

An abstract graphic on the left side of the page consists of numerous thin, curved lines in shades of orange and white. These lines originate from a central point and fan out towards the top and bottom edges, creating a sense of movement and depth. The background is a gradient of light blue, with darker blue shapes that appear to be overlapping or layered, adding to the modern and professional aesthetic of the cover.

**A systematic evidence review to
support development of policy
guidelines for improving health
worker access to prevention,
treatment, and care
services for HIV and TB**

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December 2009

WHO Library Cataloguing-in-Publication Data:

A systematic evidence review to support development of policy guidelines for improving health worker access to prevention, treatment, and care services for HIV and TB / prepared for the World Health Organization by Annalee Yassi ... [et al.]

1.HIV infections - diagnosis. 2.Tuberculosis - diagnosis. 3.HIV infections - therapy. 4.Tuberculosis - therapy. 5.Health personnel. 6.Health services accessibility. 7.Occupational health. 8.Prejudice. 9.Meta-analysis.10.Evidence-based practice. I.Yassi, Annalee. II.World Health Organization.

ISBN 978 92 4 150051 7

(NLM classification: W 76)

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ABSTRACTⁱ

Background

There is a world-wide crisis in recruitment and retention of healthcare workers. Healthcare increases the risk for blood-borne and air-borne diseases, including HIV and tuberculosis (TB). The health service sector has a vital role to play in delivering HIV and TB prevention, diagnosis, treatment, as well as care. It is therefore important that the health of healthcare workers is protected. Evidence to date indicates that despite the existence of clinical guidelines related to appropriate prevention, diagnosis, treatment and care, currently health workersⁱⁱ are not obtaining the access to the HIV and TB services they need; moreover, stigma and discrimination remain problematic. Thus guidelines are needed to guide healthcare employers, governments and other healthcare decision-makers to implement policies and programs to ensure that the needed services are provided.

Objectives

To ascertain if priority accessⁱⁱⁱ to HIV and/or TB diagnostic and/or treatment services should be provided to health care workers as well as whether workplaces should provide programs reducing stigma and/or discrimination for all health care workers.

Search strategy

Electronic searches of PubMed, Google Scholar, Cochrane Collaboration Library, and relevant websites of trade unions and other organizations were conducted, as well as hand searches of references from articles found in this search strategy that met the selection criteria. It should be noted that this review supplements a five-country study commissioned by the Guideline Group, a

ⁱ This "Systematic Review" follows the Cochrane review style of systematic reviews. It is noteworthy, however, that the Guideline Group recognized the limitations of the traditional Cochrane approach and adopted a supplementary information gathering process, as described briefly in this document, and extensively in the Synthesis Report prepared by the consultants – a non-Cochrane review-style, often needed for subject matter such as this (c.f. (Sheppard et al., August 2009, PLoS Med). The consultant team is well aware of the debates occurring with respect to how best to synthesize evidence for decision-making with respect to complex public health policy interventions, which address hard to define or measure concepts (such as stigma and trust) and indeed we are aware of progress being made within the Cochrane Collaboration itself (i.e. the recently established Cochrane Public Health Review Group- <http://www.ph.cochrane.org/en/index.html> and the Cochrane Health Equity Field- <http://equity.cochrane.org/en/index.html>). This document, however, contains the objectives, methodology and results from the more traditional Cochrane-style Systematic Review. The Guideline submission documents will report in depth not only on the results of this Systematic Review but also on the results of the Synthesis and the rationale for the recommendations derived.

ⁱⁱ With respect to the definition of "health workers", the GG cites the WHO Fact Sheet #302. April 2006 "Health workers are all people whose main activities are aimed at enhancing health. They include the people who provide health services -- such as doctors, nurses, pharmacists, laboratory technicians -- and management and support workers such as financial officers, cooks, drivers and cleaners. Worldwide, there are 59.8 million health workers. About two-thirds of them (39.5 million) provide health services; the other one-third (19.8 million) are management and support workers. Without them, prevention and treatment of disease and advances in health care cannot reach those in need." Subsectors of health workers include not only those who work in acute care facilities, but also long-term care, community-based care and home-care. Health workers also include informal caregivers. All recommendations in these guidelines apply to all subsectors of health workers. It is noted that special attention is needed in implementation planning to ensure that health workers in the community and in home settings are included.

ⁱⁱⁱ Providing "priority access" is defined in these guidelines as providing infrastructure as well as policies and programs that enable health workers to obtain prevention, treatment and care services ahead of the general public who are not health workers, Priority access implies access by policy not simply practice, This access does not necessarily imply priority access ahead of other groups who have already been designated for priority access (e.g. pregnant women), but does imply that health workers should have access that does not require them to wait in the queue with the population at large, and is convenient, accessible, free, confidential and non-stigmatizing.

preliminary review of the literature as well as review of existing guidelines, and a 17 country survey.

Selection criteria

Articles included in this search focused on workplace programs from any countries; for the first two search questions, this was restricted to programs for healthcare workers. Outcome of interest included incidence of infection, absenteeism, worker retention, uptake of VCT, uptake of appropriate treatment, morbidity, mortality, and improved working conditions (perceived or documented), as well as discrimination or stigma (perceived or documented), job loss (fear of, or documented), services to the community and cost.^{iv} Studies assessing any of these outcome relating to a workplace intervention, conducted since 1984, and available electronically were included.^v

Data collection and analysis

A minimum of two reviewers independently extracted data and assessed selection criteria; studies were also profiled and quality assessed by a minimum of two reviewers including the senior reviewer on the team. No new statistical analyses were conducted for this review.

Main results

Four studies were found that provided evidence relating to the first question (priority access for healthcare workers to HIV/AIDS and/or TB treatment services, compared to no priority access); all found that diagnostic and/or treatment programs provided by the workplace for healthcare workers showed a preponderance of positive benefits, with minimal negative outcome. No studies were found that provided evidence relating to the second question (evaluating workplace programs to reduce discrimination and stigma). Seven studies were found with evidence regarding the third question (workplace HIV and/or TB diagnosis and/or treatment programs) from any sector, public or private.

Conclusions

While better research is needed in all these areas, providing priority access for health workers to obtain HIV and TB diagnosis and treatment at the workplace is supported by the literature.

^{iv} The GG did not prioritize any of these outcome over other outcome, thus studies in which *any* of these outcome were reported upon were included in the systematic review.

^v Twenty--five years was used as the cut-off as prior to this date HIV and AIDS had barely been recognized and not understood at all; similarly tuberculosis, which of course, has existed for a long time, re-emerged since that time, and now with multiple drug resistance, new diagnostic tests, and considerable more research, it was felt that going back any further would not reveal any useful information.

BACKGROUND

The Human Immunodeficiency Virus (HIV) epidemic is creating an enormous strain on the healthcare workforce worldwide, and especially in low and middle income countries where healthcare workers are subject to extensive out-migration¹. According to the International Labour Office (ILO), in the absence of increased access to treatment, an estimated 74 million healthcare workers will have migrated from their home countries by 2015². Healthcare workers are also at increased risk for blood-borne and air-borne diseases, including morbidity related to HIV and tuberculosis (TB), due to the nature of their work. Healthcare workers have a vital role to play in delivering prevention, diagnosis, treatment and care for HIV and TB – but can do so in a sustainable manner only if their own health is protected. Evidence to date indicates that despite the existence of clinical guidelines related to appropriate prevention, diagnosis, treatment and care, currently health workers are not obtaining the access to the HIV and TB services they need. Moreover, stigma and discrimination remain problematic. Thus guidelines are needed to assist healthcare employers, governments and other healthcare decision-makers to develop and implement policies and programs to ensure that health workers receive the services they need.

This Systematic Review was conducted for the Guideline Group that drafted the Concept Paper outlining draft policy statements³, commissioned a major study in five African countries⁴, a preliminary literature review⁵ and a survey of national policies worldwide⁶. The evidence, taken together, formed the basis of the evidence that informed the decision-making process of the Guideline Group with respect to formulating the compilation of recommendations to comprise the guidelines needed.

The Medical Review Council in the United Kingdom defines complex interventions as those comprising “a number of separate elements which seem essential to the proper functioning of the interventions although the ‘active ingredient’ of the intervention that is effective is difficult to specify”⁷. As noted by Sheppard et al.⁸ complex health interventions are difficult to evaluate using the traditional Cochrane approach, particularly when the interventions include elements of a more conceptual nature, such as “trust”, or in this case “reducing stigma” and preventing “discrimination”. The authors note that policy documents can be particularly informative, consistent with the approach of the Guideline Group’s commissioning of a policy review across all regions of the world⁶.

As described in the *WHO Handbook on Guideline Development* (p.17)⁹, the first step in developing the Guidelines was to conduct a review of existing guidelines. This was especially important given that the purpose of the currently proposed Guidelines is precisely to provide guidance on *how* to accelerate the implementation of policies and programs to deliver evidence-based measures and services related to HIV and TB to the healthcare workforce.

