

Predictors of TB and HIV/AIDS external stigma among healthcare workers in the Free State

Province, South Africa

By

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degree

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## **Acknowledgements**

I would like to thank my supervisor, Prof Engelbrecht, for her unwavering patience throughout this process. I hope you're proud, paps, this one is for you. You are eternally missed.

## Declaration by the Language Editor

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I have ten years of experience in the field, having worked on multiple doctorates. All recommendations and errors have been noted in the comments. Any changes done to the document after the editing process does not reflect the editing services provided. The onus is on the student to ensure the document is fully corrected before final submission, even if that requires multiple edits.

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## **Note to the Examiner**

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## Abstract

**Background:** HIV/AIDS and TB are heavily stigmatised diseases that negatively impact health care service delivery and treatment outcomes. While there are numerous studies investigating healthcare workers (HCWs) stigmatizing TB and HIV patients, not much research has been undertaken on HCWs stigmatizing colleagues who have/are thought to have HIV/AIDS or TB. Therefore, this study sought to describe the levels of external HIV and TB stigma and to determine the factors associated with HIV and TB stigma among HCWs towards their colleagues.

**Methods:** The study utilised post-intervention data from a randomised control trial among HCWs at public hospitals in the Free State, South Africa. Of the 286 HCWs based at control hospitals who completed self-administered questionnaires, 124 were clinical professionals (doctors, nurses and allied professionals) involved in direct patient care, and 162 were administrative and support staff not directly involved in patient care. The data was analysed using descriptive statistics as well as binomial logistic regression to predict factors associated with external HIV and TB stigma.

**Results:** The results revealed more self-reported HIV stigma than TB stigma enacted towards colleagues. Slightly less than half of the respondents (47.6%) had high levels of HIV external stigma, while only one in five (20.7%) had high levels of TB external stigma. HIV external stigma was associated with a lack of personal contact with HIV-positive co-workers (AOR: 2.137, CI: 1.267-3.606,  $p=0.004$ ), female gender (AOR: 2.336, CI: 1.326-4.114,  $p=0.003$ ), and low to moderate HIV knowledge (AOR: 2.052, CI: 1.095-3.845,  $p=0.025$ ). TB stigma was predicted by age only, with older HCWs being more stigmatising than their younger counterparts (AOR: 1.042, CI: 1.006-1.079,  $p=0.023$ ).

**Conclusion:** The study identified higher levels of HIV external stigma than TB external stigma among HCWs. These findings suggest that HIV and TB stigma have different origins and

manifestations and that various factors, such as the modes of transmission, perceived responsibility, social implications, treatment outcomes, and historical contexts of the respective diseases, may influence them. As a result, interventions for reducing stigma in healthcare settings should be tailored to the specific characteristics and needs of each disease and its affected population.

## Opsomming

**Agtergrond:** MIV/VIGS en TB is siektes wat sterk gestigmatiseer word en 'n negatiewe impak op gesondheidsorg-dienslewering en behandelingsuitkomste het. Hoewel daar talle studies is wat ondersoek instel na gesondheidswerkers (GWs) se stigmatisering van TB- en MIV-pasiënte, is daar nie baie navorsing gedoen oor GWs wat kollegas met HIV/VIGS of TB stigmatiseer of vermoed word daarvan nie. Daarom het hierdie studie gepoog om die vlakke van eksterne MIV- en TB-stigma te beskryf en om die faktore wat verband hou met MIV- en TB-stigma onder GWs teenoor hul kollegas te bepaal.

**Metodes:** Die studie het na-intervensiedata gebruik van 'n gerandomiseerde kontroleproef onder GWs by openbare hospitale in die Vrystaat, Suid-Afrika. Van die 286 GWs wat aan beheerhospitale gestasioneer is en self-gedadministreerde vraelyste voltooi het, was 124 kliniese professionele persone (dokters, verpleegsters en geassosieerde professionele persone) wat direkte pasiëntsorg gelewer het, en 162 was administratiewe en ondersteuningspersoneel wat nie direk betrokke was by pasiëntsorg nie. Die data is geanaliseer met behulp van beskrywende statistiek sowel as binominale logistiese regressie om faktore wat met eksterne MIV- en TB-stigma geassosieer word, te voorspel.

**Resultate:** Die resultate het meer selfgerapporteerde MIV-stigma as TB-stigma getoon wat teen kollegas gepleeg word. Effens minder as die helfte van die respondente (47.6%) het hoë vlakke van MIV eksterne stigma gehad, terwyl slegs een uit vyf (20.7%) hoë vlakke van TB eksterne stigma gehad het. MIV eksterne stigma is geassosieer met 'n gebrek aan persoonlike kontak met MIV-positiewe kollegas (AOR: 2.137, CI: 1.267-3.606,  $p=0.004$ ), vroulike geslag (AOR: 2.336, CI: 1.326-4.114,  $p=0.003$ ), en lae tot matige MIV-kennis (AOR: 2.052,  $p=0.025$ ). TB-stigma is slegs deur ouderdom voorspel, met ouer GWs wat meer stigmatiserend as hul jonger eweknieë was (AOR: 1.042, CI: 1.006-1.079,  $p=0.023$ ).

**Slot:** Die studie het hoër vlakke van MIV eksterne stigma as TB eksterne stigma onder GWS geïdentifiseer. Hierdie bevindinge suggereer dat MIV- en TB-stigma verskillende oorspronge en manifestasies het en dat verskeie faktore, soos die oordragmetodes, waargenome verantwoordelikheid, sosiale implikasies, behandelingsoptredes en historiese kontekste van die onderskeie siektes, hulle mag beïnvloed. Gevolglik behoort ingrypings om stigmatisering in gesondheidsorgomgewings te verminder, toegespits te word op die spesifieke eienskappe en behoeftes van elke siekte en sy geaffekteerde bevolking.

## Background

HIV prevalence and Tuberculosis (TB) incidence in South Africa is amongst the highest globally, with an estimated 17.8% of the adult population aged between 15 and 49 years diagnosed with HIV<sup>1</sup>, a TB incidence rate of 468 per 100,000 population<sup>2</sup> and 54% of TB cases co-infected with HIV<sup>2</sup>. The burden of the co-epidemic puts a significant strain on the South African healthcare system, which already functions under resource-constrained working conditions coupled with poor infection-control and increasing numbers of patients<sup>3</sup>. There is clear and robust evidence that TB is an occupationally acquired disease for healthcare workers (HCWs) in South Africa; they are three times more likely to contract TB than the general population<sup>4</sup>; additionally, they have a higher prevalence of latent TB infection<sup>5</sup> and are six times more likely to be hospitalised for drug-resistant TB than the population they care for<sup>6</sup>. According to a meta-analysis<sup>7</sup>, exposure in healthcare settings caused 81% of TB cases among HCWs in countries with high TB incidence. This affected HCWs of all types, including clinical, paramedical/allied, support and administrative staff. While the prevalence of HIV among HCWs has not been specifically reported, earlier research found that 11.5% to 20% of HCWs in South Africa were HIV positive<sup>8</sup>. It is assumed that South African HCWs are at the same risk of contracting HIV as the general population<sup>9</sup>.

The fear of occupational exposure to TB and/or HIV has been expressed by HCWs in South Africa<sup>10,11,12,13</sup>. Findings suggest that HCWs' fears are perpetuated and sustained by, among other factors, the role of stigma toward these diseases<sup>14</sup>. Stigma, a term permeating sociology and psychology literature, refers to a disparaging mark or social disgrace linked to particular attributes or characteristics viewed as aberrant within a specific cultural or social milieu<sup>15</sup>. Goffman's conceptualisation of stigma is one of the critical aspects of his sociological perspective, as presented in his 1962 seminal work. Goffman conceptualises stigma as a perceived attribute, quality, or association that discredits a person within a social environment where this trait is labelled undesirable. Goffman's<sup>15</sup> social interactionist approach illuminates how stigma operates within a dynamic relational context, where both the "stigmatised" and the "normals" actively manage social identities. Goffman emphasised the complex nature of the

interactions between these two groups. Stigmatised individuals often engage in various strategies to manage or mitigate their stigma, such as hiding or downplaying it. “Normals”, on the other hand, may participate in reinforcing or challenging stigmatisation.

Furthermore, stigma can be described in how it is enacted. For the purpose of this paper, the focus is on external or enacted stigma which is the projection of disparaging views onto others<sup>16</sup>. This form of stigma encompasses the attitudes, beliefs, and behaviours that others project onto an individual or group. This type of stigma is socially constructed and ingrained in social norms and prejudices which further manifests in discrimination, rejection, or exclusion<sup>17</sup>. External stigma negatively impacts interpersonal relationships and social positionality by creating barriers between individuals who are stigmatised and those who are not. This contributes to the further exacerbation of social isolation and marginalisation<sup>18</sup> of those who are stigmatised. The impact of external stigma is detrimental and goes beyond individual relationships resulting in structural discrimination, through influencing policies, institutional practices, cultural norms, and perpetuating inequality and exclusion<sup>19</sup>.

Poor utilisation of health services by HCWs has been documented in the literature due to hostile work environments exacerbated by external stigma<sup>20</sup>. Moreover, there are numerous intricate mechanisms at play that contribute to a nuanced and challenging scenario in healthcare settings; these include societal expectations, lack of education and training, and the unique professional expectations of HCWs<sup>21</sup>. This serves to create a landscape of stigma within healthcare that is particularly complex in the context of HIV and TB that goes beyond individual prejudices and involves systemic issues. Analysing how HCWs stigmatise one another in healthcare settings highlights the intricacies of the intersectional influence of cultural norms, professional identity, misconceptions, and education in this phenomena<sup>22</sup>.

Specific to the context of the present study, HIV stigma is revealed as a pervasive and multifaceted challenge in the realm of public health which has implications beyond individual labelling or discrimination. An HIV positive diagnosis has a range of mental health related consequences due to stigmatising attitudes that promote discriminatory practices and social isolation<sup>23</sup>. Anxiety, depression, and reduced self-esteem<sup>23</sup>, amidst chronic stress as a result of stigma, may further adversely impact an individual’s physical health, compromising their immune functioning and overall well-being<sup>24</sup>. HIV-

related stigma can result in severe health consequences for infected individuals through delayed access to testing and treatment, thereby hindering early diagnosis and intervention<sup>25,26</sup>. HIV-stigma extends beyond the individual and manifests on various social levels evidenced as the marginalisation of affected communities<sup>27</sup>, strained interpersonal relationships<sup>28</sup>, and the reinforcement of harmful social norms and stereotypes<sup>29</sup>. The multilevel consequences of HIV-stigma reflects a complex interplay between individual experiences and societal dynamics.

A diagnosis of TB has long held social associations with poverty, malnutrition, and uncleanliness, contributing to the stigmatisation of the disease<sup>30</sup>. The historical roots of TB-stigma can be traced back to its association with “consumption” and moral decay that continue to influence contemporary perceptions<sup>31</sup> of the disease and subsequent treatment success thereof. Due to the mode of transmission and fear of contagion, individuals diagnosed with TB often face social rejection, isolation, and discrimination within their communities<sup>32</sup>. These fears may lead to further delays in seeking medical care and treatment, thus prolonging the period of infectivity<sup>33</sup>. TB stigma can compound difficulties in accessing and adhering to medical treatment. Furthermore, stigmatised individuals may encounter barriers within healthcare settings, such as judgment or lack of empathy, affecting their willingness to engage in long-term treatment regimens and the overall recovery of the disease<sup>34</sup>.

The determinants of external HIV and TB stigma among the population in general, including pregnant women and PLWH, have been researched and include socio-demographic factors<sup>35,36</sup>, educational attainment<sup>37,38,39,40</sup>, mental health-related quality of life<sup>41</sup>, self-esteem<sup>42</sup>, and level of social support<sup>43</sup>.

Research has identified instances where HCWs demonstrate discriminatory attitudes and practices toward HIV and TB patients<sup>44,45,46</sup>. Associating these diseases with immorality or uncleanliness are sociocultural norms and misconceptions about HIV and TB that play a role in perpetuating stigma within the healthcare community<sup>47,48</sup>. The fear of contracting HIV or TB from patients may lead HCWs to avoid or marginalise patients, especially if they perceive infection control measures as inadequate<sup>49</sup>. Workplace stress and burnout may contribute to negative attitudes and stigmatising behaviours, as HCWs may project frustrations onto already marginalised patient populations<sup>50</sup>. Stigmatising behaviours can

undermine patient trust and engagement with the healthcare system, leading to delays in seeking care, non-adherence to treatment, and potentially more severe disease progression<sup>51,52</sup>. Therefore, stigma is a major obstacle to the provision of quality healthcare services<sup>49,53,54,55</sup> as well as the utilisation of services both by the general public and also by HCWs themselves<sup>49</sup>.

A substantial body of research exists concerning stigma directed by HCWs toward patients diagnosed with HIV and/or TB<sup>53,56,57,21</sup>; however, limited research is available on TB and HIV stigma among HCWs, directed toward colleagues<sup>20</sup>. Findings by Sommerland and colleagues<sup>58</sup> suggest a significant negative relationship between stigmatising attitudes towards co-workers and knowing a colleague living with HIV, having a colleague who worked to reduce stigma in the workplace, and having basic HIV knowledge. HCWs' professional identity and the associated expectations from society and peers might contribute to unique forms of stigma within this community. The notion that HCWs must remain impervious to diseases that they are tasked with treating adds an extra layer of complexity to the stigma surrounding HIV and TB<sup>59</sup>. With this in mind, the paper explores the predictors of external HIV and TB stigma among HCWs (i.e., both clinical healthcare professionals as well as support and administrative personnel) toward co-workers in hospitals in the Free State Province, South Africa.

