Figure 5) and narrative will be developed with stakeholders during a half-day workshop in French facilitated by the research team in order to determine the links between the intervention activities and intended outcomes. Key assumptions and risks in relation to the context will also be made explicit. The theory of change should also inform the choice of indicators to be measured during the evaluation process.

Figure 5: High-level theory of change for HR intervention



Following this workshop, at least two rounds of qualitative interviews will be conducted (and tape-recorded subject to consent) with representatives from each stakeholder group shown in Table 1. It is estimated that in total, 18 stakeholders will be interviewed. The interviews will start in September 2014 and follow the process until the midline survey, and seek to understand the fidelity of the implementation process, facilitators and bottlenecks, intended and unintended consequences, and reasons underlying the outcomes observed. Key assumptions highlighted during the development of the theory of change will also inform topic guides for the semi-structured interviews (see Appendix 3). The analysis of the results early on as data is being collected will help to refine the theory of change during the research.

Table 1: Stakeholder Interviews

Stakeholder	Number of representatives	Number of interviews	Language of interviews
DFID	1	2	English
Ministry of Health and department for human resources at the central level	2	4	French
Ministry of Health: provincial and zonal levels	3 or more	6 or more	French
Ministry of Public Sector Reform	1	2	French
IntraHealth	1	2	English
Ministry of Finance	1	2	French
Ministry of Budget	1	2	French
IMA	1	2	English
NGO partners of ASSP – World Vision, Caritas, SANRU	3	6	English
Other donors/NGOs	2	4	English
Health workers in the facility	2	4	French
Total	**18 or more**	**36 or more**	

Observations of meetings during the research will be documented in field notes, and information from relevant project documents (e.g. progress reports) will be reviewed and recorded in order to accurately profile the context within which the intervention is occurring. It is hoped that the interviews and observations will also contribute to a better understanding of the political context within which the intervention is occurring, as this will clearly influence the success of the intervention.

Data Analysis

Phase One

Descriptive statistics will be used to explore the following: demographic characteristics of health workers surveyed, the amount health workers receive for each different source of income and/or in allowances, the proportion of health workers receiving income/allowances from different sources, the average number of income sources received by health workers, and the frequency of different payments to health workers.

In addition, multivariate regression analysis of the data using levels for each source of income as the dependent variables will be performed. Independent variables from the health worker survey will

include: age, marital status, gender, health worker position/cadre, qualifications, years worked at facility, number of financial dependents, number of hours worked per week, training, number of income sources, and presence of the ASSP programme. Independent variables from the health facility survey will include: location and type of facility, total number of staff, facility volume or number of patients seen, and services offered. Discrepancies between the official amount to be paid and actual pay from the government will also be quantified and described.

Phase Two

Exploratory factor analysis will be employed to identify the number of latent constructs and the underlying factor structure of the health worker motivation survey questions. Items with loadings less than 0.32 will be dropped (23). Internal consistency of each component of the instrument will be assessed using Cronbach's alpha. A coefficient value of > 0.70 is generally accepted in the literature for a component to be considered as being consistent (24).

Scores for each latent construct will be standardised to 100 to allow for comparison between other constructs. Overall scores will be calculated as the sum of all sub-scores of latent factors described. Univariate analyses and a multiple regression model will be used to identify relationships between independent variables and motivation. Independent variables will include: age, marital status, gender, health worker position/cadre, qualifications, years worked at facility, number of financial dependents, number of hours worked per week, training, number of income sources, presence of ASSP, and previous support by ATH. Independent variables from the health facility survey will include: location and type of facility, total number of staff, facility volume or number of patients seen, resources and equipment available, resources and equipment available, and services offered. Differences in motivation for health workers who previously received salary supplements from ATH will be compared with health workers in ASSP zones where salary supplements were never operational.

For the qualitative data analysis, once the in-depth interviews with nurses are transcribed and entered into Microsoft Word, transcripts will be reviewed and a coding system will be developed. Coding categories will be derived from the initial research themes and questions, as well as key concepts that emerge during data collection. Coding of the interview transcripts will be done on ATLAS.ti. Content analysis will be used to identify trends of concepts in and across individual codes. Data triangulation will be used to ensure that the findings are validated across different respondents. Efforts will also be made to identify direct quotations that illuminate key data findings.

Phase Three

Controlled before-and-after study: Facility characteristics and health worker survey responses will be compared both at baseline and midline for "intervention" and "control" areas. Tests of differences in means of variables between intervention and control groups for both the responses to baseline and midline health worker surveys will then be conducted, and t-tests undertaken to assess whether the differences in motivation, provision of services (as a proxy of health worker productivity), and the number of government payments to health workers are statistically significant. Difference-in-differences using ordinary least squares with standard errors clustered at the facility level will also be used to assess the independent effect of the intervention on each of the outcome variables, after controlling other factors, including other aspects of the ASSP project that might potentially influence outcomes. In all models, facility and year fixed effects models will be estimated, while controlling for health worker characteristics. Where possible, trends prior to the introduction of the interventions will be assessed for both "intervention" and "control" areas for measures such as service utilisation and assisted birth rates (which can be obtained from routine data) where more than two data points are available. This will test the plausibility of the assumption that trends in outcomes will not differ between the intervention and control groups in the absence of the intervention.

Process Evaluation: Observations of meetings, review of relevant documents, and in-depth interviews will be used to understand the design, context, decision processes and rationale for the way the intervention evolves. The data collected will also be used to assess the plausibility of any changes in outcomes being linked to the intervention, and unpack how the intervention works.

The theory of change will provide the deductive framework to analyse responses from the qualitative interviews. Where possible, findings will be triangulated with supporting documentary evidence. Data analysis will also be guided by the development of any other pertinent indicators identified following the construction of a theory of change, helping to monitor the achievement of intended outcomes.

Data Processing and Management

For the quantitative component, data from the baseline and midline evaluation surveys will be double-entered into SYSPRO using customized entry screens. The Kinshasa School of Public Health is responsible for overseeing the data entry, cleaning and processing; and producing preliminary tables.