The Guideline Group also commissioned a study by Elizabeth Corbett of five African countries, to inform guideline development. The methods used in the Corbett study are discussed in depth in the report of that study⁴ and in the Synthesis Report¹⁵. Basically, the Five Country Study by Elizabeth Corbett (2007, unpublished) is a well-designed and well-conducted study that provides high quality evidence very relevant to developing the needed guidelines. The methodology, detailed in the Corbett report⁴ included interviews with 938 health workers from 50 facilities across five African countries, 30 of which were selected through random cluster sampling, with the others selected through purposive selection that sought facilities with best practices. Within each country, 6 health facilities were randomly selected using a 2 to 4-stage weighted selection

method with population, staff, and establishment size used for weighting. Individual questionnaires were supplemented by facility assessment checklists for which the respondents were facility managers, and a policy questionnaire completed by Ministry of Health and other government officials. The study also included 12 focus groups. Details of the methodology are well-explained and are robust.

The Synthesis power point presentation made to the Guideline Group in September 2009, is available on request, as is the Synthesis Report. The results of the 17-Country Survey are described in the report of this 17-Country Survey⁶, as well as in the Synthesis report¹⁵, and the presentation provided to the Guideline Group is available on request as well.

In addition to carefully reviewing the Wheeler preliminary literature report, the literature cited by Wheeler (197 references), Corbett (115 references), plus another 152 references from a literature review recently conducted by the consultant team (Yassi et al., 2008) as well as another 152 references were also reviewed. For each of the draft policy statements, the list of references provided by Corbett, Wheeler and Yassi et al. were reviewed and assessed for relevancy to the questions listed in the Concept Paper related to the statement. The evidence from this preliminary literature review (of almost 500 articles) was then further supplemented by an additional search conducted in June 2009 to ensure completion, adding 32 additional articles after eliminating duplicates. This supplemental search was conducted specifically with reference to each of the (then) 13 statements in the Concept Paper.

The information from the preliminary literature review, along with results of the Corbett 5-Country Study and the multi-country national survey results were discussed at length by the Guideline Group on July 2-3, 2009. At this meeting, the draft statements in the Concept Paper were reviewed, and the 13 preliminary statements for the draft guidelines were reduced to 12 statements, through the conclusion of the Guideline Group at that time that one of the statements was somewhat redundant to what was already included in some of the other statements.

In addition, a discussion was held of the evidence supporting each of the statements to ascertain what, if anything, introduced elements that were not already recently reviewed for existing guidelines, what potentially new evidence might have been created since the time of the previous guidelines, and what was potentially controversial. **This discussion led to the formulation of three questions that would constitute the subject of a (Cochrane-style) Systematic Review.**

While the issues addressed by the Concept Paper are considerably broader than the issues addressed by this Cochrane-style Systematic Review, as described below, the questions that constitute the subject of the Systematic Review were formulated *specifically* to address the gaps in knowledge (i.e. not already systematically reviewed recently for other guidelines) needed to produce solidly evidence-based guidelines. No further discussion will be provided in this Cochrane-style Systematic Review of the results of the other components of the full review of evidence.

OBJECTIVES

To determine possible benefits and downsides to providing priority access to HIV and/or TB diagnosis and/or treatment compared to no priority access for health care workers both from interventions conducted in healthcare as well as in other sectors, in order to ascertain if workplace provision of HIV and/or TB diagnostic and/or treatment services should be promoted for all health care workers. Additional, we aim to ascertain whether workplaces should provide programs reducing stigma and/or discrimination for all health care workers.

METHODS

The Guideline Group, after a preliminary review of existing guidelines, as well as the results of the Five Country Study⁴, the multi-country survey⁶, and a preliminary literature review⁵, identified three questions that needed further exploration and were potentially amenable and appropriate for a Cochrane-style systematic review, as noted above.

Evidence regarding the extent of the problem of HIV and TB in healthcare workers, various aspects of determinants of these diseases and the morbidity and mortality that results, efficacy of clinical treatment regimens, effectiveness of specific workplace prevention measures, and other matters that have already been the subject of international guidelines are not included in this Systematic Review.

The questions formulated are listed in Table 1, using the framework often used in systematic reviews, and noted in the *WHO Handbook for Development of Guidelines*⁹, namely the Population, Intervention, Comparison, and Outcome (PICO framework). It should be noted that this Systematic Review focused on evaluating the **evidence for the effectiveness of workplace interventions**

Table 1. Criteria^{vi} for selection of articles in the systematic review^{vii} by question.

	Population	Intervention	Comparison	Outcome^{viii}
1. Should priority access for HIV and/or TB diagnostic and/or treatment services be provided for all health care workers? ^{ix}	Healthcare workers (all countries)	Intervention to provide priority access to HIV and/or TB diagnosis and/or treatment services for health care workers	Self-comparison (e.g. pre versus post intervention), as well as comparison with any suitable external comparison groups	<ul style="list-style-type: none"> - incidence of infection - absenteeism - worker retention -uptake of VCT - uptake of appropriate treatment - morbidity (perceived or documented) - mortality - working conditions (perceived or doc.) - cost (or cost-benefit) - discrimination or stigma (perceived or doc.) - job loss (perceived or documented) - services to the community
2. Should programs reducing stigma and/or discrimination be provided for all health care workers?	As above	Workplace program to decrease HIV- and/or TB-related stigma and/or discrimination	As above	<ul style="list-style-type: none"> - discrimination or stigma (perceived or documented) - job loss (fear of, or documented) - absenteeism - uptake of VCT - awareness and knowledge - reporting (reported willingness or doc) - worker retention - working conditions (perceived or doc) - cost
3. Should programs for workplace-based and/or workplace-organized diagnosis, treatment, care and support for HIV and/or TB be provided for all health care workers?	Employees (any sector – private and public)	Workplace program to diagnose and/or manage HIV and/or TB	As above	Any of the outcomes for either of the above questions.

Types of Studies

^{vi} Exclusion criteria for this Systematic Review: Studies that fail to meet the selection criteria were excluded from the review – but are listed in full in the Appendix. For example, studies that were baseline assessments to document the need for interventions were excluded as were commentaries and editorials. We would like to note that this table outlines Inclusion and Exclusion criteria for the Systematic Review. This is different from inclusion and exclusion criteria for the studies themselves. Where a study is an intervention trial, we explain with respect to that particular study, the target population included in the intervention, who were excluded, and, if necessary, data from which participants were include/excluded from analysis. As the studies were largely workplace interventions, most interventions were offered to entire workforces plus/minus families.

^{viii} Due to the multiple partners involved in creating these compilation implementation policy guidelines, the Guideline Group has elected not to prioritize outcome but to include all studies that address ANY of the outcome of interest to any of the partners.

^{ix} Our team originally suggested questions that focused on the *determinants* of successful programs, rather than the evidence of the intervention was successful or not successful, albeit aware that that binary outcome are easier to evaluate. In the session held in July 2009, the GRC strongly recommended that we frame the questions the way they are framed in this table (binary). Interestingly, the debate captured in the recent Shepperd et al. publication⁸ addresses this issue. Nonetheless, as, according to the WHO Handbook for Guideline Development it is essential that it is the Guideline Group, not the consultant, that should define the questions, we have NOT altered the questions from what was agreed up by the Guideline Group in July 2009.

Studies from the past 25 years were eligible for inclusion^x.

No eligible studies were excluded because of language.

Randomized controlled trials, quasi experimental or observational studies with external comparison groups were sought as highly preferable, however given the limited data available to answer the question posed from these higher quality studies, all analytic studies in which there was either qualitative or quantitative data evaluating a relevant intervention (i.e. an intervention that fit the criteria noted above) were deemed potentially eligible, as long as they met the criteria in other respects. Studies conducted in low, middle and high-resource settings were all included. The inclusion criteria (selection criteria for inclusion in this review) are consistent with what is being advocated for Systematic Reviews of public health interventions^{10 11} as well as the WHO Handbook on Guideline Development. We also note the debates occurring in the literature recently regarding systematic reviews – highlighting the importance of including qualitative information obtained in trials¹². Thus our tables of results do indeed include what was observed from qualitative study.

Types of Participants

As shown in Table 1, studies in which target population for the intervention were health care workers from any country were included in the search with respect to questions #1 and #2, and studies in which the participants were employees in any sector were included for question #3.

Types of Interventions

As also shown in Table 1, interventions for health care workers that offered priority access (usually at the workplace, or arranged by the employer) for HIV and/or TB diagnosis (e.g. VCT, diagnosis of LTBI as well as acute TB) and/or treatment (eg. ART, IPT, full course TB treatment) were included for questions #1 and #3. Interventions consisting only of education and prevention resources (e.g. promotion of condom use, sharps injury prevention, respirator programs or post-exposure prophylactic measures)^{xi}, but did not offer priority access to diagnosis and/or treatment were not included.