## **Method**

### **Design, setting and sample**

This paper utilises the post-intervention data from a randomised control trial (RCT) titled *Towards a health-enabling working environment: developing and testing interventions to decrease HIV- and TB-stigma among healthcare workers in the Free State, South Africa*<sup>20</sup>. The sample for the RCT included eight public hospitals in the Free State that were selected using stratified random sampling. Similar-sized hospitals (according to staff numbers and district) were paired and randomly allocated to intervention or control groups. A sampling frame of all persons working in the hospital was used to randomly select individual respondents and potential replacements. Proportion-to-size random sampling was conducted for the following three job categories: clinical professionals, management and administrative staff, and support staff. Two years after the baseline measurement and one year after the

intervention, a follow-up measurement was done with the same participants who participated in the baseline survey.

The data from the four non-intervention (control) hospitals was analysed to identify predictors of HIV and TB external stigma among HCWs towards HCWs. The decision to only include data from non-intervention hospitals was made to eliminate the possible effect of the stigma reduction intervention run at the intervention hospitals. A total of 286 HCWs, 124 clinical professionals (doctors, nurses, and allied professionals) involved in direct patient care, and 162 administrative and support staff from the non-intervention hospitals not directly involved in patient care participated in the post-intervention data gathering exercise.

## **Measures**

A self-administered questionnaire containing HIV and TB external stigma scales and other questions generated from the literature was developed. The questionnaire included questions focusing on demographic and background information (e.g. sex, age, education, occupation, years' experience as a HCW); HIV and TB knowledge; fear of acquiring TB or HIV at work; knowing colleagues with HIV or TB; seeing colleagues stopping TB and HIV stigma in the workplace; and HIV and TB external stigma. The external HIV and TB stigma scales were developed and refined from pilot and baseline data gathered for the RCT<sup>60,61</sup>. The Respondent's External Stigma scales measure respondents' perceptions, attitudes and behaviours towards other HCWs in the hospital (HIV REXT; TB REXT). HIV REXT comprises four items - 1) I would feel comfortable being close friends with a healthcare worker who is known to be HIV-positive; 2) Healthcare workers who have HIV should not feel guilty about it; 3) HIV-positive healthcare workers can be good role models in the workplace; and 4) Doctors and nurses with HIV who are otherwise in good health should continue to work in healthcare settings. TB REXT has three items - 1) I do not want to work together with co-workers who are on TB treatment; 2) I am cautious of co-workers who are on TB treatment; and 3) If I think a co-worker has TB, I will avoid eating or drinking in the same room. All items were rated on a four-point Likert scale (strongly agree, agree, disagree, strongly disagree). Higher scores on these Scales are indicative of higher levels of stigma. The scales

displayed good internal consistency: HIV REXT  $\alpha = 0.783$ ; TB REXT  $\alpha = .657$  and adequate internal and external construct validity<sup>61</sup>.

## **Data collection**

Post-intervention data was collected in Autumn 2018. Fieldworkers were trained on the standardisation and ethics of the research processes and how to approach potential respondents in the hospitals, obtain written and signed informed consent and disseminate the self-administered questionnaires. The questionnaire was available in English, Sesotho and Afrikaans. The questionnaires were translated from English into Afrikaans and Sesotho and then back translated to ensure accuracy of the translations. Upon collection of the completed questionnaires, respondents were given a small token of appreciation. Fieldworkers assisted respondents with low reading literacy by verbally working through the questionnaire; additional queries were answered in small group sessions. Participants returned the completed questionnaire in a sealed envelope to ensure the confidentiality of their responses.

## **Data analysis**

The data was analysed in IBM SPSS Statistics 28<sup>62</sup>. Frequency counts, percentages for categorical variables, and means and standard deviations (SD) for continuous variables were calculated. Composite scores were calculated for total TB knowledge, HIV knowledge, HIV-REXT and TB-REXT. As not all the assumptions for standard multiple regression were met, the dependent variables (HIV-REXT and TB-REXT) were transformed into categorical variables. No cut-off points for high, moderate and low stigma have been defined for the HIV-REXT and TB-REXT scales; therefore, percentiles (i.e., 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup>) were used to classify high (the last percentile) and moderate to low (the remaining two percentiles) stigma. Similar cut-off points have been used in scales as reported in psychology research papers<sup>63,64</sup>. Binomial logistic regression was run to determine the impact of knowing a colleague with HIV/TB, witnessing colleagues trying to stop the spread of HIV/TB stigma in the hospital, HIV/TB knowledge, worrying about acquiring HIV/TB at work, sex, age and occupation on the tendency to have negative perceptions, and attitudes and behaviours towards other HCWs in the hospital who have/thought to have HIV/TB (i.e., higher HIV/TB stigmatising attitudes towards colleagues). Prior research informed the

inclusion of these independent variables in the regression analysis<sup>10,11,58</sup>. The following assumptions for binomial logistic regression analysis were met: a dependent dichotomous variable, independent variables measured on a continuous and nominal scale, assumptions of linearity, independence of errors, homoscedasticity, influential points and normality of residuals. The adjusted odds ratios (AORs) together with their corresponding 95% confidence intervals (CIs) were estimated. The significance level considered for this study was 0.05.

## **Ethics**

Two independent ethics committees approved the RCT: the University of Antwerp Ethics Committee for the Social Sciences and Humanities (SHW\_15\_28\_03) and the University of the Free State Health Sciences Research Ethics Committee (ECUFS 55/ 2015). Additionally, the Free State Department of Health approved all aspects and activities of the research at the hospitals. Ethical principles that were adhered to included informed consent, voluntary participation and confidentiality. Surveys were completed at a time and in an environment most convenient for the participant, thereby reducing the impact on service delivery. Every reasonable measure was taken to ensure that data could not be traced back to specific individuals. Personal identifiers on the questionnaires were deleted, data was de-identified, and the informed consent documents were separated from the questionnaires. Moreover, the data was securely stored in a password-protected file accessible only to the student and supervisor. Ethical clearance from the General Human Research Ethics Committee (GHREC) at the University of the Free State was obtained to use and analyse the data from the RCT for this paper (UFS-HSD2022/1409/22).

## **Results**

### **Demographic and biographic characteristics**

Of the 286 participants, a higher percentage of women was observed, with 201 (70.3%) women in the sample. The average age was 43.6 years (SD±9.9), and the average years of employment as a HCW was 13.2 years (SD±8.7). Approximately two out of five participants had obtained a tertiary qualification (42,8%), while slightly fewer (37.9%) had passed matric. Of the total group of respondents, 43% were

clinical professionals, 41.3% were support staff and 15.7% were from administration and management (see Table 1).

**Table 1: Biographic characteristics**

Characteristics	Total <i>n</i> = 286	%
<b>Sex</b>		
Male	85	29.7
Female	201	70.3
<b>Age (Mean, SD)</b>	43.6	9.9
<b>Education<sup>a</sup></b>		
Secondary school and lower	54	19.3
Matric (Grade 12)	108	37.9
Tertiary	122	42.8
<b>Occupation</b>		
Administration or management	45	15.7
Clinical HCWs	123	43.0
Support	118	41.3
<b>Years working as a HCW (Mean, SD)</b>	13.2	8.7

<sup>a</sup>*n* = 285

### **HIV Knowledge**

Two out of five respondents (*n*=121; 42%) were concerned about HIV infection at work. The mean HIV knowledge score was 6.46 (SD±1.5) out of 9 questions (Table 2). HIV knowledge levels were categorised according to percentiles. Higher levels of knowledge were categorised according to the last percentile (i.e., 75 and above), while moderate to low levels of knowledge were categorised according to the remaining percentiles. In this regard, 52.8 % (*n*=151) of the respondents demonstrated having high levels of HIV knowledge, whereas 47.2% (*n*=135) had moderate to low levels of HIV knowledge.

The HCWs had a high level of knowledge on the following topics: the increased likelihood of a person with HIV becoming infected with TB (93.7%); the use of condoms to reduce the risk of HIV infection (92.3%); and the possibility of curing TB in people with HIV (90.2%). Three-quarters of the respondents knew that antiretroviral treatment made HIV-positive persons less infectious (75.2%), while three out of five respondents knew that the vertical transmission of HIV from a mother to a child in the womb was possible (68.4%). HCWs demonstrated a lower level of knowledge as to the risk of HIV

transmission following needle-prick or sharps injuries (51.7%) and that medical male circumcision does not prevent HIV-positive men from transmitting HIV (51.6%) to their partners (Table 2).

**Table 2: Correct knowledge of HIV diagnosis and treatment**

Knowledge statements	n=286	%
People can reduce their risk of HIV infection by using a condom every time they have sex	264	92.3
HIV or AIDS cannot be cured	215	75.2
It is possible to cure TB in people with HIV	257	90.2
A person with HIV is more likely to get TB	268	93.7
Antiretroviral treatment makes HIV-positive people less infectious	177	61.9
HIV can be transmitted from a mother to a child in the womb	195	68.4
The risk of HIV transmission following needle-prick or sharps injuries is very small (under 0.4% risk)	148	51.7
All HIV-positive women should not use formula feeding only, for their babies	176	61.5
Medical Male Circumcision does not prevent HIV-positive men from transmitting HIV	147	51.6

### TB Knowledge

Most respondents (n=203; 71%) were concerned about becoming infected with TB at work. The mean TB knowledge score was 7.78 (SD±1.78) out of 10 questions (Table 3). TB knowledge levels were categorised according to percentiles. Higher levels of knowledge were categorised according to the last percentile (i.e., 75 and above), while moderate to low levels of knowledge were categorised according to the remaining percentiles. In this regard, 39.9% (n=114) of the respondents demonstrated having high levels of TB knowledge compared to 60.1% (n=172) who had moderate to low levels of TB knowledge.

Most of the respondents knew the four main symptoms of TB: cough for more than 2 weeks (95.5%), unintentional weight loss (94.8%), night sweats (94.4%), and fever for more than a week (81.8%) and that TB should be treated for at least 6 months (95.5%). However, their knowledge of more nuanced aspects of TB treatment was slightly more limited: 55.4% knew that at least four drugs were used to treat TB, and 68.9% were aware that multi-drug resistant (MDR) TB could not be cured within 12 months (at the time of the fieldwork, the nine-month treatment regimen had not yet been implemented in South Africa) (Table 3).

**Table 3: Correct knowledge of TB diagnosis and treatment**

Knowledge statements	(n=286)	
		%
<b>Symptoms used to diagnose TB</b>		
Cough for more than 2 weeks	273	95.5
Unintentional weight loss	271	94.8
Fever for more than 1 week	233	81.8
Night sweats	270	94.4
Nausea is not used to diagnose TB	153	53.9
TB should be treated for at least 6 months	273	95.5
At least 4 drugs should be used to treat TB	158	55.4
People with TB usually become less infectious within 3 weeks of initiating appropriate treatment	196	68.5
People with MDR TB cannot be cured within 12 months	197	68.9
HIV-positive HCWs can be protected from TB infection by taking IPT*	201	70.3

\*Isoniazid preventative treatment

### **HIV external stigma**

A Cronbach's alpha of 0.76 was calculated for the HIVREXT Scale, which was similar to that reported by Wouters and colleagues<sup>61</sup>. The respondents scored an average of 6.94 (SD  $\pm$ 2.3) on the HIV REXT scale (minimum 4 and maximum 16). Scores on the HIVREXT scale were categorised according to percentiles. In this regard, 47.6% (n=136) of the respondents demonstrated having higher levels of HIV stigma compared to 52.4% (n=150) who had moderate to lower levels of HIV stigma.

The majority of HCWs strongly agreed/agreed with the statement that doctors and nurses with HIV should continue to practice medicine if they were in good health (94%); HIV-positive HCWs can be good role models in the workplace (93.1%), and that HIV positive HCWs should not feel guilty about their positive status (89.2%). Three-quarters of the respondents indicated that they would feel comfortable being close friends with a healthcare worker who was known to be HIV-positive (75.2%) (Table 4).

**Table 4: External HIV stigma**

<b>Attitude statements</b>	<b>Strongly Disagree n (%)</b>	<b>Disagree n (%)</b>	<b>Agree n (%)</b>	<b>Strongly Agree n (%)</b>
I would feel comfortable being close friends with a healthcare worker who is known to be HIV-positive	26 (9.1%)	45 (15.7%)	127 (44.4%)	88 (30.8%)
Healthcare workers who have HIV should not feel guilty about it	11 (3.8%)	20 (7.0%)	121 (42.3%)	134 (46.9%)
HIV-positive healthcare workers can be good role models in the workplace	8 (2.8%)	12 (4.2%)	138 (48.3%)	128 (44.8%)
Doctors and nurses with HIV who are otherwise in good health should continue to practice medicine	7 (2.4%)	10 (3.5%)	123 (43.7%)	144 (50.3%)

### Factors associated with HIV external stigma

Results of univariate logistic regression analysis identified four factors that each had an independent and statistically significant influence on HIV external stigma. These are knowing a colleague with HIV, female sex, moderate to low levels of HIV knowledge and being a support staff worker. Binomial logistic regression was then performed to determine the effects of knowing a colleague with HIV, witnessing colleagues trying to stop the spread of HIV stigma in the hospital, HIV knowledge, worrying about acquiring HIV at work, sex, age, and occupation on the tendency to have negative perceptions, attitudes and behaviours towards other HCWs in the hospital who have/thought to have HIV (i.e., higher HIV stigmatising attitudes towards colleagues). All assumptions for binomial logistic regression were investigated and met. In particular, the linearity of the continuous variables concerning the logit of the independent variable was assessed via the Box-Tidwell procedure. Based on this assessment, age and years of experience as a health care worker were not linearly related to the logit of the dependent variable. Therefore, years of experience were removed from the model. There were no outliers or influential cases and five high-leverage values. Since the unusual points were not due to a data entry error, all cases were maintained in the analysis.

