Essential interventions on Workers' Health by Primary Health Care

A scoping review of the literature: a technical report

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TNO innovation for life

TNO report for WHO

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Summary

The TNO review Essential interventions on Workers' Health by Primary Health Care *shows those interventions in primary, secondary and tertiary prevention are necessary and feasible* but not yet satisfactorily evidence-based.

Necessary, because primary or community health care covers about 80% of the world population, and can reach many of the 80 to 90% of the workers worldwide without any occupational health care at all, who nevertheless are the backbone of national economies. WHO is exploring such a strategy that can only succeed when PHC is well trained, equipped, supported and motivated to do this job – which mostly is not yet reality.

Feasible, because our study, assigned by WHO, reports about a variety of primary health care activities for workers' health in different regions in the world, varying form small-scale initiatives improving daily practice during office hours to large-scale programs involving thousands of professionals and millions of workers. Structured large-scale programs involving primary and community health care started only recently in e.g. Thailand, China, the UK and Indonesia, demonstrating the pioneering phase we are in. In other countries, many small-scale activities and interventions are noted, aiming to improve activities within existing primary health care practices aimed to improve workers' health. We found reports underlining the need to develop good policies leading to programmatic conditions needed to implement structural essential interventions successfully. Investments are needed in four connected areas: policies, infrastructure, tools and education. In several initiatives we recognized the vital support role by experts of various disciplines in occupational health and safety.

Not yet satisfactorily evidence-based because the level of evidence supporting especially the quality of concrete interventions - including the effect on working conditions and on the quality of enterprise policy, and on health, safety and work ability of the workers, is mostly not high. The level of evidence is many times low and sometimes even very low. Accordingly we strongly recommend developing and funding large research and development programs to support projects and programs with existing knowledge and experiences, and to deliver more scientifically sound evaluation studies to support adequate evidence-based policies

Unexplored territory
Because this is quite unexplored territory, we had to start with our own conceptual analysis of the domains, relations and interactions between primary or community and occupational health care, before we could describe essential interventions on three levels of prevention. Then we had to choose for the relatively new *scoping review method* as an adequate method different from the systematic review approach, related to a well explored territory. This method resulted in about 800 literature hits. We first selected 200 publications, later on reduced to few dozens described in Chapter 4 as our scientific building blocks.

Our main conclusions regarding the three intervention levels are:

Primary prevention activities – including workplace visits - can be part of PHC interventions on workers' health in situations where the community has a dominant industry or where agriculture is dominant and when expert support is available. Serious limitations in PHC interventions can be found in more complex activities where experts are needed such as for most risk assessments and advises regarding more complicated improvements of working

conditions. Education and training in prevention and health promotion can be executed by primary health care professionals.

Secondary prevention in PHC may include periodic general health examinations to detect work-related health problems and occupational diseases. Screening tests as part of a workers' health surveillance program such as for pesticide poisoning or exposure, can be performed by PHC under the condition of guidance by experts. Tools and education are available for primary health care to detect occupational diseases in daily practice. We did not find well-designed studies showing that better tools and education result in a better detection, individual therapy or support, screening or notification of occupational diseases.

Tertiary prevention may include first aid services and emergency treatment by primary health care and consultations of working patients regarding their health and work ability. In several countries the attitude and communication skills of GPs regarding work have to improve. New tools can lead to more GP knowledge on the risks for long-term sickness absence and to better advices toward patients with a chronic disease and problems at work. Employment advisors and GPs with extra training in occupational medicine obtained good results while working within primary health care.

We recommend:

1. Discussing the conclusions and recommendations of this report with experts from primary, community and occupational health care (Wonca, ICOH), and with representatives of current initiatives, focusing first on the potential contribution of primary care for workers' health, and on the programmatic, infrastructural, financial and occupational health and safety expert support needed to fulfill this contribution. Second, discussing the need for better evaluations of small and large-scale initiatives, and for strengthening and upscaling international programs to support existing and new initiatives in development, education, information, implementation and scientific evaluation.

2. Improving practical primary health care activities on workers' health like developing education programs encouraging to question patients on their working conditions and to apply a good occupational history. Physicians, nurses, community health workers and others should also be provided with appropriate tools for the identification and control of occupational and work-related diseases, accidents and work disability. Collaboration of primary health care professionals with occupational physicians and other occupational safety and health professionals should be encouraged.

3. Studying the scientific literature thoroughly, but also existing evidence-based guidelines, tools and good practices related to workers' health can be a source for developing new or better tools and interventions suitable for primary care. Education and training of personnel can be supported by international facilities, exchange of experiences and learning materials.

4. Stimulating inter-sector collaboration and coordination, involving health, labour, social security, environment, agriculture, industry and education. The common aim is to deliver occupational health care to all workers, also by other ways than by expert-based occupational health services and by primary or community health care. Employers, trade unions, the private sector, civil society organizations and social security institutions have a particular role to play – together with the governments - in shaping public policies and concrete programs for workers' health.

Finally: of course primary health care cannot replace high quality comprehensive and multidisciplinary occupational health services already available for a part of the working population in both high and low-income countries and in multinational companies. There is still an urgent need to extend such services because of their high-level of expertise. But if we succeed in letting primary health care all over the world pay appropriate attention to workers' health – well educated and equipped, supported by more specialized occupational professionals and by an adequate infrastructure - then that will mean a major step forward in the direction of where the WHO World Health Assembly asked for in 2007: full coverage of occupational health care of the global work force, especially the more vulnerable workers: workers in small and medium-sized enterprises, in high-risk industries, in agriculture and in informal economy, self-employed, migrants, people with a handicap or a chronic medical condition. Those groups are mostly far out of reach of the expert-based regular occupational health care, and primary and community health care are in a better position to connect to them. That would mean a real revival of the WHO 1978 Alma Ata Declaration, speaking about bringing primary health care as close as possible to where people live and work.

How to read this technical review report

This review has provided us with more relevant scientific articles, reports and lectures than was expected. We interpret this finding as a positive sign showing the growing awareness about the urgency to improve health care for workers. As we found many publications, we decided to present in this report not one publication for each intervention as the most suitable, as we were asked to do[a], but in addition a shortlist of a number of most suitable publications more in accordance with the variety of initiatives and results, ending with 'our pick' of the best one or two. Finally we decided to add publications on policy and programmatic conditions necessary for a successful implementation, encouraged by the equivalent strategy applied in the WHO OneHealth Costing tool.

Short introduction of the Chapters

In the Introduction (Chapter 1) we will first describe the WHO request for a technical report about descriptions of essential interventions for workers' health at the primary care level, and the search for the evidence about their delivery. The background of this request, finding its roots in the famous Alma Ata Declaration (1978), is to find in the Global Plan of Action for Workers' health, adopted by the World Health Assembly in 2007, that got a new momentum in the WHO 'Hague Conference *Connecting Health and Labour* in 2011, and during a Follow Up in 2012 at the WHO in Geneva, resulting in outlining the assignment for our search.

In Chapter 2 we describe the three essential interventions at stake, after an analysis of how work and health can fit into primary health care, while in Chapter 3 the Methods are presented how to fulfil the WHO assignment: aims of the search, considerations about relevant information, the questions to be answered, the search strategies to be chosen and search terms, selection criteria, limitations and considerations.

The results of the searches are presented in Chapter 4 regarding primary, secondary and tertiary prevention, as well as regarding the policy and programmatic conditions needed to implement the essential interventions successfully. We distinguished those conditions in four interconnected areas: policies, infrastructure, tools and education.

After the Discussion in Chapter 5 we present our conclusions and recommendations in Chapter 6. Finally our references are summed up in Chapter 7.

Acknowledgement

The authors are grateful for the valuable comments and additional materials from Ivan Ivanov and his colleagues from WHO, and for the substantial amount of advises by Jos Verbeek[b] at the Methods Chapter (3) and by Chris van Weel[c], who served in this project as advisor on behalf of the WHO to secure the primary health care perspective. He has commented on all findings and has structured the primary health care values and approach to work and health. He contributed in particular to Chapters 1, 2 and 5.

[a] Dresden, where the two authors met Ivan Ivanov (WHO), 7-2-2013
[b] Finnish Institute of Occupational Health, Kuopio, Finland
[c] Prof. Emeritus in Primary Health Care, Radboud University, Nijmegen, The Netherlands

List of abbreviations

BOHS	Basic Occupational Health Services
CHC	Community Health Care
COPD	Chronic Obstructive Pulmonary Disease
GP	General Practitioner (in USA: family physician)
ICOH	International Commission on Occupational Health
ILO	International Labour Organization
NIOSH	National Institute of Occupational Health and Safety (USA)
OD	Occupational Diseases
OH	Occupational Health
OHC	Occupational Health Care
OHN	Occupational Health Nurse
OHS	Occupational Health Services [d,e]
OP	Occupational (Health) Physician
OSH	Occupational Safety and Health
PC	Primary Care
PCU	Primary Care Units
PHC	Primary Health Care
RCT	Randomized Controlled Trial
SME's	Small and Medium-sized Enterprises (companies)
TNO	Netherlands Organisation for Applied Scientific Research
WIND	Work Improvement in Neighbourhood Development program (ILO)
WISE	Work Improvement in Small Enterprises program (ILO)
WISH	Work Improvement for Safe Home program (ILO)
WHO	World Health Organisation
WRD	Work-Related Diseases

[d] Mostly the term 'services' is used in the meaning of 'providers' or even as a term for the whole sector. So then OHS means providers that deliver occupational health care. However, in some publications the term services is used as synonym of the concrete care or assistances that are delivered. Then OHS means certain care or assistance delivered in the tradition of occupational health care.

[e] In some publications the meaning is: occupational health and safety.

1 Introduction

"It is important that the Primary Health Care Practitioner takes an accurate medical history since this may be the only chance a patient has to have their occupational disease recognized and properly detected/identified." (Cegolon et at, 2010)

1.1 WHO request

The search described in this report is an answer to the WHO request to look for evidence about the delivery of three specified groups essential interventions at the primary care level, regarding workers' health. Additionally we have included evidence about policy and programmatic conditions, needed for a successful implementation.
The interventions should be limited to the most essential ones, so that they can be used in every country or situation as a starting point. Modifications or additions are possible depending on the local conditions and possibilities. The main precondition is that the interventions are adequate or adaptable to the culture and context of primary (health) care. In this exploring phase we decided to include Community Health Care (CHC) initiatives when they have a primary health care (PHC) approach. Moreover, in several countries there seem to be no strict boundaries between PHC and CHC[1].

The defined essential interventions should be based on evidence from peer-reviewed literature, in this case complemented by grey literature. Therefore the search has the aim to add evidence where possible on the level of input or structure, process, output or outcome of the health system. Preferably evidence-based guidelines, peer-reviewed reviews and scientific articles should be used, complemented by reports from the grey literature when needed and available.
This WHO request is a logical next step after having concluded, that Primary Health Care offers a promising opportunity to provide more workers worldwide with some basic work-related health care than up till now is possible – as will be illustrated in the next Chapter.

1.2 Background: from Alma Ata to The Hague

Approximately half of the world's population spends at least one third of its time in a workplace. Fair employment and decent work are important social determinants of health and a healthy workforce is essential for productivity and economic development[2]. However, despite WHO/ILO-appeals to extend Occupational Health Care (OHC) to all workers, only 10-15% has access globally. Rantanen stated: "One of the widest impacts of globalization is the growing inequity in the conditions of work between the industrialized and developing world. A vast majority of workers of the world (80-90%) do not have access to occupational health services (OHS). Many of existing services are outsourced and downsized to the minimum. There is challenge to provide and modify occupational health services to meet the needs of particularly underserved and vulnerable groups of workers."[3]

Those workers, many of them working in SME's and informal economy, self-employed, migrants, people with a handicap or a chronic medical condition, are much more in reach of primary health care (PHC), covering 70 to 80 % of the global population. So a relevant question is: Can PHC offer adequate interventions to meet specific workers' health needs, so achieving a more universal access for the global work force to work-related health care?

An answer to that question was discussed end 2011 during the WHO Invitational Conference, *Connecting Health and Labour: what role for Occupational Health in PHC?* This conference in The Hague (The Netherlands), co-organized by TNO Work & Health and the Dutch Ministries of Health and Labour[f] was "a world first!", according to Maria Neira, WHO Director Public Health and key speaker on that Conference[g]. Two global health care communities, crucial to preserve workers' health, but often acting separately – PHC and OHC – got structurally connected for the first time. During three days invited key experts from governments, social partners, medical professionals, financing and research, from 40 countries all over the world discussed four topics: universal coverage, people centred care, participatory leadership and health in all policies. A number of countries presented plans and good practices.
Instead of having 'territorial discussions' the representatives of both worlds soon found common ground, expressed by the guiding principles they formulated at the end of the conference (Table 1), and by the main conclusion: 'Let's further explore the potential and possibilities of PHC regarding workers' health!'[4]

Table 1 Principles for integrating OHC in PHC, formulated during the 'The Hague-Conference', 2011[h]

a. Workers' health is part of general health and life;
b. Health systems should facilitate local strategies to meet workers' health needs;
c. In moving towards universal OHC coverage, target first those at greatest risk or needs;
d. Involve all relevant stakeholders when developing policies about workers' health;
e. Training in health and work should be part of all health care professionals training;
f. Workers empowerment and encouraging decision-makers are critical for promotion of workers' health and safety.

This technical report can be considered as a part of that exploration, as well as the The Hague Conference can be seen as part of a global process to improve OHC coverage as requested by the World Health Assembly in 2007[5], e.g. to "… urge countries to work towards full coverage of all workers with prevention of occupational and work-related diseases and injuries"[i]. Special attention was asked for workers in the informal economy, small and medium enterprises, agriculture and migrant and contractual workers – mostly far out of reach of the regular OHC.
In 2008, WHO launched reforms to provide PHC to all citizens, focusing on universal coverage, people-centred care, participatory health governance, and health in all policies[j], and in 2009 the World Health Assembly requested for implementing vertical health programmes (e.g. OHS) in the context of integrated primary health care[k].
The results of this report have the aim to provide input to national debates about health care reforms based on PHC values that should improve service delivery to workers' health and ensure equity by better connection between Health and Labour sectors, prevention and care.

The idea to address the impact of work and work environment on health as a shared PHC-OHC responsibility was already included in the **WHO 1978 Alma Ata Declaration**, where it stated**:** 'bring PHC as close as possible to *where people live and work'.* However, when PHC was put into practice, the focus was mostly on health services where people live. With a few

[f] 29/11 – 1/12-2011, The Hague, The Netherlands.
[g] Interview with Maria Neira, Director Public Health WHO, in TNO Times, summer 2012, p. 13-6.
[h] http://www.who.int/occupational_health/publications/hague_executive_summary/en/index.html.
[i] Resolution WHA 60.26 from 2007.
[j] WHO-report "PHC: now more than ever!", Geneva, 2008.
[k] Resolution WHA 62.12 from 2009.

exceptions, the provision of health care where people work was absent from the debate on programmes and strategies for primary health care, and PHC and OHC have remained disconnected worldwide.