The literature notes the difficulties in assessing complex interventions⁷ and particularly in conducting Systematic reviews of complex interventions^{8 14}. It has been noted that details of the intervention components are often lacking^{8 14}. Nonetheless, as the purpose of the policy guidelines under development is precisely to synthesize existing information into policy to guide the implementation of a comprehensive intervention, studies were not excluded because of lack of details.

We again stress that matters that were not covered by the three PICO questions devised by the Guideline Group for the systematic review does not in any way suggest that the intervention is not important (e.g. prevention interventions), but rather that the Guideline Group deemed these issues adequately addressed by existing guidelines. For question #2, the intervention had to specifically target reduction of stigma and/or discrimination to be deemed eligible. The wealth of

^x In the Systematic Review we included studies from June 1, 1989 until May 31, 2009. We had felt that given that the knowledge of HIV and AIDS as well as the nature of the re-emergence of tuberculosis is such that studies prior to this date would unlikely be relevant. We were, however, aware that some new studies were soon to be published. We therefore extended our search back to October 1, 1984 and forward until September 30, 2009

^{xi} This comment may seem confusing to those less familiar with the subject matter. The activities mentioned in parentheses are very important aspects to consider for the Guideline Group, as these are crucial “prevention” activities with respect to HIV and TB. The reason that studies that focuses solely on such prevention measures are not included in this review is because first, these activities have been reviewed extensively for other guidelines, and secondly, because they cannot be considered “diagnostic or treatment” services, but rather “prevention” measures.

literature on the magnitude of the problem were not included in this review, but was indeed presented to the Guideline Group in the Synthesis Report noted above.

Types of Outcome Measures

The effectiveness of interventions, as noted above, could be determined by analyzing quantitative and/or qualitative data. To be included in this review, outcome measures had to include at least one of the outcome measures listed in Table 1 (including incidence of infection, absenteeism, worker retention, uptake of VCT, uptake of appropriate treatment, morbidity, mortality, working conditions as perceived or documented). Positive as well as negative outcome were sought, including whether the intervention led to increased stigma and/or, discrimination (perceived or documented); increased job loss (perceived or documented); decreased services to the community; or high cost. As noted above, none of these outcome measures were prioritized over others.

Search methods for identification of studies

Electronic searches of PubMed, Google Scholar, and Cochrane Collaboration Library were conducted, supplemented by an Advanced Search of Google to access “grey literature” including relevant websites of trade unions and other organizations with an interest in this area; hand searches of reference lists from articles and documents obtained through articles identified in the above approach were also conducted^{xii}.

For PubMed we conducted an additional search for the period July 1, 1984 until September 30, 2009, using MeSH Terms. As we were mainly interested in the publication in peer-review journals of any new articles that could meet the PICO criteria, we did not re-do the searches from the other databases to include the additional four months, (or extending back the additional five years – for reasons explained above -- i.e. that knowledge of HIV/AIDS and the re-emergence of TB would not likely be relevant to the questions posed.^{xiii}).

The **search terms** used for all databases, as conducted in our original submission are listed in the Appendix, along with the MeSH terms used for the supplementary search. The reason we chose to include “search terms” rather than solely using MESH terms or key words supplied by the author, was to be as inclusive as possible. For example, there is no MeSH term for “priority access” nor “stigma”, thus to search for articles addressing these issues required the additional use of non-MeSH terms. As such, the search terms listed in the Appendix refer to terms that appeared in the title, key words, or abstract, the article was included for review as to whether it met the inclusion and exclusion criteria.

Search strategies, including the combination of search terms used in the searches, from PubMed, Google and Cochrane are outlined in detail here, divided by the specific questions.

^{xii} We originally only conducted the search by the search terms listed, to be consistent in the searches across all the different databases we searched. In our extended search (an additional 5 years back and an additional four months forward) we also expanded this search to include MeSH terms from PubMed as well, as discussed below.

For PICO Question #1, *should priority access for HIV and/or TB diagnostic and/or treatment services be provided for all health care workers?*, the search consisted of the following:

PubMed with MeSH:

- a) Health care sector OR health occupations AND acquired immunodeficiency virus OR HIV and workplace
- b) Health care sector OR health occupations AND acquired immunodeficiency virus OR HIV and intervention studies
- c) Workplace and tuberculosis and health occupations
- d) Health care sector and health occupations and tuberculosis
- e) Health care sector OR health occupations and HIV OR tuberculosis AND occupational health OR occupational health services

PubMed with keywords:

- a) health care workers occupational health HIV priority
- b) health care workers occupational health tuberculosis priority
- c) health care workers occupational health HIV priority treatment”
- d) health care workers occupational health tuberculosis priority treatment
- e) health care workers priority access to ART
- f) health care workers occupational health HIV priority access
- g) health care workers occupational health tuberculosis priority access

Google Scholar:

- a) health care workers HIV treatment
- b) health care workers tuberculosis treatment

Cochrane Collaboration Library:

- a) healthcare workers AND occupational health AND HIV
- b) healthcare workers AND occupational health AND tuberculosis
- c) healthcare workers AND tuberculosis AND treatment
- d) healthcare workers AND HIV AND priority AND treatment
- e) healthcare workers AND priority AND tuberculosis AND treatment
- f) healthcare workers AND occupational health AND HIV AND treatment
- g) healthcare workers AND occupational health AND Tuberculosis AND treatment
- h) healthcare workers AND occupational health AND HIV AND priority
- i) healthcare workers AND occupational health AND Tuberculosis AND priority
- j) healthcare workers AND occupational health AND HIV AND priority AND treatment

Grey Literature:

The following websites were suggested through in-person consultations, phone and email consultation with experts in the field of occupational health, HIV/AIDS, infection control and health and human rights. These websites were hand-searched for any of the keywords (1-39) listed in the Appendix on July 20, 21 and 22, 2009. Following the meeting of the Core Guideline Group in September 2009, a few more webpages were added, both for the Synthesis of the Evidence (“realist search”) as well as for this Cochrane- style Systematic Review.

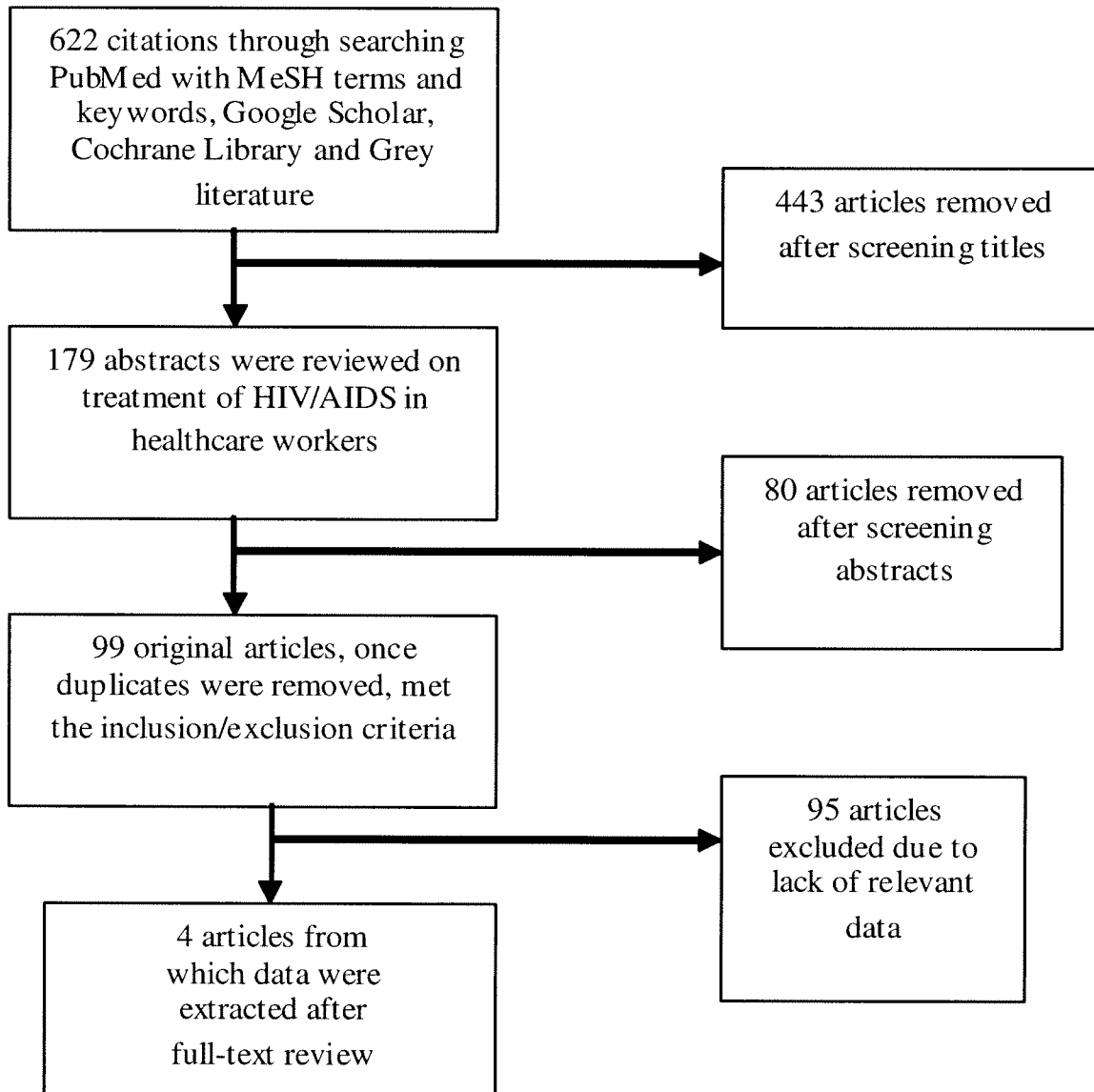
- 1- **Treatment Action Campaign** - www.tac.org
- 2- **Physicians For Human Rights**- www.physiciansforhumanrights.org
- 3- **South African Department of Health**- www.doh.gov.za
- 4- **Congress of South Africa Trade Unions**- www.cosatu.org.za
- 5- **Public Services International** - www.world-psi.org
- 6- **International Centre for AIDS Care and Treatment Programs**- www.columbia-icap.org
- 7- **US President’s Emergency Fund for AIDS Relief**- www.pepfar.gov
- 8- **International AIDS Society**- www.iasociety.org
- 9- **People’s Health Movement**- www.phmovement.org