The Hosmer and Lemeshaw test indicated that the model was a good fit  $X^2(8) = 4.518$ ,  $p > 0.005$ , indicating that the predictors, as a set, reliably distinguished between high and low to moderate HIV stigmatising attitudes towards colleagues (Table 4). The model explained 13.4% (Nagelkerke  $R^2$ ) of the

variance in the tendency to have higher HIVREXT and correctly classified 65.6% of the cases. Sensitivity was 60%, specificity was 70%, the positive predictive value was 65%, and the negative predictive value was 33.5%. Of the seven predictor variables, three were statistically significant. Compared to HCWs who knew a colleague with HIV, HCWs who did not know a colleague with HIV were 2.1 times more likely to have higher HIV stigmatising attitudes towards colleagues (AOR: 2.137, CI: 1.267-3.606,  $p=0.004$ ). Female HCWs were 2.3 times more likely to have HIV-stigmatising attitudes towards colleagues than male HCWs (AOR: 2.336, CI: 1.326-4.114,  $p=0.003$ ). Compared to HCWs with high HIV knowledge, HCWs with moderate to low levels of knowledge were 2 times more likely to have HIV-stigmatising attitudes towards their colleagues (AOR: 2.052, CI: 1.095-3.845,  $p=0.025$ ).

**Table 5: Factors associated with higher levels of HIV stigma**

<b>Variable</b>	<b>Higher levels of HIV Stigma (n=136)*</b>	<b>Unadjusted Odds Ratio (OR) (95% CI)</b>	<b>p-value</b>	<b>Adjusted Odds Ratio (AOR) (95% CI)</b>	<b>p-value</b>
<b>Know colleagues with HIV</b>					
Yes (ref)	53 (36.6%)	1		1	
No	83 (58.9%)	2.484 (1.543-3.999)	<0.001	2.137 (1.267-3.606)	0.004
<b>See colleagues trying to stop HIV stigma</b>					
Yes (ref)	85 (49.5%)	1		1	
No	50 (50.0%)	1.176 (1.723-1.915)	0.513	0.982 (0.580-1.663)	0.948
<b>Worry about HIV infection at work</b>					
No (ref)	74 (44.6%)	1		1	
Yes	62 (51.7%)	1.329 (0.830-2.129)	0.237	1.179 (0.703-1.976)	0.533
<b>Sex</b>					
Male (ref)	32 (37.6%)	1		1	
Female	104 (51.7%)	1.776 (1.057-2.983)	0.030	2.336 (1.326-4.114)	0.003
<b>Age</b>					
	Mean 44.35 (SD 9.384)	1.018 (0.992-1.044)	0.171	1.008 (0.981-1.035)	0.576
<b>Knowledge about HIV</b>					
High levels (ref)	24 (33.3%)	1		1	
Moderate to low levels	112 (52.3%)	2.196 (1.256-3.839)	0.006	2.052 (1.095-3.845)	0.025
<b>Occupation (N=136)</b>					
Clinical professionals (ref)	50 (40.7%)	1		1	
Management and admin	19 (42.2%)	1.067 (0.534-2.132)	0.855	0.995 (0.467-2.120)	0.989
Support	67 (56.8%)	1.918 (1.150-3.200)	0.013	1.456 (0.816-2.596)	0.204

\*Row percentages were calculated

## TB external stigma

A Cronbach's alpha of 0.604 was calculated for the TBREXT Scale, which was slightly lower than that reported by Wouters et al. (2017). The respondents scored an average of 5.63 (SD  $\pm$ 1.5) on the TBREXT scale (minimum 3 and maximum 10). Scores on the TBREXT scale were categorised according to percentiles. In this regard, 22.7% (n=65) of the respondents demonstrated having higher levels of external TB stigma compared to 77.3% (n=221) who had moderate to lower levels of TB stigma.

As can be seen in Table 4, the majority of the HCWs (93.7%) strongly disagreed/disagreed with the statement that they did not want to work together with co-workers who were on TB treatment. Most HCWs (90.5%) also strongly disagreed/disagreed that they would avoid eating or drinking in the same room with a co-worker who had TB. Furthermore, 70.1% of the respondents strongly disagreed/disagreed that they are cautious of co-workers who were on TB treatment.

**Table 6: External TB stigma**

<b>Attitude statements</b>	<b>Strongly Disagree n (%)</b>	<b>Disagree n (%)</b>	<b>Agree n (%)</b>	<b>Strongly Agree n (%)</b>
I do not want to work together with co-workers who are on TB treatment	111 (38.8%)	157 (54.9%)	16 (5.6%)	2 (0.7%)
I am cautious of co-workers who are on TB treatment	50 (17.5%)	150 (52.6%)	73 (25.6%)	12 (4.2%)
If I think a co-worker has TB, I will avoid eating or drinking in the same room	89 (31.1%)	170 (59.4%)	23 (8.0%)	4 (1.4%)

## Factors associated with TB external stigma

The same procedure, binomial regression, was followed to test for predictors of TB stigma towards colleagues (See Table 7). Variables included in the model were knowing a colleague with TB, witnessing colleagues trying to stop the spread of TB stigma in the hospital, TB knowledge, worrying about acquiring TB at work, sex, age and occupation. All assumptions for binomial logistic regression were met. There were no influential cases or high-leverage values and seven outliers. Since the outliers were not due to data entry errors, all cases were maintained in the analysis. The Hosmer and Lemeshaw test indicated that the model was a good fit  $X^2(8) = 4.442$ ,  $p > 0.005$ . The model explained 9.7% (Nagelkerke  $R^2$ ) of the variance in the tendency to have higher TBREXT and correctly classified 78.8%

of the cases. Sensitivity was 9.6%, specificity was 100%, the positive predictive value was 100%, and the negative predictive value was 22.1%. Of the seven predictor variables, only age was statistically significantly (AOR:1.042, CI: 1.006-1.079, p=0.023) associated with higher levels of TB stigma, indicating that older respondents were more likely to have higher levels of TB stigma.

**Table 7: Factors associated with higher levels of TB Stigma**

<b>Variable</b>	<b>Higher levels of TB Stigma (n=136)*</b>	<b>Unadjusted Odds Ratio (OR) (95% CI)</b>	<b>p-value</b>	<b>Adjusted Odds Ratio (AOR) (95% CI)</b>	<b>p-value</b>
<b>Know colleague with TB</b>					
Yes (ref)	28 (58.3%)	1		1	
No	121 (64.4%)	1.952 (0.821-4.646)	0.130	1.730 (0.693-4.322)	0.241
<b>See colleagues trying to stop TB stigma</b>					
Yes (ref)	107 (60.8%)	1			
No	78 (71.6%)	0.654 (0.362-1.182)	0.160	0.783 (0.384-1.595)	0.500
<b>Worry about TB infection at work</b>					
No (ref)	51 (61.4%)	1			
Yes	134 (66.0%)	1.088 (0.588-2.013)	0.788	0.987 (0.493-1.975)	0.971
<b>Sex</b>					
Male (ref)	54 (63.5%)	1			
Female	131 (65.2%)	0.712 (0.,396-1.281)	0.257	0.651 (0.332-1.278)	0.213
<b>Age</b>					
	Mean 45.38 (SD 10.028)	1.027 (0.,997-1.059)	0.077	1.042 (1.006-1.079)	0.023
<b>Knowledge about TB</b>					
High levels (ref)	117 (68.0%)	1			
Moderate to low levels	68 (59.6%)	1.278 (0.720-2.271)	0.402	1.138 (0.584-2.218)	0.705
<b>Occupation (N=136)</b>					
Clinical professionals (ref)	73 (59.3%)	1			
Management and admin	32 (71.1%)	1.766 (0.785-3.973)	0.169	1.816 (0.746-4.418)	0.189
Support	80 (67.8%)	1.807 (0.972-3.362)	0.062	1.828 (0.879-3.798)	0.106

\*Row percentages were calculated

## Discussion

This paper aimed to describe the levels of HIV and TB external stigma among HCWs and to explore the factors that predict external stigma towards co-workers who have/are thought to have HIV or TB. The results showed more HIV external stigma than TB external stigma among HCWs towards their colleagues. Furthermore, not knowing a colleague with HIV, being female and having low to moderate knowledge about HIV were associated with higher levels of HIV external stigma. Only age was positively correlated with higher levels of external TB stigma.

There are several possible explanations for the different levels of HIV and TB stigma among HCWs towards colleagues, including that TB is seen as an occupational disease<sup>4,65,66,67</sup> and the role of social and cultural norms<sup>68,69,70,71,72</sup>. It is noted that the perceived risk of HCWs contracting HIV at work is similar to that of the general population, while TB is considered to be an occupationally acquired disease<sup>65,66,67</sup>. This is consistent with the finding that far more HCWs feared becoming infected with TB at work than with HIV. TB is mainly transmitted through airborne droplets<sup>73</sup>, while HIV is mainly transmitted through sexual contact or blood exposure<sup>74</sup>. Therefore, while HCWs may perceive TB as a professional hazard<sup>75</sup>, a medical challenge<sup>76</sup>, or a public health issue<sup>77</sup>, HIV is frequently associated with moral judgments<sup>70</sup>, social stigma<sup>78</sup>, and discrimination<sup>72</sup>. This may also account for the lack of significant predictors of TB stigma in this study, as TB stigma may be less influenced by individual or contextual factors than HIV stigma.

HCWs who did not know a colleague who was infected with HIV were twice as likely to have higher levels of external HIV stigma than HCWs who knew a colleague with HIV. This is supported by research done by Emler and colleagues<sup>79</sup> and Nyblade and colleagues<sup>49</sup>, who found that knowing someone with HIV was a protective factor against stigma and discrimination. This finding suggests that personal contact/familiarity with people living with HIV (PLHIV) can reduce HIV stigma. Personal contact is described as direct or indirect exposure to PLHIV through knowing an individual that is infected, whether it is a family member or friend, and caring for or working with a PLHIV<sup>79</sup>. The above

findings are supported in a cross-sectional analysis of general population surveys from 26 sub-Saharan African countries that reported that personal contact with PLHIV was associated with a decrease in wanting to maintain social distance from PLHIV among the general population of sub-Saharan Africa<sup>80</sup>. The role of personal contact impacts HIV stigma in numerous ways, such as increasing knowledge and awareness, reducing fear and prejudice, enhancing empathy and compassion, and challenging negative stereotypes and myths<sup>81,82,83</sup>.

External HIV-stigma has been associated with the level of knowledge of the disease. Findings suggest that HCWs with low to moderate levels of HIV knowledge were twice as likely to have higher levels of HIV external stigma compared to those with high levels of HIV knowledge<sup>84</sup>. As such, research findings have indicated that lower HIV knowledge among HCWs<sup>84</sup> and the general population<sup>85,86</sup> leads to higher levels of stigma. This finding can be explained through detailing potential reasons how having moderate to low levels of HIV knowledge can increase stigmatising attitudes. Ignorance and misinformation can be perpetuated as a result of low HIV knowledge; this includes the belief that HIV can be transmitted through casual contact, that HIV is a punishment for immoral behaviour, or that HIV is incurable and fatal<sup>87,88</sup>. These misconceptions perpetuate fear and anxiety, in addition to moral judgments and blame, perpetuating stigma and discrimination of the disease<sup>89</sup>. Moreover, misconceptions and lack of HIV knowledge has been found to reduce awareness, empathy and compassion towards PLHIV<sup>81</sup>. A lack of understanding of the plight and experiences of PLHIV, including the physical, psychological and social challenges they face, may result in further devaluation and marginalisation, exacerbating stigma and discrimination<sup>89</sup>.

Research endeavours have indicated gender differences in stigmatising behaviours as evidenced through the finding that HIV stigma is higher among women than men<sup>92,93</sup>. Numerous researchers point to the role of governing social norms of communities as a possible explanation of the role of gender in stigmatising behaviors<sup>92,93</sup>. No singular reason can be ascribed to why women have higher levels of stigma as numerous factors may influence women's attitudes towards HIV. A possible explanation considers the influence of social norms, which are the unwritten rules of behaviour that are considered acceptable or expected in a given group or society<sup>94</sup>. Social norms influence the formation of perception,

judgement, and how individuals respond to those who are different to them. In the context of PLHIV social norms may create or reinforce negative attitudes and beliefs that perpetuate stigma. Stigmatising behaviours may include blaming PLHIV for their infection, fearing them as a source of contagion, or discriminating against them in various contexts<sup>47</sup>. However, social norms are dynamic in nature and dependant on culture, region and time, therefore, the level and nature of HIV stigma may differ depending on the local context and the characteristics of the affected population during a period of time. Some studies have extrapolated this argument in that HIV stigma was found to be more prevalent and severe in rural areas than in urban areas. This may be due to decreased exposure and awareness of HIV and more conservative, traditional values and beliefs<sup>90,95</sup>.

Expanding on the contextual manifestation of stigma, studies have found that HIV stigma is more pronounced and harmful for women than for men. This is particularly evident amidst gender-based discrimination and violence, less access to education and health care, and lower social status and autonomy<sup>92,93</sup>. Moreover, women may internalise the stigma and discrimination they receive as a result of their gender and project these feelings onto other marginalised groups, such as PLHIV<sup>90,91</sup>. Consequentially, due to low HIV knowledge in the form of accurate education women may rely on myths and stereotypes that portray PLHIV as immoral, dirty, or deserving of punishment<sup>92,93</sup>. Women may fear the consequences of being associated with HIV, such as losing their partners, families, or communities, and distance themselves from PLHIV to protect their own status and reputation<sup>92,93</sup>. Additionally, women may have limited power and autonomy in their sexual and reproductive health decisions and blame PLHIV for not preventing or disclosing their infection or for transmitting it to others<sup>92,93</sup>.