For the qualitative data components in phases two and three, data collectors will audio record the key informant and in-depth interviews and group discussions; hand written field notes of information that will give additional insights into the data will also be taken. The audio recordings will be translated and transcribed from the local language into French after the interview is completed. Transcriptions will be written up in a Microsoft Word document. All completed transcripts will first be reviewed by the data collectors and subsequently sent to the Principal Investigator for her review. She will send comments on the transcripts if gaps are identified or improvements in interviewing techniques are needed. Electronic copies of the transcripts will be stored on a password protected computer and only accessible to the research assistants and the Principal and Co-Principal Investigators.

All data forms and records collected during this research will be held in a secure location at KSPH and/or Tulane University for the duration of the proposed research. Confidentiality of all respondents will be ensured through the replacement of any personal information with unrelated unique identifiers. Where relevant, names and location information will be separated from the electronic data processed for analysis. The only identifiers used during the analysis will be a unique identification number. All data will be kept under lock and key or password protected computer, with only key personnel having access.

Study strengths and limitations

The strength of the approach for phase one is that the results will be drawn from a large sample, thereby increasing the generalisability and representativeness of the results. Drawbacks of this approach are that reporting on income and levels can be a sensitive issue and respondents may not wish to disclose this information and/or provide biased answers. In order to mitigate this risk, the issue of confidentiality will be emphasised and respondents will be informed that data will be anonymised and stored securely.

For phase two, given this is a cross-sectional analysis of quantitative data, it will not be possible to attribute causality between salary supplement withdrawal and motivation. However, qualitative interviews will be used to investigate whether there are differences observed between health workers who used to receive salary supplements and those who did not. Another limitation between the cross-sectional comparison between areas that were supported by ATH and those of the new ASSP zones in terms of motivational outcomes is that ATH areas do not only differ in terms of the removal of salary payments, but also due to a history of support that the new ASSP zones did not

have. Phase two also relies on subjective or self-reported measures of income and motivation, which can be problematic as such methods are subject to several errors, including response bias. Again, in order to mitigate this risk, the issue of confidentiality will be emphasised.

A strength of the approach of phase three is that it will permit the collection of a lot of detailed information from a variety of stakeholders. A weakness of the controlled before and after study, is that control and intervention zones will not be located within the same province and so there may be other contextual factors explaining the differences between the two areas. However, it was not possible to have control sites in Kasai Occidental due to programming priorities; IMA are collaborating with a larger World Bank project which hopes to conduct a headcount of civil servants in key sectors for the whole province. The World Bank have agreed to conduct a headcount of health workers outside of ASSP zones if IMA cover all ASSP zones. In the analysis, we will be testing for differences between the two provinces using the baseline data (health worker, health facility and community data from the surveys). However, if there are substantial differences noted between zones in Kasai Occidental and Equateur, it may be necessary to resort to a before and after study without a control.

Results Dissemination

The study team will submit to DFID and IMA World Health two technical reports; one detailing the results of phases 1 and 2, and the other detailing the results of phase 3. Reports will be written in English and in French, summarising the study results. IMA World Health and DFID will use the study findings to inform decisions about whether the interventions affecting health workers need to be refined or changed.

Ethical Considerations for Human Subjects Research

Risks to subjects

There is the risk of breach of confidentiality or privacy during the data collection or storage process; processes to mitigate these risks are detailed below. In addition, all data will be stored under lock and key or password protected computers. Only key personnel and data managers will have access to collected data. The use of unique identifiers will further ensure that no data are linked to individuals. The data will be retained by the researchers without identifiers for possible use in future data analysis related to this project, which will be consistent with the original research purpose.

The consent procedures for the baseline survey have already been documented in the ASSP baseline impact evaluation research protocol. For the qualitative interviews, we will administer an informed consent form both verbally and in writing to all participants in French (see Appendices 4 and 5). The consent forms and procedures will follow exactly those that are approved by the Ministry of Health, and institutional review board of the Kinshasa School of Public Health. These forms will be read or will be given to participants to read themselves and will include a full description of voluntary participation (no penalty for non-participation), the right to withdraw from the study at any time and the right to not answer any question. Verbal and written consent will be obtained before each interview and respondents have the right to withdraw from the study at any point over the five year time period. The forms will also address the risks, benefits and purpose of the study and what we hope to learn. All interviewers will be trained extensively on the consent procedures, and each form will be co-signed (or verified by their mark) by the interviewer to ensure all participants have consented **(see section on training below)**. Checks in the field by the Principal Investigator will further ensure the consenting process is followed in all cases. The confidentiality procedures are designed to meet all contingencies so that the privacy of the participants is preserved.

Potential benefits of the proposed research to the subjects and others
The selected health zones for the pilot intervention may potentially benefit from improved compensation from the government. The national health policy makers will potentially benefit from the availability of evidence to support the effectiveness of the project in improving the motivation, management and payment of health workers.

Remuneration
Respondents will not be paid to participate in the study.

Costs
Apart from the respondents' time, there will be no costs to individuals participating in this research study.

Importance of knowledge to be gained

Describing and quantifying how health workers are remunerated in the DRC will be of critical importance in informing national discussions around the coordination of contributing actors (such as donors, government, faith based organisations etc.). It will also shed light on the degree of consistency in government payments to workers.

In addition, in the DRC health worker performance and motivation are serious concerns given the low and uncontrolled remuneration which exists. This research will be the first to identify both financial and non-financial influences on health worker motivation in the DRC, which will be a necessary precursor to planning future policy interventions aimed at improving health worker performance. It will also be the first research to describe the effects on motivation of withdrawing financial incentives from health workers in a fragile state.

Finally, uncovering the strengths and weaknesses of an intervention to support the payment of health workers by government in fragile states will have important implications for future continued work on health worker pay reform, as well as in other public sectors such as education, where similar problems with the organisation and payment of teachers exist. In comparison with pay-for-performance schemes, this intervention offers an opportunity for the government to resume its responsibility to health workers and services, thereby signalling an increased willingness to act on behalf of its citizens in an accountable and responsive way. Hence, the intervention may also contribute to the rebuilding of the social contract between government and Congolese society. A key benefit of conducting a process evaluation is that it will be able to distinguish any issues early on with the intervention and therefore allow ASSP to adapt the intervention as necessary, thus potentially limiting a waste of resources and increasing the chance of its success (22).