Hand-Search of References

The references of all included articles listed above were hand searched for additional articles meeting the inclusion criteria.

The above protocol resulted in 622 citations appearing in the electronic search. As shown in Figure 1 titles were then screened, and if it was clear that the article did not meet the criteria for inclusion in this systematic review (e.g. interventions that targeted patients not health workers), it was excluded leaving 179 for review. Abstracts of these articles were all reviewed; duplicates were removed; 95 articles were left for detailed review. These are all listed in the Appendix. After reviewing the articles, carefully applying the criteria noted in Table 1, only four articles were left for profiling for this systematic review.

Figure 1– Study selection process for Question #1



For PICO Question #2, Should programs reducing stigma and/or discrimination be provided for all health care workers?, the following search methods were used using the search terms listed below.

MeSH keywords:

- a) Prejudice AND health personnel AND HIV OR Acquired Immunodeficiency Syndrome AND education AND health care sector
- b) HIV OR Acquired Immunodeficiency Syndrome AND prejudice AND education OR staff development AND Health personnel
- c) Health Care Sector OR Health Personnel AND Attitude of Health Personnel AND Prejudice AND Acquired Immunodeficiency Syndrome

A supplemental search was conducted using keywords in PubMed. Search terms used are listed below:

- a) Occupational health and health personnel and HIV stigma reduction and Health Knowledge, Attitudes, Practice and Prejudice and Stereotyping
- b) occupational health and health personnel and attitude of health personnel and stereotyping and prejudice
- c) health personnel and occupational health and HIV
- d) health personnel and occupational health and HIV and prejudice

Cochrane Collaboration Library:

- a) healthcare workers and occupational health and HIV
- b) healthcare workers and occupational health and HIV and stigma
- c) healthcare workers and occupational health and HIV and discrimination
- d) healthcare worker and occupational health and tuberculosis
- e) health personnel and occupational health and HIV
- f) health personnel and occupational health and HIV and stigma
- g) health personnel and occupational health and tuberculosis
- h) health worker and tuberculosis and stigma
- i) tuberculosis and stigma
- j) tuberculosis and discrimination

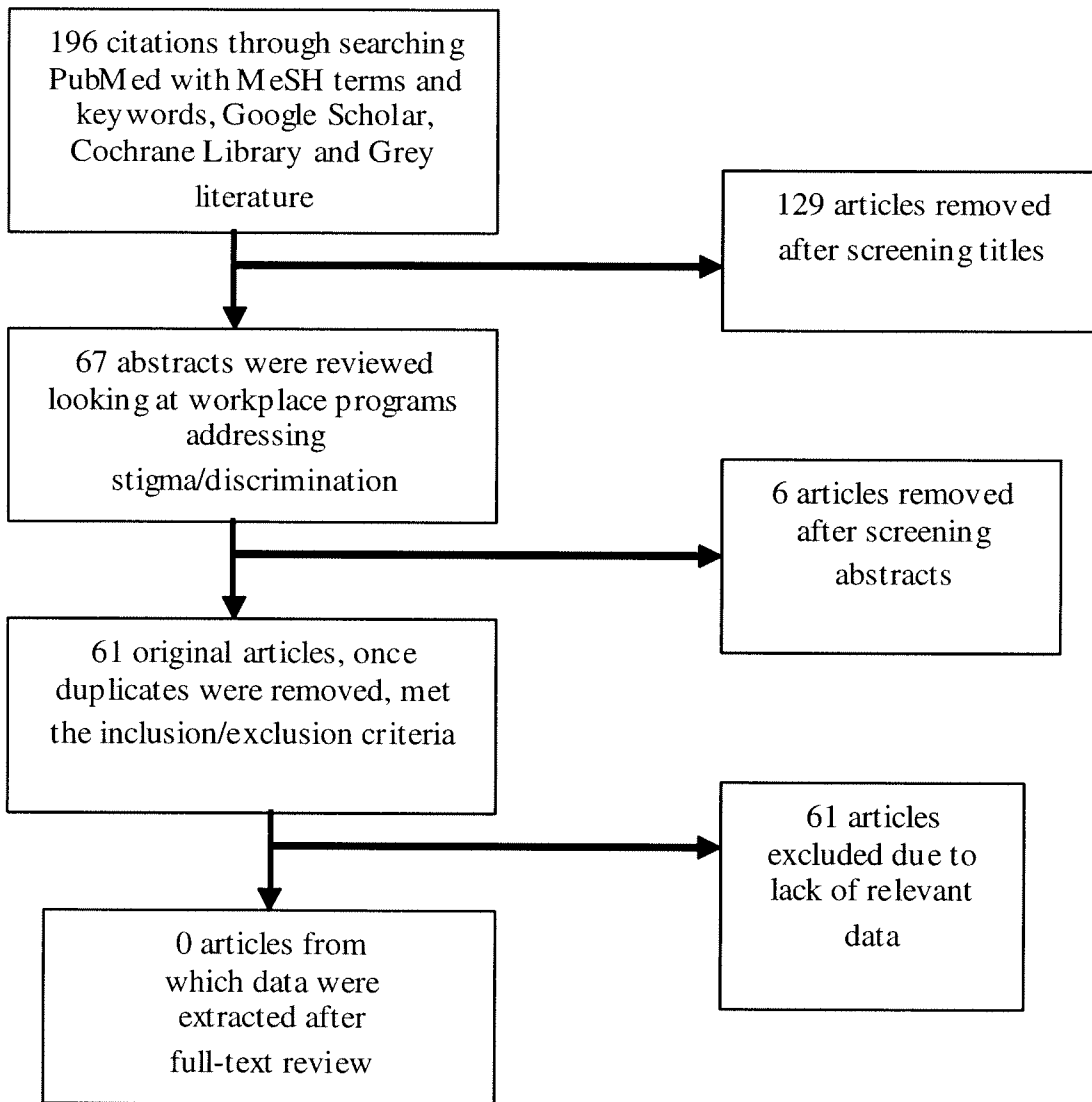
Google Scholar:

- a) health care workers HIV stigma
- b) health care workers HIV discrimination

Grey literature and hand-searches were conducted for PICO Question #2 in the same format as for PICO #1 described above.

Applying the protocol as noted above (see Figure 2) resulted in 61 articles. These are all listed in the Appendix. Note that carefully applying the *a priori* criteria established resulted in zero articles for inclusion for profiling.