In contrast, only age was found to be associated with high levels of TB stigma. This means that older HCWs were more likely to express negative and prejudiced attitudes towards their co-workers who have TB than younger HCWs. No literature was identified that specifically looked at the age of HCWs and the influence on stigma; however, this finding is consistent with previous studies that have reported a positive correlation between age and TB stigma in different settings and populations<sup>90,96,97</sup>. The populations studied were HIV-positive individuals<sup>98</sup>, a previous TB diagnosis<sup>32</sup> and the general population attending clinics in a healthcare setting<sup>99</sup>. There are several possible explanations for this

association. One is that older individuals may have more exposure to and experience with TB, which may increase their fear and anxiety of contracting the disease or witnessing its adverse effects on their colleagues<sup>96</sup>. Another is that older individuals may have less access and adherence to updated and accurate information and education on TB, which may lead to ignorance and misinformation about the transmission, prevention, and treatment of TB<sup>100</sup>. Moreover, older individuals may be more influenced by the prevailing social and cultural norms and values that shape the perception and response to TB, such as stigma, discrimination, or isolation<sup>99</sup>. These factors may affect the level and nature of TB stigma among older HCWs, who may be more likely to blame, avoid, or isolate their co-workers who have TB.

The strengths of this study include the random selection of participants and specially developed scales to measure TB and HIV external stigma among healthcare workers and towards healthcare workers. However, as with all research, this study has limitations that should be acknowledged and addressed in future research. Firstly, completion of the baseline survey potentially affected the respondents' awareness and attitudes towards HIV and TB stigma in the workplace, influencing their responses on the follow-up survey two years later. Despite the fact that respondents from the control hospitals did not receive any interventions, the baseline survey potentially sensitised them to HIV and TB stigma in the workplace. As a result, at follow-up the respondents may have been more aware or cautious of their stigma levels when completing the questionnaire. The results of this study may indicate true reflections of the levels and predictors of HIV and TB stigma among HCWs who have no previous exposure to any stigma-related surveys or interventions.

The possibility of response bias due to the use of self-reported measures serves as another potential limitation of this study. Stigma and discussing issues surrounding stigma remains a sensitive issue and due to this, respondents potentially answered questions in a socially desirable manner as opposed to expressing their true opinions in the survey. The respondents' individual motivations and expectations of their participation in the survey could impact overreporting or underreporting of stigma. Several measures were taken to mitigate this risk through ensuring the confidentiality and anonymity of the respondents by excluding their names from the questionnaire and rather using identifying numbers, separating signed informed consent forms from the questionnaires, and assuring the respondents that

their answers would be anonymised and reported as aggregated data. The effectiveness of these measures does not guarantee the elimination of response bias and future research should consider using other methods. These methods include direct observation, peer reports, or implicit measures, to assess stigma levels more accurately and objectively.

## **Conclusion**

This study explored the predictors of external HIV and TB stigma among HCWs (i.e., both clinical healthcare professionals as well as support and administrative personnel) toward co-workers in hospitals in the Free State Province, South Africa. The findings suggest that HCWs had higher levels of HIV external stigma than TB external stigma. The following factors were significantly associated with HIV stigma: not knowing a colleague with HIV, female gender, and low to moderate HIV knowledge. Increasing age was the only factor found to be associated with higher levels of TB stigma.

The findings of this study suggests that HIV and TB stigma are rooted in different origins and manifest independently. It further suggests that factors such as the modes of transmission, perceived responsibility, social implications, treatment outcomes, and historical contexts of the respective diseases, play a role in these differences. Interventions aimed at reducing stigma in healthcare settings should be tailored to and informed by the specific characteristics and needs of each disease independently and its affected population. For interventions that aim to reduce HIV stigma, the focus should be on promoting positive interactions and communication between HCWs and their colleagues living with HIV, challenging stereotypes and dismantling gendered influences on stigma, and providing accurate and comprehensive information and education on HIV. Interventions that aim to reduce TB stigma should be orientated towards reducing the fear and anxiety of occupational exposure, particularly among older HCWs, and the prevailing social and cultural norms and values that shape social perceptions to TB. More specifically, further research into the potential role of cultural norms in perpetuating stigma in healthcare settings may provide further insights into the development and maintenance of the phenomenon.

The findings of this study contribute to the sparse literature on HIV and TB stigma and their predictors among HCWs in South Africa. Moreover, the study provides findings that may have

implications for policymaking and provides insights and recommendations for designing and implementing effective, evidence-based interventions to reduce HIV and TB stigma in healthcare settings.

## **Declarations**

### **Ethics approval and consent to participate**

Two independent ethics committees approved the RCT: the University of Antwerp Ethics Committee for the Social Sciences and Humanities (SHW\_15\_28\_03) and the University of the Free State Health Sciences Research Ethics Committee (ECUFS 55/ 2015). Additionally, the Free State Department of Health approved all aspects and activities of the research. Ethical principles regarding participation were adhered to, including informed consent, voluntary participation and confidentiality. Ethical clearance from the General Human Research Ethics Committee (GHREC) at the University of the Free State was obtained to use and analyse the data from the RCT for this paper (UFS-HSD2022/1409/22).

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

This paper utilised the post-intervention data from a randomised control trial (RCT) titled *Towards a Health-enabling Working Environment: developing and Testing Interventions to decrease HIV- and TB-stigma among healthcare workers in the Free State, South Africa*<sup>20</sup>. The data for this study was securely stored in a password-protected file accessible only to the student and supervisor. Data are, however, available from the authors upon reasonable request and with permission.

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### **Competing Interests**

The author declares no competing interests.

## References

1. UNAIDS. HIV and Aging: A special supplement to the UNAIDS report on the global AIDS epidemic. Geneva: UNAIDS; 2013. Available from:  
<https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2013/november/20131101praging>
2. World Health Organisation. Tuberculosis profile: South Africa. 2024. Available from:  
[https://worldhealthorg.shinyapps.io/tb\\_profiles/?\\_inputs\\_&entity\\_type=%22country%22&iso2=%22ZA%22&lan=%22EN%22](https://worldhealthorg.shinyapps.io/tb_profiles/?_inputs_&entity_type=%22country%22&iso2=%22ZA%22&lan=%22EN%22)
3. Churchyard GJ, Mametja LD, Mvusi L, Ndjeka N, Pillay Y, Hesselning AC, et al. Tuberculosis control in South Africa: Successes, challenges and recommendations: tuberculosis control-Progress towards the Millennium Development Goals. *S Afr Med J*. 2014; 104(3): 244-248.
4. University Research Council. Tuberculosis in Healthcare Workers: Findings from South Africa. University Research Co. South Africa; 2012.
5. McCarthy KM, Scott LE, Gous N, Tellie M, Venter WD, Stevens WS, Van Rie A. High incidence of latent tuberculous infection among South African health workers: an urgent call for action. *Int J Tuberc Lung Dis*. 2015 Jun;19(6):647-53. doi: 10.5588/ijtld.14.0759. PMID: 25946353.
6. O'Donnell MR, Jarand J, Loveday M, Padayatchi N, Zelnick J, Werner L, Naidoo K, Master I, Osburn G, Kvasnovsky C, Shean K, Pai M, Van der Walt M, Horsburgh CR, Dheda K. High incidence of hospital admissions with multidrug-resistant and extensively drug-resistant tuberculosis among South African health care workers. *Ann Intern Med*. 2010 Oct 19;153(8):516-22. doi: 10.7326/0003-4819-153-8-201010190-00008. PMID: 20956708; PMCID: PMC3074259.
7. Baussano I, Nunn P, Williams B, Pivetta E, Bugiani M, Scano F. Tuberculosis among health care workers. *Emerg Infect Dis*. 2011;17(3):488-94. Available from:  
<http://dx.doi.org/10.3201/eid1703.100947>

8. Adams S, Ehrlich R, Quail Z, Jeebhay MF, Ismail N. Occupational health challenges facing the Department of Health: Protecting employees against tuberculosis and caring for former mineworkers with occupational health disease. In: Padarath A, English R, editors. *South African Health Review 2012/13*. Durban: Health Systems Trust; 2013. Available from: <http://www.hst.org.za/publications/south-african-health-review-2012/13>
9. Shisana O, Hall EJ, Maluleke R, Chauveau J, Schwabe C. HIV/AIDS prevalence among South African health workers. *S Afr Med J*. 2004;94(10):846-50. Available from: <https://www.ajol.info/index.php/samj/article/view/13643>
10. Engelbrecht M, Rau A, Kigozi G, Janse van Rensburg A, Wouters E, Sommerland N, et al. Waiting to inhale: factors associated with healthcare workers' fears of occupationally-acquired tuberculosis (TB). *BMC Infect Dis*. 2019;19(1):475. Available from: <http://dx.doi.org/10.1186/s12879-019-4115-z>
11. Engelbrecht M, Rau, A, Uebel K, Kigozi G, Sommerland N, Masquillier C, Wouters E. Factors associated with healthcare workers' fear of occupationally acquired HIV. *Occup. Health South*. 2020;26(3):117-21. Available from: <https://journals.co.za/doi/abs/10.10520/EJC-1f3fbf0492>
12. Malotle MM, Spiegel JM, Yassi A, Ngubeni D, O'Hara LM, Adu PA, Bryce EA, Mlangeni N, Gemell GSM, Zungu M. Occupational tuberculosis in South Africa: are health care workers adequately protected? *Public Health Action*. 2017;7(4):258-267. Available from: doi: 10.5588/pha.17.0070. PMID: 29584794; PMCID: PMC5753778.
13. Sissolak D, Marais F, Mehtar S. TB infection prevention and control experiences of South African nurses-a phenomenological study. *BMC Glob Health*. 2011;11(1): 1-10. Available from: <https://link.springer.com/article/10.1186/1471-2458-11-262>
14. Chambers LA, Rueda S, Baker DN, Wilson MG, Deutsch R, Raeifar E, et al. Stigma, HIV and health: A qualitative synthesis. *BMC Glob Health*. 2015;15(1):848. Available from: <http://dx.doi.org/10.1186/s12889-015-2197-0>

15. Goffman E. Stigma: Notes on the management of spoiled identity. *Am Sociol Rev.* 1964;29(5):770. Available from: <http://dx.doi.org/10.2307/2091442>
16. Link BG, Phelan JC. Stigma and its public health implications. *Lancet.* 2006;367(9509):528-9. Available from: [https://doi.org/10.1016/S0140-6736\(06\)68184-1](https://doi.org/10.1016/S0140-6736(06)68184-1)
17. Wolitski RJ, Pals SL, Kidder DP, Courtenay-Quirk C, Holtgrave DR. The effects of HIV stigma on health, disclosure of HIV status, and risk behavior of homeless and unstably housed persons living with HIV. *AIDS Behav.* 2009;13(6):1222-32. Available from: <http://dx.doi.org/10.1007/s10461-008-9455-4>.
18. Rueda S, Mitra S, Chen S, Gogolishvili D, Globerman J, Chambers L, et al. Examining the associations between HIV-related stigma and health outcomes in people living with HIV/AIDS: a series of meta-analyses. *BMJ Open.* 2016;6(7):e011453. Available from: <https://bmjopen.bmj.com/content/6/7/e011453.short>
19. Alemu WG, Due C, Muir-Cochrane E, Mwanri L, Ziersch A. Internalised stigma among people with mental illness in Africa, pooled effect estimates and subgroup analysis on each domain: systematic review and meta-analysis. *BMC Psychiatry.* 2023;23(1):480. Available from: <http://dx.doi.org/10.1186/s12888-023-04950-2>
20. Rau A, Wouters E, Engelbrecht M, Masquillier C, Uebel K, Kigozi G, et al. Towards a health-enabling working environment-developing and testing interventions to decrease HIV and TB stigma among healthcare workers in the Free State, South Africa: study protocol for a randomised controlled trial. *Trials.* 2018;19:1-5. Available from: <https://link.springer.com/article/10.1186/s13063-018-2713-5>
21. Wouters E, Sommerland N, Masquillier C, Rau A, Engelbrecht M, Van Rensburg AJ, et al. Unpacking the dynamics of double stigma: how the HIV-TB co-epidemic alters TB stigma and its management among healthcare workers. *BMC Infect Dis.* 2020;20(1):106. Available from: <http://dx.doi.org/10.1186/s12879-020-4816-3>

22. Bond V, Nyblade L. The importance of addressing the unfolding TB-HIV stigma in high HIV prevalence settings. *J Community Appl Soc Psychol*. 2006;16(6):452–61. Available from: <http://dx.doi.org/10.1002/casp.893>
23. Logie C, Gadalla TM. Meta-analysis of health and demographic correlates of stigma towards people living with HIV. *AIDS Care*. 2009;21(6):742–53. Available from: <http://dx.doi.org/10.1080/09540120802511877>
24. Hatzenbuehler ML, Phelan JC, Link BG. Stigma as a fundamental cause of population health inequalities. *Am J Public Health*. 2013;103(5):813-21. Available from: <http://dx.doi.org/10.2105/AJPH.2012.301069>
25. Fortenberry JD, McFarlane M, Bleakley A, Bull S, Fishbein M, Grimley DM, et al. Relationships of stigma and shame to gonorrhoea and HIV screening. *Am J Public Health*. 2002;92(3):378-81. Available from: <http://dx.doi.org/10.2105/ajph.92.3.378>
26. Rintamaki LS, Davis TC, Skripkauskas S, Bennett CL, Wolf MS. Social stigma concerns and HIV medication adherence. *AIDS Patient Care STDS*. 2006;20(5):359-68. Available from: <http://dx.doi.org/10.1089/apc.2006.20.359>
27. Donnelly LR, Bailey L, Jessani A, Postnikoff J, Kerston P, Brondani M. Stigma experiences in marginalised people living with HIV seeking health services and resources in Canada. *J Assoc Nurses AIDS Care*. 2016 Nov 1;27(6):768-83. Available from: <https://www.sciencedirect.com/science/article/abs/pii/S1055329016301030>
28. Moore D, Onsomu EO, Abuya BA. HIV prevention using films: HIV/AIDS positive African American women respond through interpersonal relationships in Life Support. *Open Journal of Social Sciences*. 2014;2(11):110. Available from: [https://www.scirp.org/html/2-1760289\\_51895.htm](https://www.scirp.org/html/2-1760289_51895.htm)
29. Stangl AL, Lloyd JK, Brady LM, Holland CE, Baral S. A systematic review of interventions to reduce HIV-related stigma and discrimination from 2002 to 2013: how far have we come? *J Int AIDS Soc*. 2013;16(3 Suppl 2):18734. Available from: <http://dx.doi.org/10.7448/IAS.16.3.18734>