Inclusion of vulnerable populations (women, minorities, children)

Both the quantitative and qualitative analyses will include men and women, as gender-differences in the motivation, behaviour and compensation of health workers is an important aspect of the study. No racial or ethnic group will be excluded.

Training of data collectors

Training for the baseline surveys has already been described for the baseline impact evaluation study protocol. The same level of training will be repeated for the midline survey. Prior to qualitative collection, a three-day training will be held which will include sessions on the qualitative data collection techniques employed during the study, with a focus on open-ended questioning, approaches used when interacting with respondents, and research ethics and ethical procedures.

During the training, the researchers will be introduced to the study objectives, the methodology, and the instruments. Sessions will also be devoted to obtaining informed consent.

Planning, Study Management and Governance

Dr. Rishma Maini, the Principal Investigator, and Dr. David Hotchkiss, the Co-Principal Investigator, are responsible for overseeing the planning and implementation of the study. Tasks completed to this point include developing a concept note, and convening meetings with IMA World Health and DFID staff to discuss the objectives and approach for the study. Two data collectors need to be identified and recruited to assist with data collection. In carrying out the study, the research team will adhere to Tulane's Terms of Reference for the ASSP project. This includes ensuring that the study is carried out independently, routinely reporting on the progress of the study to DFID and IMA World Health staff, and adhering to the OECD DAC criteria for evaluating programmes and projects (relevance, effectiveness, efficiency, impact, and sustainability).

Study timeline

Operational Research Steps and Milestones

Programme:	ASSP - OR
Study Topic:	Health worker motivation
DFID Adviser(s):	Sarah Goldsmith, Lizz Frost Yocum
Implementer:	Tulane

	Steps and Milestones (marked in *)	Expected	Completed	Notes
1	Identifying Research Topics			
	Study topics proposed to DFID	Dec 2013	Dec 2013	
*	DFID APPROVAL : Study topic agreed by DFID (with input from IMA)	Jan 2014	Jan 2014	
2	Drafting Concept Note			
	Discussions with DFID, gov and other stakeholders on research questions for the study completed	Feb 2014		
	Development of study concept note	Feb, 2014		
	Submission of Concept Note to DFID	2 May, 2014		
*	DFID APPROVAL: Concept Note approved by DFID (OR STUDIES ONLY)	June, 2014		
*	DFID APPROVAL: CV of lead researcher agreed by DFID	June, 2014		
3	Developing Study Protocol			
	Protocol and instruments completed	July, 2014		
	Submission of Study Protocol to DFID	July 14, 2014		
	DFID review and QA	July 14 - 28, 2014		
*	DFID APPROVAL: When protocol has passed QA	July 28, 2014		
	Authorisation in writing from DFID to start research implementation	August 18, 2014		
	Tulane IRB approval given	August 11, 2014		
	Local IRB approval given	August 11, 2014		
4	Implementing Study			
	Field workers trained	August 30, 2014		
	Field work/ secondary data collection completed.	August 2016		Phase 1 collection completed by August 2014 (baseline survey)

				Phase 2 collection completed by October 2014 Phase 3 collection completed by August 2016
	Analysis of data completed	December 2016		Phase 1 analysis completed by October 2014 Phase 2 analysis completed by August 2015. Phase 3 analysis completed by December 2016
5	Reporting,			
	Preliminary findings presented in routine meetings with IMA and DFID	Ongoing		Fieldwork briefs will be submitted upon completion of data collection in each province. This will include a discussion of the preliminary findings.
	Drafting preliminary report	December 2016		
	Preliminary report submitted	January 2017		
	Dissemination and uptake plan, based on dissemination strategy in study protocol approved earlier by DFID (following QA), submitted	February 2017		
*	DFID APPROVAL: Preliminary report	March 2017		
*	DFID APPROVAL: Dissemination and uptake plan	March 15th 2017		
	Final report revisions	March-April 2017		
	Final report submitted to DFID for approval	April 14 2017		
	DFID review and final report	April 14-28 2017		

*	DFID APPROVAL: Final report	April 28th 2017		
6	Dissemination, Uptake			
	Publication paper(s) reviewed by DFID	TBD		
	Dissemination activities conducted	April 2017		
	Study submitted for publication	In 2017/2018		

Appendix 1: Modifications made to original health worker survey

The sources of the original questions in the baseline health worker survey developed by Tulane were taken from survey instruments used in the following studies:

1. Khan et al., 2013 - Use of a balanced scorecard in strengthening health systems in developing countries: an analysis based on nationally representative Bangladesh Health Facility Survey.

2. Banteyerga et al., 2010 - The system-wide effects of the scale-up of HIV/AIDS, Tuberculosis, and Malaria services in Ethiopia

3. Hansen et al., 2008 – Measuring and managing progress in the establishment of basic health services: the Afghanistan Health Sector Balanced Scorecard

Subsequently, the Principal Investigator reviewed the literature and proposed several additions based on: instruments previously used in other low income countries; themes identified from the literature; input from the Principal Investigator's PhD supervisors; and contextual information from partners working in the field. Where Likert scales were used for questions, a five-point scale replaced the original three-point scale as this was more consistent with the recent literature.

Detail on the sources of additional/modified questions is given in the following table.