Figure 2. Search Strategy Results for Question #2



For PICO Question #3, *Should programs for workplace-based and/or workplace-organized diagnosis, treatment, care and support for HIV and/or TB be provided for all health care workers?*, the following search methods were utilized using the listed search terms:

MeSH keywords:

- a) health personnel AND HIV OR acquired immune deficiency syndrome AND workplace AND diagnosis
- b) health personnel AND HIV OR acquired immune deficiency syndrome AND workplace (8 results)

Pubmed:

- a) HIV workplace program and testing
- b) HIV workplace programme
- c) HIV workplace programme and diagnosis
- d) HIV and workplace and treatment program and cost
- e) HIV and employer and treatment program
- f) HIV and workplace program and voluntary counseling and testing
- g) HIV and antiretroviral therapy and workplace program
- h) HIV occupational setting intervention

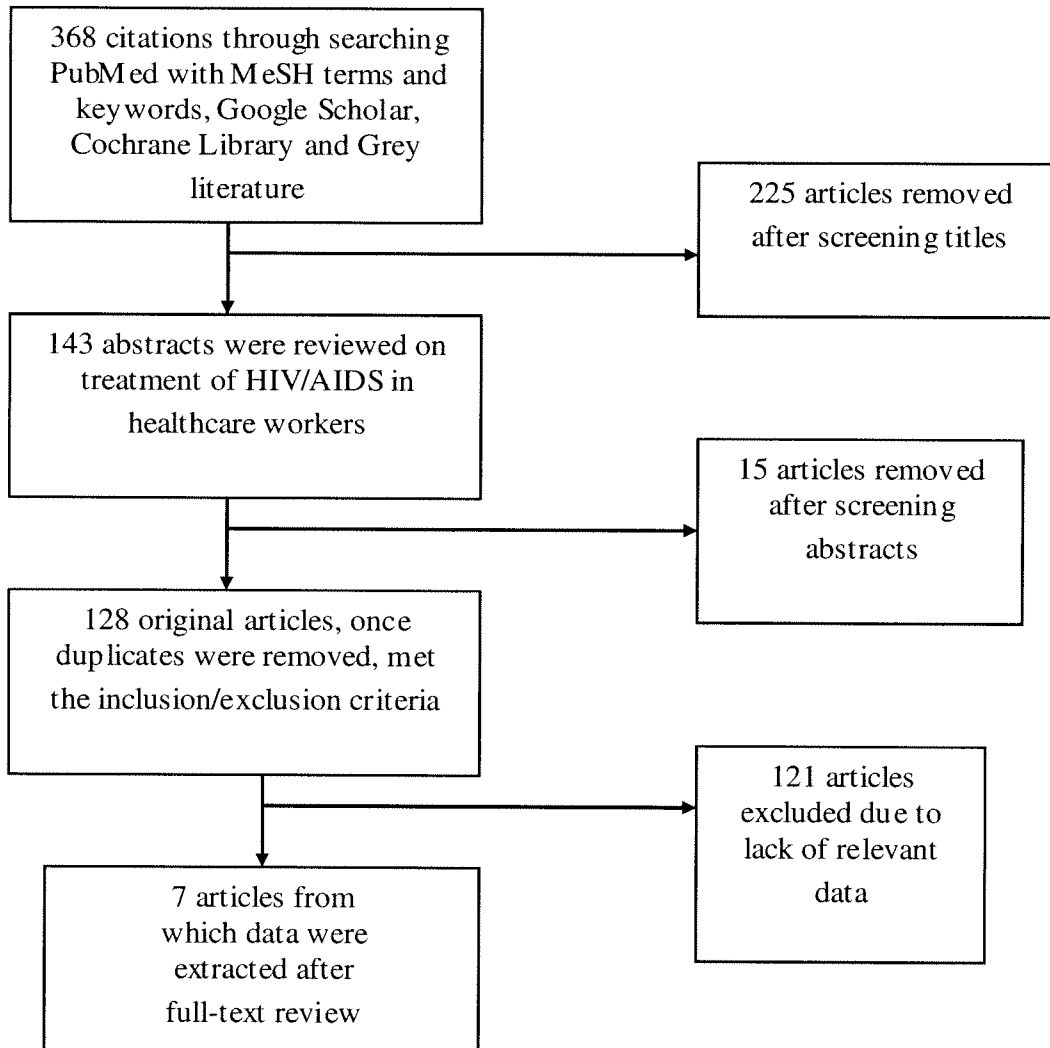
Google Scholar:

**A search was conducted in Google Advanced Scholar using all of the keywords:
WITH ALL OF THE WORDS: hiv workplace program treatment occupational counselling
testing**

**WITHOUT THE WORDS: Sex, gender, injection, condom, prenatal, child, mother,
needlestick**

The above protocol, as shown in Figure 3, resulted in 128 articles. These are all listed in the Appendix.

Figure 3– Search Strategy Results for Question #3



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DATA COLLECTION AND ANALYSIS

One reviewer screened titles and abstracts of the electronic search results from applying the above protocol. Duplicates were eliminated. Two reviewers independently assessed the retrieved articles for inclusion/exclusion based on the *a priori* criteria set out for eligibility of studies. Disagreement was resolved through discussion with at least one other reviewer involved. Reasons for exclusion of studies were documented (see Appendix).

Two reviewers, including the senior reviewer, independently assessed the methodological quality of eligible studies using the standard criteria^{9 13}. Specifically, for each study evaluated, we created evidence tables in which we summarized study design and any limitations, in terms of their conduct and analysis, along with strengths and weaknesses, results and the description of the intervention and setting. Two reviewers independently extracted the following information from the eligible studies: type of setting, occupational background of participants, information around the nature of the interventions, the intervention agent, description of the comparison group (if applicable), and all outcomes measured. The results were summarized in Table 2 for question #1 and Table 4 for question #3, outlining the design, setting, intervention, and outcomes, as well as the strengths and limitations of the study. There is no table presented for question #2 as no articles met the *a priori* selection criteria.

Grading of the Evidence^{xiv}

As discussed at length in the WHO Handbook, the GRADE approach has 2 main steps: First, evaluation of the quality of evidence, and, secondly, preparation of a summary of findings. Quality is defined as the “extent to which one can be confident that an estimate of effect or association is correct”. It is a continuum; any discrete categorization involves some degree of arbitrariness. It is based on the following standard criteria:

- study design and any limitations of the studies, in terms of their conduct and analysis,
- the consistency of the results across the available studies,
- the precision of the results (wide or narrow confidence intervals)
- the directness (or applicability or external validity) of the evidence with respect to the populations, interventions and settings where the proposed intervention may be used, and the
- the likelihood of publication bias

Additionally for observational studies, the magnitude of the effect, presence or absence of a dose response gradient direction of plausible biases, etc. are also considered. Quality of evidence is categorized as high, moderate, low or very low and the definitions are explicit in the Handbook.

GRADE tables, according to the Handbook, should be constructed by ‘rows’ for each outcome, with at least one table per question and to beneficial outcomes separated from harms/side effects. It is noted that not all studies in the reviews may report the outcome of

^{xiv} This section was included in the Draft Systematic Review first presented in July, as the Guideline Group asked our team to undertake this task, this is included in this report as well. The Guideline Group discussed and approved these grades.

interest and that for each outcome, data should be presented from the subset of studies in the review that reported it.

The headings of the columns of the GRADE table are laid out in detail, with the first column consisting of 1) Study design, broadly classified as 2 types: a. RCT – randomized controlled studies or randomized cluster trials and b. observational studies, including interrupted time-series (or quasi-experimental design), cohort studies and case-control studies and other types of design such as case-series and case reports. The design is of course the baseline for rating quality of evidence. Evidence based on RCTs begins as high quality evidence and evidence from observational studies begins as low quality evidence, as noted in the table. 2) The second column is supposed to consist of Limitations, i.e. how well the study is performed and analysed. For randomized controlled trials (RCTs), for example, the main criteria for assessing trial limitations are whether concealment of allocation to treatment group is adequate, whether participants and investigators were blinded, especially if the outcomes are measured subjectively and subject to bias, whether an intention-to-treat analysis is reported, whether all withdrawals and patients lost to follow-up are accounted for whether the trial was stopped early for benefit, etc. There are many checklists for assessing quality of RCTs, and an abundance of references that discuss this topic. For observational studies, the main criteria depend on the design: case control or cohort studies. For both, the methods used to select the population in the study and the comparability of the two groups are important. For case control studies the method of determining exposure to the factor of interest also needs to be evaluated. For cohort studies the method of measuring outcomes needs to be evaluated. The assessment is supposed to decide whether the studies have “no limitations” or serious limitations or very serious limitations, with each of these categories well-defined in the Handbook. 3.) The third column is for assessing consistency, or the similarity of estimates of effect across studies. Variability or inconsistency in results can arise from differences in the populations in the studies, differences in the interventions, or outcomes. Differences in the direction, size or significance of effect guide the decision about whether important inconsistency exists. If all the results of the studies for one outcome are in the same direction, there is unlikely to be important inconsistency. 4) Assessing directness or generalizability or external validity of study results or applicability are all synonymous is next. 5) Imprecision is next. Results are imprecise when studies include relatively few patients and few events and thus have wide confidence intervals around the estimate of the effect. In this case the quality of the evidence is lower than it otherwise would be due to resulting uncertainty in the results.