30. Daftary A. HIV and tuberculosis: the construction and management of double stigma. *Soc Sci Med.* 2012;74(10):1512–9. Available from: <http://dx.doi.org/10.1016/j.socscimed.2012.01.027>
31. Sontag S. *Illness as metaphor and AIDS and its metaphors.* London, England: Penguin Classics; 2002.
32. Craig GM, Daftary A, Engel N, O'Driscoll S, Ioannaki A. Tuberculosis stigma as a social determinant of health: a systematic mapping review of research in low incidence countries. *Int J Infect Dis.* 2017; 56:90-100. Available from: <https://www.sciencedirect.com/science/article/pii/S120197121631195X>
33. Courtwright A, Turner AN. Tuberculosis and stigmatisation: pathways and interventions. *Public Health Reports.* 2010;125(4\_suppl):34-42. Available from: [doi:10.1177/00333549101250S407](https://doi.org/10.1177/00333549101250S407)
34. Somma D, Thomas BE, Karim F, Kemp J, Arias N, Auer C, et al. Gender and socio-cultural determinants of TB-related stigma in Bangladesh, India, Malawi and Colombia [Special section on gender and TB]. *Int J Tuberc Lung Dis.* 2008 Jul 1;12(7):856-66. Available from: <https://www.ingentaconnect.com/content/iuatld/ijtld/2008/00000012/00000007/art00029>
35. Cuca YP, Onono M, Bukusi E, Turan JM. Factors associated with pregnant women's anticipations and experiences of HIV-related stigma in rural Kenya. *AIDS Care.* 2012 Sep 1;24(9):1173-80. Available from: <https://doi.org/10.1080/09540121.2012.699669>
36. Nattabi B, Li J, Thompson SC, Orach CG, Earnest J. Factors associated with perceived stigma among people living with HIV/AIDS in post-conflict northern Uganda. *AIDS Educ Prev.* 2011 Jun;23(3):193-205. Available from: <https://doi.org/10.1521/aeap.2011.23.3.193>
37. Neuman M, Obermeyer CM, MATCH Study Group. Experiences of stigma, discrimination, care and support among people living with HIV:A four-country study. *AIDS Behav.* 2013;17(5):1796–808. Available from: <http://dx.doi.org/10.1007/s10461-013-0432-1>
38. Sorsdahl KR, Mall S, Stein DJ, Joska JA. The prevalence and predictors of stigma amongst people living with HIV/AIDS in the Western Province. *AIDS care.* 2011 Jun 1;23(6):680-5. Available from: <https://www.tandfonline.com/doi/abs/10.1080/09540121.2010.525621>

39. Takada S, Weiser SD, Kumbakumba E, Muzoora C, Martin JN, Hunt PW, et al. The dynamic relationship between social support and HIV-related stigma in rural Uganda. *Ann Behav Med.* 2014;48(1):26-37. Available from: <http://dx.doi.org/10.1007/s12160-013-9576-5>
40. Visser M, Sipsma H. The experience of HIV-related stigma in South Africa. In: Liamputtong P, editor. *Stigma, Discrimination and Living with HIV/AIDS*. Dordrecht: Springer Netherlands; 2013. p. 205-27.
41. Rasoolinajad M, Abedinia N, Noorbala AA, Mohraz M, Badie BM, Hamad A, Sahebi L. Relationship among HIV-related stigma, mental health and quality of life for HIV-positive patients in Tehran. *AIDS Behav.* 2018 Dec; 22:3773-82. Available from: <https://doi.org/10.1007/s10461-017-2023-z>
42. Kalomo EN. Associations between HIV-related stigma, self-esteem, social support, and depressive symptoms in Namibia. *Aging Ment Health.* 2018 Dec 2;22(12):1570-6. Available from: <https://doi.org/10.1080/13607863.2017.1387763>
43. Earnshaw VA, Lang SM, Lippitt M, Jin H, Chaudoir SR. HIV stigma and physical health symptoms: Do social support, adaptive coping, and/or identity centrality act as resilience resources? *AIDS Beh.* 2015 Jan; 19:41-9. Available from: <https://doi.org/10.1007/s10461-014-0758-3>
44. Feyissa GT, Abebe L, Girma E, Woldie M. Stigma and discrimination against people living with HIV by healthcare providers, Southwest Ethiopia. *BMC Glob Public Health.* 2012 Dec;12(1):522.
45. Reis C, Heisler M, Amowitz LL, Moreland RS, Mafeni JO, Anyamele C, et al. Discriminatory attitudes and practices by health workers toward patients with HIV/AIDS in Nigeria. *PLoS Medicine.* 2005 Aug;2(8):e246. Available from: <https://doi.org/10.1371/journal.pmed.0020246>
46. Zarei N, Joulaei H, Darabi E, Fararouei M. Stigmatised attitude of healthcare providers: a barrier for delivering health services to HIV positive patients. *Int*

- J Community Based Nurs Midwifery. 2015 Oct;3(4):292. Available from:  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4591575/>
47. Parker R, Aggleton P. Culture, Society and Sexuality: A Reader. London: Routledge; 2007.  
Available from: <https://doi.org/10.4324/9780203966105>
48. Rao D, Feldman BJ, Fredericksen RJ, Crane PK, Simoni JM, Kitahata MM, et al. A structural equation model of HIV-related stigma, depressive symptoms, and medication adherence. *AIDS Behav.* 2012;16(3):711-6. Available from: <http://dx.doi.org/10.1007/s10461-011-9915-0>
49. Nyblade L, Stangl A, Weiss E, Ashburn K. Combating HIV stigma in health care settings: what works? *J Int AIDS Soc.* 2009;12(1):15. Available from: <http://dx.doi.org/10.1186/1758-2652-12-15>
50. Wagner AC, Hart TA, Mohammed S, Ivanova E, Wong J, Loutfy MR. Correlates of HIV stigma in HIV-positive women. *Arch Women's Ment Health.* 2010; 13:207-14.
51. Rueda S, Mitra S, Chen S, Gogolishvili D, Globerman J, Chambers L, et al. Examining the associations between HIV-related stigma and health outcomes in people living with HIV/AIDS: a series of meta-analyses. *BMJ Open.* 2016;6(7):e011453. Available from:  
<https://bmjopen.bmj.com/content/6/7/e011453>
52. Sweeney SM, Vanable PA. The association of HIV-related stigma to HIV medication adherence: A systematic review and synthesis of the literature. *AIDS Beh.* 2016;20(1):29-50.  
Available from: <http://dx.doi.org/10.1007/s10461-015-1164-1>
53. Feyissa GT, Woldie M, Munn Z, Lockwood C. Exploration of facilitators and barriers to the implementation of a guideline to reduce HIV-related stigma and discrimination in the Ethiopian healthcare settings: A descriptive qualitative study. *PloS One.* 2019 May 13;14(5):e0216887.  
Available from: <https://doi.org/10.1371/journal.pone.0216887>
54. Straetemans M, Bakker MI, Mitchell EMH. Correlates of observing and willingness to report stigma towards HIV clients by (TB) health workers in Africa. *Int J Tuberc Lung Dis.* 2017;21(11):6-18. Available from: <http://dx.doi.org/10.5588/ijtld.16.0913>

55. Waluyo A, Culbert GJ, Levy J, Norr KF. Understanding HIV-related stigma among Indonesian nurses. *J Assoc Nurses AIDS Care*. 2015;26(1):69-80. Available from: <http://dx.doi.org/10.1016/j.jana.2014.03.001>
56. Siegel J, Yassi A, Rau A, Buxton JA, Wouters E, Engelbrecht MC, et al. Workplace interventions to reduce HIV and TB stigma among health care workers—where do we go from here? *Glob Pub Health*. 2015 Sep 14;10(8):995-1007. Available from: <https://doi.org/10.1080/17441692.2015.1021365>
57. Nyblade L, Stockton MA, Giger K, Bond V, Ekstrand ML, Lean RM, et al. Stigma in health facilities: why it matters and how we can change it. *BMC Med*. 2019;17(1):25. Available from: <http://dx.doi.org/10.1186/s12916-019-1256-2>
58. Sommerland N, Wouters E, Masquillier C, Rau A, Engelbrecht M, Kigozi G. Factors associated with HIV-related stigma toward colleagues in the health care workforce in South Africa. *J Assoc Nurses AIDS Care*. 2019 Jul 1;30(4):451-61. doi: 10.1097/JNC.0000000000000010
59. Deacon H, Uys L, Mohlahlane R. HIV and stigma in South Africa. In: Rohleder P, Swartz L, Kalichman SC, Simbayi LC, editors. *HIV/AIDS in South Africa 25 years on: Psychosocial perspectives*. New York: Springer; 2009. p. 105-120. Available from: <https://doi.org/10.1007/978-1-4419-0306-8>
60. Wouters E, Rau A, Engelbrecht M, Uebel K, Siegel J, Masquillier C, et al. The development and piloting of parallel scales measuring external and internal HIV and tuberculosis stigma among healthcare workers in the free state province, South Africa. *Clin Infect Dis*. 2016;62(suppl 3): S244-54. Available from: <http://dx.doi.org/10.1093/cid/civ1185>
61. Wouters E, Masquillier C, Sommerland N, Engelbrecht M, Van Rensburg AJ, Kigozi G, Rau A. Measuring HIV-and TB-related stigma among health care workers in South Africa: a validation and reliability study. *Int J Tuberc Lung Dis*. 2017 Nov 1;21(11):S19-25. Available from: <https://doi.org/10.5588/ijtld.16.0749>

62. George D, Mallery P. IBM SPSS statistics 27 step by step: A simple guide and reference. 17th ed. London, England: Routledge; 2021.
63. Misdrahi D, Denard S, Swendsen J, Jaussent I, Courtet P. Depression in schizophrenia: the influence of the different dimensions of insight. *Psychiatry Res.* 2014;216(1):12-6. Available from: <http://dx.doi.org/10.1016/j.psychres.2014.01.039>
64. Dardas LA, Silva S, Noonan D, Simmons LA. Studying depression among Arab adolescents: Methodological considerations, challenges, and lessons learned from Jordan. *Stigma Health.* 2018;3(4):296-304. Available from: <http://dx.doi.org/10.1037/sah0000101>
65. Van der Water N, Yassi A, Ehrlich R. Workers' compensation claims for occupational tuberculosis in South African health workers: Outcomes and workers' experiences. *S Afr Med J.* 2020;110(5):389-95. Available from: <http://dx.doi.org/10.7196/SAMJ.2020.v110i5.14247>
66. Tudor C, Van der Walt ML, Margot B, Dorman SE, Pan WK, Yenokyan G, et al. Occupational risk factors for tuberculosis among healthcare workers in KwaZulu-Natal, South Africa. *Clin. Infect. Dis.* 2016 May 15;62(suppl\_3):S255-61. Available from: <https://doi.org/10.1093/cid/ciw046>
67. Youakim S. The occupational risk of tuberculosis in a low-prevalence population. *Occup Med [Internet].* 2016;66(6):466-70. Available from: <http://dx.doi.org/10.1093/occmed/kqw040>
68. Bhagavathula AS, Clark CCT, Sharma R, Chhabra M, Vidyasagar K, Chattu VK. Knowledge and attitude towards HIV/AIDS in India: A systematic review and meta-analysis of 47 studies from 2010-2020. *Health Promot Perspect.* 2021;11(2):148-60. Available from: <http://dx.doi.org/10.34172/hpp.2021.19>
69. Sinha A, Renu R, Kar A, Karkhanis P, Singarajipura A, Adepu R, et al. Health-seeking behaviour, knowledge, and stigma around Tuberculosis: A mixed-method study with specific vulnerable population groups in India. *Research Square.* 2023;1(10):1-14. Available from: <https://doi.org/10.21203/rs.3.rs-3083635/v1>
70. Mason PH, Roy A, Spillane J, Singh P. Social, historical and cultural dimensions of tuberculosis. *J BioSoc Sci.* 2016;48(2):206-32. doi:10.1017/S0021932015000115

71. Kontomanolis EN, Michalopoulos S, Gkasdaris G, Fasoulakis Z. The social stigma of HIV–AIDS: society’s role. *HIV/AIDS (Auckl)*. 2017; 10:111-8. doi:10.2147/HIV.S129992.
72. Stangl AL, Atkins K, Leddy AM, Sievwright KM, Sevelius JM, Lippman SA, et al. What do we know about interventions to reduce intersectional stigma and discrimination in the context of HIV? A systematic review. *Stigma Health*. 2023;8(3):393. Available from: <https://doi.org/10.1037/sah0000414>
73. Nardell EA. Catching droplet nuclei: toward a better understanding of tuberculosis transmission. *Am J Respir Crit Care Med*. 2004;169(5):553-4. Available from: <https://doi.org/10.1164/rccm.2401003>
74. Shaw GM, Hunter E. HIV transmission. *Cold Spring Harb Perspect Med*. 2012;2(11):a006965–a006965. Available from: <http://dx.doi.org/10.1101/cshperspect.a006965>
75. Kumar A, Kumar A, Panigrahi OP. Assessment of knowledge, attitude and practice towards occupational health hazards and safety measures among health care personnel working in public health facilities of Bhubaneswar Block, India. *Int J Health Sci*. 2022;1597–609. Available from: <http://dx.doi.org/10.53730/ijhs.v6ns5.8919>
76. Chiang CY, Van Weezenbeek C, Mori T, Enarson DA. Challenges to the global control of tuberculosis: Global control of TB. *Respirology*. 2013;18(4):596-604. Available from: <http://dx.doi.org/10.1111/resp.12067>
77. Goswamy M. Tb scenario & public health. *J Evol Med Dent Sci*. 2013;2(15):2558-62. Available from: <http://dx.doi.org/10.14260/jemds/577>
78. Turan B, Hatcher AM, Weiser SD, Johnson MO, Rice WS, Turan JM. Framing mechanisms linking HIV-related stigma, adherence to treatment, and health outcomes. *Am J Public Health Res*. 2017;107(6):863-9. Available from: <https://doi.org/10.2105/AJPH.2017.303744>
79. Emler CA, Brennan DJ, Brennenstuhl S, Rueda S, Hart TA, Rourke SB, et al. Protective and risk factors associated with stigma in a population of older adults living with HIV in Ontario, Canada. *AIDS Care*. 2013;25(10):1330-9. Available from: <https://doi.org/10.1080/09540121.2013.774317>