Reference/Source for questions	Questions added/modified in final survey tool
Willis-Shattuck et al., 2008 – Motivation and retention of health workers in developing countries: a systematic review (indicated themes as opposed to questions)	109.
Bennett et al., 2001 – The development of tools to measure the determinants and consequences of health worker motivation in developing countries.	305, 312, 322, 323, 329
Blauuw et al. 2013 – Comparing the job satisfaction and intention to leave of different categories of health workers in Tanzania, Malawi, and South Africa	314
Chandler et al., 2009 – Motivation, money and respect: A mixed-methods study of Tanzanian non-physician clinicians	323, 415, 416, 417
Penn-Kekana et al., 2005 – Nursing staff dynamics and implications for maternal health provision in public health facilities in the context of HIV/AIDS.	415, 416, 417
Peters et al., 2010 – Job satisfaction and motivation of health workers in public and private sectors: cross-sectional analysis from two Indian states	302, 307, 316, 322, 323,
Faye et al., 2013 – Developing a tool to measure satisfaction among health professionals in sub-Saharan Africa	102, 109, 302, 304, 305, 307, 309, 310, 314, 315, 316, 320, 322, 323, 325, 326 – 331, 335, 509, 510
Prytherch et al., 2012 – The challenges of developing an instrument to assess health provider motivation at primary care level in rural Burkina Faso, Ghana and Tanzania	102, 108, 109, 110, 306, 337, 411, 416, 417, 421, 424, 425, 426,
Mutale et al., 2013 – Measuring health workers' motivation in rural health facilities: baseline results from three study districts in Zambia	301, 302, 320, 338, 403, 418, 423, 426
Fox et al., 2013 – Paying health workers for performance in a fragmented, fragile state: reflections from Katanga province, Democratic Republic of Congo (gave more contextual information than questions)	501, 502
Mbindyo et al., 2009 – Developing a tool to measure health worker motivation in district hospitals in Kenya	309, 403, 415, 420
Yami et al., 2011 – Job satisfaction and its determinants among health workers in Jimma University Specialised Hospital, Southwest Ethiopia	307
Malik et al., 2010 – Motivational determinants among physicians in Lahore, Pakistan	Questions covered in original survey (appendix 5)
Agyepong et al., 2004 – Health worker (internal customer) satisfaction and motivation in the public sector in Ghana	337
Alhassan et al., 2013 – Association between health worker motivation and healthcare quality efforts in Ghana	Questions covered in original survey (appendix 5)
Health Worker Incentive Survey, Impact Toolkit developed by University of Aberdeen.	521 – 532
Tanzania P4P study. (Preliminary results from December 2013)	312
Dieleman et al., 2006 – The match between motivation and performance management of health sector workers in Mali	109, 315
Other sources	
Suggestions from Principal Investigator's supervisors	221, 222, 227, 501, 513,
Suggestions by researcher based on contextual information from IMA Worldhealth	222, 227, 418, 421, 423,

N.B. Many of the tools in the literature had questions which overlapped with those in the original survey developed by Tulane and with each other.

Appendix 2: Interview Guide for Phase Two

In depth interviews with nurses

Note to interviewer on logistics:
Conduct interview in a private place. Interviews should be tape-recorded subject to consent.

Selecting interviews:
Choose at least 8 nurses in facilities previously receiving salary supplements and at least 8 nurses in facilities where salary supplements were never operational.
Respondents:
Gather basic information about the respondents before the interview and assign a code to him/her. Only use the assigned code for the interviewee in the notes/transcript, together with notes about gender, age, etc.

Introducing the interview (see consent form in Appendix 4)

Topic Guide

Key area of investigation	Rationale	Themes	Example questions	Explanatory notes
Health facility environment	Introductory questions to encourage nurses to discuss the health facility within which they work in and what their everyday job is like. This will give an idea of context. Also explore reasons for doing their job, which may be linked to intrinsic motivation. Also start to explore nurse's perceptions of the facility and challenges associated with their work.	• History of working for the facility • Health facility environment • Perceptions of quality of health facility services • Barriers or facilitators in performing job in facility • Relationship with other staff	1. What made you want to become a nurse? 2. Can you tell me for how long you have worked in this facility? 3. What services do you directly provide at the facility? 4. Do you think that the clinic provides good services to the community? Can you give examples? 5. What features of the services do you think are good and what bad? Can you give examples? 6. How does this service compare with the services offered at other facilities? 7. Do you think the facility has a good reputation with the community? (Please give reasons for your answer)	Deliberately don't start with challenges of doing the job. Want to understand the everyday context within which the nurse operates, and encourage them to talk in a more informal way. Also may discuss features of the environment (extrinsic factors) which may affect the "can do" component of motivation. When asking about challenges or reputation of the facility, may be worthwhile emphasising the confidentiality of the interview.

			8. What prevents you from doing your job effectively at this facility? Can you give examples? 9. What would allow you to do your job more effectively? Can you give examples? 10. How would you describe your relationship with other staff in the hospital?	
Organisational commitment	To explore the commitment of the nurse to the organisation, and this should lead into discussion of whether the nurse's goals are aligned with that of the organisation and perceptions of management of the facility.	• Commitment to organisation • Factors which affect commitment to the organisation • Perception of management of the facility	11. Do you feel that there is a strong commitment to delivering good health care at this facility? 12. Do you think the commitment of health workers is different in different sectors (private, for-profit, not-for-profit)? Why? 13. How likely is it that you will be working at this facility three years from now? Why or why not? If not, where do you think you will be working and why? What would encourage you to stay? 14. What are your thoughts on the way the facility you work in being managed?	Want to understand whether the nurse's goals are aligned with what they perceive to be the organisational goals (the "will do" component of motivation) Also want to understand the organisational environment within which the nurse is working (extrinsic factors).

			15. If you could change anything about how the facility is managed, what would you change?	
Incentives and income	To understand the non-financial and financial incentives affecting nurses. To also explore the perception of the job itself and the role of government	• Non-financial incentives • Financial incentives	16. How valued do you feel by your employer? Why or why not? 17. What are some of the ways your employer shows that they value you as a professional? Can you give any examples? 18. Does your facility or employer do/give you anything if you perform well at work? If yes, can you please explain? Does this influence how you work? If so, in what way? 19. What are your sources of income? 20. How often are you paid from each source? 21. Do you receive any allowances or other benefits e.g. accommodation etc. Can you please elaborate? 22. Do you have to work elsewhere to supplement your income? If so, can you please give details? 23. Do you feel you are well compensated for the work you do?	Important to get a picture of the different incentives nurses are exposed to. Also, whether these incentives are perceived to change how the nurse works, and which ones are deemed to be important. These questions are likely to be more sensitive hence they are being raised later on in the interview, once rapport has been established.

			Please give reasons for your answer. 24. How do you feel currently about the way you are compensated *by the government* for the work you do? 25. Do you think the government currently fulfils its responsibility to health workers? Please give reasons for your answer. 26. What changes, if any, would you like to see in the future in terms of how the health system operates in the DRC?	
Motivational outcomes – job satisfaction and behaviour	To give some contextual understanding around how nurses behave in the workplace, and factors influencing job satisfaction.	• Behaviour and coping strategies of nurses • Job satisfaction	27. In many countries, communities complain about the quality of health services. For example, there are often complaints that health workers are not very motivated, that they do not spend as much time as they should doing their job, that they are competent at their job, and even sometimes that they are involved in illegal activities such as stealing drugs and material and charging too much for services. How do you feel that the situation is in the DRC?	Where the nurse may be struggling to talk about anything that they feel may incriminate them (e.g. charging informal payments), then you should use hypothetical situations – what would happen if etc.? Again, it may be worthwhile emphasising the confidentiality of the interview.