There is also detailed information regarding how to downgrade the quality of evidence, etc. as shown in the Table below. As could be seen, the second half of a GRADE table is the summary of findings, including “total number of patients in each group”, “total number with event”, “an estimate of the control group risk (control event rate)”, “effect size (relative risks or odds ratios, absolute differences and 95% CIs)”, etc.

In the case of the Guidelines being currently proposed, the recommendations relate essentially in their entirety to implementation, synthesizing information well-established in a variety of previously developed guidelines to be compiled in a way so as to assist the countries actually be able to implement clinical guidelines. The PICO questions chosen for the Systematic Review, as noted above, were formulated so as to ascertain if indeed there had been any rigorous implementation evaluation studies related to the challenge at hand.

In addition to the summary tables of results, adapting as best we could from Systematic Review

methodology designed for clinical interventions or simple public health interventions, we also add a table summarizing the features of each study that more explicitly address the elements of complex health interventions of this nature⁸. That is presented as Table 3 for question #1 and Table 5 for question #3. (As noted there was no evidence obtained from this Systematic Review component for question #2).

RESULTS

Results for PICO Question 1- Should priority access for HIV and/or TB diagnostic and/or treatment services be provided for all health care workers? (compared to no priority access)

As shown in the Appendix, this systematic approach identified a total of only 4 studies that examined the outcome of interventions to provide health care workers with priority access to HIV and/or TB diagnosis and/or treatment that met the criteria for inclusion for assessment of quality of evidence.

It is noteworthy that there were no randomized controlled trials that shed light on the question of whether health care workers should be afforded with priority access to HIV and/or TB diagnosis and/or treatment; two of the four were studies published were conducted by Uebel and colleagues in South Africa and Botswana^{24 25} reporting on different outcome measures from the same intervention, and one study was conducted by Kiragu and colleagues in Zambia²⁶. We also profiled a study conducted in the US regarding the role pharmacists could play¹⁴, although the quality of the study was much lower and of less relevance. Nonetheless, the African studies of workplace interventions to provide priority access for diagnosis and treatment of HIV and TB for healthcare workers conducted in South Africa, Botswana, and Zambia, are quite relevant to development of Guidelines in this area. All three showed positive results.

Table 2 - Results for Question #1

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS ^{xv}	WEAKNESSES
Kiragu K, Nyumbu M, Ngulube T, Njobvu P, Mwaba C, Kalimbwe A, Bradford S. Caring for the Caregivers: An HIV/AIDS Workplace Intervention for Hospital Staff in Zambia. Evaluation Results. July 2008. Horizons Program, PATH.	All healthcare workers and their families at two hospitals in Zambia compared to three comparison hospitals (N = 3000), powered to detect a 10% difference between baseline and follow-up of the outcome of interest. Jan 2004-Feb2006	Quasi-experimental design, using both qualitative and quantitative methods	HIV risk-reduction workplace program for hospital staff prevention, treatment and care interventions	-improved knowledge and attitudes about HIV among hospital staff -increased adoption of HIV-preventative behaviours such as condom use -increased uptake of HIV testing -increased coping, care and support for staff -resource intensive	Study uses a pre-versus-post design with concurrent comparison groups. - which makes this one of the stronger studies that exist in this field.	Pre-versus-post results were not longitudinal, but comparing of a cross-sectional baseline survey with a follow-up cross-sectional survey of the same cohort; outcome were all self-reported (questionnaire, interviews or focus groups, with no objectively obtained outcome measures)

^{xv} A quality assessment was conducted of all the studies. As indicated by the WHO Handbook for Guideline Development, the final decision as to whether the evidence was "very strong", "strong", etc. was conducted by the Guideline Group.

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS	WEAKNESSES
Tavitiam SM, Spalek VH, Bailey RP. A pharmacist-managed clinic for treatment of latent tuberculosis infection in health care workers. Am J Health Syst Pharm. 2003 Sep 15;60(18):1856-61.	All 8000 employees were eligible at Cedars-Sinai Medical Centre, United States of America	Program Evaluation based on number of employees who completed LTBI therapy vs. Number of employees monitored -Cumulative data was collected retrospectively for the clinic from June 1993-June 1997 -Annual data were collected from July 1997-Dec 2001	Creation and implementation of a pharmacist-managed clinic with enhanced follow-up measures such as phone contact for hospital employees with LTBI	-improved treatment outcomes -improved adherence to LTBI treatment (94% of all HCWs whose LTBI treatment was monitored by the clinic completed their therapy) -no active TB cases reported to date since inception of clinic -decreased adverse drug effects (6% of HCWs seen at clinic vs. 23% reported in literature)	This is actually quite a weak study, with poor documentation of those who took up the intervention, and many other key design features -- see next column.	The comparison is over time (trends) with no comparison group, weakening the conclusions.
Uebel K, Friedland G, Pawinski R, et al. HAART for hospital health care workers- an innovative programme. S Afr Med J. 2004;96:128-33.	HIV positive healthcare workers in KwaZulu-Natal, South Africa	Pre versus- post intervention study, (with no external comparison group, and comparing cross-sectional data at baseline to these data post-intervention.)	-workplace based program at one site (staff of 500) that provides priority access to ART and follow-up for healthcare workers	Increased uptake of VCT among staff (3-fold increase from 3 years pre-intervention) -increased uptake of appropriate treatment (10 staff were on ARVs, 4 of whom also on TB therapy) -decreased mortality -better management -decreased "hopelessness" -decreased stigma; but: - increased reported fear of discrimination -side effects with first step drugs; &	Sample size of 500	The design of this study is not particularly sophisticated, so while its findings are valid, it is of limited value with respect to generalizability

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS	WEAKNESSES
Uebel KE, Nash J, Avalos A. Caring for the Caregivers: Models of HIV/AIDS Care and Treatment Provision for Health Care Workers in Southern Africa. <i>The Journal of Infectious Diseases</i> . 2007; 196 :S500–S504	South Africa and Botswana All healthcare workers at: McCord Hospital-clinic established in 2001 Mseleni Hospital-clinic established in 2005 Tshedisa Hospital-clinic established in 2006	Descriptive study of intervention program,	Workplace based program that provides VCT and ART to staff and families	-labour intensive program -increasing numbers of health workers accessing VCT every year (from 6-11 pre-intervention to 118 post-intervention at McCord Hospital) -high numbers of health workers accessing ART (35 of 450 total workers at Mseleni Hospital) -great improvement in health worker morale observed by program staff, attributing this to health workers showing clinical improvements not dying -more health workers disclosed their status throughout the program suggesting decreased stigma or fear of discrimination - program staff also reported that there was decreased stigma, but was -internal stigma reported by staff -fear of disclosure reported by staff	The program was conducted at three different hospital sites in two countries	The study design was weak as there were no comparison hospitals to assess true impact of intervention, and details of ascertaining outcome were not well described.

Table 3 - GRADE profile for Question #1

No. Studies	Design	Limitations	Inconsistency	Indirectness	Imprecision	Quality
4	Quasi experimental (program evaluations)	Considerable	No serious inconsistencies in results	No indirectness	Considerable imprecision	LOW

Results for PICO Question 2- Should programs reducing stigma and/or discrimination be provided for all health care workers? (compared to no programs)

As also shown in the Appendix, applying the above protocol identified a total of **61 articles** of which 0 were deemed eligible on applying the inclusion and exclusion criteria. In other words, none of the studies identified met the criteria for inclusion, although, as discussed below, many provided useful information as to the need for interventions in the area, many of which are cited in the Synthesis Report¹⁵ for the Core Guideline Group.

Results for PICO Question 3- Should programs for workplace-based and/or workplace-organized diagnosis, treatment, care and support for HIV and/or TB be provided for all health care workers? (compared to no programs)

Similarly, as shown in the Appendix, this systematic approach using the above protocol identified a total of 128 articles of which only **7 studies** met the inclusion and exclusion criteria, ie. examined the outcome of interventions to provide programs for workplace-based and/or workplace-organized diagnosis, treatment, care and support for HIV and/or TB be provided for all health care workers.

The results consisted of findings from four studies of different outcome measures related to an HIV treatment program in South Africa for the 140,000 employees of a multinational company^{16 17 18 19}. Results showed considerable success, including good viral responses, albeit there was no external comparison group. A similar large study of a program for the employees of the Heineken Breweries in Rwanda presented by Feeley and colleagues²⁰ is also included, again showing impressive results, but again, having no external control group. The study by Morris and Cheevers²¹, although of a program for a small cohort of sugar mill workers, was particularly noteworthy in that the package of care was developed for the occupational setting specifically coordinated and supervised by a multi-stakeholder committee comprised of union, management, and medical staff; it too showed impressive results. The study using the most sophisticated design, the cluster-randomized trial by Corbett et al.²² of two strategies of VCT offered to 24 small and medium-sized businesses in Zimbabwe (12 businesses in each arm) showed unequivocally that the occupational health clinic on site was the preferred choice for VCT.