80. Chan BT, Tsai AC. Personal contact with HIV-positive persons is associated with reduced HIV-related stigma: cross-sectional analysis of general population surveys from 26 countries in sub-Saharan Africa. *J Int AIDS Soc.* 2017;20(1):21395. Available from: <http://dx.doi.org/10.7448/ias.20.1.21395>
81. Brown L, Macintyre K, Trujillo L. Interventions to reduce HIV/AIDS stigma: What have we learned? *AIDS Educ Prev.* 2003;15(1):49-69. Available from: <https://doi.org/10.1521/aeap.15.1.49.23844>
82. Herek GM, Capitanio JP. AIDS stigma and sexual prejudice. *Am Behav Sci.* 1999;42(7):1130-47. Available from: <https://doi.org/10.1177/0002764299042007006>
83. Yiu JW, Mak WWS, Ho WS, Chui YY. Effectiveness of a knowledge-contact program in improving nursing students' attitudes and emotional competence in serving people living with HIV/AIDS. *Soc Sci Med.* 2010;71(1):38–44. Available from: <http://dx.doi.org/10.1016/j.socscimed.2010.02.045>
84. Fauk NK, Ward PR, Hawke K, Mwanri L. HIV stigma and discrimination: Perspectives and personal experiences of healthcare providers in Yogyakarta and Belu, Indonesia. *Front Med.* Available from: <http://dx.doi.org/10.3389/fmed.2021.625787>
85. Fotso SA, Wright CG, Low A. How does HIV-related stigma correlate with HIV prevalence in African countries? Distinct perspectives from individuals living with and living without HIV. *BMC Glob Public Health.* 2023;23(1):1720. Available from: <http://dx.doi.org/10.1186/s12889-023-16545-3>
86. Langi GG, Rahadi A, Praptoraharjo I, Ahmad RA. HIV-related stigma and discrimination among health care workers during early program decentralization in rural district Gunungkidul, Indonesia: a cross-sectional study. *BMC Health Serv Res.* 2022;22(1):356. Available from: <https://doi.org/10.1186/s12913-022-07751-7>
87. Herek GM, Capitanio JP. Sex differences in how heterosexuals think about lesbians and gay men: Evidence from survey context effects. *J Sex Res.* 1999;36(4):348–60. Available from: <http://dx.doi.org/10.1080/00224499909552007>

88. Welch M. The correctional response to prisoners with HIV/AIDS: Morality, metaphors, and myths. In: Lanier MM, editor. *The Impact of HIV/AIDS on Criminology and Criminal Justice*. London: Ashgate Publishing, 2009.
89. Celeste-Villalvir A, Payan DD, Armenta G, Palar K, Then-Paulino A, Acevedo R, et al. Exploring gender differences in HIV-related stigma and social support in a low-resource setting: A qualitative study in the Dominican Republic. *Plos One*. 2023;18(8):e0290228.
90. Mburu C, Njuguna I, Neary J, Mugo C, Moraa H, Beima-Sofie K, et al. Mortality and loss to follow-up among adolescents and young adults attending HIV care programs in Kenya. *AIDS Patient Care STDs*. 2023;37(7):323–31. Available from: <http://dx.doi.org/10.1089/apc.2023.0019>
91. Shubber Z, Mills EJ, Nachega JB, Vreeman R, Freitas M, Bock P, et al. Patient-reported barriers to adherence to antiretroviral therapy: a systematic review and meta-analysis. *PLoS Medicine*. 2016;13(11):e1002183. Available from: <https://doi.org/10.1371/journal.pmed.1002183>
92. Castilho JL, Melekhin VV, Sterling TR. Sex differences in HIV outcomes in the highly active antiretroviral therapy era: a systematic review. *AIDS Res Hum Retroviruses*. 2014;30(5):446–56. Available from: <http://dx.doi.org/10.1089/AID.2013.0208>
93. Meyer JP, Cepeda J, Taxman FS, Altice FL. Sex-related disparities in criminal justice and HIV treatment outcomes: A retrospective cohort study of HIV-infected inmates. *Am J Public Health*. 2015;105(9):1901–10. Available from: <http://dx.doi.org/10.2105/AJPH.2015.302687>
94. Cialdini RB, Trost, MR. Social influence: Social norms, conformity and compliance. In Gilbert DT, Fiske ST, Lindzey G, editors. *The Handbook of Social Psychology*. New York: McGraw-Hill; 1991. p. 151-192.
95. Nachega JB, Adetokunboh O, Uthman OA, Knowlton AW, Altice FL, Schechter M, et al. Community-based interventions to improve and sustain antiretroviral therapy adherence, retention in HIV care and clinical outcomes in low- and middle-income countries for achieving

- the UNAIDS 90-90-90 targets. *Curr HIV/AIDS Rep.* 2016;13(5):241-55. Available from:  
<http://dx.doi.org/10.1007/s11904-016-0325-9>
96. Chen X, Du L, Wu R, Xu J, Ji H, Zhang Y, et al. Tuberculosis-related stigma and its determinants in Dalian, Northeast China: a cross-sectional study. *BMC Public Health.* 2021;21(1):6. Available from: <http://dx.doi.org/10.1186/s12889-020-10055-2>
97. Vericat-Ferrer M, Ayala A, Ncogo P, Eyene-Acuresila J, García B, Benito A, et al. Knowledge, attitudes, and stigma: The perceptions of tuberculosis in Equatorial Guinea. *Int J Environ Res Public Health.* 2022;19(14):8227. Available from:  
<http://dx.doi.org/10.3390/ijerph19148227>
98. Bresenham D, Kipp AM, Medina-Marino A. Quantification and correlates of tuberculosis stigma along the tuberculosis testing and treatment cascades in South Africa: a cross-sectional study. *Infect Dis Poverty.* 2020;9(1):145. Available from: <http://dx.doi.org/10.1186/s40249-020-00762-8>
99. Pungrassami P, Kipp AM, Stewart PW, Chongsuvivatwong V, Strauss RP, Van Rie A. Tuberculosis and AIDS stigma among patients who delay seeking care for tuberculosis symptoms. *Int J Tuberc Lung Dis.* 2010;14:181-7. Available from:  
<https://www.ingentaconnect.com/content/iuatld/ijtld/2010/00000014/00000002/art0001>
100. Huq KE, Moriyama M, Krause D, Shirin H, Awoonor-Willaims JK, Rahman M, Rahman MM. Perceptions, Attitudes, Experiences and Opinions of Tuberculosis Associated Stigma: A Qualitative Study of the Perspectives among the Bolgatanga Municipality People of Ghana. *Int J Environ Res Public Health.* 2022;19(22):14998. Available from:  
<https://doi.org/10.3390/ijerph192214998>

## Appendix A: Author Guidelines

### Research articles

#### Criteria

In addition to adhering to the editorial policies specified for BMC journals as a whole, we also strongly encourage the use of the following checklists and reporting guidelines:

- Mendelian Randomisation studies (STROBE-MR)

#### Preparing your manuscript

The information below details the section headings that you should include in your manuscript and what information should be within each section.

Please note that your manuscript must include a 'Declarations' section including all of the subheadings (please see below for more information).

#### Title page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:
  - "A versus B in the treatment of C: a randomised controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
  - or for non-clinical or non-research studies a description of what the article reports
- list the full names and institutional addresses for all authors
  - if a collaboration group should be listed as an author, please list the Group name as an author. If you would like the names of the individual members of the Group to be searchable through their individual PubMed records, please include this information in the "Acknowledgements" section in accordance with the instructions below
  - Large Language Models (LLMs), such as ChatGPT, do not currently satisfy our authorship criteria. Notably an attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be

properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript.

- indicate the corresponding author

## **Abstract**

The Abstract should not exceed 350 words. Please minimise the use of abbreviations and do not cite references in the abstract. Reports of randomised controlled trials should follow

the CONSORT extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used
- **Results:** the main findings
- **Conclusions:** brief summary and potential implications
- **Trial registration:** If your article reports the results of a health care intervention on human participants, it must be registered in an appropriate registry and the registration number and date of registration should be stated in this section. If it was not registered prospectively (before enrollment of the first participant), you should include the words 'retrospectively registered'. See our editorial policies for more information on trial registration

## **Keywords**

Three to ten keywords representing the main content of the article.

## **Background**

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

## **Methods**

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials

- a clear description of all processes, interventions and comparisons. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses
- the type of statistical analysis used, including a power calculation if appropriate

## **Results**

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

## **Discussion**

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

## **Conclusions**

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

## **List of abbreviations**

If abbreviations are used in the text they should be defined in the text at first use, and a list of abbreviations should be provided.

## **Declarations**

All manuscripts must contain the following sections under the heading 'Declarations':

- Ethics approval and consent to participate
- Consent for publication
- Availability of data and materials
- Competing interests
- Funding
- Authors' contributions
- Acknowledgements
- Authors' information (optional)

Please see below for details on the information to be included in these sections.

If any of the sections are not relevant to your manuscript, please include the heading and write 'Not applicable' for that section.

### ***Ethics approval and consent to participate***

Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

Studies involving animals must include a statement on ethics approval and for experimental studies involving client-owned animals, authors must also include a statement on informed consent from the client or owner.

See our editorial policies for more information.

If your manuscript does not report on or involve the use of any animal or human data or tissue, please state "Not applicable" in this section.

### ***Consent for publication***

If your manuscript contains any individual person's data in any form (including any individual details, images or videos), consent for publication must be obtained from that person, or in the case of children, their parent or legal guardian. All presentations of case reports must have consent for publication.

You can use your institutional consent form or our consent form if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication).

See our editorial policies for more information on consent for publication.

If your manuscript does not contain data from any individual person, please state "Not applicable" in this section.

### ***Availability of data and materials***

All manuscripts must include an 'Availability of data and materials' statement. Data availability statements should include information on where data supporting the results reported in the article can be found including, where applicable, hyperlinks to publicly archived datasets analysed or generated

during the study. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article. We recognise it is not always possible to share research data publicly, for instance when individual privacy could be compromised, and in such instances data availability should still be stated in the manuscript along with any conditions for access. Authors are also encouraged to preserve search strings on searchRxiv <https://searchrxiv.org/>, an archive to support researchers to report, store and share their searches consistently and to enable them to review and re-use existing searches. searchRxiv enables researchers to obtain a digital object identifier (DOI) for their search, allowing it to be cited.

Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets):

- The datasets generated and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS]
- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [third party name] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [third party name].
- Not applicable. If your manuscript does not contain any data, please state 'Not applicable' in this section.

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For example:

Hao Z, AghaKouchak A, Nakhjiri N, Farahmand A. Global integrated drought monitoring and prediction system (GIDMaPS) data sets. figshare. 2014. <http://dx.doi.org/10.6084/m9.figshare.853801>

With the corresponding text in the Availability of data and materials statement:

The datasets generated during and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS].<sup>[Reference number]</sup>

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### **Example reference style:**

#### *Article within a journal*

Smith JJ. The world of science. *Am J Sci.* 1999;36:234-5.

#### *Article within a journal (no page numbers)*

Rohrmann S, Overvad K, Bueno-de-Mesquita HB, Jakobsen MU, Egeberg R, Tjønneland A, et al. Meat consumption and mortality - results from the European Prospective Investigation into Cancer and Nutrition. *BMC Medicine.* 2013;11:63.

#### *Article within a journal by DOI*

Slifka MK, Whitton JL. Clinical implications of dysregulated cytokine production. *Dig J Mol Med.* 2000; doi:10.1007/s801090000086.

#### *Article within a journal supplement*

Frumin AM, Nussbaum J, Esposito M. Functional asplenia: demonstration of splenic activity by bone marrow scan. *Blood* 1979;59 Suppl 1:26-32.

#### *Book chapter, or an article within a book*

Wyllie AH, Kerr JFR, Currie AR. Cell death: the significance of apoptosis. In: Bourne GH, Danielli JF, Jeon KW, editors. *International review of cytology.* London: Academic; 1980. p. 251-306.

#### *OnlineFirst chapter in a series (without a volume designation but with a DOI)*

Saito Y, Hyuga H. Rate equation approaches to amplification of enantiomeric excess and chiral symmetry breaking. *Top Curr Chem.* 2007. doi:10.1007/128\_2006\_108.

#### *Complete book, authored*

Blenkinsopp A, Paxton P. *Symptoms in the pharmacy: a guide to the management of common illness.* 3rd ed. Oxford: Blackwell Science; 1998.

#### *Online document*

Doe J. Title of subordinate document. In: *The dictionary of substances and their effects.* Royal Society of Chemistry. 1999. <http://www.rsc.org/dose/title of subordinate document>. Accessed 15 Jan 1999.

*Online database*

Healthwise Knowledgebase. US Pharmacopeia, Rockville. 1998. <http://www.healthwise.org>. Accessed 21 Sept 1998.

*Supplementary material/private homepage*

Doe J. Title of supplementary material. 2000. <http://www.privatehomepage.com>. Accessed 22 Feb 2000.

*University site*

Doe, J: Title of preprint. <http://www.uni-heidelberg.de/mydata.html> (1999). Accessed 25 Dec 1999.

*FTP site*

Doe, J: Trivial HTTP, RFC2169. <ftp://ftp.isi.edu/in-notes/rfc2169.txt> (1999). Accessed 12 Nov 1999.