Thirty-six years after Alma Ata there are even more compelling arguments for using also the workplace as an entry point to the health system. It can be a setting for delivery of essential health interventions and for reaching out to workers' families and communities. In some cases, the workplace is the only way of providing health care, e.g. for mining communities and migrant workers. Furthermore, improving workers' health can help to reduce poverty, and is an essential prerequisite for productivity and economic development.

Meanwhile, there have been some innovative attempts to extend the coverage of basic occupational health services or essential interventions for workers' health through integration of workers' health care with primary care at the point of delivery: by training primary care providers - primarily in rural areas and for the informal sector - and by designating a member of the PHC team to provide OH support to workers and workplaces in the catchment area of the primary care centre. In many countries and in the European Union the education of medical students in occupational health is subject of innovation and evaluation[6].

PHC with integrated basic services for workers would provide the first point of contact within the health system, while emphasizing the most essential services for prevention, diagnosis and treatment of occupational and work-related diseases and injuries, promotion of health and restoring working capacity. Such services require active mechanisms for workers' participation in planning, delivery and evaluation, collaboration with companies and other stakeholders such as insurers, an adequate skill mix of service providers, equitable financing and purchasing mechanisms as well as a sound policy, legal and institutional framework.

Such an integration is of course not without difficulties: often OHC is organized as a stand-alone 'vertical' service, resulting in loss of continuity of care and in poor coordination of care, and in poor effectiveness, like other vertical programs. At the same time primary health care professionals seem to have developed a 'blind spot' for work-related aspects of health problems, overlooking 'salutogenic' as well as negative effects of working conditions. The causes of this Blind Spot have not been yet looked into very thoroughly, but a lack of expertise, work-related guidelines, time, proper training and (continuous medical) education are often mentioned, as well as cultural aspects[7,8].
However, making work-related functioning part of management and treatment of health problems would put PHC in an excellent position for early detection and intervention regarding work-related health problems, for preventing long-term sick leave and work incapacity, and for reaching underserved workers[9]. And in some cases, patients tend to trust GPs more than occupational physicians funded by the employer[10].
Still we have to promote a wider coverage of expert based multidisciplinary occupational health services in accordance with the ILO Convention 161 on Occupational Health Services (1985) as both levels of care are complementary to each other. Good access to expert-based occupational health services is not only of vital importance for workers and companies, primary health care will also need expert support in more complex cases.

1.3 WHO Follow Up: assignment to TNO and Coronel Institute

These issues discussed in the previous pages have been extensively reviewed by key persons from both the PHC and OHC during The Hague Conference end 2011. In her

keynote for the ICOH tri-annual World Conference in Cancún México, March 2012, Maria Neira confirmed that for the coming years WHO had decided to choose for exploring the potential of PHC as an effective way to reach more workers worldwide with Occupational Health Care, referring very positively to the The Hague Conference. And during the World Health Assemble 2013 this issue was elaborated by experts during a significant WHO Side Event.[l]

May 2012 WHO published the The Hague Conference results on her website[m], outlining in 17 paragraphs a new strategy to reach more workers by integrating OHC elements into PHC, stating that this "… will yield bigger impact on the health of people, than each can achieve on their own, to secure work-focused health care. How that integration works in practice depends on national and local circumstances. *(…). Important assets in initiating this collaboration are the experiments that can be found in a number of countries and settings around the world".* (Par. 10).

More concrete about the content is paragraph 13 a and b: 'Emphasizing the role of national and local governments for guaranteeing the access of all workers to curative and preventive health care that allows for full and productive working life, *including essential interventions for occupational health and work ability in the delivery of comprehensive, integrated primary care, such as advice for improving working conditions and for promoting health at work; early detection of occupational and work-related diseases and support for return to work and preservation of working capacity."*

The Summary ends with Next Steps: the WHO will collaborate with other stakeholders on activities like:

- Developing policy options, methodologies and *case studies.*
- Establishing a global repository of training materials and information.
- Collecting, evaluating and disseminating *case studies and examples of delivery of essential interventions* and basic services and care for workers' health in the context of integrated PHC, and setting up an interdisciplinary research agenda.

On these points, WHO has taken actions directed at the Dutch research bodies involved in the aftermath of the WHO Conference: TNO Work & Health and the Coronel Institute of Occupational Health of the University of Amsterdam. After the release of the Executive Summary mentioned above, WHO asked TNO Work & Health in August 2012 to elaborate proposals on the following activities, in good collaboration with the Coronel Institute.

1. Review of evidence on the interventions in favour of the health and safety of workers related to their work, delivered by primary care settings in different contexts around the world and WHO regions. The outputs will be a technical report with description of interventions and ways of delivery plus a book chapter for WHO publication.
2. Identification and evaluation of programmes and learning materials for training of primary care providers in workers' health issues in different contexts and WHO regions –, the output will be a technical report describing the materials collected and reviewed and the evaluation with attached curricula and learning materials.

In response, TNO and Coronel have made an integrated proposal, also regarding another request directly sent to Coronel about making a website page for the learning materials especially for primary health care (www.workershealtheducation.org). This proposal has

[l] See Gohnet,Newsletter, June 2013.
[m] http://www.who.int/occupational_health/publications/hague_executive_summary/en/index.html.

been discussed during a Follow Up of the Hague Conference, organized by WHO in Geneva, November 2012, resulting in the final Terms of Reference for three interconnected projects, send to TNO and Coronel Institute, end 2012: to develop evidence-based definitions of effective interventions for workers' health delivered at primary care and to identify information resources on the web to support primary care providers in delivering these interventions.

The description of the first project – including the current report - was[n]: a review of evidence on the interventions for workers' health delivered by primary care settings in different contexts across WHO regions, including:

1. A systematic review of the evidence for delivery of the above mentioned interventions through primary care and for their effectiveness.
2. Developing definitions on the interventions – according to the requirements of the One Health Costing Tool.
3. Preparation of technical report, including the results of the review with inclusion and exclusion criteria and description of the interventions.

So then the project could be started by Peter Buijs (TNO), in collaboration with Frank van Dijk (Coronel) and supported by PHC consultant Chris van Weel, appointed by WHO, taking into account the discussions during the Follow Up Meeting.[o]

[n] WHO ToR dd 25-11-2012.

[o] These discussions were summarized in a Prevention Scheme, edited by Nickels, during the WHO Workshop, 12-14 Nov 2012, Geneva (follow up of the The Hague Conference 2011). Activities mentioned there are included in Chapter 2, especially Table 2.

2 Three essential interventions

In this chapter we will analyse how interventions for workers' health may fit into primary health care, and based on that we will describe what we consider as essential interventions on the three levels of prevention: primary, secondary and tertiary.

2.1 How work and health fit into primary health care: a brief analysis

For the integration of workers' health activities in primary health care (PHC), it is relevant first to analyse the common ground considering the guiding professional principles and concepts in the domains of PHC and occupational health care (OHC). From this analysis could follow how work-related issues relate to the overall tasks of PHC, and how a more comprehensive addressing of work and health could empower PHC in its response to the health, and health problems, of individuals and communities belonging to the catchment area of the primary health care facility involved.

An important common characteristic is that PHC and OHC both deal with individuals, ('patients' in PHC, 'individual workers or employees' in OHC) as well as with populations (the community or practice population in PHC, the workers population and enterprises/companies in OHC). Both disciplines apply approaches directed at populations, especially in primary, and sometimes also at secondary prevention level, in combination with individual approaches. Assessment of risks, needs and demands should play a key role in prioritizing preventive interventions. This in turn stresses the value of a combined individual/population approach: from the literature it is clear that this yields the best effects in preventive interventions.[11]

Social determinants of health and inter-sectorial collaboration
In dealing with health risks of individuals and populations, social determinants of health play an important role[12]. As many people spend a substantial part of their daily living in work, the work place provides a substantial contribution to these social determinants, either positive or negative. Inclusion of the work environment in analysing individuals' and populations' risks will substantially enhance the effectiveness of interventions.

This highlights another common trait of PHC and OHC: its society – community basis, with the need to interact and collaborate with other parties inside and in particular also outside the health care sector: inter-sectorial collaboration.

Operationalization of PHC
In the operationalization of its disciplinary values, the community basis of PHC is essential. Its provision of first contact, continuity of care, health promotion, and patient empowerment is always in the context of a responsibility for a defined group of people[13]. Even when the health care system does not require so, the large majority of people tend to contact the same general practitioner/practice over time[14]. As an example, in the current US health care reforms a key component is the organization of preventive and cure-care facilities around people in their social setting: the patient centered medical home[15]. This team based model of health care delivery to provide coordinated services can be seen in principle as the PHC basis to define priorities for individuals and communities, to achieve the optimal outcome in terms of health, with the application of 'minimal' expenses[p].

[p] Of course there is always the risk, that in a demanding PHC office, GPs focus solely on the individuals.

To prioritize and respond to needs, PHC has a strong 'bottom-up' development: the local conditions dictate to a large degree which interventions are relevant for the people and population under care, and how the local team is composed according to disciplines and providers[16].

A formal analysis of the local situation in terms of a 'community diagnosis' provides the possibility of priority setting and is an ongoing instrument for community based PHC[17],[18]. In this, PHC is a contributing factor to more equity and a more equal society[19]. The integral inclusion of work conditions and health at work will strengthen this. From this, the interaction between PHC and OHC in terms of interventions can be summarised as (Table 2):

Table 2 How the topic workers' health can fit in primary health care: operationalization[q]

OHC	PHC	Activities/interventions by PHC
› Primary prevention	› Community Diagnosis and related activities	› Identification of (past) dominant employment in the community › Analysing their workplace-related hazards (risks) › Promoting health protection, counselling[r] › Improving work conditions, including employers' participation › Inter-sectorial actions
› Secondary prevention	› Anticipatory/early diagnosis[s]	› Monitoring and analysing (early) signs/symptoms vis a vis work exposure; can include evaluation and referrals. › Diagnosis and treatment of work-related diseases › Developing ways to prevent work-related diseases
› Tertiary prevention	› Continuity of person centred care › Optimising on-going management › Empowerment › Strengthening self-management › Promoting societal participation	› Analysing impact of work on health on patient level › Promoting employers' participation, and societal participation of people with health problems; management of occupational diseases › Identifying positive and negative influences of workplace › Supervising sickness absence to accommodate ill workers › Guiding for self-efficacy in workplace or self- management of illness conditions

[q] Developed by Chris van Weel, supported by the two authors.
[r] Could also include programs for health promotion such as tobacco cessation, exercise promotion and blood pressure measurements.
[s] In case of certain countries, we also found uncomplicated management of occupational and work-related diseases to be included in secondary prevention.

2.2 Descriptions

In this paragraph we will describe the three levels of possible essential interventions for workers' health in primary health care we identified, based on the analysis in paragraph 2.1: primary, secondary and tertiary prevention (2.2.2). But first we will give the descriptions of crucial concepts used in this report.

2.2.1 Descriptions of basic concepts[t]

Hazard
A physical or psychosocial condition, object or agent that has the potential to cause harm to a worker or to cause damage to property or environment.

Intervention can be defined as an activity /action or set of activities/ actions, which when undertaken can help in changing the health and safety outcomes for the target population. The activities/actions can influence the inputs, the processes, the outputs, and the outcomes (for example in terms of changes in the health of those targeted by the actions).[u]

Primary health care (PHC) is the function in the health system where everyone, both rich and poor, irrespective of the question or health problem involved, can access the services and the conditions necessary for realizing the highest level of health. It includes organizing health systems to provide quality and comprehensive health care to all while ensuring that poor and other disadvantaged people have fair access to essential health services[v].

Primary care is a component of PHC and refers to the first level of contact people have with health-care teams. In some countries this may be a community health worker or midwife; in others, it refers to the family practitioner[w].

Occupational health care refers to the care for the health of workers. It includes preventive health care, health promotion, in some places also curative health care, first aid and rehabilitation, where appropriate, as well as strategies for prompt recovery and return to work[x].

Occupational health services (in the meaning of service providers) means services entrusted with essentially preventive functions and responsible for advising the employer, the workers and their representatives in the enterprise (company) on:
(i) the requirements for establishing and maintaining a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work;
(ii) the adaptation of work to the capabilities of workers in the light of their state of physical and mental health[y].

[t] For a substantial part based on: Van Dijk F, Varekamp I, Radon K, Parra M. *Glossary for Basic Occupational Safety and Health. Version 02*. Amsterdam. Coronel Institute. 11 October 2011). In this Glossary all sources and adaptations are mentioned.
[u] I. Ivanov ToR 25-11-12.
[v] From the documentations used for the Hague Conference (2011).
[w] Idem
[x] ILO 1998 adapted.
[y] ILO C161 Occupational Health Services Convention, 1985.

Occupational disease[z]

A disease as the effect of work as the main cause. This means that the disease is caused by physical, chemical, biological, ergonomic or psychosocial factors at work. In many countries there are official lists of occupational diseases, including lists of factors which may cause such diseases. ILO guides the countries by the ILO List of Occupational Diseases (revised in 2010).[aa] In this TNO report and in many quoted publications herein the term 'occupational diseases' is often used in a broader meaning including also work-related diseases in which concept work is regarded as one of the causal factors (see there).

OneHealth Costing Tool

A new UN software tool designed to strengthen health system analysis, costing and financing scenarios at the country level. Its primary purpose is to assess public health investment needs in low and middle income countries. For the first time, planners have a single framework for planning, costing, impact analysis, budgeting and financing of strategies for all major diseases and health system components.

Risk assessment (related to work)

Risk assessment is the process of quantifying the frequency or probability of a harmful effect to individuals or populations (e.g. related to exposure or activities at work) and is one of the first steps in risk management.

Work Disability Evaluation

Determination of the degree of a physical, mental, or emotional handicap in relation to the capacity to work. The diagnosis can be, but does not have to be related to legal qualification for benefits and income under disability insurance and to eligibility for Social Security and workmen's compensation benefits (adapted from Mesh term definition of 'disability evaluation' in PubMed).

Work-related disease

A disease for which the occupational factor may be one of several causal agents, or a disease for which the occupational factor may trigger or worsen an already existing disease, or a disease for which the risk may be increased by work or work-determined lifestyles.[bb] See also 'occupational diseases'.

Workers' health surveillance

Workers' health surveillance is a generic term which covers procedures and investigations to assess workers' health in order to detect and identify (early) signs of abnormality with the main aim prevention of occupational and work-related diseases and injuries. The results of surveillance should be used to protect and promote the health of the individual, collective health at the workplace, and the health of the exposed working population.

z Some authors use the terminology 'occupational illness or injury.
aa http://www.ilo.org/safework/info/publications/WCMS_125137/lang--en/index.htm (see endnotes).
bb adapted after Rantanen 2007 (see endnotes).

2.2.2 Descriptions of the three prevention levels

The possible essential interventions for workers' health in primary health care we identified in paragraph 2.1 can be applied at three levels: primary, secondary and tertiary prevention. They can be described as follows[cc]:

Primary prevention

Interventions regarding healthy people in the community of PHC, working in potentially harmful working conditions, targeted to modify the risk factors for occupational and work-related diseases and for accidents at the workplace. These are interventions to modify the work environment, work behaviour and/or work organization[dd].