Only one systematic review article was identified that seemed to relate to this subject matter. It too, identified only a very small number of studies, and noted that 11 of the 12 studies reviewed lacked rigour, had no control or comparison group, used a self-selected convenience sample, used instruments of questionable reliability or validity, and lacked attention to appropriate data analysis. On assessment, none of the 12 studies met the criteria for this systematic review, and are therefore not described further. Some of the studies reviewed here, most notably the study

conducted by Corbett and colleagues²², showed considerable advancement in methodology. Nonetheless, the need for more rigorous study in this area is unquestionable

Table 4 - Results for Question #3

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS	WEAKNESSES
Charalambous S, Grant AD, Day JH, et al. Establishing a workplace antiretroviral therapy programme in South Africa. <i>AIDS Care</i> . 2007 Jan; 19(1):34-41.	70 ARV sites of a multinational company with 140,000 employees in South Africa	Longitudinal study of HIV workplace programs; monthly reports generated.	Workplace HIV program delivered via workplace health services, and managed by a health systems and research unit (see below); patients are enrolled when HIV+; ART, INH, cotrimoxazole are provided as per WHO guidelines.	Good retention in the program and good viral response. (see below) The authors reported that early face-to-face practical training of health practitioners running the programme was important, with intensive support for the first few weeks, and on-going training. They found that in companies where HIV facilities already existed, implementation was easier and uptake faster. They also found that workers feared loss of earnings from taking <i>time off work to be treated and note that systematic follow-up was needed, as was employing a fulltime counsellor, as stigma and discrimination remained a major obstacle</i>	This was a large study with a well-described HIV care programme, which offered useful observations. (also see below)	The uptake rate was not provided, only the numbers, and it is not clear what methods were used to derive the conclusions, so this may be subject to bias in favour of promoting the program
Charalambous S, Innes C, Muirhead D, Kumaranayake L, Fielding K, Pamba L, et al. Evaluation of a workplace HIV treatment programme in South Africa. <i>AIDS</i> 2007;21 Suppl 3:S73-8.	Across South Africa (see #1 above)	Program evaluation of viral load, CD4 count and cost trends over time (6, 12 and 24 months)	Standardized, centrally managed, nurse-based ART programme providing free treatment to all employees of the company.	CD4 counts increased, viral load decreased and cost per patient (worker) decreased over time. <i>Authors reported that Retention and treatment adherence were key concerns in the programme, which are being addressed by continued emphasis on the counselling of patients, and ensuring adequate staffing levels, with sufficient training and support. High programme loss rate (death, loss of employment and defaulting treatment) were all reasons for loss.</i>	Large study using comprehensive database to monitor clinical and cost outcome over time.	The comparison is over time (trends) with no comparison group, weakening the conclusions. Also, there are several possible biases in the study, and details of methodology are not provided to evaluate the extent of these potential concerns.
Corbett EL, Daya E, Matambo R, et al. Uptake of	Zimbabwe (small and medium-sized businesses)	Cluster-randomized trial, of two VCT strategies	Workplace HIV counselling, testing and treatment	Uptake of VCT with on-site rapid testing was significantly and substantially higher than voucher uptake (51% compared to 19.2%), with the true adjusted risk ratio	An excellent and important study, Well-designed and appropriately	Conclusions can only be extrapolated to programmes that provide

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS	WEAKNESSES
workplace HIV counselling and testing: a cluster-randomised trial in Zimbabwe. <i>PLoS Med.</i> 2006 Jul;3(7):e238.		(12 businesses in each arm, with 3950 employees randomized)	program- offered either within the occupational health clinic of the business or off-site.	for on-site compared to off-site VCT being as high as 12.5%(95% CI 8.2-16.8).	analysed.	comprehensive care – i.e. counselling and follow-up.
Dahab M, Charalambous S, Hamilton R, Fielding K, Kielmann K, Churchyard GJ, et al. "That is why I stopped the ART": patients' & providers' perspectives on barriers to and enablers of HIV treatment adherence in a South African workplace programme. <i>BMC Public Hlth</i> 2008;8: 63.	Across South Africa (see #1 above)	Key informant interviews with providers and participants in a workplace ART program	See above.	Found long waiting times to be a key factor – time as well as the stigmatization of waiting (having to take time off work) Role of traditional medicine was explored and found to be a factor – there is a need to find effective ways to support adherence to ART even if the individual does not accept biomedical concepts of HIV disease or decides to use traditional medicine	Excellent feedback was obtained from long (1-1.5 hr) interviews. Good reporting of barriers and facilitators from those involved in the program as well as those responsible for the program on the ground.	Small study – only 12 interviews were held, but supplements other reports from same program.
Feeley FG, Collier AC, Van der Borch SF, et al. A successful workplace program for VCT and treatment of HIV/AIDS at Heineken,	Heineken Breweries, Rwanda	Qualitative and quantitative evaluation, including HIV sero-survey baseline to calculate expected rate; and monitoring	Company contracted PharAccess to jointly launch VCT and access to HAART. Employees may choose to be tested off-	High uptake of VCT: 87% of expected number of HIV positive workers. Qualitative findings indicated need to: 1. Offer HAART as part of a comprehensive employer AIDS program; 2. Encourage couple testing (with targeted outreach to spouses); 3. Ensure strong support from local management (empower champion);	Both quantitative outcome (well defended, with limitations discussed) and qualitative findings are strength of this study	Article lacked some methodological details. Also, there was no comparison group.

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS	WEAKNESSES
Rwanda. <i>Int J Occup Environ Health</i> . 2007 Jan-Mar;13(1):99-106.		of VCT uptake, HIV status, CD4 count over time.	site but must report result to the occupational clinic to be included in treatment program.	4. Use PLWHA in worker education programmes from the beginning; 5. Attempt to decouple milestones from staff layoffs (to avoid misperceptions of a link); & 6. Assure confidentiality and perception of confidentiality; consider using off-site provider.	Inclusion of spouses both in the programme itself and study.	
Morris C, Cheevers E. A package of care for HIV in the occupational setting in Africa: Results of a pilot intervention. <i>AIDS Patient Care and STDs</i> . 2001;15(12):633-640.	All 386 employees of a sugar mill in South Africa	Qualitative & quantitative evaluation, incl HIV sero-survey & KAB survey pre and post; monitoring of VCT and treatment uptake, & (calculating infections averted).	Package coordinated by multi-stakeholder committee: incl prevention (condoms), education (mass plus volunteer peer counsellors), VCT, and therapeutics (including IPT/co-T for HIV+), LTBI testing, and tx.	Of 27.2% of employees (in anonymous sero-survey), 82.8% accepted VCT, of whom 35.4% received co-T, and 10.4% INH. Condom distribution increased 400% and STD rate declined by 88%.	Intervention was innovation, using multi-stakeholders in an occupational setting; est. infection transmission reduction; included KABP info.	Lack of a control group, and lack of hard biological outcome associated with the intervention.
Stenson AL, Charalambous S, Dwadwa T, et al. Evaluation of antiretroviral therapy (ART)-related counselling in a workplace-based ART implementation	Across South Africa - (see #1 above).	Descriptive study of questionnaire results	Implementation of a ART workplace based program described in #1)	Good results on knowledge were reported, with very high support (93%) stating that on-going counselling was important. Findings included the importance of addressing infected partners and stigma.	Adds support to other studies on this topic.	The design of this study is not particularly sophisticated, so while its findings are valid, it is of limited value with respect to generalizability.

SOURCE	SETTING	DESIGN	INTERVENTION	FINDINGS	STRENGTHS	WEAKNESSES
programme, South Africa. <i>AIDS Care</i> . 2005 Nov;17(8):949- 57.						

Table 5 – GRADE profile for Question #3

No. Studies	Design	Limitations	Inconsistency	Indirectness	Imprecision	Quality
7	Observational (1), Quasi-experimental (1), Program evaluation (2), Cluster randomized trial (1), Trend analysis (2)	Serious limitations in all studies	No serious inconsistency	Some indirectness	Considerable Imprecision	LOW

Results synthesized:

The reader is referred to the Guideline submission documents, and Table 13 of that document in particular, for greater detail about the studies, and specifically the nature of the interventions . The results from this Cochrane-style systematic review were synthesized with the other types of evidence obtained (the preliminary review, the 17-country survey, the 5 African country in-depth study, and extensive consultations.

DISCUSSION

The general challenges encountered in attempting to conduct systematic reviews of complex health promotion and public health intervention that have been well documented^{8 23}.

As noted above, while there are few studies relevant to the questions at hand, and all have methodological limitations, the consistency of the results supporting workplace provision of HIV and TB diagnostic and treatment services for healthcare workers is noteworthy.