			28. Do you think most health workers are satisfied with their job? Why do you think some health workers are unsatisfied in their job? 29. What aspects of how the staff behave and do their work are good and what are bad? Can you give examples for each? 30. What drives you to do your job? Can you give any concrete examples?	
For facilities where primes were removed only Effect of removing primes	To explore nurses perceptions of (1) the payment of primes, (2) how primes were removed, and (3) a description of any changes in behaviour following the removal of primes	• Perceptions of donor-funded primes • Perceptions on why primes were removed and process of communicating the removal of primes to nurses • Behaviour following removal of primes	31. What did you think about the payment of "primes" in the old Access to healthcare programme? Did you agree with it or disagree with it? Can you give reasons for your answer? 32. Did you understand the reasons why the primes were removed? What do you think these reasons were? 33. Was it adequately explained to you that primes would be removed? Who explained that this would occur? 34. How did you feel when the salary supplements were removed? Did	Need to understand the strengths and weaknesses around the process of removing primes so lessons can be learned and applied to other programmes. Also to gain an understanding of any negative or positive consequences as a result of removing primes.

			you change your behaviour in any way? Did you see any change in behaviour in your colleagues? 35. How have you coped with the removal of primes? Have you done anything to supplement your income since they have been removed?	
Finish by asking for advice from nurses (if not already covered) on what strategies nurses think would be likely to lead to improvements in nurse behaviour and satisfaction.				

Conclusion

Thank you very much for your time, it's been really interesting to hear about your experiences and views.

I have asked so many questions, do you have any further questions?

Again thank you. And let me just remind you that, as I said at the start, this interview will be confidential no one will know what you personally have said.

Appendix 3: Interview Guides for Phase Three

Stakeholders: DFID / Government Ministries / IntraHealth / IMA / World Bank

Note to interviewer on logistics:
Conduct interview in a private place. Interviews should be tape-recorded subject to consent.
Respondents:
Gather basic information about the respondents before the interview and assign a code to him/her. Only use the assigned code for the interviewee in the notes/transcript.

Introducing the interview (see consent form in Appendix 5)

Topic Guide

Key area of investigation	Rationale	Themes	Example questions	Explanatory notes
Knowledge of the HR intervention	Introductory questions to encourage stakeholders to reveal their interpretation and understanding of the HR intervention. Also start to explore the role of the stakeholder in the intervention and how their actions may moderate the intervention itself.	• Understanding of what the intervention will do • Changes made to the intervention • Perceptions of stakeholder's role in the implementation of the intervention	1. Can you start off by telling me what you know about the HR intervention planned in ASSP? 2. What problems do you think this is trying to address? 3. What is/are the overall goal/goals of the intervention? 4. What activities are planned in order to achieve these goals? 5. How did the choice of these activities come about? 6. How will these activities achieve the intended goal/vision, and through which mechanisms? 7. Do you know of any changes which have been made to the intervention during the pilot? If so, what are they? 8. What has been your role in the intervention to date?	This will allow the interviewer to gauge the respondent's knowledge and understanding as well as involvement in the intervention.
Theory of Change	To explore the stakeholder's understanding of theory	• Understanding of principles of	9. Are you familiar with Theories of Change? (Explain using a brief description if necessary).	The interviewer will use a visual theory of change map when

	of change, and how it applies to the intervention. Also to identify areas of risk/contention/gaps with respect to the intervention.	theory of change • Understanding of how theory of change applies to the intervention • Gaps in the intervention • Participation of stakeholders in implementation • Risks associated with the intervention • Threats to the intervention • Stakeholder's perceptions of the intervention and activities	10. Below is a theory of change which has been devised together with relevant stakeholders. Starting with inputs, followed by outputs through to outcomes and impact, are there any gaps that you can identify based on your knowledge of the planned interventions? Is there anything in there which you do not agree with? Are there any activities missing which we would should be doing? 11. Who will be involved in implementing these activities and in taking action to achieve the goal? 12. How will each actor be involved? 13. What are their roles? 14. Why are they crucial for this intervention (probe: what resource they bring in, etc)) 15. Which parts of the theory of change seem to carry the highest risk? In other words, what threats are there to the intervention not being executed as planned?	discussing this element with stakeholders. The interviewer should think about how best to extract individual opinion as opposed to the "party-line" response. They should also be cognisant and reflect on their position in relation to the interviewee (e.g. is the interviewee perceived as being a member of DFID etc.) and emphasise that they will not be individually identified by their responses.

			16. Overall, do you agree with the approach being adopted? Please give reasons for your answer.	
Implementation of the intervention	To better understand the current state of implementation of the intervention and contextual factors affecting the intervention.	• Intended consequences • Unintended consequences • Enabling factors • Bottlenecks	17. Are the activities being implemented as you had envisaged? If not, please elaborate. 18. What has happened so far that you didn't expect? 19. Were the necessary inputs supplied by the project (technical input, equipment, managerial and training support)? 20. Were there any particular opportunities the HR interventions could capitalise on? 21. What have been the important elements so far in enabling the HR interventions to happen? 22. What factors have impeded the HR interventions? 23. How do you expect the health workers to react to these activities? Why do you expect that?	The interviewer should seek to probe for strengths and weaknesses of the intervention, as well as understand the roles played by stakeholders and how they may influence implementation of the intervention. The information will be used to refine the intervention if necessary.
Next steps	To explore where the intervention can be changed in order to	• Changes needed to the intervention	24. What do you think will be needed to insure that the HR activities succeed and have a sustained impact on health workers?	Information will be used to inform ongoing implementation so that the intervention can be refined if necessary.

	enhance the chance of success		25. Do you have any suggestions regarding ways to improve the HR intervention design and/or activities?	

Conclusion

Thank you very much for your time, it's been really interesting to hear about your experiences and views.