These interventions correspond to *community diagnosis and prevention in PHC,* aiming to improve working conditions that are a risk for the health and/or safety of workers, belonging to the PHC community.

The following activities can be seen as belonging to primary prevention:

a. **Identification of hazards in dominant employment**
   First the identification of dominant (past) employment in the community as a form of community diagnosis. Subsequently, when needed workplace visits for a workplace health hazards evaluation[ee].
   e.g. in an agricultural region visiting farms together with the farmers, similar as in ILO Wise programs; next the assessment of specific hazards by exposure to a variety of pesticides.
b. **Counselling to improve working conditions in a participatory way**
   e.g. counselling in a participatory way (shared decision making) with stakeholders involved such as in a WIND, WISE or WISH project[ff] to improve use of impermeable gloves at workplaces.
c. **Health protection by information, education and training**, together with others, corresponding to the encouraged inter-sectoral actions approach by PHC.
   e.g. together with agriculture authorities informing workers, management and communities by leaflets and meetings about the risk of (inadequate application of) pesticides and about appropriate personal protection measures.

Secondary prevention

Diagnosis and treatment refers to the situation that a patient with health complaints might have a risk factor at work as a cause of disease. For 'occupational diseases' (OD) work is the dominant risk factor (e.g. asbestos), for 'work-related diseases' (WRD) work is one of the risk factors (e.g. psychosocial risk factors). Secondary prevention in the form of a 'workers' health surveillance' program starts with a healthy working population organizing early detection of a disease caused by high risk working conditions as a consciously chosen option for prevention, based on a workplace risk assessment. Bio-monitoring is one of the options for secondary prevention.

[cc] These descriptions can also be seen as an elaboration of the Prevention Scheme, edited by Nickels, as discussed by the participants of the WHO Workshop, 12-14 Nov 2012, Geneva (Follow Up of the The Hague Conference 2011). Activities mentioned there are included.

[dd] In a few cases traditional medical interventions are needed, such as vaccinations.

[ee] Under specific conditions such as sufficient expert support, a formal work risk assessment may be possible, but this is exceptional.

[ff] WIND, ILO program for Work Improvement in Neighbourhood Development. WISE, ILO program for Work Improvement in Small Enterprises. WISH, ILO program for Work Improvement for Safe Home. A model for improvement based on the idea of participatory action-oriented training.

The following activities can be seen as belonging to secondary prevention:

a. **Recognition and diagnosis** of an occupational disease, a work-related disease or an occupational accident. This includes occupational history taking and when needed an individual workplace visit.
   e.g. diagnosis of work-induced COPD caused by work exposure as a welder or occupational asthma by flour at a bakery; analysis of the causes of an occupational accident.
b. **Treatment**[gg]**, rehabilitation** and prevention of new episodes or new cases by counselling.
   e.g. low back pain treatment and rehabilitation of workers in the construction industry and counselling to prevent future exposure, also for colleagues.(also partly primary prevention)
c. **Notification** of Occupational Diseases to authorities[hh].
   e.g. notification of mesothelioma by asbestos exposure in the past.
d. Next to these three aspects of individual-focused secondary prevention, **a collective approach** has to be considered**: a 'workers' health surveillance' program** by detection (monitoring) of early adverse health effects by work. This strategy is, in general, based on risk assessments on the work floor. Workers' health surveillance is only feasible in PHC when developed and guided by an OSH specialist .
   e.g. specialized protocols and tools can be used in a project supervised by a district centre or National Occupational Health Institute to monitor effects of pesticides.
   Another example can be a hearing conservation program where audiometry can detect early hearing loss present without the awareness of the workers.

Tertiary prevention

Interventions are targeted on patients with an injury or a specified disease, often a chronic disease, in order to prevent or reduce negative impact of the injury or disease at work.
The following activities can be seen as belonging to tertiary prevention:

a. Occupational history taking, understanding/analyzing and – if possible – changing or reducing the impact of the disease and therapy on health and on work ability.
   e.g. regarding a patient with Rheumatoid Arthritis, understanding the consequences of the disease and medication on the work ability, e.g. in work in agriculture; when possible, adaptation of therapy or guidance.
b. Assessment of fitness for work.
   e.g. after a myocardial infarction or a whiplash after a car accident during work, assessment of fitness for certain tasks e.g. for work as a truck driver on long-distance routes. e.g. certification of sickness absence for a welder with COPD working in the metal industry.
c. Counselling in patient empowerment and rehabilitation.
   The aim is to protect and promote participation at work, rehabilitation, encouragement of return to work as well as self-management in cases of injury, sickness absence or work disability. *e.g. guidance in gradual physical activation for a fire fighter with a work accident or chronic low back pain; referral to activating physiotherapy.*
   e.g. counselling a social worker working under high pressure, who has Multiple Sclerosis with a variety of health complaints.

[gg] Therapy is mostly not specific for occupational diseases. So there can be an overlap with other modules in OneHealth Costing Tool.
[hh] This may include referrals to OD specialists.

3 Methods

3.1 Aims, questions and selection criteria

3.1.1 Aims of the search

The WHO request was[ii]:
"to develop evidence-based definitions of effective interventions for workers' health delivered at primary care and to identify information resources on the web to support primary care providers in delivering these interventions. The work will include a review of evidence on the interventions for workers' health delivered by primary care settings in different contexts across WHO regions, consisting of:

- A systematic review of the evidence for delivery of the above mentioned interventions through primary care and for their effectiveness.
- Developing definitions on the interventions – according to the requirements of the OneHealth Costing Tool (next phase).
- Preparation of technical report, including the results of the review with inclusion and exclusion criteria and description of the interventions."

This leads to the following description of what we regard as relevant information, formulated as informative questions that we want to answer. This formulation will help us to define criteria for the inclusion or exclusion of publications and for the subsequent selection and presentation.

We have started with pilots on how to search most effectively and efficiently, and consequently we completed a number of searches. Thereafter we selected the results, so reducing the findings, followed by a presentation of the results in several short lists. Finally we selected the most useful sources from these short lists in order to present these as the most appropriate examples of evidence for the three essential interventions in relation to the Costing Tool.

3.1.2 Questions

The most essential information that we wanted to collect by searching the literature is not only about the validity or quality or about the effectiveness of an intervention, but also about the feasibility or actual implementation of an intervention in the context of PHC.

More in detail we were interested in specific aspects of the intervention itself and in contextual questions such as:

1. Did the intervention contain validated or evidence-based elements such as well-developed tools or evidence-based guidelines?
2. Was the intervention targeted at specific groups such as specific patient groups, specific vulnerable groups such as disabled persons, or specific occupational groups such as farmers?
3. Was the intervention developed or adapted in collaboration with PHC professionals or volunteers?

[ii] Terms of Reference, WHO, 25-11-2012.

4. Was the intervention feasible for PHC and/or well implemented in PHC?
5. Was the intervention executed in collaboration with stakeholders such as workers, companies, community?
6. Were the stakeholders satisfied?
7. Was the intervention using support or referral facilities such as stemming from occupational health and safety experts, clinical experts, laboratories, information experts or others?
8. Was the intervention using specific equipment or specific software developed for workers' health?
9. Was the intervention effective in terms of intermediates or final outcomes?

3.1.3 Inclusion and selection criteria for the short lists and the final selection

From the articles, reports etc. found in the literature search we planned to make a new selection in order to develop four short lists – corresponding with the three essential interventions and, in addition, with the topic 'policy and programmatic conditions'– based on the next criteria:

1. Is the article, report informing us about the validity, target groups, quality, feasibility and/or implementation, effectiveness, satisfaction of stakeholders? Informing us about contextual aspects?
2. Is the article, report peer-reviewed?
3. Is the article, report up-to-date/recent?
4. Is the final presentation of articles, reports representing the reality of the various regions of the world?

From the four shortlists we will finally choose the most useful publications, according to the answers on the four questions just formulated. The four criteria are not used as absolute ones, to be met for all publications to be selected, therefore also relevant not peer-reviewed lectures or reports could be included.

3.1.4 Questions regarding the Costing Tool Exercise[jj]

In the next phase of this project, the best publications will be described and carved, in order to make them suitable for the WHO Costing Tool Exercise, with - next to the name and definition of the activity/ intervention - questions like:

1. Population in Need: This is the target population that needs to be specified for a given intervention. The tool then, using the coverage scale-up path specified by the user, calculates the number of workers that currently receive the intervention and are projected to receive them in the future.
2. Possible Delivery Channels: The model assumes that interventions are provided at one or several of the following three levels:
   a. Community-level (through community health workers) – e.g. workplace visits, risk communications.
   b. Outreach (e.g. workplace visit) such as by a nurse from a PHC centre.
   c. Clinic/health centre (e.g. primary care centre, GP practice).

The model contains suggestions as to where the individual interventions could be delivered (e.g. 50% at community level and 50% through outreach). The default values from the literature should be provided, which can then be changed by the user, specific to a country.

[jj] These questions are dealt with in a meeting in The Netherlands at TNO in Hoofddorp, with contributions of WHO officials and the authors of this report (17-19 June 2013).

3. Drugs, Consumables and Supplies required Per Case: The standard prices for drugs and supplies used in these interventions are to be provided.
4. Personnel Time Required per Case: If more than one health provider is used /required to provide an intervention, it must be specified.
5. Number of Visits Required in a given year for intervention to be effective: Standard assumptions for the number of days or visits in a day must be specified.

3.2 Search strategy, terms, limitations and considerations at a "scoping review",

The search has the aim to add evidence where possible on the level of input or structure, process, output or outcome of the intervention. Preferably peer-reviewed guidelines, reviews and scientific articles are used, complemented by reports from the grey literature when needed and available.

The searches were completed in the period from February to April 2013. We approached two databases: **Google Scholar** for the *grey literature* also containing many scientific publications and **PubMed** for the *scientific publications (mostly scientific journals).*
The reason not to limit ourselves to PubMed and to include Google Scholar was that new topics tend to be underreported in scientific literature lagging sometimes five or more years behind the first international and national reports and lectures at international conferences as we have seen in the nano particles literature. Another reason is that index systems such as in PubMed are often not offering adequate subject terms to support searches for new topics. On the other hand, we limited ourselves to PubMed/Medline being the leading database of medical scientific literature, as the large majority (close to 90 %) of high-quality occupational health (intervention) studies can be found in the Medline database as reported by Rollin et al (2010)[20].

An other important reason to limit ourselves to PubMed/Medline was that the review executed can be best understood as a "scoping review", that asks for a different search strategy than a so called Cochrane systematic review. In fact a scoping review can be regarded as a crucial earlier step (when an area is complex and has not been reviewed before) in the systematic review process, defining the scope of the research question. "This requires an understanding of existing literature including gaps and uncertainties, clarification of definitions related to the research question and an understanding of the way these are conceptualized within existing literature". Scoping reviews are "a useful and increasingly popular way to collect and organize important background information and develop a picture of the existing evidence base". (Amstrong et al, 2011)[21]. Interestingly in this phase information is often acquired in a more ad hoc fashion. The search process has to maintain a wide approach, can be iterative requiring reflections by the researchers, in order to cover the literature in a more comprehensive way. Electronic databases but also reference lists, hand searching key journals and use of existing networks and conference materials are recommended. In addition a consultation function can be added to validate the findings. (Arksey and O'Malley, 2005)[22] In accordance with this recommendation we endorse organizing such a consultation after publishing this report.

We limited ourselves to publications in the English language, and mostly to materials published in the last 3 or 5 years. In a few searches we deliberately have chosen for a longer search period. Finally we added a limited number of key publications we already had to our disposal or received otherwise.

Google Scholar
Limitations: English pages; no patents and no citations; hits sorted on relevance. We have chosen for publications of the last three years (2010-2013) as to find recent sources that are not yet available in the peer-reviewed scientific literature in PubMed/Medline.

Primary care and occupational
After pilot searches we have first chosen for the search string: ("primary care" OR "primary health care") AND occupational. Limitations: from 2010 – 2013. We found 15.800 hits. After selecting from 60 hits we stopped the search because most hits that we found in the first 60 were not direct related to PHC. In the first round 11 hits were included for further selections.

Primary health care and occupational diseases
As prevention of occupational diseases is one of the main objectives of essential interventions by primary health care, we have chosen for a second search using the more specific term 'occupational diseases' with the strategy: ("primary care" OR "primary health care") AND "occupational diseases". Limitations: from 2010 - 2013. We found 723 results. Gradually the number of useful results declined to almost zero, so we stopped this search after screening 150 hits. We included 30 hits in the first round for further selections.

Basic occupational health care
After pilot searches we have chosen for a search with the terms "basic occupational health". Limitations: from 2010 – 2013. We found 145 results. Adding (primary OR community) with AND did not result in much lower numbers, so we decided not to add these terms. As most publications found were not direct related to PHC, we stopped the search after screening the first 40 hits, of which, in the first round, 13 hits were included for further selections.

Pubmed
Limitations: English language, having abstract, humans. We used as limitations in years the last 5 years when there were many hits, or the last 10 or even 20 years when we considered the topic as of paramount importance while there were not many hits. To focus on different topics we used various filters, when available we used validated filters derived from literature.

Occupational diseases and primary health care
As primary and secondary prevention of occupational diseases belong to the main objectives, we have chosen to use as strategy: Occupational diseases [Mesh] combined with an own newly developed primary care filter[kk]. Limitations: last 5 years. We found 36 hits that we screened for relevant titles and abstracts.

[kk] ("Primary Health Care"[Mesh] OR "General Practitioners"[Mesh]) OR "Physicians, Family"[Mesh] OR "Physicians, Primary Care"[Mesh] OR "Nurse Practitioners"[Mesh] OR "Community Health Workers"[Mesh]).

COPD and occupational diseases
To receive more detailed information for one group of work-related diseases, not being a recognized “occupational disease” in most countries, and as a test to check the sensitivity (coverage) of the more generic search strategy that we used, working with terms as “occupational diseases” (Haafkens et al[23]; Schaafsma et al 2006[24]; Schaafsma et al 2007[25]), we decided to search more in depth for only one relevant work-related disease: COPD. We wanted to explore if such a more specific search would yield more and/or other relevant publications considering that many publications will not use terms as ‘occupational disease’ in the title, key terms or abstract, but will simply use the terms belonging to a specific (occupational) disease. A complementary consideration is that adequate Mesh term attribution in Medline surely is not guaranteed. Such a sensitivity analysis can be regarded as a simulation analysis in which key assumptions and strategies, in this case underlying the chosen search strategy, are changed to assess their effect on the final outcome.
The strategy chosen is: COPD [Mesh] AND Occupational Diseases [Mesh]. Limitation: the last 5 years (and as before: English, abstract, humans). We found 53 hits that we screened.

Medical and occupational history taking
One of the most crucial tasks in primary health care is the taking of a good occupational history. We decided to complete three searches with related complementary terminology.