*Organisation site*

ISSN International Centre: The ISSN register. <http://www.issn.org> (2006). Accessed 20 Feb 2007.

*Dataset with persistent identifier*

Zheng L-Y, Guo X-S, He B, Sun L-J, Peng Y, Dong S-S, et al. Genome data from sweet and grain sorghum (*Sorghum bicolor*). GigaScience Database. 2011. <http://dx.doi.org/10.5524/100012>.

## Appendix B: Post-Intervention Stigma Questionnaire

### SECTION 1

Please mark with a cross your answer to each of the following:

1.1 Hospital name

1.2 Your sex?  1 Male  2 Female

1.3 How old are you? Please write the number of years in the box

1.4 Your race?  1 Black  2 Coloured  3 White  4 Asian  
 5 Other: Please specify .....

1.5 What is your current marital status? **Select ONE only**  
 1 Living together, married  2 Living together unmarried  
 3 Spouse/partner living elsewhere  4 Single  
 5 Other: Please specify .....

1.6 What is your current occupation? **Select ONE only**  
 1 Doctor  2 Administration  
 3 Professional Nurse (chief & senior)  4 General Assistant (e.g. housekeeper, cleaner, messenger)  
 5 Assistant/ Auxiliary Nurse  6 Maintenance Worker (e.g. painter, gardener)  
 7 Staff Nurse  8 Porter  
 9 Allied Health Professional  10 Laundry Worker  
 11 Security  12 Food Service Worker  
 13 Other: Please specify .....

1.7 1.7.1 In the department/s where you currently work, are you exposed to patients with TB?  
 1 Yes  2 No  3 Not sure

1.7.2 In the department/s where you currently work, are you exposed to patients with MDR/XDR TB (drug-resistant TB)?  
 1 Yes  2 No  3 Not sure

1.8 How many years have you been working in this particular hospital?  
Please write the number of years  Or If less than 1 year, tick this box

1.9 How long have you been a healthcare worker?  
Please write the number of years  Or If less than 1 year, tick this box

- 1 None
- 2 Primary (up to Standard 5/ Grade 7)
- 3 Secondary (up to Standard 9/ Grade 11)
- 4 Matric (Standard 10/ Grade 12)
- 5 Diploma from a college or university
- 6 Degree from a college or university

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1.11		Are you currently a member of a medical aid?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No
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1.12	1.12.1	I am satisfied in my job	<input type="checkbox"/> 1 Strongly agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly disagree
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	1.12.2	I am thinking about leaving my job	<input type="checkbox"/> 1 Strongly agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly disagree
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	1.12.3	I think my workload is too high	<input type="checkbox"/> 1 Strongly agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly disagree
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	1.12.4	I am stressed at my job/ at work	<input type="checkbox"/> 1 Strongly agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly disagree
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## SECTION 2

### The next questions ask about basic, as well as advanced, HIV and TB knowledge

#### Basic questions about *HIV*

**Please mark with a cross your answer to each of the following:**

2.1	2.1.1	Can people reduce their risk of HIV infection by using a condom every time they have sex?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.1.2	Can HIV or AIDS be cured?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.1.3	Is it possible to cure TB in people with HIV?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.1.4	Is a person with HIV more likely to get TB?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.1.5	Does antiretroviral treatment make HIV-positive people less infectious?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure

#### Advanced questions about *HIV*

**Please mark with a cross your answer to each of the following:**

2.2	2.2.1	Can the HIV virus <i>EVER</i> be transmitted from a mother to a child in the womb?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.2.2	Is the risk of HIV transmission following needle-prick or sharps injuries very small (under 0.4% risk)?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.2.3	Should all HIV-positive women use formula feeding only, for their babies?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.2.4	Does Medical Male Circumcision help to prevent HIV-positive men from transmitting HIV?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.2.5	Will all people who are taking antiretroviral drugs (ARVs) eventually develop resistance?	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure

#### Basic questions about *TB*

**Please mark with a cross your answer to each of the following:**

2.3	Are the following symptoms used to diagnose TB?							
	2.3.1	Cough for more than 2 weeks	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.3.2	Unintentional weight loss	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.3.3	Fever for more than 1 week	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.3.4	Nausea	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure
	2.3.5	Night sweats	<input type="checkbox"/>	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>	Not sure

#### Advanced questions about *TB*

**Please mark with a cross your answer to each of the following:**

2.4	2.4.1	Should TB be treated for at least 6 months?	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not sure
	2.4.2	Should at least 4 drugs be used to treat TB?	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not sure
	2.4.3	Do people with TB usually become less infectious within 3 weeks after initiating appropriate treatment?	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not sure
	2.4.4	Can people with MDR TB be cured of their MDR TB within 12 months?	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not sure
	2.4.5	Can HIV-positive healthcare workers be protected from TB infection by taking IPT (Isoniazid Prophylaxis)?	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not sure

### SECTION 3

#### The next questions ask about HIV and TB infection control in the workplace

3.1 Please mark with a cross *ONE* answer for each of the following:

	3.1.1	There are adequate disposable gloves in my department that reduce my risk of becoming infected with HIV	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
	3.1.2	There are adequate sharps bins in my department that reduce my risk of becoming infected with HIV	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
	3.1.3	I know what steps to take after a needle-stick injury	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
3.2	3.2.1	There are adequate disposable respirators (N95 / FFP2) in my department that reduce my risk of becoming infected with TB	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
	3.2.2	We hand out surgical masks to coughing patients to reduce the risk of TB infection	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
	3.2.3	There is adequate natural ventilation (open windows) in the department where I currently work to reduce my risk of becoming infected with TB	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
	3.2.4	There are sufficient extractor fans in the department where I currently work to reduce my risk of becoming infected with TB	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
	3.2.5	There is yearly TB screening done for all HCWs at this hospital	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me
3.3	3.3.1	I am worried about becoming infected with HIV at work	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No	<input type="checkbox"/> 3	Not applicable to me

	3.3.2	I am worried about becoming infected with TB at work	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	<input type="checkbox"/> 3 Not applicable to me
	3.3.3	I am worried about becoming infected at work with MDR/XDR TB (drug-resistant TB)	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	<input type="checkbox"/> 3 Not applicable to me

## SECTION 4

### The next questions ask about confidentiality in the workplace

Please mark with a cross **ONE** answer for each of the following:

4.1		In the last 2 years (since you last completed this questionnaire) have you been taught about protecting the confidentiality of the HIV status of co-workers ( <i>healthcare workers</i> )?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	
4.2		In your hospital is there a code of conduct (formal set of guidelines) in place for dealing with wrongful disclosure of a <i>healthcare worker's</i> health information?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	<input type="checkbox"/> 3 Not sure
4.3		In the last 2 years (since you last completed this questionnaire), have <b><i>you personally</i></b> ever witnessed an Occupational Health nurse (Sick bay nurse) in this hospital failing to keep confidentiality about the health status of another healthcare worker? (for example: gossiping about the health status of a healthcare worker)	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	<input type="checkbox"/> 3 No Occupational Health Nurse (Sick bay nurse) in this hospital
		If, in question 4.3 above, you answered <b>No Occupational Health Nurse (sickbay nurse) in this hospital</b> – then please go to question 5.1			

If you answered **YES** to question 4.3 above — then please tell us: **What did you do?**

Mark one answer (either *Yes* or *No*) for each of the questions:

	4.3.1	Reported it officially at my workplace?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No
	4.3.2	Told a friend at my workplace?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No
	4.3.3	Told someone outside of my workplace?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No
	4.3.4	Told no one at all?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No

Now please carry on to the next question

4.4		Do you think that confidentiality about HIV is maintained in your Occupational Health Unit (Sick Bay)?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	<input type="checkbox"/> 3 Not sure
4.5		Do you think that confidentiality about TB is maintained in your Occupational Health Unit (Sick Bay)?	<input type="checkbox"/> 1 Yes	<input type="checkbox"/> 2 No	<input type="checkbox"/> 3 Not sure

4.6		Do you think that confidentiality about general health related issues is maintained in your Occupational Health Unit (Sick Bay)?
	<input type="checkbox"/> 1	Yes <input type="checkbox"/> 2 No <input type="checkbox"/> 3 Not sure

**SECTION 5**

**The next questions ask about HIV and TB status disclosure in the workplace**

**Please mark with a cross your answers to the following:**

5.1 Do you know of any staff members in your hospital who are HIV-positive?

1 Yes  2 No

**If you answered *NO* to question 5.1 above — then please go to question 5.3**

**If you answered *YES* to question 5.1 above — then please tell us: **How did you find out about their status?****

**Please mark ALL that fit with your experience**

- 5.1.1  1 I heard through gossip and rumour in the workplace
- 5.1.2  2 I heard from the healthcare worker who tested him/her
- 5.1.3  3 I read her/his medical records
- 5.1.4  4 The infected person told me her/himself
- 5.1.5  5 A member of the community outside told me
- 5.1.6  6 Other: Please specify

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**Now please carry on to the next question**

5.2 Do you work in the same department/ unit with a colleague who has HIV

1 Yes  2 No  3 I prefer not to answer

5.3 Do you work in the same department/ unit with a colleague who has TB

1 Yes  2 No  3 I prefer not to answer

5.4 Is it ever acceptable for an Occupational Health nurse to disclose the HIV status of a healthcare worker without his/her consent?

1 Yes  2 No  3 Not sure

5.5 Is it ever acceptable for an Occupational Health nurse to disclose the TB status of a healthcare worker without his/her consent?

1 Yes  2 No  3 Not sure

**SECTION 6**

**The next 5 questions ask about the general climate of *HIV* stigma in this hospital**

**Please mark with a cross *ONE* answer to each of the following:**

- 6.1      Some other healthcare workers in this hospital tend to neglect patients who they think may have HIV  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.2      Some other healthcare workers in this hospital talk badly about patients who they think may have HIV  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.3      Some other healthcare workers in this hospital look down on patients who they think may have HIV  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.4      Some other healthcare workers in this hospital feel uncomfortable being around patients who they think may have HIV  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.5      Some other healthcare workers in this hospital are afraid of catching HIV from patients  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree

**The next 5 questions ask about the general climate of *TB* stigma in this hospital**

- 6.6      Some other healthcare workers in this hospital tend to neglect patients who they think may have TB  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.7      Some other healthcare workers in this hospital talk badly about patients who they think have TB  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.8      Some other healthcare workers in this hospital look down on patients who they think may have TB  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.9      Some other healthcare workers in this hospital feel uncomfortable being around patients who they think may have TB  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree
- 6.10     Some other healthcare workers in this hospital are afraid of catching TB from patients  
 1 Strongly Agree       2 Agree       3 Disagree       4 Strongly Disagree

**SECTION 7**

**The next questions ask specifically about *HIV* stigma among *healthcare workers***

**Please mark with a cross *ONE* answer for each of the following:**

7.1	Some of my co-workers in this hospital look down on healthcare workers who they think may be HIV-infected	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.2	I would feel comfortable being close friends with a healthcare worker who is known to be HIV-positive	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.3	If I was HIV-positive, I would worry that some co-workers might avoid touching me	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.4	There are healthcare workers who make negative remarks about the health of co-workers who are involved in HIV care and treatment	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.5	I would feel comfortable having healthcare workers who are known to be HIV-positive working closely with me in my job	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.6	Healthcare workers who have HIV should not feel guilty about it	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.7	HIV-positive healthcare workers can be good role models in the workplace	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.8	Doctors and nurses with HIV who are otherwise in good health should continue to practise medicine	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.9	Some healthcare workers who are suspected of having HIV get rejected by others in the workplace	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.10	Other healthcare workers in this hospital are afraid of catching HIV from colleagues who care for HIV-positive patients	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.11	If I had HIV I would feel comfortable disclosing to some of my co-workers	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.12	If I was diagnosed with HIV, I would be afraid that some co-workers might blame me for being infected								

	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.13	As a healthcare worker I would feel it was my fault if I was infected with HIV							
	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.14	If I had HIV I would avoid making new friends at my workplace							
	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.15	Some healthcare workers in this hospital are known to give extra support to colleagues with HIV							
	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.16	Some healthcare workers in this hospital educate co-workers who stigmatise people living with HIV							
	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.17	Some healthcare workers in this hospital are doing something to stop HIV stigma in the workplace							
	<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
7.17.1	<b>If you answered <i>STRONGLY AGREE</i> or <i>AGREE</i> to question 7.17 above—then please tell us: In the last two years (since you last filled in this questionnaire) what kinds of things are the healthcare workers doing to stop HIV stigma in the workplace?</b>							
	<hr/> <hr/> <hr/> <hr/> <hr/>							

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**SECTION 8**

**The next questions ask about testing and treating for HIV and TB**

**Please mark with a cross your answer to each of the following:**

8.1	When was your last HIV test? (Select <b>ONE</b> only)							
	<input type="checkbox"/> 1	More than 2 years ago	<input type="checkbox"/> 2	Less than 2 years ago	<input type="checkbox"/> 3		Never tested	
	If you answered <b>NEVER TESTED</b> to question 8.1 above, then <b>please go to question 8.4</b>							
	If you answered <b>MORE THAN 2 YEARS AGO</b> or <b>LESS THAN 2 YEARS AGO</b> to question 8.1 above, then <b>please go to the next question 8.2, below</b>							
8.2	Have you ever tested for HIV <b>at your workplace</b> in the last 2 years (since you last completed this questionnaire)?							
	<input type="checkbox"/> 1	Yes	<input type="checkbox"/> 2	No				