I have asked so many questions, do you have any further questions?

The next step is that I'm going to go away and put together a combined Theory of Change for the HR interventions, based on this interview and the other interviews I'm conducting with key stakeholders. I'd like to forward the final version to you to let you feedback on it, if that would be OK?

Again thank you. And let me just remind you that, as I said at the start, this interview will be confidential no one will know what you personally have said.

Stakeholders: Health Workers/NGO implementing partners

Note to interviewer on logistics:

Conduct interview in a private place.

Respondents:

Gather basic information about the respondents before the interview and assign a code to him/her. Only use the assigned code for the interviewee in the notes/transcript.

Introducing the interview (see consent form in Appendix 5)

Topic Guide

Key area of investigation	Rationale	Themes	Example questions	Explanatory notes
Knowledge of the HR intervention	Introductory questions to encourage respondents to reveal their awareness and involvement in the intervention.	• Understanding of what the intervention is • Understanding of what the intervention will achieve • Involvement in the intervention	1. Can you start off by telling me what you know about the HR interventions planned in ASSP? 2. What do you think the HR interventions are intending to achieve? 3. What do you think is/are the overall goal/goals of the intervention? 4. Do you know about the activities planned in order to achieve these goals? If so, what are they? 5. To what extent have your views been solicited on the HR interventions planned within the programme?	This will allow the interviewer to gauge the respondent's knowledge and understanding of the intervention.
Theory of Change	To explore the respondent's understanding of theory of change, and how it applies to the intervention. Also to identify areas of risk/contention/gaps.	• Understanding of principles of theory of change • Understanding of how theory of change applies to the intervention	6. Are you familiar with Theories of Change? (Explain using description if necessary). 7. Below is a theory of change that has already been devised together with relevant stakeholders. Starting with inputs, followed by outputs through to outcomes and	The interviewer will use a visual theory of change map when discussing this element. For NGO implementing partners, the interviewer should think about how best to extract individual opinion as opposed to the "party-line" response. They should also be

		• Gaps in the intervention • Risks associated with the intervention • Threats to the intervention • Respondent's perceptions of the intervention and activities	impact, are there any gaps that you can identify based on your knowledge of the planned interventions? Is there anything in there which you do not agree with? Are there any activities missing which we would should be doing? 8. Which parts of the intervention seem to carry the highest risk? In other words, what threats are there to the intervention not being executed as planned? 9. Overall, do you agree with the approach being adopted? Please give reasons for your answer.	cognisant and reflect on their position in relation to the interviewee (e.g. is the interviewee perceived as being a member of DFID etc.) and emphasise that they will not be individually identified by their responses. For health workers, the interviewer may need to explain the theory of change in a lot of detail, as it will be unlikely they will have ever come across this before. The interviewer may also have to explain the intervention activities as it is possible that the health workers are not aware of it.
Implementation of the intervention	To better understand the current state of implementation and contextual factors affecting the intervention.	• Intended consequences • Unintended consequences • Participation in implementation • Enabling factors • Bottlenecks	10. Do you think the HR interventions are being implemented as planned? 11. What positive things have you seen happen as a result of the intervention? 12. What negative things have you seen as a result of the intervention? 13. Do you feel sufficiently involved and consulted in the process?	As above, the health worker may not be aware of the status of implementation. However, the interviewer should try and probe for their opinion on risks associated with the intervention and whether there are any gaps in activities.

			14. Do you know of anything which has helped the activities to occur? 15. Do you know of anything that has prevented certain activities from taking place?	
Next steps	To explore where the intervention can be changed in order to enhance the chance of success	• Changes needed to the intervention	16. What do you think will be needed to insure that the HR activities succeed and have a prolonged impact on health workers? 17. Do you have any suggestions regarding ways to improve the HR intervention design and/or activities?	Information will be used to inform ongoing implementation so that the intervention can be refined if necessary.

Conclusion

Thank you very much for your time, it's been really interesting to hear about your experiences and views.

I have asked so many questions, do you have any further questions?

The next step is that I'm going to go away and put together a combined Theory of Change for the HR interventions, based on this interview and the other interviews I'm conducting with key stakeholders. I'd like to forward the final version to you to let you feedback on it, if that would be OK?

Again thank you. And let me just remind you that, as I said at the start, this interview will be confidential no one will know what you personally have said.

Appendix 4: Consent form for Phase Two In-Depth Interviews

Principal Investigator: Rishma Maini, MBChB
Co-Investigator: David Hotchkiss, PhD
Study Title: Health worker motivation in the DRC.
Sponsor: Interchurch Medical Assistance

The following informed consent is required by Tulane University for any research study conducted by investigators at the University. This study has been approved by the University's Institutional Review Board for Human Subjects.

Introduction

You are invited to participate in a research study to understand more about your experience of working in this health facility. You are being asked to participate because you are currently working in this facility. No research activity is to be conducted until you have had an opportunity to review this consent form, ask any questions you may have, and sign this document if applicable.

The main objective of this study is to understand health workers experiences of working in facilities, and what help health workers to be effective in their job, and what needs to be improved or changed. The information collected will guide decisions regarding changes which should be made in health facilities in order to improve the effectiveness of health workers and hence service delivery.

We would like to ask you about more about your role in the facility, the facility environment, what helps you to do your job effectively and what things hinder you in performing your job. We will also be asking some questions related to your income.

You have the right to refuse to participate in the study now or at any time during the interview. There are no penalties of any kind if you decide that you do not want to participate. You can also refuse to respond to specific questions if you choose. If you decide to participate, you will be asked to sign this form and it will be a record of your agreement to participate. You will be given a copy of this form.

The study will be carried out in eight health facilities of ASSP and the study will be conducted in Kasai Occidental province. In each facility we plan to carry out two interviews with nurses working there.

Why is this study being done?

The purpose of this research study is to understand the working environment of health workers in the DRC, and the experiences of health workers in delivering services. We also hope to understand what changes could be made to improve the ability of health workers to perform their job as effectively as possible.

What are the study procedures? What will I be asked to do?