The first strategy chosen is using ‘Medical history taking’ [Mesh] combined with an occupational health intervention filter (J Verbeek, specific version[ll]). Limitations: the last 20 years as we considered this topic as of paramount importance for primary health care. We found 58 hits that we screened.

The second strategy chosen is using the term “occupational history”. Limitations: review, last 10 years. We found 27 hits.

As a third strategy is chosen: "occupational history" combined with an occupational health intervention filter (J Verbeek [26]., specific version[mm]). Limitations: last 10 years. We found 23 hits and screened these.

Fitness for work, sickness absence, work disability
As fitness for work given a (chronic) disease is a crucial issue in primary health care, belonging to tertiary prevention, we decided to search on this topic. We used an adapted filter[nn] based on a filter for chronic diseases and work of Haafkens et al[27]. We added the new developed primary health care filter[oo].
Limitations: last 5 years. We found 382 hits and screened these all.

Other materials
Some key publications were included that we knew before; some relevant publications, not yet found in the searches, were sent to us by WHO experts and consequently included.

[ll] (program[tw] OR "prevention and control"[sh]) AND (occupational [tw] OR worker*[tw]).
[mm] (program[tw] OR "prevention and control"[sh]) AND (occupational [tw] OR worker*[tw]).
[nn] ("Rehabilitation, Vocational"[Mesh] OR "Occupational Health"[Mesh] OR "Sick Leave"[Mesh] OR "absenteeism"[MeSH Terms] OR presenteeism[All Fields] OR "workers' compensation"[Mesh] OR "work capacity"[All Fields] OR "return to work"[All Fields] OR "back to work"[All Fields] OR "work disability"[All Fields] OR "employment"[MeSH Terms] OR sickness absence[TW] OR "Disabled Persons"[Mesh] OR vocational reintegration[TW]).
[oo] ("Primary Health Care"[Mesh] OR "General Practitioners"[Mesh]) OR "Physicians, Family"[Mesh] OR "Physicians, Primary Care"[Mesh] OR "Nurse Practitioners"[Mesh] OR "Community Health Workers"[Mesh]).

3.3 Criteria for in- and exclusion

Inclusion criteria

Articles and other publications were included when describing or analysing studies and innovations located in or closely related to primary health care (PHC) and relevant and of practical value for primary health care interventions contributing to workers' health. The focus should be on concrete activities by PHC, preferably in situations not related to large company health care, but to small and medium sized enterprises (SMEs), or to workers in the informal sector or agriculture, or to migrant workers and other underserved workers groups.

A second reason to include articles and other publications is the description or analysis of policies or programs or programmatic conditions needed to facilitate interventions e.g. reporting of programs aimed at capacity building in primary health care on workers' health.

Exclusion criteria

Studies and innovations (articles) are excluded in the report presenting evidence supporting or commenting on the three essential interventions when:

- The content was mainly a position statement or a policy description arguing for more attention for workers' health in PHC without informing about concrete interventions or concrete programs. A limited number of articles were nevertheless included, but only when they were outstanding presenting the needs and demands of the working population or of PHC professionals and volunteers.
- The object of study was to improve (pure) knowledge about occupational health risks (etiologic studies) or about prognosis / prediction of occupational and work-related diseases.
- The object was primarily studying (pre)conditions that have to be met in practice, such as on identity or role problems of GPs when active in workers' health issues.
- The object was studying complex details or only (effects of) national regulations.

For all searches, all titles were carefully analysed following the predefined inclusion criteria. When preliminary included, the abstract, and on indication full text articles, were analyzed if the information source could indeed meet the inclusion criteria, and if the source did not meet the exclusion criteria.

Information about three essential interventions and about programs

After definite inclusion, the articles were categorized in one of four chapters:

1. Primary prevention of occupational and work-related diseases by primary health care: essential interventions.
2. Secondary prevention and diagnosis and therapy on occupational and work-related diseases by primary health care: essential interventions.
3. Tertiary prevention by primary health care: essential interventions.
4. Policy, programs and programmatic conditions needed to facilitate interventions by primary health care aimed at workers' health. We distinguish four interconnected conditions: Policies, Infrastructure, Tools and Education.

4 Results of the Searches

The search has the aim to meet the WHO request to describe and to underline with evidence a limited number of essential interventions on workers' health that can be executed by primary health care in various parts of the world. The interventions should be limited to the most essential ones, so that this set of interventions can be used in every country or situation as a starting point. Modifications are possible or additions depending on the local conditions and possibilities. The main precondition is that the interventions are appropriate for primary or community health care or can be adapted to the culture and context of primary care.

The description of essential interventions should be accompanied by evidence from the peer-reviewed literature, if needed complemented by grey literature.

Therefore the search has the aim to add evidence for the validity or quality, or the effectiveness of an intervention, or the feasibility or actual implementation. Descriptions and evaluations can be located on the level of input or structure, process, output or outcome of the health system. Preferably peer-reviewed guidelines, reviews and scientific articles should be used, complemented by reports and other publications from the grey literature when needed.

First we present the results of the searches regarding the three prevention levels (4.1, 4.2 and 4.3), followed by the results on policy and programmatic conditions (4.4).

The searches described in 3.2 have led to ca. 800 hits, which we first reduced to ca. 200 relevant publications. From those 200 we selected publications for four shortlists. From those shortlists we finally have chosen a limited number of the most appropriate publications, to be described in this chapter.

4.1 Primary prevention

> *"It is crucial to include OHS in primary health care, because the units that are close to informal workers in the communities have to deal with exposure to several occupational hazards." (Chancharoen and Untimanon, 2011)*

In 2.2.2 we have described primary preventions as "Interventions regarding healthy people in the community of PHC, working in potentially harmful working conditions, targeted to modify the risk factors for occupational and work-related diseases and for accidents at the workplace. These are interventions to modify the work environment, work behaviour and/or work organization." These interventions correspond to *community diagnosis and prevention in PHC,* aiming to improve working conditions that are a risk for health or safety of workers, belonging to the PHC community.

a. **Identification of hazards in dominant employment**
   First the identification of dominant (past) employment in the community as a form of community diagnosis. Subsequently, when needed the organization of workplace visits for a workplace health hazards evaluation.
b. **Counselling to improve working conditions in a participatory way**
c. **Health protection by information, education and training,** together with others, corresponding to the encouraged intersector actions approach by PHC.

From the 200 selected scientific publications out of ca. 800 hits, we identified the following as most relevant regarding primary prevention.

In "Basic Occupational Health Services (BOHS) model utilizing governmental, academia and private enterprises network in Songkhla province, Southern Thailand: A preliminary result.", **Jirakalvisan** (2012[28]) describes a tool of a one-day-meeting between health workers from ten enterprises with at least 100 employees, two Primary Health Care Units (PCU) and six private hospitals and clinics, regarding among others primary prevention, and a two-days training on “Risk assessment and risk management of Workplace in BOHS Model Training”. (more information about Thailand is given in the publications of Siriruttanapruk et al. and of Chancharoen and Untimanon, presented on the next pages).

In "Application of BOHS (Basic Occupational Health Services) principles in practice.", **Kogi** (2012)[29] reviews recent experiences in combining BOHS application with the use of participatory action-oriented tools proven useful in WISE (Work Improvement in Small Enterprises) programs in China, Vietnam and some other countries in Asia and Africa, with attention to qualitative risk assessment tools and “action checklists” for immediate work improvements. The six basic principles for WISE – and also for WIND and WISH[pp] - are:
1) Build on local practice, 2) Use learning-by-doing, 3) Encourage exchange of experience, 4) Link working conditions with other management goals, 5) Focus on achievements, 6) Promote workers’ involvement.
Kogi concluded, that the combined use of BOHS and WISE methods can be a useful basis for developing locally practicable toolkits, also for PHC - although it is not clear if WISE has already been used by primary care providers.

The huge primary prevention challenges developing countries are confronted with are well illustrated by **Chen et al.** (2010)[30]. They describe the steps involved to integrate BOHS in the primary health care system in the Chinese province of Baoan. These steps include capacity building, health training and education – “with the help of the PHC system” -, surveillance of workplaces and the health of workers, risk assessment, control and evaluation processes. This model, combining primary prevention activity as well as program activity - provided BOHS to employees universally, especially migrant workers in small- and medium-sized enterprises (SMEs) who had been underserved. Furthermore, this system was cost-effective and accepted by both employers and employees. “In summary, the BOHS system in Baoan has proved to be an effective way of providing BOHS for workers in SMEs. It is integrated with the primary health care approach with support of the government and involves both employers and employees. Our BOHS model can point the way to the expansion of the coverage of OHS for workers in SMEs, although it needs further development to improve the content and expand the coverage.” They conclude: “Our experiences suggest that this strategy might be a feasible and effective way of protecting the health of workers confronted with occupational hazards.” In 2006 3,700 factories were covered by OHS and 610,000 workers received health surveillance. In 2008 these figures were respectively 9,200 factories and 1.9 million workers. The coverage rate of factories increased from 35 % to 82 %, of workers from 29% to 81%.

Two other most useful publications regarding primary prevention of workers’ health, integrated in PHC we found both were from Thailand.

[pp] WIND, ILO program for Work Improvement in Neighbourhood Development. WISH, ILO program for Work Improvement for Safe Home.

In the publication: "The Development of basic occupational health services (BOHS) for workers in the informal sector through primary care units", **Siriruttanapruk et al.** (2009)[31] describe the integration of BOHS in Primary Care Units (PCUs) in Thailand, where more than half of the working population are agricultural, informal, or self-employed workers, unable to get access to OH services. The project was started by conducting a pilot study on BOHS model development during 2004-2007. The activities included setting the BOHS guidelines, development of a training curriculum for health officers, and a pilot provision of BOHS. After that, the model of BOHS in community hospitals and the linkage system between PCUs and these hospitals was set up and developed. The project showed that all PCUs were able to provide BOHS, mainly among farmers. The activities performed included OH education, working environment surveys in farms, health screening for pesticide exposure and first aid and emergency treatment.

This project shows that BOHS can be integrated effectively into a general health service system at the Primary Care Unit level. In order to improve the quality of the services, however, policy support, resource allocation and continued capacity building to increase knowledge and skills for the health care staff are needed (see also 4.4. Policy and programmatic conditions).

More detailed information is provided in the publication by **Chancharoen and Untimanon**, called 'Basic Occupational Health Services (BOHS) and the National Programme for Farmers' (2011)[32]. They state: "It is crucial to include OHS in primary health care, because the units that are close to informal workers in the communities have to deal with exposure to several occupational hazards. Additionally, the health and welfare of this group are not covered by the Social Security Scheme".
The number of farmers is high in Thailand, compared to other occupations, and their work involves exposure to several hazards. In 2008, a pilot project in practice started, aiming to develop OHS in 16 primary care units (PCU). Capacity building, training and supervision were the main activities of the project, aiming to strengthen the health team and support their networking, and focused on informal workers in the agriculture, industry and service sector. In 2010, the PCUs could provide Basic Occupational Health Services including health examinations, risk assessments and interviews of workers with occupational sicknesses or injuries. *The risk assessments* showed that not NCD's (non communicable diseases were the highest occupational risk, but infectious diseases, since most of the workers were farmers who worked in contaminated areas, including contact with animals.

The results of this project demonstrated the need to provide BOHS in Primary Health Care (PCUs), combining primary prevention activities - including walk-through surveys in the workplace using an observation checklist and risk assessment - with secondary prevention activities, like screening of occupational diseases, health examinations, and treatment of such diseases and injuries. In 2010, there were 156,975 informal workers who could access the services, 72% of them being farmers. Most of them worked in environments with a high risk for biological exposure (63%), noise exposure (49%), and chemical exposure (43%). Poor working positions were also noted. As regards occupational injuries at farmers, 30% of them had been injured by sharp tools or equipment. The other causes included accidents from slipping (21%), chemical splashes (13%), and electricity (11%). Most of the occupational health problems of the farmers were due to pesticide poisoning, muscular pain and occupational injuries.

Since farmers are the largest group of workers in the informal sector, the Ministry of Public Health decided in 2011 to make sure that the PCUs in the high-risk areas of every province

will be able to provide Basic Occupational Health Services, including training of health volunteers, risk interviews, health examinations, screening tests for pesticide poisoning, and risk communication. The goal is to provide services in 1000 PCUs for 800,000 farmers .
Chancharoen and Untimanon conclude: ”A definitive occupational health policy is needed, as well as collaboration among related agencies, especially the local authority and health volunteers in the community. In this way the BOHS provided by primary health care units can be maintained, and also extended to broader areas.”

4.2 Secondary prevention

> *“Occupational diseases are highly preventable. (…) The development of a heightened sensitivity of primary care providers to occupationally induced disease is an urgent priority!” (Baker&Landrigan, 1990)*

In 2.2 we described secondary prevention as follows:
Diagnosis and treatment refers to the situation that a patient with health complaints might have a risk factor at work as a cause of disease. For ‘occupational diseases’ work is the dominant risk factor (e.g. asbestos), for ‘work-related diseases’ work is one of the risk factors (e.g. psychosocial risk factors). Secondary prevention in the form of a ‘workers’ health surveillance’ program starts with a healthy working population organizing early detection of a disease caused by high risk working conditions as a consciously chosen option for prevention. Bio-monitoring is one of the options for secondary prevention.

a. **Recognition and diagnosis** of an occupational disease, a work-related disease or an occupational accident. This includes occupational history taking, and when needed an individual workplace visit.
b. **Treatment[qq], rehabilitation[rr]** and **prevention of new episodes** or new cases by counselling.
c. **Notification** of Occupational Diseases to authorities[ss].
d. Next to these three aspects of individual-focused secondary prevention, **a collective approach** has to be considered**: a ‘workers’ health surveillance’ program** by detection (monitoring) of early adverse health effects by work. This strategy is, in general, based on risk assessments on the work floor, Workers health surveillance is only feasible in PHC when developed and guided by an OSH specialist.

Regarding secondary prevention we identified several scientific publications. We will present them below, ending with ‘our number one’.

Already in 1983 **Orris and Baron**[33] mentioned: “Knowledge of the general categories of disease-causing exposures is *essential to the practice of primary care* medicine, but occupational medicine remains an area in which *most physicians are markedly undereducated.* A relevant occupational history may provide the clues to an otherwise elusive etiology”.

[qq] Mostly not specific for occupational diseases (exceptions e.g. PTSD by working conditions, allergic reactions caused by allergens at work), so there can be an overlap with other modules in OneHealth Costing Tool.
[rr] Mostly tertiary prevention (see 4.3).
[ss] This could include referrals to OD specialists.