A particularly important recent article, as noted in the tables, is that by Uebel, Nash, and Avalos (2007)²⁴ which describes staff care programs at McCord Hospital in Durban, South Africa; Mseleni Hospital in northern KwaZulu-Natal, South Africa; and the Tshedisa Institute in Gaborone, Botswana. This is an important article because it described an intervention that provided convenient, confidential, and holistic care for HIV-infected health workers and health workers caring for HIV-infected patients. Study of all three programs noted that there was increasing acceptance of counselling, testing, and treatment among health care workers. The authors' conclusions, based on comparing the number of staff accessing ART and uptake of HIV testing before the implementation of the program and the number of staff accessing ART and uptake of HIV testing after the intervention, highlights the desirability of HIV/AIDS care and treatment programs for health workers that remove barriers to access, provide confidentiality in testing, are conveniently located, and are integrated with tuberculosis programs and other treatment services.

The study by Uebel and colleagues²⁴ described above builds on an earlier study by Uebel, Friedman and Pawinski (2004)²⁵ which provided a more detailed description of the results of implementing a staff HIV program at McCord Hospital. The authors presented data in this earlier publication which showed the numbers of staff: accessing VCT, know their CD4 count, receiving ART, and receiving TB prophylaxis in 1999, 2000, 2001 and 2002 (post-intervention). Congruent with the results published in 2008, they showed dramatic increases in all four indicators after the implementation of the staff HIV program.

As also noted in the findings of this Systematic Review, Kiragu and colleagues²⁶ evaluated an intervention focusing on the development and testing of an HIV risk reduction workplace program for hospital staff. This intervention included a peer education program implemented in two Zambian hospitals in Ndola and Livingstone, with a total of 1,700 employees. Three other hospitals served as comparison sites. The intervention was implemented by 79 local staff. This quasi-experimental study collected data from hospital workers using a cross-sectional baseline survey. The intervention began about eight months later, and a follow-up survey was conducted in February 2006. The baseline sample comprised 1,424 hospital workers, and the follow-up sample size was 1,336. The authors found that participation in the intervention was associated with a nearly six-fold increase in PEP awareness and nearly triple the proportion of respondents reporting high HIV knowledge which could be translated into great long-term benefits. This study found that financial challenges limited the intensity with which the program could be implemented and that more concerted efforts could yield higher results. Sustained and supportive supervision of program staff was also deemed essential to success. Overall, the authors concluded that a workplace program for hospital staff is feasible, and can have many beneficial outcomes.

The fact that we found no eligible studies for PICO question #2 is noteworthy. While there is extensive evidence that there is indeed a problem related to stigma and discrimination, there have been no properly conducted studies evaluating the effectiveness of workplace-based programs in

this regard. (The evidence outlining the need for such programs has been summarized in the Synthesis Report for Guideline development¹⁵, but as none of these studies were intervention studies, none met the criteria for the Systematic Review.)

It is noteworthy that four of the studies from private sector HIV programs were conducted by the same group, namely Charalmbous, Fielding, Stenson, Brick, Grant, Day et al.^{16 17 18 19} from the workplace ART-program in South Africa led by the Aurum Institute of Health Research, in conjunction with university colleagues from South Africa, the UK and the US, and with the support of the Anglo American group. While this may present a potential bias, the reports present strong objective information (e.g. decreased viral loads, increased VCT uptake, etc.) that is compelling, as well as identifying important factors that hinder the success of the program. Combined with the study of Feeley and colleagues in Rwanda²⁰, Morris and colleagues²¹ in South Africa and the excellent study by Corbett and colleagues²² in Zimbabwe, considerable evidence exists to support the implementation of comprehensive workplace-based programs for HIV and TB. Perhaps more importantly, there were no studies that found any significant negative impacts of such programs.

The difficulties in evaluating complex interventions have been recognized, and are now the subject of increasing attention⁷. Complexities derive from the number and difficulty of behaviours required by those delivering or receiving the intervention, the number of groups or organisational levels targeted by the intervention, the number and variability of outcomes and the degree of flexibility or tailoring of the intervention necessary in the real world setting.

Additionally, the unique often politically-charged stakeholder relations in workplace settings pose additional challenges. Nonetheless, the skills, expertise and unique stakeholder relations in healthcare workplaces also makes the healthcare workplace an excellent venue in which to make significant progress in stem the tide of HIV and TB.

AUTHORS' CONCLUSIONS

Implications for Practice

Overall conclusions from this systematic review provide support for a recommendation that health workers should receive priority access to diagnosis and treatment for HIV and TB through integrating these services with other comprehensive occupational health services. Additionally, the review provided some evidence to indicate that treatment programs for healthcare workers should ensure meaningful involvement or program oversight governance by a multi-stakeholder workplace committee, remove barriers to access, provide confidentiality in testing, attend to issues to minimize stigma, be conveniently located, and be integrated with tuberculosis programs and other treatment services, as well as be sufficiently resourced and supported to ensure success. While the quality of evidence is low, it must be stressed that the evidence from this Systematic Review of three questions posed by the Guideline Group constituted only one element of the extensive data synthesizing process utilized by the Guideline Group, as explained in other documents alluded to earlier. The utilization of different approaches to gathering evidence, in combination with assessment of rights, values, feasibilities, cost, etc. is explained in full in other documents.

Implications for Research

While the studies that have been conducted of the workplace interventions programs for healthcare workers in South Africa, Botswana and Zambia are compelling, they all have substantial methodological weaknesses (either lack of comparison populations, or cross-sectional rather than longitudinal analysis, or lack of randomization, and all report on a limited number of objective outcome). As such, a well-conducted longitudinal study (quasi experimental, or preferably a cluster-randomized trial) of a comprehensive program with the essential elements identified above would be highly desirable to fine-tune guideline implementation. Such a study should use both qualitative and quantitative outcome measures but strengthening the design of Kiragu and colleagues²⁶, data should be gathered in a reliable manner carefully preserving confidentiality but allowing for longitudinal analysis. Both subjective and objective outcome measures should be rigorously collected, including not only quantitative outcome such as the proportion of health workers who i) know their HIV and/or TB status (e.g. have accepted VCT and/or LTBI); and ii) have accepted appropriate treatment (e.g. if HIV infected but low viral count and high CD4, should have IPT if appropriate; if appropriate should start ART, etc.) but also iii) report on outcome such as improved self-efficacy, empowerment, and improvements in knowledge, attitudes and practices, the latter perhaps both obtained using mixed methods. The cluster-randomized study conducted in small and medium sized companies in Zimbabwe²² provided a useful model.

A cluster-randomized design of a comprehensive workplace intervention for prevention, diagnosis, treatment, care and support for healthcare workers would help identify the impact of implementing the proposed guidelines. However, it is the opinion of the authors that approving the guidelines should not wait for such a study to be funded or completed. Ideally, the research needed should be designed so that long-term follow-up can occur to allow assessment of impact on morbidity, mortality, transmission of diseases, and the other outcome of interest identified by the Guideline group.

As a final note, complex interventions are well-known to produce “irregular outcome”, and as noted by Shepperd et al., “complex health interventions are more than just a complicated “jumble” of components that interact in a regular predictable but linear fashion (i.e.

deterministically) to produce health outcome. Interactions between the components are not as deterministic as might be expected because they are invariably highly dependent on human behaviour.” Evaluation methods for these interventions, and systematic reviews of intervention studies of complex interventions, must be flexible enough to take this into account.

CONTRIBUTIONS OF AUTHORS

AY, LO, and KL developed the review protocol. LO and KL undertook the electronic searches. AY, LO, KL, JL selected studies for inclusion in the review. AY drafted the paper. AY, LO, JL, JS, ML commented on the paper. Formatting and editing was conducted by AY, LO, JS, KL and JS.

DECLARATION OF INTEREST

The review team has been working on grants funded by the Canadian government (Canadian Institutes for Health Research) related to this subject matter.

SOURCES OF SUPPORT

This review was funded by the World Health Organization.

ACKNOWLEDGEMENTS

The authors thank UBC staff members Michael Lathuilliere, Sozan Savehilaghi, and Rupinder Brar for their contributions to this document. The authors also express their gratitude to Eileen Petit-Mshana, Susan Wilburn and Sulava Gautaum of the WHO, as well as other members of the Core Guideline Group, and the Guideline Review Committee for their guidance.

GLOSSARY OF ACRONYMS

AIDS- Acquired immunodeficiency syndrome

ART- Antiretroviral therapy

CD4- Cluster of differentiation 4

HCW- Healthcare worker

HIV- Human immunodeficiency virus

ILO- International Labour Organization

IPT- Isoniazid preventative therapy

LTBI- Latent tuberculosis infection

TB- Tuberculosis

VCT- Voluntary counselling and testing

WHO- World Health Organization

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ISBN 978 92 4 150051 7



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