Underestimated health exposures and effects:

UV skin exposure and outcomes

-disseminating the knowledge of STANDERM COST Action-

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• “Interpretative Document” to the EU Strategic Framework Health and Safety at work 2014–2020 aimed at DG EMPL and EU OSHA.
Exposure to solar ultraviolet radiation (UVR)

- Classified by the IARC and the WHO as a recognized group one carcinogen associated with the highest level of causality for skin cancers, both melanoma and non-melanoma skin cancer (NMSC)


NMSC

- NMSC is the most common cancer in the world and incidences are increasing.
- Considered a tumor typical for elderly, male farmers
- 2 - 3 million people diagnosed worldwide each year
- Age-specific incidence rates increase steadily from age 20–24 years, with increase being sharper for males from age 55–59 years onwards.


North-south gradient for SCC incidence

• NMSC comprises cutaneous squamous cell carcinoma (SCC) and basal cell carcinoma (BCC)

• Population-based cancer surveys conducted by the National Cancer Institute in the US have shown a north-south gradient for SCC incidence with low rates in northern states and high rates in southern states

• Estimated 50–70% of SCC and 50–90% of BCC in fair-skinned people are caused by UV radiation


AK

- Actinic keratosis (AK) is an in situ SCC which may develop where skin has been exposed to the sun over time.
- AK is caused by cumulative exposure to the sun and can take years or even decades to appear in the form of noticeable skin changes.
- Elderly people living with AK are six times more likely to develop any type of skin cancer than those without AK. 13
- The vast majority of invasive SCCs begin as AK

Increasing risk

• Systematic reviews and meta-analyses have demonstrated that occupationally UV-exposed workers are at least:

• at a 43% higher risk of BCC [pooled odds ratio (OR) 1.43; 95% confidence interval (CI) 1.23–1.66; P = 0.0001]

• and 77% higher risk of SCC (pooled OR 1.77; 95% CI 1.40–2.22) compared to the average population,

• with risk increasing with decreasing latitude.


BCC, SCC, AK

- Outdoor workers have higher risk behaviour, with more UV exposure (during both occupational and leisure time) and less sunscreen use.

- Combined with lower health literacy results in higher exposure, more photo-damage and increasing risks of AK, BCC and SCC.

- The risk for BCC, SCC and AK among workers who have worked outdoors for more than 5 years is 3-fold higher than the risk among those with no years of working outdoors.


Primary prevention

• Occupational exposure limits and safety standards
• The two most widely used guidelines:
  • International Commission on Non-Ionizing Radiation Protection (ICNIRP 2004) and the
  • American Conference of Governmental Industrial Hygienists (ACGIH 2004) guidelines
• the exposure guideline is based on a normal 24 hours light/dark cycle where cellular repair can
take place after the exposure is discontinued.
• need for a clear definition of outdoor work and high-risk activities,
• BUT!!, outdoor workers, such as agricultural and construction workers, gardeners, police officers,
  physical education teachers, ski instructors, lifeguards and fishermen have an increased risk of skin
cancer.

What is needed now

• Personal UV dosimetry
• An international database on factual UVR exposure comparable data in outdoor workplaces
• This will help define the needs for improved health and safety and workers’ education.
• Regulation to protect outdoor workers from UV radiation in the workplace
• *Serrano et al* conducted a study of construction workers in Spain using personal dose-meters found median UV exposure was 6.11 (SED) per day.
• Comparison with the occupational UV radiation exposure limit showed that the subjects had received UV erythemal radiation exposure in excess of occupational guidelines, indicating that protective measures against this risk are highly advisable.


Regulation: legislation and non-legislative documentation

• Prevention of occupational skin cancer (OSC) is easy and cost-effective
• The prevention of work-related and occupational diseases is among the three major challenges outlined for EUOSHA new Strategic Framework on Occupational Health and Safety at Work 2014–2020.
• In 2015, the European Commission started to review all EU existing legislation on health and safety at work.
• The 2006 EU Directive on Optical Radiation (2006/25/EC) is included in this review.