In 1990 **Baker and Landrigan** elaborated [34]:
"Occupational disease is responsible each year in the USA for 50,000 to 70,000 deaths and for approximately 350,000 new cases of illness. ODs affect all organ systems and (…) may be very difficult to diagnose. Pathognomonic signs and symptoms are rare; most ODs are clinically indistinguishable from diseases of other aetiologies. Diagnosis is complicated further by the long latency, typical between a toxic occupational exposure and the appearance of illness. Further, there is widespread lack of information on the toxicity of most chemical substances, and workers frequently are not informed of the nature or the hazards of the materials with which they work"
Prevention is most efficiently achieved by removing hazardous materials from the workplace and replacing them with less hazardous substances, they say, adding that the occupational history is the principal clinical instrument for OD diagnosis. All patients should undergo at least a brief occupational history that inquires about the current job, including both industry and occupation, the longest-held previous jobs, and any toxic occupational exposures. Proper OD diagnosis permits proper treatment and also provides a basis for recognition of other similarly employed persons who may also be at risk of toxic exposure. US physicians are for the most part not well trained to recognize occupational illness, while at the same time, there is a great lack of qualified specialists in occupational medicine, they say, concluding: "*The majority of care of patients with occupational disease will therefore continue to be the responsibility of primary care physicians, and these physicians must become more highly attuned to the possibility that their patients may have diseases induced by toxic exposures encountered at work."*

One year later both authors published a brief but systematic guide for obtaining an occupational history, and a OD prevention programme[35], stating that better education is not only needed of physicians, but also of workers and industrial managers.

A brief screening questionnaire has been administered by **Wasem et al.,** (2001)[36] to 791 patients consulting a primary health care physician, to discover job-related health problems. The study participants were patients from the general consultation of the outpatient department of the medical university policlinic of Lausanne and from 10 private medical practices in the French part of Switzerland.
Of those patients, 43% estimated that their job had an unfavourable influence on their health. Secondarily 401 patients were interviewed with a questionnaire evaluated by three reviewers resulting in the identification of 25% of the patients as having a job-related health problem.

About 10 years later **Cegolon et al.**[37] came up with four easy to ask questions for GPs, regarding occupational diseases (see Box 1), also important for establishing preventive measures by eliminating and controlling exposure, for epidemiological reporting and studies, regulatory reporting requirements and insurance compensation. Specific OSH expert support can be needed, when after determining the clinical diagnosis and the actual pathology of a disease, the identity, duration, and intensity of the exposure have to be assessed for establishing a close-causal effect.

Box 1. PHC questions about occupational or work-related diseases (Cegolon et al, 2010)

1. What is the time lag between exposure and symptoms?
2. Do symptoms diminish when there is no exposure?
3. Do symptoms aggravate when there is exposure/at work?
4. Do colleagues have the same symptoms, related to the same exposure?

Also in 2010, **Taiwo et al.**[38] underline: ”Given the burden of occupational illnesses and injuries in the USA, *family physicians should understand the role workplace exposures may play in patients' chief concerns”.* They recommend incorporating employment screening questions into patients' intake questionnaires, such as:
‘What kind of job patients have; whether their symptoms are worse at work; whether they are or have been exposed to dust, fumes, chemicals, radiation, or loud noise; and whether they think their health problems may be related to their work’. Afterwards, a more detailed occupational history may be appropriate[tt], and patients with suspected occupational illnesses or injuries may benefit from referral to an occupational medicine specialist for a more detailed assessment and follow-up.’

Closer to practice, **Benavides et al.** (2005)[39] randomly selected a sample of 322 workers attending a *Primary Health Care Center,* from whom 207 workers agreed to participate. An occupational questionnaire was administered, while GPs provided medical records for each worker. Both information sources were independently assessed by three occupational health professionals, concluding: “A significant proportion of *diseases attended in primary care setting was not recognized as occupational*.” A clear sign of the so called Blind Spot in PHC for work.

In the Italian region of Lombardy **Colosio** (2012)[40] started a pilot among agricultural workers, after observing a lack of preventive activities and underreporting of occupational diseases and accidents. Since very often rural GPs are the only health care providers for agricultural workers, the project started experimental activities of collaboration between OPs and rural GPs, based on information exchange. Basic Occupational Health Services were offered to select rural GPs, asking them to perform specific medical examinations[uu] and vaccinations, and to conduct health promotion activities, such as campaigns for prevention of cardiovascular risks.
Although there is no scientific publication yet, this case is interesting because of its context. Preliminary results presented at a scientific Congress (ICOH, Cancun 2012) show that providing agricultural workers with health surveillance at the workplace is fully reachable and that, where it exists, OD notifications increase

Arnaud et al.[41] conducted a telephone study in 2006–2007 among 391 GPs, 95 pulmonologists and 96 rheumatologists in France, concerning their knowledge, attitudes and practice in occupational health. GPs reported significantly less often than specialists that they questioned their patients on past occupational exposure. They more frequently reported difficulties in identifying the occupational origin of diseases, and a lack of knowledge on the OD reporting system. Finally they issued significantly less medical certificates for OD reporting than the medical specialists.

Illustrative is a study done by **Walters et al**. (UK, 2012)[42], knowing that 1 in 10 cases of adult-onset asthma is due to work, and that health outcomes are better with an early diagnosis. However, there is considerable delay, largely due to a *lack of enquiry in primary care about effects of work,* while national guidelines recommend asking two screening questions (See box 2), which together have a high sensitivity in identifying Occupational Asthma.

[tt] E.g. asking about routine tasks performed during a typical work shift; anything out of the ordinary (e.g., a change in routine, an injury or accident). The occupational history should include information about alcohol and tobacco use, second or part-time jobs, military service, hobbies, and home environment.

[uu] Like electrocardiography, respiratory function examinations, hearing function evaluations, biological specimen collections.

Box 2. Two screening questions about occupational asthma *(Vandenplas et al. 2005)*[43]

Two simple questions have a high sensitivity when both are asked:

'Are your symptoms better on days away from work, at weekends?' and

'Are your symptoms better on holidays?'

The conclusions of the study were: "Prevalence of occupational asthma was low, suggesting under-diagnosis plus under-reporting in primary care. Occupation and work-effect enquiry is lacking despite guidelines for identifying occupational asthma."

So, because training in OD detection is considered to be important, the following study is relevant:

Kaewboonchoo et al. (2011)[44] from Thailand wanted to demonstrate, that participatory capacity building regarding OD surveillance could enable the Primary Care Unit (PCU) health personnel to provide satisfactory occupational health services for workers in the community. A needs assessment was carried out to identify gaps in PCU health personnel skills and knowledge so these areas could be strengthened. A training program was developed: 59 health personnel participated in a *5 day workshop* and received instructions regarding a wide range of occupational diseases, surveillance methods, prevention measures, and surveillance systems from the Ministry of Public Health. Participants reported positive changes in knowledge and skills, as well as a high level of satisfaction with the workshop. However, many participants also noted barriers to consistently implementing reporting procedures.

Regarding early detection of adverse effects by work (active workers' health surveillance) we did not find more detailed *nonspecific* intervention studies. This might be not surprising: when it comes to the early detection of occupational diseases, this medical activity is almost per definition focused on one *specific disease,* mostly in correlation with the results of a risk assessment regarding e.g. noise exposure or exposure to one chemical substance such as lead or cadmium.

What we did find in the category of specific diseases in our sensitivity analysis, were relevant guidelines regarding occupational asthma: interventions, issued by the International Primary Care Respiratory Group (IPCRG), representing the highest scientific level of proven effectiveness. So, the most appropriate publication we found regarding secondary prevention is a double-publication by Halbert et al.[45] respectively Levy et al. [46].

In the first of the IPCRG Guideline papers, **Halbert et al.** state: "This paper provides the background evidence and rationale for the integrated diagnostic section of the IPCRG Guideline. It focuses on identifying the unique challenges in respiratory disease diagnosis in primary care, the use of epidemiology to build a co-ordinated diagnostic framework, and the development of tools to support guideline implementation." Pag 14 and 16 (e.g. Table 1) gives guidance about occupation as a cause of asthma.

The second of the IPCRG Guideline papers (**Levy et al., 2006)** deals with the management of chronic respiratory diseases in PHC. "Primary care health professionals are usually the first point of contact for patients who can present a wide range of initial symptoms which may

or may not constitute their first presentation of a chronic disease such as asthma, COPD, or rhinitis. This paper is focused upon the early identification and diagnosis of chronic respiratory diseases in primary care. It uses a symptom-based approach, and includes original questionnaires and diagnostic guides to help the primary care clinician proceed systematically through the diagnostic process." Tables in the article give information about work as a risk factor, e.g. table 12 with the title 'Work-related asthma diagnosis guide.

Equally informative – and disease-specific too - is a cross-sectional telephone study of GPs in France (**Souville et al.,** 2009)[47] about PHC patients with psychological stress at work, studying the frequency of this stress as perceived by GPs, their practices in such situations, and the factors associated with these perceptions and practices, especially drug prescription.'
They used a questionnaire about knowledge, attitudes, behavior, and practices in occupational health, and explored the management of stress at work with a case-vignette of a 45-year-old supermarket cashier consulting for psychological stress that the patient attributes to the job.
In all, 391 GPs participated; 87% reported that they encountered stress at work often in their practice, and that they would treat the case-vignette patient by prescribing anxiolytics (66%), sick leave (66%) or referral to an occupational physician (80%) or a mental health specialist (45%).
Their conclusion was that psychological stress at work is perceived by GPs as one of the principal work-related health problems. Education programs and good practice guidelines would be useful to help them deal with these problems.

4.3 Tertiary Prevention

> *"Introducing and implementing structured functional assessments (…) made GPs capable to assess the functional ability of their patients in a structured manner. Intervention effects of increased GP knowledge and self-efficacy were sustained at the second follow-up". (Østerås et al. 2009)*

In 2.2.2 we described tertiary prevention as follows:

Interventions targeted on patients with a specified disease, often a chronic disease, in order to prevent or reduce negative impact of the disease or injury at work.

The following activities can be seen as belonging to tertiary prevention:

a. Occupational history taking, understanding or analyzing and – if possible – changing or reducing the impact of the disease and therapy on health and on work ability.
b. Assessment of fitness for work.
c. Counselling in patient empowerment and rehabilitation.

The aim is to protect and promote participation at work, rehabilitation and encouragement of return to work as well as self-management in cases of sickness absence or work disability.

Regarding tertiary prevention we were also able to identify several relevant scientific publications. We will present them, ending with 'our number one'.

We start with **Østerås et al**. (2009)[48], regarding functional assessments of workers: assessing patient ability on the level of functioning at work: can they perform adequately their tasks? They took as a starting point, that the increasing attention on functional assessments in medical and vocational rehabilitation requires a focus change for GPs into paying attention to patient resources, possibilities and coping instead of symptoms, problems and limitations.
The purpose of their study was to implement a structured method for GPs to assess functional ability in persons with long-term sick leave, by evaluating intervention effects on important GP parameters: knowledge, attitudes, self-efficacy towards functional assessments and knowledge about patient work factors.
57 GPs were randomly assigned to a control and an intervention group. For the last group an introductory one-day work-shop was organized, afterwards implementing structured functional assessments during an eight months intervention period. GP knowledge, attitudes and self-efficacy towards functional assessments, as well as GP knowledge of patient work factors, were collected before, after and six months after the intervention period started. Evaluation score-sheets were filled in by both the intervention GPs and their patients immediately after the consultation to evaluate the GPs' knowledge of patient work factors. The GPs from the intervention group reported increased knowledge towards functional assessments, and their patients' workplace and perceived stressors, with lasting effects at the second follow-up. No intervention effect was seen in relation to GP attitudes. Both before and after the intervention, the GPs were most informed about physical stressors, and less about mental and work organisational stressors. After consultation, both the 'intervention GPs and their patients reported that the GPs' knowledge about patient work factors had increased. The authors concluded that implementing structured functional assessments in general practice made the GPs capable to assess the functional ability of their patients in a structured manner. Intervention effects of increased GP knowledge and self-efficacy were sustained at the second follow-up.

Buijs et al. (2009)[49] found that Dutch patients much appreciated GP commitment and guidance during sick leave, although almost all of them had free access to an OP. Questionnaires were sent to a sample of long-term sick listed employees (n = 5800; response 42%). From the respondents – of whom 83% reported to have a chronic condition – 89% had a contact with their GP at least once, and 65% more often during sick leave; 92% had a contact with an OP at least once, 80% more often.
While 29% of the respondents regarded the medical specialist as the most important *actual* treating physician – against only 17% the GP, and 11% the OP – 36% would rather consult the GP, 34% the OP, and only 12% the medical specialist. Regarding important aspects like *independence, communication, expertise about the work - health relationship,* and above all *trust,* patients assessed GPs more positively than OPs. When they have health problems they preferred to visit the GP.

But how far GPs want to become committed regarding sickness absence? **Coole et al.** (2010)[50] found out - questioning 441 GPs in the UK (54.6% response rate) –that 76.8% of them reported that they did not take overall responsibility for managing the work problems of patients arising from low back pain. And only a few 'mainly agreed' that they initiated communication with employers (2.5%) and/or therapists (10.4%) regarding their patients' work. So, their conclusion was: "Most GPs do not readily engage in vocational rehabilitation nor initiate contact with employers or other health care practitioners regarding patients' work problems. Thus the current government expectation that GPs are able to successfully manage this role may be unrealistic; considerable training and a change in the GPs' perception of their role will be required."

Another important question is: do GPs and other primary health care professionals communicate with patients about 'work' or a possible work-relatedness of the health problem at stake? **Weevers et al.** (2009)[51] performed a descriptive analysis of 680 systematic observations of GP consultations regarding musculoskeletal disorders of patients in paid work. In 227 of 680 consultations, work was discussed. In 69% the patient started communication concerning the work-relatedness. In 36% of consultations the patient's working conditions were discussed and in 12% the GP advised on whether to stay at home or return to work. There was a statistically significant positive correlation between the extent to which GPs rated the patient's musculoskeletal disorders to be work related and the number of utterances the GP and patient made about work-related matters during the consultation.
So they concluded: 'Work is not a standard topic of conversation during the GP consultation, and GPs could more often start communication about patients' work.'

Meanwhile there seem to be chances, especially regarding prevention of long-term sickness absence. "If GPs were better informed about patients' risks of long-term sickness absence, they could incorporate assessments for that specific risk into their patient management plans and cooperate more with occupational physicians to prevent long-term sickness absence" **Van Dijk et al**. (2008)[52] stated. So they developed a protocol with four basic questions, helping GPs in assessing the risks and in co-operating with OPs, and evaluated its effectiveness (Box 3).

Box 3: Four basic questions, helping GPs to assess the risks of long-term sickness absence (Van Dijk et al., 2008)

1. Do you have paid employment?
2. Is there any current or previous sickness absence?
3. When do you think your sick leave will end?
4. Did you have contact with your OP?

26 Dutch GPs participated in a controlled intervention study, randomly assigned to an intervention or a control group. The intervention group was educated to use the four questions in relevant patient cases. Recording of relevant risk factor information increased significant and substantially in the intervention group (percentage of cases with information on risk factors especially on actual and previous sickness absence, increased in the intervention group with 16 %), and the referral rate by the GP to an occupational physician increased from 2 to 6 %. There was no significant increase in contacts between OPs and GPs or between OPs and patients. They concluded that protocol-supported consultations may lead to a modest increase in information regarding risk factors for long-term sickness absence in GPs' electronic records and to more referrals to OPs.