		<b>If you answered <i>NO</i> to question 8.2 above — then please go to question 8.4</b>									
		<b>If you answered <i>YES</i> to question 8.2 above (<i>YES</i>, you <i>have</i> tested at your workplace — then please tell us:</b>									
8.3		<b>Who did the test? ( Please Select <i>ALL</i> that apply)</b>									
	8.3.1	<input type="checkbox"/>	1	Myself							
	8.3.2	<input type="checkbox"/>	2	A friend at work							
	8.3.3	<input type="checkbox"/>	3a	A doctor or nurse at the Occupational Health unit (Sick bay)							
	8.3.4	<input type="checkbox"/>	3b	A doctor or nurse , but <i>NOT</i> at the Occupational Health unit (Sick bay)							
	8.3.5	<input type="checkbox"/>	4	Other ..... .....							
		<b>Now please carry on to the next question</b>									
8.4		Would you use the Occupational Health Unit (Sick Bay) for each of these <b><i>HIV</i></b> services:									
	8.4.1	HIV testing	<input type="checkbox"/>	1	Yes	<input type="checkbox"/>	2	No	<input type="checkbox"/>	3	No Occupational Health Unit (Sick bay)
	8.4.2	CD4 counts	<input type="checkbox"/>	1	Yes	<input type="checkbox"/>	2	No	<input type="checkbox"/>	3	No Occupational Health Unit (Sick bay)
	8.4.3	HIV treatment	<input type="checkbox"/>	1	Yes	<input type="checkbox"/>	2	No	<input type="checkbox"/>	3	No Occupational Health Unit (Sick bay)
8.5		<b>If you said <i>NO</i> to any of the above (that you would <i>NOT</i> use the Occupational Health Unit (Sick Bay) for any of the <b><i>HIV</i></b> services above) then please tell us the MOST IMPORTANT reason/s why not:</b>									
	8.5.1	<input type="checkbox"/>	1	Quality of care							
	8.5.2	<input type="checkbox"/>	2	Confidentiality is a concern							
	8.5.3	<input type="checkbox"/>	3	Stigma is a concern							
	8.5.4	<input type="checkbox"/>	4	Other: Please specify..... .....							
		1									
8.6		Have you been screened for <b>TB</b> at this hospital in the last two years (since you last completed this questionnaire)?									
		<input type="checkbox"/>	1	Yes			<input type="checkbox"/>	2	No		
		If <b>YES</b> , then please mark with a cross any of the following reasons why you went for screening? ( Please Select <i>ALL</i> that apply)									
	8.6.1	<input type="checkbox"/>	1	I had some TB symptoms							
	8.6.2	<input type="checkbox"/>	2	It was my annual screening							
	8.6.3	<input type="checkbox"/>	3	A colleague suggested that I should screen							
	8.6.4	<input type="checkbox"/>	4	The “Let’s stop Stigma” interventions in my hospital influenced me							
	8.6.5	<input type="checkbox"/>	5	Other							
8.7		Would you use the Occupational Health Unit (Sick Bay) for each of these <b><i>TB</i></b> services:									
	8.7.1	TB Screening	<input type="checkbox"/>	1	Yes	<input type="checkbox"/>	2	No	<input type="checkbox"/>	3	No Occupational Health Unit (Sick bay)
	8.7.2	TB Treatment	<input type="checkbox"/>	1	Yes	<input type="checkbox"/>	2	No	<input type="checkbox"/>	3	No Occupational Health Unit (Sick bay)
	8.7.3	IPT (to help prevent TB in HIV-positive people)	<input type="checkbox"/>	1	Yes	<input type="checkbox"/>	2	No	<input type="checkbox"/>	3	No Occupational Health Unit (Sick bay)

8.8	<b>If you said <i>NO</i> to any of the above</b> (that you would NOT use the Occupational Health Unit (Sick Bay) for any of the TB services above), then please tell us the <b>MOST IMPORTANT</b> reason/s why not:			
8.8.1	<input type="checkbox"/>	Quality of care		
8.8.2	<input type="checkbox"/>	Confidentiality is a concern		
8.8.3	<input type="checkbox"/>	Stigma is a concern		
8.8.4	<input type="checkbox"/>	Other: Please specify	..... .....	
<b>Please mark with a cross <i>ONE</i> answer for each of the following:</b>				
8.9	Healthcare workers tend to ignore their symptoms for HIV			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
8.10	Healthcare workers tend to ignore their symptoms for TB			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree

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### SECTION 9

**The next questions ask about *TB* stigma among healthcare workers**

**Please mark with a cross *ONE* answer for each of the following:**

9.1	Healthcare workers who are suspected of having TB are stigmatised in this hospital			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.2	Some healthcare workers in this hospital avoid contact with co-workers who they think may have TB			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.3	If I was diagnosed with TB I would not need to feel shame			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.4	As a healthcare worker I would feel it was my fault if I was infected with TB			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.5	Some healthcare workers in this hospital would not want to eat or drink with a co-worker who they think has TB			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.6	If I was diagnosed with TB I would feel comfortable to tell some of my co-workers			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.7	Some healthcare workers in this hospital are stigmatised when others find out that they have gone for TB screening			
	<input type="checkbox"/>	Strongly Agree	<input type="checkbox"/>	Agree
			<input type="checkbox"/>	Disagree
				<input type="checkbox"/>
				Strongly Disagree
9.8	I do not want to work together with co-workers who are on TB treatment			

		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.9		I have noticed that some other healthcare workers in this hospital feel uncomfortable to work near co-workers with TB							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.10		If I was diagnosed with TB I would feel alone in my workplace							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.11		I am cautious of co-workers who are on TB treatment							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.12		I If I think a co-worker has TB I will avoid eating or drinking in the same room							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.13		Some healthcare workers in this hospital are known to give extra support to colleagues with TB							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.14		Some healthcare workers in this hospital educate co-workers who stigmatise people living with TB							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.15		Some healthcare workers in this hospital are doing something to stop TB stigma in the workplace							
		<input type="checkbox"/> 1	Strongly Agree	<input type="checkbox"/> 2	Agree	<input type="checkbox"/> 3	Disagree	<input type="checkbox"/> 4	Strongly Disagree
9.15.1		If you answered <b>STRONGLY AGREE</b> or <b>AGREE</b> to question 9.15 above — then please tell us: In the last two years (since you last filled in this questionnaire) what kinds of things are the healthcare workers doing to stop <b>TB</b> stigma in the workplace?							
		<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>							

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**SECTION 10**



11.1	Some other healthcare workers in this hospital tend to neglect patients who they think may have MDR/XDR TB (drug-resistant TB)	<input type="checkbox"/> 1 Strongly Agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly Disagree
11.2	Some other healthcare workers in this hospital talk badly about patients who they think have MDR/XDR TB (drug-resistant TB)	<input type="checkbox"/> 1 Strongly Agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly Disagree
11.3	Some other healthcare workers in this hospital look down on patients who they think may have MDR/XDR TB (drug-resistant TB)	<input type="checkbox"/> 1 Strongly Agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly Disagree
11.4	Some other healthcare workers in this hospital feel uncomfortable being around patients who they think may have MDR/XDR TB (drug-resistant TB)	<input type="checkbox"/> 1 Strongly Agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly Disagree
11.5	Some other healthcare workers in this hospital are afraid of catching MDR/XDR TB (drug-resistant TB) from patients	<input type="checkbox"/> 1 Strongly Agree	<input type="checkbox"/> 2 Agree	<input type="checkbox"/> 3 Disagree	<input type="checkbox"/> 4 Strongly Disagree

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## SECTION 12

**The next 5 questions ask about the ‘Let’s Stop Stigma’ interventions in your hospital during the last two years**

12.1 Did you participate in the stigma-reduction workshops?

1 Yes  2 No

If **YES** (you **DID participate** in the stigma reduction workshops) then please answer questions **12.3** and **12.4**

If **NO** (you **did NOT participate** in the stigma reduction workshops) then please answer the next question 12.2 below

12.2 Did you hear about the content of the ‘Let’s Stop Stigma’ workshop from someone else who attended it?

1 Yes  2 No  3 I do not remember

**Now please go to question 12.5**

If **YES** (you **DID participate** in the stigma reduction workshops) then please answer question 12.3 and 12.4, below

12.3 **On a scale of 1 – 5:** To what extent did the workshops help you to.....

(Please select only **ONE** answer for **EACH** of the 6 items below)

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Did not help me at all	←————→			Helped me a lot

12.3.1	Understand what stigma is	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
12.3.2	Recognise stigma	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
12.3.3	Understand how stigma feels	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
12.3.4	Know what to do to reduce stigma	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	
12.3.5	Talk to colleagues about stigma	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	I did not talk to colleagues about stigma <input type="checkbox"/> 6
12.3.6	Actually do something to reduce stigma	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	I did not do anything <input type="checkbox"/> 6

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12.4 **On a scale of 1 to 5:** To what extent did the workshops improve your knowledge of the following items:  
(Please select only **ONE** answer for **EACH** of the 13 items below)

		1	2	3	4	5
		Did not improve my knowledge	←————→			Improved my knowledge a lot
12.4.1	HIV Infection control in the workplace	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.2	TB Infection control in the workplace	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.3	Confidentiality in the workplace	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.4	Post-exposure care and follow-up for HIV	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.5	TB treatment	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.6	How to find help for stigma in the workplace	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.7	Workplace rights and responsibilities	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.8	How to report violations of workplace rights in the workplace	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.9	The importance of HIV testing	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.10	The importance of TB screening	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.11	Infectiousness of HIV-positive people on ART	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.12	My HIV knowledge	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12.4.13	My TB knowledge	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**Now please go to the next question (Question 12.5 below)**

12.5	In the last two years (since you last completed this questionnaire), have you been part of any conversations about reducing <b>HIV stigma</b> in the workplace? (Select only <b>ONE</b> answer)
	<input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No <input type="checkbox"/> 3 I do not remember

**If you answered NO, or I DO NOT REMEMBER, then please go to question 12.6**

If **YES**, please tell us....

12.5.1	Did you initiate any of these conversations about reducing <b>HIV</b> stigma in the workplace?
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I do not remember
12.6	In the last two years (since you last completed this questionnaire), have you been part of any conversations about reducing <b>TB</b> stigma in the workplace? (Select only <b>ONE</b> answer)
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I do not remember
	<b>If you answered NO, or I DO NOT REMEMBER, then please go to question 12.7</b>
	<b>If YES, please tell us....</b>
12.6.1	Did you initiate any of these conversations about reducing <b>TB</b> stigma in the workplace?
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I do not remember

**Now could you please answer the last few important questions on the “Lets Stop Stigma” campaign in your hospital:**

12.7	Were you exposed to any promotional materials from the “Let’s stop stigma” campaign? (Please indicate <b>YES</b> or <b>NO</b> for <b>every one</b> of the 5 items below)
12.7.1	Posters <input type="checkbox"/> Yes <input type="checkbox"/> No
12.7.2	Pens <input type="checkbox"/> Yes <input type="checkbox"/> No
12.7.3	Chocolates <input type="checkbox"/> Yes <input type="checkbox"/> No
12.7.4	Wrist bands <input type="checkbox"/> Yes <input type="checkbox"/> No
12.7.5	Fridge magnets <input type="checkbox"/> Yes <input type="checkbox"/> No

12.8	<b>On a scale of 5:</b> To what extent did the promotional materials work to spread the message “Let’s stop stigma”? (Please select only <b>ONE</b> answer for <b>EACH</b> of the 5 items below)
------	---

		1	2	3	4	5	
		Did not work at all	←————→			Worked very well	I was not exposed to this
12.8.1	Posters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.8.2	Pens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.8.3	Chocolates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.8.4	Wrist bands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.8.5	Fridge magnets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### SECTION 13

13	In the last two years (since you last completed this questionnaire), do you think healthcare workers in this hospital are more aware of HIV & TB stigma in the workplace? (Select only <b>ONE</b> answer)
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> I am not sure

**Thank you *very* much for your time and trouble!**

**Any comments or suggestions?**

## Appendix C: Ethical Clearance



### GENERAL/HUMAN RESEARCH ETHICS COMMITTEE (GHREC)

18-Oct-2022

Dear Ms Helen-May Johnston

#### Application Approved

Research Project Title:

**Predictors of TB and HIV/AIDS external stigma among healthcare workers in the Free State Province, South Africa.**

Ethical Clearance number:

**UFS-HSD2022/1409/22**

We are pleased to inform you that your application for ethical clearance has been approved. Your ethical clearance is valid for twelve (12) months from the date of issue. We request that any changes that may take place during the course of your study/research project be submitted to the ethics office to ensure ethical transparency. Furthermore, you are requested to submit the final report of your study/research project to the ethics office. Should you require more time to complete this research, please apply for an extension. Thank you for submitting your proposal for ethical clearance; we wish you the best of luck and success with your research.

Yours sincerely

**Dr Adri Du Plessis**

**Chairperson: General/Human Research Ethics Committee**

Adri  
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Plessis

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signed by Adri  
Du Plessis  
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## Appendix D: Turnitin Report

Helen-May 10 July submission

### ORIGINALITY REPORT

<b>18%</b> SIMILARITY INDEX	<b>4%</b> INTERNET SOURCES	<b>18%</b> PUBLICATIONS	<b>0%</b> STUDENT PAPERS
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### PRIMARY SOURCES

<b>1</b>	Nina Sommerland, Caroline Masquillier, Asta Rau, Michelle Engelbrecht et al. "Reducing HIV- and TB-Stigma among healthcare co-workers in South Africa: Results of a cluster randomised trial", <i>Social Science &amp; Medicine</i> , 2020 Publication	<b>4%</b>
<b>2</b>	Edwin Wouters, Asta Rau, Michelle Engelbrecht, Kerry Uebel et al. "The Development and Piloting of Parallel Scales Measuring External and Internal HIV and Tuberculosis Stigma Among Healthcare Workers in the Free State Province, South Africa", <i>Clinical Infectious Diseases</i> , 2016 Publication	<b>1%</b>
<b>3</b>	V. Karasavva, J. Swanek, A. Smodis, A. Forth. "Expectations VS reality: Expected and actual affective reactions to unsolicited sexual images", <i>Computers in Human Behavior</i> , 2022 Publication	<b>1%</b>