If you agree to take part in this study, you will then be asked to participate in one interview which should last about an hour. Questions will be asked about the place where you work, and how you feel about working there. There will also be some questions relating to the income you receive in the facility. If you agree, the interview will be audio recorded for the study. We will conduct the interview in a private area of the facility today. After this interview, I may need to follow up to understand some of the points made

during our talk and to ask some additional questions. We are hoping to interview a total of 16 people for this study.

If you agree to have our talk audio recorded, neither your name nor any other information that can identify who you are and will be linked to the audio recordings or any written documents created from the recordings. Only the people involved in the study will be permitted to listen to the recordings. Immediately following your interview you will be given the opportunity to have the recordings erased. The recordings will be written up by members of the research team and erased once the written document is checked for accuracy. The written document may be used in whole or in part for oral presentations or written documents that result from this study. Neither your name nor any other information that can identify who you are will be used in presentations or in written documents that result from this study.

What are the risks or inconveniences of the study?

We believe there are no known risks associated with this research study; however, a possible inconvenience may be the time it takes to complete the study. You can refuse to answer any questions during the discussion. The initial discussion will take about an hour of your time. Any discussions carried out later will probably be shorter.

We understand the possibility of problems in keeping the information we collect confidential, or private, and are taking measures to prevent that your name is linked to the information collected. All the information obtained from you will be kept in a secure location and will be strictly used for the purpose of this study. If you have any concerns regarding our study, please use the contact information below to express your concerns.

What are the benefits of the study?

You will not receive any direct benefit from taking part in the study. By talking to you, we will be able to understand changes that are needed to improve working conditions for health workers in order for them to be more effective.

Will I receive payment for participation?

You will not be paid to be in this study. Your participation in the study is for voluntary. You will not be provided with any reward or payment to participate in the study.

Are there costs to participate?

There are no costs to you to participate in this study.

How will my personal information be protected?

The following procedures will be used to protect the confidentiality of your data. The researchers will keep all study records locked in a secure location. Research files and documents will be marked with a special code. A list that includes the names of people who participated in the study and special codes for each name will be kept in a separate and secure location. All computer files that include information that can be used to identify your name will be protected by a password. Any computer containing these files will also have a special password to prevent use by people not participating in the study. Only the members of the research

staff will have access to the passwords and any other information you provide. At the end of this study, the researchers may share the findings. Information will be presented in a summary format and you will not be identified in any printed documents or presentations. Any list of codes, audio recording, and other information described in this paragraph will be kept as explained in this paragraph until they are destroyed by the researchers five years after the study. Audio recordings will be written up by a member of the staff.

You should also know that the ethics committees of Tulane University and the University of Kinshasa School of Public Health may inspect study records, but these reviews will only focus on the researchers and not on your responses or involvement. The IRB or ethics committee is a group of people who review research studies to protect the rights and well-being of research participants.

Can I stop being in the study and what are my rights?

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate. You also do not have to answer any question that you do not want to answer.

Who do I contact if I have questions about the study?

Take as much time as you like before you make a decision to participate in this study. Feel free to ask me any questions you have about the study. If you have questions about this study that I cannot answer, or if you feel that you have been treated unfairly or have been hurt by joining the study, you may contact Rishma Maini who is in charge of the study, at Tel: 0817106670 or
David Hotchkiss who is the co-investigator of the study, at +504 988-3289.

If you have any questions, concerns, or complaints about your rights as a research subject or want to speak to someone who is not included in in the research, you can contact the Kinshasa School of Public Health Ethics Committee, Félicien Munday Mulop, Tel: 0998419816 or Tulane University Human Research Protection Office (HRPO) Tel: +504 988-2665; email at irbmain@tulane.edu.

Consent to Audio:

This study involves **audio recording of your participation.** Neither your name nor any other identifying information will be associated with the **audio recordings or any transcripts created from them.** Only the researchers will be permitted to **listen to** the recordings.

Immediately following the interview, you will be given the opportunity to have the recordings erased.

Please initial one of each pair of options.

___ I consent to have my participation recorded.

___ I do not consent to have my participation recorded

___ I consent to have my recorded participation transcribed into written form.

___ I do not consent to have my recorded participation transcribed.

The recordings will be transcribed by the researcher and erased once the transcriptions are checked for accuracy. Transcripts of your participation may be reproduced in whole or in part for use in presentations or written products that result from this study. Neither your name nor any other identifying information such as your voice will be used in presentations or in written products resulting from the study.

___ I consent to the use of the written transcription in presentations and written products resulting from the study provided that neither my name nor other identifying information will be associated with the transcript.

___ I do not consent to the use of my written transcription in presentations or written products resulting from the study.

The above permissions are in effect until August 2015. On or before that date, the tapes will be destroyed.

_____ _____

Subject Date

_____ _____

Legally Authorized Representative (if applicable) Date

_____ _____

Person Obtaining Consent Date

Documentation of Consent:

I have read this form and decided that I will participate in the research project described above. Its general purposes, the particulars of involvement and possible risks and inconveniences have been explained to my satisfaction. I understand that I can withdraw at any time. My signature also indicates that I have received a copy of this consent form.

_____ _____

Subject Date

_____ _____

Legally Authorized Representative (if applicable) Date

_____ _____

Person Obtaining Consent Date

I am unable to read but this consent document has been read and explained to me by

_____ . I volunteer to participate in this research.

_____ _____

Subject Date

_____ _____

Witness Date

_____ _____

Person Obtaining Consent Date

_____ _____

Principal Investigator Signature

Appendix 5: Consent for Phase Three In-Depth Interviews

Principal Investigator: Rishma Maini, MBChB
Co-Investigator: David Hotchkiss, PhD
Study Title: Health Worker Motivation in the DRC
Sponsor: Interchurch Medical Assistance

The following informed consent is required by Tulane University for any research study conducted by investigators at the University. This study has been approved by the University's Institutional Review Board for Human Subjects.

Introduction

You are invited to participate in a research study to understand more about the pilot intervention affecting human resources for health within the ASSP programme. No research activity is to be conducted until you have had an opportunity to review this consent form, ask any questions you may have, and sign this document if applicable. The main objective of this study is to understand whether the activities of the intervention are being implemented as planned, any strengths and weaknesses, as well as any ways to improve the intervention. The information collected will guide decisions regarding changes in intervention activities.