In another study **Buijs et al**. (2007)[53] developed a GP-guideline to manage work-related mental problems, in coordination with OPs, and assessed its feasibility and acceptability in a pilot, using an explorative and evaluative study design. 23 recruited GPs were trained to include patients with paid work and work-related mental problems, and to test the guideline. Patients received questionnaires after 0, 4, 10 and 30 weeks, GPs after 4 and 30 weeks.
The guideline regards problem orientation, diagnosis and advice (see Table 3), and was meant to avoid contradictory advices and to activate patient responsibility regarding a GP-OP-patient-communication form about information exchange and harmonization of insight and advice. GPs who did implement the guideline concluded it promoted recovery and work resumption. In their opinion OP-GP-contact benefits patients, prevents conflicting advice and

promotes agreement on task division. GPs were less positive about the guideline efficiency and OP-commitment, but patients were very positive, especially about GP-OP contact.

Table 3: GP Guideline for managing work-related psychological complaints, in collaboration with OPs: five steps (source: **Buijs et al**. (2007)[54], p. 39)

Steps	
Problem orientation	Ask patient about work, date of sick leave, work-relatedness of complaints, workload, stressful factors at home, coping/problem solving strategies, support from OP/others, patient's point of view; obstacles to resume work.
Diagnosis	Why does this patient develop these complaints on this moment? Classify complaints: work-related psychological disorder, overstrain, burn-out.
Exchange of information or referral	When there is e.g. insufficient information for adequate treatment: Consult the OP by communication form and/or refer the patient.
Harmonization of insight	If work-related mental problems require OP attention, if there are obstacles to resume work or if an intervention at work is needed, consult the OP by the communication form.
Harmonization of advice	If the GP-advice can hinder work resumption, is contrary to the OP advice or if the GP wants to advise patients with work-related problems, consult the OP by the communication form.

An important aspect of the relation work – health is the growing amount of evidence that having work is a crucial prerequisite for one's health and well-being[55]. From that perspective, an interesting experiment was evaluated by **Pittam et al.** (2010)[56]. They noticed that the first point of contact for most people with common mental health problems, such as mild to moderate anxiety or depression, is their GP. That provides a chance to address the issue of people falling out of the workplace, through the provision of an early combined vocational and psychological treatment package. Four employment advisers could work together with GP surgeries in Eastern England, aiming to help people with mental health problems gain work (Regain clients) or retain their current employment (Retain clients).
The interventions Retain clients found most helpful were careers guidance (including psychological profiling) and developing strategies to negotiate and communicate with employers - in many cases including strategies to help clients think through whether they wanted to consider a career change. For Regain clients the most important interventions were help with interview skills, CV writing and assertiveness training. Employment outcomes were considerably higher for the Retain clients than for the Regain clients.

The most appropriate intervention regarding tertiary prevention we found was from **Beckley et al.** (UK, 2011)[57]. They studied the patient willingness to seek occupational health advice in a PHC-setting. "The dangers of long-term sickness absence and worklessness are well recognized. In the UK, a National Health Service OH service and Leicestershire general practice set up a pilot clinic to provide work-related health advice in primary care". Pre-booked 30 min appointments for work-related health consultations were offered by a GP with a qualification in Occupational Medicine . The appointments were attended by 96 patients in a period of 12 months. Of them 86 were employed, 49 were on sick leave and 10 were

workless. Mental health and musculoskeletal problems were the most common diagnoses. Following their consultation, 29% of patients reported workplace adjustments which were beneficial to them. None of the workless reported a return to employment. So the authors concluded: ”Patients will access work-related health advice in primary care. Extended OH consultations by GPs can achieve positive self-reported outcomes for patients in employment.”

4.4 Policy and programmatic conditions

Many publications in our review deal with prerequisites or conditions needed to enable PHC professionals to really pay attention to workers’ health, like

- Policies, including Mission Statements, Strategy and Objectives.
- Infrastructure and support.
- Tools, guidelines and good practices.
- Education related to competence, knowledge, skills and ethics.

These prerequisites are mutual dependent: none of them can be neglected, in order to successfully introduce interventions for workers’ health in PHC. They reflect the four main focus points of Rantanen’s ‘pyramid’ (Fig 1), covering essential aspects of WHO and ILO Global Strategy for Basic Occupational Health Services.

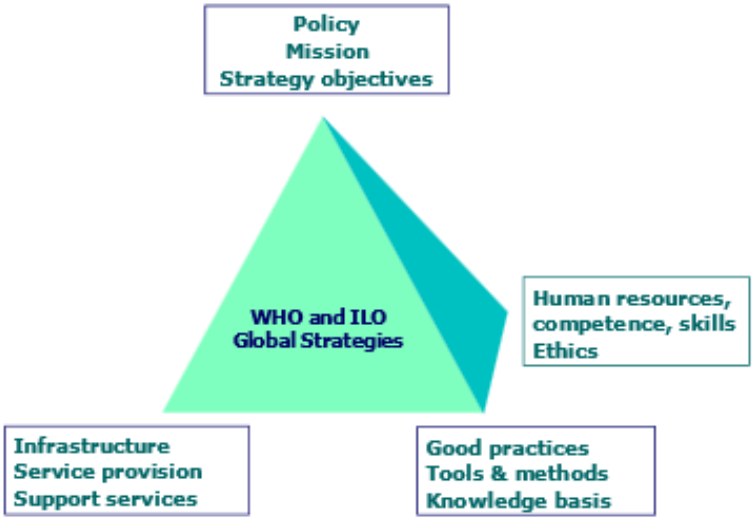

Figure 1. The WHO and ILO Global Strategy for Basic Occupational Health Services

Figure 1 ‘Strategy Pyramid’ (Rantanen, 2007, p. 6, Fig 1)

We considered it worthwhile to pay attention to these aspects - in accordance with the Costing Tool strategy - by choosing two suitable examples of publications for each of the four prerequisites – one from a low income country, and one from a high income country.

4.4.1 Policy, including Mission Statements, Strategy and Objectives

Chen et al. (2011)[58] describe the development of a model in **Baoan, China**, integrating on PHC-level basic occupational health services (BOHS) universally for workers and for the

control of occupational hazards. Steps involved in this strategy included construction of the BOHS system, capacity building, health training and education, surveillance of workplaces and the health of workers, risk assessment, control and evaluation processes. This model provided BOHS to employees universally, especially underserved migrant workers in small- and medium-sized enterprises. It expanded the OHS coverage and improved their content. Knowledge and recognition rate of occupational diseases, the coverage rates of working places and workers rose significantly after 3 years development. BOHS was cost-effective and accepted by both employers and employees. They concluded: “Our experience suggests that a BOHS strategy might be a feasible and effective way of protecting the health of workers confronted with occupational hazards.” See also 4.1.

In the UK, 2008 was a crucial year for the start of reforms regarding workers’ health, with a crucial role for PHC, when the National Director for Work and Health, Dame prof. Carol Black, presented her so called **Black Report analysis**[59]. Main recommendations were:

- Government, employers and representative bodies should develop a robust model for measuring and reporting on the benefits of employer investment in health & well-being. Government, healthcare professionals, employers, trades unions and all with an interest in workers’ health should adopt a new approach to health & work.
- Launching a campaign to understand the positive relation between health and work
- Committing healthcare profession leaders in the consensus statement, supporting GPs and other healthcare professionals to help people enter, stay in or return to work.
- Replace the GP ‘sick note paper’ with an electronic ‘fit note’, switching the focus to what people can do and to better communication with employers and employees.
- Pilot a new multi-disciplinary Fit for Work service to support patients in early sick leave, making access to work-related health support available to all, including those on incapacity benefits and other out-of-work benefits, also for mental health support.
- Including occupational health and vocational rehabilitation within mainstream healthcare.
- Promote professional leadership, clear standards of practice, a revitalised workforce, a sound academic base, and systematic data gathering and analysis.
- Collaboration of those departments who influence Britain’s workers’ health.

Also in 2008, the **UK Government’s response**[60] was positive, with 3 key aspirations:

1. Creating new perspectives on health and work, by introducing e.g. an electronic ‘fit note’ for GPs; providing Health, Work and Wellbeing Co-ordinators to support them; establishing a National Expertise Centre for Working-Age Health and Wellbeing, and a National GP Education Program, to improve knowledge, skills and confidence when dealing with health and work issues and to enable them to adapt the advice they give to help people stay in or return to work.
2. Improving work and workplaces, by several key initiatives.
3. Supporting people with health conditions and disabled people to stay in, return to, or move into work, e.g. by multidisciplinary early intervention services and placing advisers in GP surgeries to help individuals by making access to work-related health support more widely available.

The government concludes: “This is crucial to everyone of working age, their families, their communities, our society and the wider economy. By working together we will help combat social exclusion, eradicate child poverty, support our ageing population, and together build a workforce for tomorrow.”

4.4.2 Infrastructure and support

In **Thailand**, the Bureau of Occupational and Environmental Health (Ministry of Public Health) has been conducting a pilot project, funded by the ILO, to provide occupational health services at Primary Care Units (PCU) for workers in the informal economy. **Siriruttanapruk et al.** (2009)[61] reviewed the pilot progress, and proposed policy recommendations, in order to develop sustainable occupational health services for workers in the informal economy at PCUs in Thailand. Good practices were:

1. Intensive follow-ups to PCUs.
2. Good support to PCUs by provincial public health offices.
3. Promoting self-initiative of workers and employers in improving occupational health;
4. Identifying and supporting local needs.
5. Combining OHS with other priorities like food hygiene and product quality control.

The PCU staff visited targeted workplaces once or twice a month, providing risk assessment, workplace improvement advice, health surveillance of work-related and chronic diseases, basic occupational health education to workers and employers, and safety equipment. For PCUs to further develop sustainable OHS to the informal economy, recommendations for short-term actions were at central government and provincial levels:

1. Formulating clear guidelines on occupational health services at PCUs;
2. Increasing the regular budget allocation to those services by PCUs.

At PCU level they recommended to add the results of OH assessments to the family health files, and to advise the PCU staff to focus on low-cost improvement approaches in BOHS. Recommendations for long-term actions at the PCU level were: Training local health volunteers as BOHS service facilitators; and at the central government and provincial levels:

(i) Establishing national OHS strategies to meet local needs.
(ii) Promoting inter-ministry collaboration.
(iii) Collaborating with local universities and other health research institutions.
(iv) Expanding the coverage of employment injury compensation to all workers.

This project showed PCU staff being able to access workers in the informal economy systematically through the community health network, providing OHS. This "…will become a model not only for other provinces in Thailand but also for other developing countries." the report ends.

Donham (2012)[62] describes a model program to cope with the lack of basic occupational health services and surveillance for **US farmers**: developing, integrating and deploying a program comprised of three projects: (1) Occupational Health Care for farmers (AgriSafe Network Program) incorporating "occupational health and wellness screening, farmer health education and on-farm audits to remove safety and health hazards." (2) An Agricultural Medicine education program developed to learn health care providers "to recognize, treat and prevent occupational health problems", and in addition (3) a comprehensive and multifactorial intervention program (Certified Safe Farm). "These programs run contiguous to prepare providers and structure to provide occupational health care and surveillance for farmers. The AgriSafe Network has evolved to a new independent non-profit organization, with members located in 17 states in the US, Canada and Australia. The Agricultural Medicine Training program, preparing health care providers to serve as AgriSafe Providers, has trained over 500 health professionals from 26 different states and 9 different countries."

It was not clear how many participants came from primary health care. The Certified Safe Farm Program "has proven successful in increased use of personal protective equipment, lower rates of respiratory diseases and of severe injuries, and up to a 47% savings on health care costs for occupational injuries and illnesses. This model is the first comprehensive program designed to educate health care providers to deliver comprehensive occupational health to farmers, and has been scientifically evaluated. A new program, "Building Capacity", is designed to be exported to other countries."

4.4.3 Tools/good practices

Kogi (2012)[63] reviews recent experiences in participatory action–oriented training programs in small workplaces and agriculture, emphasizing training steps, improvement types achieved and the use of action tools by trainers and participants. He describes the following results:

- Immediate improvements in multiple technical areas, including materials handling, workstation design, physical environment, welfare facilities and work organization.
- In facilitating local ergonomic improvements, it is important to focus on:
  (a) building on local good practices.
  (b) practical, simple, low cost improvements applying basic ergonomic principles.
  (c) developing locally designed action-oriented toolkits for direct use by workers and managers, including good examples, action checklists and illustrated how-to guides.

Based on these findings, Kogi concludes that the intervention studies demonstrate the effectiveness of participatory steps using these toolkits in promoting good practices and reducing work-related risks. PHC providers were not involved, but the author recommends this strategy as particularly useful for BOHS regarding SMEs.

Rantanen (2009)[64] describes surveillance results, enabling him to draw general conclusions, made on the level of overall quality, safety and health of the workplace. The checklist is based on observations of the (non-)correctness of the characteristic in concern. This decision is made, based on available standards, guidelines or criteria provided in the BOHS training. Some of the workplace features may be hazardous, others may be fully acceptable. Special hazards and other findings should be discussed with the employer and workers and, if needed, controlled and managed by the persons responsible for safety and health in the workplace. Often high target numbers for improvement are recognized. Decisions on order of priority and urgency are made by using the risk-ranking table of this guideline. According to the continuity principle, and due to dynamic changes at workplaces, a repeated survey is planned in due course, depending on the workplace nature, the observed hazards and the expected changes. BOHS providers, including PHC should survey every workplace at least once a year.

We like to end this paragraph, mentioning the informative **UK website for PHC and work**. It provides physicians and other healthcare professionals with information, guidance and training on the management of health and work: http://www.healthyworkinguk.co.uk/home .

4.4.4 Education (competences, skills, ethics)

Kaewboonchoo et al. (2011)[65] aimed to demonstrate participatory capacity building in **Thailand** regarding occupational disease surveillance to enable Primary Care Unit (PCU) health personnel in providing satisfactory occupational health services for workers in the

community. A needs assessment was carried out to identify gaps in the PCU health personnel skills and knowledge so these areas could be strengthened. An occupational disease surveillance training program was developed, and 59 health personnel participated in a five day workshop, receiving instructions about a wide range of occupational diseases, surveillance methods, prevention measures, and surveillance systems. (see Table 4)
Participants reported positive changes in knowledge and skills, as well as a high level of satisfaction with the workshop. However, many participants also noted barriers to consistently implementing reporting procedures.

Table 4. Occupational disease surveillance training program (Derived from Table 2 in: Kaewboonchoo et al. Participatory capacity building in occupational disease surveillance among primary care unit (PCU) health personnel. Southeast Asian J Trop Med Public Health 2011).

Occupational disease surveillance training program.