Occupational diseases ILO and EUOSHA

• ILO maintains a list of occupational diseases, which acts as a worldwide benchmark for the establishment, review and revision of national lists

• The 2010 ILO list makes a general recommendation to include diseases caused by optical (ultraviolet, visible light, infrared) radiation in national lists, but does not specify diseases

• Another policy instrument of potential relevance is the European Schedule of Occupational Diseases, a list of occupational diseases that the European Commission recommends EU member states introduce into their national legislation.


Employer and worker joint responsibility

• Employer: decrease risk factors, develop internal policies, and raise education and awareness among workers.

• UV exposure minimized with technical, organizational and personal strategies, combined with adequate training.

• Examples: use of awnings, planning of work schedules optimal use of personal protective measures (clothing, brimmed hats with neck protection, sunglasses), and the use of sunscreens on uncovered skin surfaces.

• Worker acceptance of requirements is needed: many studies have shown that inadequate sun protection measures are utilized by outdoor workers.

• A change in health awareness regarding exposure to UV radiation, knowledge of preventative measures and observing and regularly applying them (including clothing protection and sunscreens), are important for workers with high natural UV exposure


Raising awareness among at-risk populations

• Both bottom up and top down approaches may be employed to raise awareness, to include the general public, healthcare professionals, vocational trainers, employers, single workers, schools, policymakers, social partnership organizations, prevention institutions, accident insurance companies and occupational bodies.

• Programmes to educate the outdoor workforce are developed:
  • **Sun Safe Workplaces programme in the UK** aims to provide employers and workers with educational materials on suitable sun safe policies.
  • **Sun at Work programme in Canada**
  • **SunPass project in Germany**, which was implemented in 55 kindergartens in 2010

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Need for clear defining whom to screen

• Notification and surveillance through OH services and public health programmes.
• The effectiveness of skin cancer screening programmes in Germany has been studied.
• Importance of these programmes and collaboration with GPs is well established.
• A major risk factor for NMSC in outdoor workers are Fitzpatrick skin types 1 and 2.


Developing a universal NMSC patient pathway

• Variations across Europe in managing skin cancer patient from diagnosis to treatment.

• Improve in the accessibility of specialists and in the provision treatment were

• Needed:
  • optimal patient pathway through
  • development of a common patient management algorithm may help address health disparities,
  • educational materials targeted at people showing the early signs of skin cancer are warranted to halt the progression of further skin damage.

Educational Programs

• Training and Awareness Training programs must be tailored to local circumstances.

• The nature of the outdoor work, social customs and skin phototypes must be considered in developing educational programs.

• The following aspects of a training program should be considered:
  • an introductory talk on UV awareness and protection advice appropriate to the job
  • refresher briefings as appropriate, such as when moving to a new work site.
  • training of supervisory personnel on the UVR risks to outdoor workers and appropriate protective measures.
  • fact sheets made available for the outdoor worker on UV exposure risks and safe practice.
  • Locate them in briefing rooms and in modes of transport to the work site.
Obstacles in education and overcoming them

• Cultural attitudes toward sunlight exposure,

• perceptions of the “benefits” of tanning and any discomfort or inconvenience related to protective measures will mitigate against successful implementation of UVR protective advice.

• educational programs aimed at changing entrenched behavioral attitudes

• A special educational campaign can be effective, but must be carefully planned
Secondary prevention

• Improve considerable underreporting of OSC
• BCC and SCC are not reported to cancer registries in most countries, thus precise statistics of NMSC are generally not available.
• OSCs are not notified even in those countries where they would be recognizable as an occupational disease.
• Steps to drive screening for early identification of skin cancers particularly in defined high-risk populations like outdoor workers with more than 5 years’ exposure.


Why continue-economical impact of OSC

- SCCs that can cause severe morbidity and mortality
- NMSC is ranked among the five most costly cancers to US Medicare
- The total annual budget for skin cancer in the US has escalated from $3.6 billion in 2002–2006 to $8.1 billion in 2007–2011
- The potential for the economic benefits are not only a reduction of costs but also a gain in quality of life, functional ability and health


Acknowledgments:

to all the experts in STANDERM COST Action

and

Colleagues in Croatian Institute for Health Protection and Safety at Work