We are asking you to participate in the study because we know that you are either involved or will be affected by the intervention. We would like to learn more about your views on the intervention preparations and activities, including any benefits and problems that have occurred thus far. We would like to ask you about how you are involved in the project, and how the project activities could be improved.

You have the right to refuse to participate in the study now or at any time during the interview. There are no penalties of any kind if you decide that you do not want to participate. You can also refuse to respond to specific questions if you choose. If you decide to participate, you will be asked to sign this form and it will be a record of your agreement to participate. You will be given a copy of this form.

The study will be carried out mainly in Kinshasa with a total of 18 people who are known to be involved or affected by the intervention.

Why is this study being done?

We are working with a university in the United States called Tulane University. The research will be carried out to understand how the intervention itself, and to learn about ongoing intervention activities. We also hope to understand successes and failures associated with the intervention, as well as any outcomes that were not planned. One component of the study is to talk to people who have directly influenced or been involved in the planning and/or implementation of the intervention. We will also talk to those who are directly affected by the activities of the intervention.

What are the study procedures? What will I be asked to do?

If you agree to take part in the study, I will ask you to participate in one interview which should last about an hour. If you agree, the interview will be audio recorded for the study. After the first interview, I may

need to follow up to understand some of the points made during our talk and to ask some additional questions. We are hoping to interview a total of 18 people for this study.

If you agree to have our talk audio recorded, neither your name nor any other information that can identify who you are and will be linked to the audio recordings or any written documents created from the recordings. Only the people involved in the study will be permitted to listen to the recordings. Immediately following your interview you will be given the opportunity to have the recordings erased. The recordings will be written up by members of the research team and erased once the written document is checked for accuracy. The written document may be used in whole or in part for oral presentations or written documents that result from this study. Neither your name nor any other information that can identify who you are will be used in presentations or in written documents that result from this study.

What are the risks or inconveniences of the study?

There are no known risks in taking part in the study. You can refuse to answer any questions during the discussion. A possible problem may be the time it takes to complete the discussion. The initial discussion will take about an hour of your time. Any discussions carried out later will probably be shorter.

We understand the possibility of problems in keeping the information we collect confidential, or private, and are taking measures to prevent that your name is linked to the information collected. All the information obtained from you will be kept in a secure location and will be strictly used for the purpose of this study. If you have any concerns regarding our study, please use the contact information below to express your concerns.

What are the benefits of the study?

You will not receive any direct benefit from taking part in the study. By talking to you, we will be able to understand changes that are needed to improve working conditions for health workers in order for them to be more effective.

Will I receive payment for participation?

You will not be paid to be in this study. Your participation in the study is for voluntary. You will not be provided with any reward or payment to participate in the study.

Are there costs to participate?

There are no costs to you to participate in this study.

How will my personal information be protected?

The researchers will keep all study records locked in a secure location. Research files and documents will be marked with a special code. A list that includes the names of people who participated in the study and special codes for each name will be kept in a separate and secure location. All computer files that include information that can be used to identify your name will be protected by a password. Any computer containing these files will also have a special password to prevent use by people not participating in the study. Only the members of the research staff will have access to the passwords and any other information you provide. At the end of this study, the researchers may share the findings. Information will be presented in a summary format and you will not be identified in any printed documents or presentations. Any list of codes, audio recording, and

other information described in this paragraph will be kept as explained in this paragraph until they are destroyed by the researchers five years after the study. Audio recordings will be written up by a member of the staff.

You should also know that the ethics committees of Tulane University and the University of Kinshasa School of Public Health may inspect study records, but these reviews will only focus on the researchers and not on your responses or involvement. The IRB or ethics committee is a group of people who review research studies to protect the rights and well-being of research participants.

Can I stop being in the study and what are my rights?

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

Who do I contact if I have questions about the study?

Take as much time as you like before you make a decision to participate in this study. Feel free to ask me any questions you have about the study. If you have questions about this study that I cannot answer, or if you feel that you have been treated unfairly or have been hurt by joining the study, you may contact Rishma Maini who is in charge of the study, at 0817106670 or David Hotchkiss who is the co-investigator of the study, at +504 988-3289.

If you have any questions, concerns, or complaints about your rights as a research subject or want to speak to someone who is not included in in the research, you can contact the Kinshasa School of Public Health Ethics Committee, Félicien Munday Mulop, Tel: 998419816 or Tulane University Human Research Protection Office (HRPO) Tel: +504 988-2665; email at irbmain@tulane.edu.

Consent to Audio:

This study involves **audio recording of your participation.** Neither your name nor any other identifying information will be associated with the **audio recordings or any transcripts created from them.** Only the researchers will be permitted to **listen to** the recordings. Immediately following the interview, you will be given the opportunity to have the recordings erased.

Please initial one of each pair of options.

___ I consent to have my participation recorded.

___ I do not consent to have my participation recorded

___ I consent to have my recorded participation transcribed into written form.

___ I do not consent to have my recorded participation transcribed.

The recordings will be transcribed by the researcher and erased once the transcriptions are checked for accuracy. Transcripts of your participation may be reproduced in whole or in part for use in

presentations or written products that result from this study. Neither your name nor any other identifying information such as your voice will be used in presentations or in written products resulting from the study.

___ I consent to the use of the written transcription in presentations and written products resulting from the study provided that neither my name nor other identifying information will be associated with the transcript.

___ I do not consent to the use of my written transcription in presentations or written products resulting from the study.

The above permissions are in effect until August 2015. On or before that date, the tapes will be destroyed.

_____ _____

Subject Date

_____ _____

Legally Authorized Representative (if applicable) Date

_____ _____

Person Obtaining Consent Date

Documentation of Consent:

I have read this form and decided that I will participate in the research project described above. Its general purposes, the particulars of involvement and possible risks and inconveniences have been explained to my satisfaction. I understand that I can withdraw at any time. My signature also indicates that I have received a copy of this consent form.

_____ _____

Subject Date

_____ _____

Legally Authorized Representative (if applicable) Date

_____ _____

Person Obtaining Consent Date

I am unable to read but this consent document has been read and explained to me by

_____ . I volunteer to participate in this research.

_____ _____

Subject Date

_____ _____

Witness Date

_____ _____

Person Obtaining Consent Date

_____ _____

Principal Investigator Signature Date

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