Date	Time	Contents
Day 1	8:30-9:30	Introduction of participants and social group activity
	9:30-12:00	Overview of occupational health concepts
	13:00-14:00	Overview of the occupational disease surveillance system of the MOPH
	14:00-16:00	Experience sharing: discuss problems and challenges with ODS at the PCU level
Day 2	8:30-9:00	Warm up session
	9:00-12:00	Principles of occupational disease screening
	13:00-16:00	Musculoskeletal disorder surveillance
Day 3	8:30-9:00	Warm up session
	9:00-12:00	Skin disease surveillance
	13:00-16:00	Practice by case study: occupational disease surveillance at the PCU level
	16:00-16:30	Homework assignment
Three weeks break		Practice at their own PCU regarding diagnosing, recording and reporting occupational diseases
Day 4	8:30-9:00	Warm up session
	9:00-12:00	Pesticide related disease surveillance
	13:00-16:00	Homework presentation
Day 5	8:30-9:00	Warm up session
	9:00-12:00	Best practice in occupational disease surveillance at the PCU level
	13:00-16:00	Evaluation of the workshop
		Closing the workshop

In 1987 the University of Iowa began training health care professionals from various disciplines to care for farmers' work and health needs related to occupational diseases and accidents, strengthening capacities in anticipation, diagnosis, treatment, and prevention. **Fisher and Donham** (2011)[66] describe the challenges, successes, and lessons learned from dissemination this Agricultural Medicine Core Course.

In-person instruction is the optimal way to teach the materials, but in very rural states part of the training could be conducted via distance learning, to be tested in North Dakota. A significant outcome of the project has been the development of state affiliates for the AgriSafe Network in Vermont, North Carolina, Wisconsin, Iowa, Illinois, and Australia.

Other valuable lessons learned:

- There is tremendous synergism in the multidisciplinary participants and the mixing of students with practitioners.
- Course participants become energized to incorporate agricultural medicine in their practices and become advocates of the farm population, serving their needs.

The expansion of this program has been “a process of collaboration, evaluation, and revision based on evaluation. Examination results, trainee course evaluations, instructor surveys, and key organizer interviews have all influenced course organization and technical assistance.”

5 Discussion

We first reflect on the results regarding risks and needs and regarding different elements of the health care system. Next we give a reflection on the three prevention levels and the four prerequisites. After discussing strengths and weaknesses regarding this review, we present additional observations such as on the weaknesses of the studies we have found in our search and the significance for the recommendations.

5.1 Reflection on results

Within the limitations of this study we were able to describe how the topic 'work and health' can fit in primary health care, regarding the three levels of preventive interventions by PHC on workers' health, as well as the four policy and programmatic conditions. Consequently we could find evidence in the scientific literature relevant for PHC for all three intervention levels as well as for the four prerequisites needed for a successful implementation: policy, infrastructure, tools and education. As we were asked to find evidence on input, process, output and outcome parameters of health care, we start with a consideration using this perspective, after a short introduction on studies showing risks and needs involved.

5.1.1 Risks and needs; from input to outcome

Risks and needs

Much evidence has been found on the level of risks and needs: studies demonstrating high risks at workplaces and a high prevalence or incidence of occupational and work-related diseases, accidents, sickness absence and work disability. Many studies deal with the lack of attention within PHC for 'work' ('Blind Spot'), not limited to high-income countries. We have found studies showing insufficient diagnoses of occupational and work-related diseases by PHC leading to suboptimal or even inadequate treatment, as well as to underreporting. For one of the big PHC challenges for the coming decades - supporting patients with a chronic medical condition to find or keep a job - studies show the need for improvement and the potential benefits for workers, companies and society.

Health system quality: from input to outcome

On the level of *input* in the health system we found examples of development and implementation of large-scale programmes such as in China, Thailand, Indonesia[67], USA and the UK. We also located a number of good practices such as schemes how to visit workplaces and checklists for the description and evaluation of hazards and risks at work. There are descriptions of tools and protocols for the recognition and diagnosis of occupational and work-related diseases including suggestions and lists for occupational history taking. In other publications, numbers of well-educated, motivated and supported PHC professionals and community health workers are presented being the result of training and education in workers' health. It should be noted that in all large programmes, PHC professionals and volunteers are supported by experts and a good infrastructure. On the other hand some studies reported about GPs being reluctant to engage in vocational rehabilitation nor initiate contact with employers regarding patients' work problems. In general GPs do not consider (yet) work as a standard topic of conversation with their patients. In another study however an increase was found of the GP's capability to assess the functional ability related to work of their patients, when trained in using structured

functional assessments. A good example of an appropriate tool is a set of just four simple questions for the GP to assess the patient's risk for long-term sickness absence.
We found one study on the development and piloting of a GP-guideline to manage work related mental problems in coordination with OPs. In our searches we did not find many examples of evidence-based guidelines on workers' health suitable for primary health care, but this is presumably a consequence of our search strategy not specifically searching for those guidelines or for specific diseases.

Regarding the essential interventions on *process* level we found studies reporting about the number and kind of interventions or professional activities completed, inclusive numbers of PHC or community health personnel and volunteers, and numbers of workers and companies involved. Reports from China and Thailand include e.g. numbers of factories covered by OHS, number of workers or clients, of workplace advises and medical examinations. In a Dutch study the information about risk factors for long-term sickness absence increased using a simple questionnaire. Unfortunately we did not find studies on the performance quality of the activities by PHC on workers' health.

The *output* in terms of number of advises, recommendations or reports to workers, patients or companies were described in a few studies e.g. about working conditions, personal protection, or individual fitness for work. One publication mentioned increased referral rates to an occupational physician after using a new tool. In other studies reports were mentioned about the most frequent risks at the workplaces and about the most frequent occupational diseases and injuries identified.

A few publications reported about *outcomes* such as the increased awareness about occupational health in workers and managers in China, in a before-after study with large numbers. In ILO WISE and WIND studies and in BOHS guideline publications, improvements are reported in e.g. working conditions and work organization, but we could not find figures. In some publications, the role of primary health care is not clear. In one study workers described benefits of advises to adjustments of workplaces. Clients with mental health problems informed about positive effects of PHC advices in retaining or regaining work. However, we did not find more objective outcomes on health or safety such as fewer diseases or accidents, or improved work participation rates after interventions.

5.1.2 Essential interventions at the three prevention levels

Primary prevention
Of all levels interventions in primary prevention were hardest to find, taking into account the practice or suitability for PHC. Still we can mention several examples:
In Thailand training programs for PHC professionals are described regarding prevention at the workplace. Next, primary care unit personnel is performing occupational health education, walk-through working environment surveys with an observation checklist and risk interviews, and risk assessments. Finally they practise risk communication.
In the province of Baoan in China a comprehensive program for integrating BOHS in PHC is executed including surveillance of workplaces and the health of workers, risk assessments, control and evaluation processes. On the level of PHC or community health services primary preventive tasks are occupational health education and health promotion. Working environment surveillance however is carried out by experts from institutes on town or district level.

Concluding:

- Primary prevention activities – including workplace visits - can be part of PHC interventions on workers' health in situations where the community has a dominant industry or where agriculture is dominant. Expert support is needed.
- Also education and training regarding primary prevention, as well as health promotion can be done by primary health care professionals.

Secondary Prevention

On the level of community health services in Baoan, China the secondary preventive task is a general health examination once a year for those workers not exposed to occupational hazards that are listed in legislation. The centres work as sentinels for the detection and control of occupational diseases as they check on workers earliest when they have health problems. If symptoms might be associated with work they report to the town level for further investigation.

In Thailand health examinations, health screening and screening tests for pesticide poisoning or exposure are described, as well as interviews of workers with occupational sicknesses or injuries.

In Italy GPs, supported by OH experts, took part in pilots performing medical examinations in farmers presumably resulting in an increase of occupational disease notifications.

In several publications from USA, Italy, Swiss, Spain and other countries screening questionnaires and schemes for occupational history taking by PHC are described, to screen for job-related health problems or for potential occupational diseases.

The International Primary Care Respiratory Group (IPCRG) has published guidelines regarding occupational asthma[vv]. For early identification and diagnosis a symptom-based approach is recommended. The guideline includes original questionnaires and diagnostic guides to help the primary care clinician to proceed systematically through the diagnostic process. Tables give information about work as a risk factor.

Concluding:

- General health examinations once a year as is practice in China may lead to the detection of work-related health problems and occupational diseases. It is important to support PHC e.g. with facilities to refer patients suspected of occupational diseases.
- Screening tests such as for pesticide poisoning or exposure, can be performed by PHC under guidance of experts as part of a well-developed infrastructure.
- Tools are available for primary health care to detect occupational diseases during office hours; training and education is described.
- We did not find well-designed studies at primary care level that taking a good occupational history results in a better detection, individual therapy of support, and to better notification of occupational diseases. As we did not search for specific diseases[ww], there is a chance of overlooking well-designed studies e.g. related to a specific disease such as occupational dermatitis, work-related musculoskeletal disorders or mental health problems.

Tertiary prevention

On the level of primary and community health services in Baoan, China and in Thailand the tertiary preventive tasks are mainly first aid services and emergency treatment.

French GPs reported that they encountered the problem of stress at work often in their practice, and that they would treat the (case-vignette) patient by prescribing anxiolytics

[vv] In general this study was meant to be focused on not-disease specific information, but we made deliberately an exception for respiratory diseases, to explore the potential of looking into more *specific,* disease-related studies and sources See 3.2 .

[ww] See also the previous footnote.

(66%), would certify sickness absence (66%) or would refer to an occupational physician (80%) or a mental health specialist (45%).
In Norway GPs were trained in structured functional assessments. That did increase their knowledge towards functional assessments, and towards their patients' workplace and perceived stressors especially physical stressors. Training resulted in making them more capable to assess the functional ability as an author's conclusion based on self-reports (self-efficacy).
Dutch workers on long-term sick leave, most of them having a chronic medical condition, had many contacts with GPs and OPs. Patients had more trust in GP compared with OP. And although they regarded medical specialists often as their *actual* treating physician, many of them would prefer their GP instead.
GPs in UK do not readily engage in vocational rehabilitation nor initiate contact with employers or other practitioners regarding patients' work problems.
In The Netherlands many GPs did not start communication about work with their patients having musculoskeletal disorders. In another Dutch study a simple tool of four basic questions was developed and evaluated to clarify the risk on long-term sickness absence of the patients. The tool was evaluated positively. A guideline for GPs on how to deal with work-related mental health problems in coordination with OPs, was positively evaluated by patients and GPs in a pilot, but implementation was not easy.
Employment advisers working together with GP surgeries in England could help patients with common mental health problems in difficulties in gaining work or retaining their current employment.
In another UK study a pilot clinic to provide work-related health advice in primary care was set up with 30 minutes appointments for work-related health consultations by a GP with a qualification in Occupational Medicine. Mental health and musculoskeletal problems were the most common diagnoses. Following their consultation, 29% of patients reported workplace adjustments that were beneficial to them.

Concluding:

- In Baoan, China and in Thailand first aid services and emergency treatment are offered by PHC.
- In many European countries GPs are active in consultations of working patients regarding their health and work ability given a medical condition. Mental and musculoskeletal conditions are often encountered. In these consultations advices are given about work and work ability. However, in the UK, The Netherlands and probably many other countries, there seems to be a need for improvement in the general attitude of GPs towards work and in communication skills regarding work.
- Employment advisors and GPs with training in occupational medicine, working within primary health care did obtain good results.
- There are indications that training GPs in structured functional assessment results in better advices to patients.
- A simple questionnaire on risks for long-term sickness absence applied by GPs was successful in detecting those risks and resulted in more referrals to an OP.

5.1.3 Policy and Program

New comprehensive and well-structured **programs** in building qualified capacity in PHC for workers' health started only recently in a few countries, as we saw for Great Britain, China and Thailand, (See 4.4.1. and 4.4.2), more recently in Indonesia[68] and just starting in Turkey. There is a need to ask the stakeholders for existing or new to perform evaluation studies. National of regional **policy decisions** form the basis of these large-scale programs. As an

illustration for the practice in the other countries we will present briefly the grand design as reported from the province of Baoan, China. The three-level basic occupational health system has been integrated in the already existing health care system. On district level occupational health was integrated in the Centre for Disease Control and Prevention, on town level in the Institutes of health care and prevention, and in each community in a Community health service centre using the primary health care approach. Several obvious advantages are summed up pleading for integration of occupational health with the existing (primary) health care system. In the future the authors propose also to develop other models such as group services organized jointly by SME's (hiring less than 2,000 workers).

Also in Thailand primary care units are not operating isolated. It is described clearly how the **infrastructure** is organised e.g. through expert support to primary care units by provincial public health offices. Intensive support came also from the Bureau of Occupational and Environmental Diseases. Some experts visited primary care units. "Such regular follow-up visits motivated the target primary care unit staff , ensured continuous services and identified improvements needed to upgrade the services for local people" (Siriruttanapruk 2009) .

In a thesis study in Indonesia, Central Java as a province without support centres has been compared with West Java as a province with five centres for occupational referral services (BKKM) that support so called occupational health posts connected with community health centres (equivalent for PHC). The BKKM, equipped with competent human resources, funding and infrastructures, strengthened the occupational health deliveries and community health centre officers[69].
In Baoan, China the Centre of Disease Control on the highest (district) level has the task to provide information, advice and training for BOHS personnel. Institutes of health care and prevention on intermediate (town) level have clear own responsibilities such as on surveillance of the working environment and proposing prevention and control actions. Community health services centres on the lowest administrative level always check on sick workers earliest. When they judge that the symptoms may be associated with work they report to the institutes on town level that investigate these cases. The institutes decide whether these cases are caused by the working environment or not.
In UK expert support has been organized by a special website for primary health care professionals with a helpdesk function, referral addresses for GPs and patients showing local support groups and national advice lines, information, news and educational materials special developed for primary health care (see 4.4.3).

A USA founded comprehensive education and support program for basic occupational health services and surveillance for farmers committed many professionals, not only in many States of the USA but also in other countries. The role of primary health care however is not clear.

Tools suitable for PHC on workers' health are described in a number of publications. We did find only a few well-designed studies evaluating explicitly the suitability for PHC or the quality of the application in PHC.

Education and training of PHC professionals and volunteers is mentioned in all program descriptions as an essential component. Evaluation studies are scarce. One good example comes from Thailand where a needs assessment was carried out before the educational program started. After the training, participants reported positive changes in knowledge and skills, as well as a high level of satisfaction with the workshop.

5.2 Strengths and weaknesses

Strengths

We succeeded, given the limited possibilities in this study, to give a wide overview of interventions by primary health care on workers' health. Starting with a conceptual approach, needed in this rather undiscovered and seldom described area, we proceeded with a number of searches looking for supporting evidence.

In the conceptual part of the study we tried to bring together the practical and conceptual worlds of primary and occupational health care, with a multidisciplinary team including primary health and occupational health expertise. We defined a number of potential interventions for three levels of prevention that can be (made) appropriate for primary health care in the different regions of the world and in different contexts.

We did not only a search for examples of preventive interventions but extended the range to a search of studies on policies and programmatic conditions. This extension is not only referring to the OneHealth Costing tool that uses the same approach, but also to a number of impressive practices in various countries. We considered that it would be unwise even to suggest that isolated primary health care interventions will be a valid or sustainable answer to the huge problem of the about 80 % of the workers worldwide that have no professional support in occupational health and safety. In practice we know that a well-designed policy and a programmatic approach are needed to support PHC professionals in delivering essential care for workers' health. Expert support may involve multidisciplinary expert-based occupational health services with a variety of experts, (national or province level) institutes of occupational safety and health, regional clinical facilities, laboratories and a good information infrastructure using modern IT provisions, optimal using social media.

We performed a number of searches looking for evidence. For this part of the study we have deliberately chosen for the model of a 'scoping review'. The reason for this choice is that the field of primary health care performing well-structured activities for workers' health is rather new and often in an experimental phase. This implies that evaluation studies following accepted formal scientific models might still be scarce. At the same time we know, and that is confusing, that professionals in PHC in their daily practice are dealing almost every day with workers' health as they are confronted not only with occupational and work-related diseases and health problems, but also with sickness absence and work disability because a major part of the population has a paid job in the formal or informal economy. So, while a large-scale programmatic approach is new, it is true as well that a number of articles on this topic were written even decades ago.

Confusion may arise furthermore as the terminology is not yet well-founded and in debate. Some authors and authorities prefer terms as 'basic occupational health services' offered among others by primary health care. Others prefer the term 'workers' health', again others refer to primary care in the form of community health care. The wide variety of risk factors and the wide, range of potential interventions, coping and control strategies, the multitude of relevant diseases, injuries and forms of work disability as study outcomes, made the execution of a formal systematic review that usually has a more clear focus, not possible. Using the methodology of a scoping review however allowed us to follow sometimes unusual pathways such as exploring Google Scholar for the most recent publications, even in the grey literature, and to use a variety of search strategies in PubMed/Medline.

Weaknesses

More on operational level we had to make choices in e.g. search strategy, number and kind of databases, search terms, number of years to screen and how to deal when you find

thousands of hits in Google Scholar to give an example. We would have welcomed more time for the searches. Due to time and financial restraints we concentrated on publications in English. So we did not have the chance to check publications in e.g. Spanish, Portuguese (Brazil), Indian or Chinese language on their value for workers' health in PHC. The PubMed function 'Related articles' has been used with success only in a few cases, as such searching is time-consuming. We recommend the use of this function consequently in a more exhaustive or a much more focused study in the future.

Making the choice for selecting only generic, namely not disease-specific studies as we were asked to do by WHO, so not focusing on a selected limited number of specific diseases such as on hearing loss, asthma, low back pain and rheumatoid arthritis), has been a limitation in the search and study strategy because many scientific studies and almost all reviews and guidelines focus on one (group of) disease. So, most of those studies are not retrievable only using generic terms in searches (e.g. using only 'occupational diseases' as term). Therefore we decided to explore the yield of a search after publications in respiratory diseases as a kind of sensitivity analysis. This exploration confirmed our suspicion that there may be more studies on disease-specific level showing e.g. tools and interventions useful to apply by primary health care, such as on diagnosis and prevention.

5.3 Additional observations

This study focuses on PHC, but several times during our search we did run into publications indicating that also medical specialists are involved increasingly in workers' health, like in the medical disciplines of dermatology, oncology, cardiology, psychiatry, rheumatology, rehabilitation and orthopaedics. Those often very recent studies on workers' health, developing and evaluating innovative clinical practice but also preventive activities and a variety of tools, elucidate a great potential for future improvements.

Starting with more uncertainties than certainties we had to make several choices that are inevitably partly arbitrary. One of these is to include studies and practices that are sometimes more representing community or public health than primary health care. Our argument is that the boundary between both is more or less non-existing or rather vague in a number of countries. Another argument could be that both are part of the primary health care structure in the context of our study, organizing care for millions of workers without any professional support. In such cases we prefer inclusion and not exclusion.

A large series of Cochrane reviews is published on occupational health interventions, including reviews on the effectiveness of interventions to protect workers, e.g. through education and training, who are working in high noise levels or in physically heavy working conditions. Other studies could have been included such as the evaluation study of Verbeek and Ivanov (2013)[70] on the effectiveness of interventions to prevent major causes of seven common occupational diseases: work-related cancer, dust-related diseases, asthma, COPD, noise-induced hearing loss, back pain and occupational injuries. Some of these advises can be at least useful for PHC to know, such as that feedback and rewards for workers probably help in reducing occupational injuries, and that drugs and health examinations have little to offer for primary prevention of occupational diseases and injuries, nor education and training as single interventions.

Guidelines can of course be an adequate tool regarding PHC and workers' health, but as we have said: in our searches we did find only a few evidence-based examples, presumably as

a consequence of our search strategy. We know e.g. that the Dutch evidence-based GP Guidelines in general pay little of no attention to 'work': out of 10 most relevant guidelines regarding workers' health only the one for low back pain did so, and to a much lesser extent the guidelines for depression and anxiety disorders. One reason is that there are few, if any, RCT's or other relevant clinical studies with work-related outcomes, which is reflected in the content of the guidelines[71]. Yet the guidelines should pay more attention to the relationship between work and disease. Very positive to mention is that to date a chapter on work has been included in 56 evidence-based guidelines for different diseases [xx]. Most of these were developed by medical specialists in close collaboration with the Netherlands Society of Occupational Medicine (NVAB).

An imbalance of the materials found is that many studies in this search are initiated by occupational health experts. In the near future we hope for a more equal participation of PHC experts, among them general practitioners/family physicians from Wonca and operating on a national or local level.

Another weakness in the materials found and discussed before is the lack of well-designed studies, especially evaluation studies. However, this fact is partly a consequence of the phase of development we are in: we have found the start of new programs and practices in a few countries and not even in all continents, showing a remarkably absence of Latin American publications (probably partly as a result of not selecting Spanish and Portuguese publications) and publications from Africa (maybe partly as a result of not selecting publications in French).

Many studies have been conducted on a small scale or were pilot studies. We could not find well-designed studies on the effectiveness of PHC interventions on the level of improved health or work ability of the workers or patients. Controlled studies or RCT's were almost absent, so there is a lack of high quality scientific intervention studies. This does not mean that the interventions that are realized are not effective on health or work ability. The significance is that we do not have confirmation from well-designed scientific evaluation studies that we would like to have given the need for evidence-based practice (see also recommendation nr 3).

There is also a scarcity of well-designed evaluation studies regarding PHC based advices for improvement of working conditions, safe behaviour or company policy. Where we have found reports about e.g. the success of ILO WISE and WIND programs or of large-scale programmatic approaches of PHC interventions on workers' health, such as in Thailand and China, we miss formal scientific evaluation studies (observational or intervention studies) with a control population, a time series design or an RCT design.
To give an example, in the article "Grading the quality of evidence and the strength of recommendations in clinical practice guidelines" (Brozek et al. 2009)[72], the quality of evidence regarding intervention studies, originating from observational studies without special strengths or with important limitations, is classified as "low". The quality of evidence form observational studies with serious limitations is regarded as "very low".
For example, in the data presented in the studies of Chen et al. about the Chinese program and in the materials about Thailand presented by Chancharoen and Untimanon, we can find many indicators but no exact data on risk reduction, risk mitigation, or improvement of working conditions. There is no before-after design, no time series design, and no control group. It is also possible that we do not have all information yet.

[xx] http://nvab.artsennet.nl/Richtlijnen/Multidisciplinaire-richtlijnen.htm

On the other hand, one has to realize that recommendations for practice in the leading GRADE approach are determined not only by the level/quality of evidence.[73] The proposed four factors determining the strength of recommendations for practice are:

1. The balance between desirable and undesirable consequences of alternative management strategies.
2. The quality of the evidence.
3. Variability in values and preferences of stakeholders.
4. Costs of the intervention.

So applying this proposal on the strength of recommendations to give based on the publications about the programs in Baoan, China and Thailand, we might reflect on the four factors with an impact on the strength of the recommendation as follows:

Ad 1. There are many undesirable consequences of NOT starting with a program, based on available (primary) health care systems, oriented on risk assessment and control, health surveillance and diagnosis and control of occupational diseases, in cases of clearly high risk working conditions and (potentially) a high prevalence or incidence of occupational and work-related diseases and accidents.
Ad 2. The quality of the evidence of the evaluations of interventions as found in the literature is low, maybe very low.
Ad 3. In both countries the publications suggest sufficient support from different stakeholders; in Baoan, China the program is accepted by both employers and employees.
Ad 4. In Baoan, China it is argued that the program is cost-effective. In Thailand there are plans to extend the services to 1000 primary care units for 800.000 farmers suggesting a good balance between costs and benefits.

The preliminary conclusion may be that there are good reasons to recommend a programmatic approach like completed and further developing in Baoan, China and Thailand even when the evidence on the effectiveness is weak. Adaptations will be needed dependent on local conditions. Still there is an urgent need to improve the quality of the evidence by better designed innovations and good evaluation studies. We need urgently (inter)national research programmes – and funding - to evaluate the quality and implementation of PHC interventions, and we miss accompanying more fundamental research in this quite unexplored area.

6 Conclusions and recommendations

6.1 Conclusions

1. A variety of primary health care activities for workers' health are reported from different regions of the world, demonstrating that essential interventions are applied in a wide diversity of countries and situations. Structured large-scale programs involving primary and community health care in new activities on workers' health started recently in a few countries. This is encouraging and at the same time demonstrating the pioneering status of these programs. Many small-scale activities aiming to improve interventions on workers' health within existing primary health care practice can be noted in a wide variety of countries.

2. Based on the results of the literature search we may conclude that essential interventions on workers' health on the level of primary, secondary and tertiary prevention as proposed for primary health care are supported to a greater or lesser extent by evidence from the scientific and gray literature.

   Primary prevention activities – including workplace visits - can be part of PHC interventions on workers' health in situations where the community has a dominant industry or where agriculture is dominant and when expert support is available. Serious limitations in PHC interventions can be found in more complex activities where experts are needed such as for most risk assessments and advises regarding more complicated improvements of working conditions. Education and training in prevention and health promotion can be executed by primary health care professionals.

   Secondary prevention activities by primary health care may include periodic general health examinations to detect work-related health problems and occupational diseases. Screening tests as part of a workers' health surveillance program -such as for pesticide poisoning or exposure, can be performed by PHC under the condition of guidance by experts. Tools and education are available for primary health care to detect occupational diseases in daily practice. We did not find well-designed studies showing that better tools and education result in a better detection, individual therapy or support, screening or notification of occupational diseases.

   Tertiary prevention activities may include first aid services and emergency treatment by primary health care and consultations of working patients regarding their health and work ability. In several countries the attitude and communication skills of GPs regarding work have to improve. New tools can lead to more GP knowledge on the risks for long-term sickness absence and to better advices toward patients with a chronic disease and problems at work. Employment advisors and GPs with extra training in occupational medicine obtained good results while working within primary health care.

3. The programs and studies make clear that the integration of a number of activities on workers' health -in primary or community health care has many advantages and should be promoted, but also that primary health care can only work structurally and sustainably on workers' health when supported by an infrastructure involving experts of various disciplines in occupational health and safety.

4. The level of evidence about the feasibility of programs aimed to encourage and structure capacity building and concrete primary health care interventions for workers' health is high as can be shown by a number of impressive programs from Thailand, China, UK, Indonesia and other countries. These programs show that large-scale primary health care interventions have to be supported by a programmatic approach including investments in infrastructure - among others organizing expert support -, tool development and education and training of primary health care personnel.

5. The level of evidence regarding the quality including the effectiveness of the interventions is not high, so there is an urgent need for scientific sound but practical implementation and evaluation studies, like good qualitative studies and quantitative studies using control groups, a time series or a RCT design. We also miss implementation studies and studies measuring outcome variables reflecting the impact on workplaces and workers, like (improved) working conditions, enterprise policy, health, safety, work ability or work participation. Such studies need to be planned from the very beginning of projects and programs.

6.2 Recommendations

1. We recommend discussing the conclusions and recommendations of this report with experts from Wonca and ICOH, and with representatives of both small-scale and large-scale initiatives in the world on primary health care interventions for workers' health. The discussion might focus on (a) the potential contribution of primary health care for workers' health given the examples presented in this report, and the limitations as presented in the conclusions, (b) the programmatic, infrastructural, financial and OSH expert support for primary health care required to fulfill this contribution, (c) the need for better evaluations of new initiatives, and (d) the need to strengthen and upscale international programs to support initiatives e.g. support with education and information, and with the choice and execution of evaluation studies.

2. We recommend - given the fact that 80-90% of the global workforce has no occupational health care at all, nevertheless forming the backbone of national economies - both well-designed small-scale innovations regarding occupational safety and health, but certainly also large-scale programs, developing primary and community health care for workers' health, including policy and infrastructure development, tool development and adequate education. This applies especially to make progress in situations where workers are exposed to high risks at the workplace. Such programs should learn from experiences in e.g. China, Thailand, Indonesia, USA and UK.

3. We recommend improving the scientific evidence regarding the feasibility, quality and effectiveness of the programs and interventions by facilitating innovations both in concrete primary health care interventions and on programmatic level. Development of innovations can be supported by existing knowledge, tools, materials and experiences. The quality, implementation and effectiveness have to be evaluated properly. That implies appropriate (financial) investments in (inter)national research and development programs to support and evaluate preventive interventions by PHC on workers' health. The final goal is to develop evidence-based policies to support (inter)national efforts in this still quite unexplored but promising area.

4. We recommend improving concrete primary health care activities on workers' health e.g. starting innovation and education programs to encourage questioning patients on their working conditions and to apply a good occupational history. Physicians, nurses, community health workers and others should be provided with appropriate tools for the identification and control of occupational diseases and work disability. Collaboration of primary health care professionals with occupational physicians, safety experts, hygienists, ergonomists, psychologists and occupational nurses should be encouraged.

5. We recommend studying the scientific literature thoroughly, and evidence-based guidelines related to workers' health that can be a source for new or better tools and interventions for primary health care. Education and training of primary care personnel can be supported by international exchange of experiences, facilities and learning materials.

6. We recommend stimulating inter-sector collaboration and coordination, involving health, labor, environment, agriculture, industry and education, in order to deliver occupational health care to all workers, also by other ways than by primary health care. Social security institutions, employers, trade unions, the private sector and civil society organizations have a particular role to play – together with the governments - in shaping public policies for workers' health.

6.3 Closing remarks

"Give us the tools, and we will do the job!"

(Winston Churchill during the Battle of Britain, 1940)

Finally: of course primary health care cannot completely replace comprehensive multidisciplinary occupational health services available in both high and low-income countries and in multinational companies. But if we succeed in letting primary health care all over the world pay appropriate attention to workers' health that will mean a major step forward in the direction of where the WHO World Health Assembly asked for in 2007: a full coverage of occupational health care of the global workforce. And according to the 'Principles of The Hague', that applies especially to the more vulnerable parts of that work force: workers in SME's and informal economy, self-employed, migrants, people with a handicap or a chronic condition. That will mean a real revival of the 1978 Alma Ata Declaration, speaking about bringing primary health care as close as possible to where people live and work.
We hope that the results of our study will be helpful to give primary health care workers the tools to do this challenging job, benefiting workers' health!

7 References

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