

Recommendations, scientific gaps, and work that needs to be done

Formulated at the

Fifth International UV and Skin Cancer Prevention Conference

7th – 9th Sept. 2021

Advancements in Epidemiology of Skin Cancer

Recommendations:

- 1) *There is an increasing burden of NMSCs therefore it is recommended to strengthen skin cancer registry, especially reliable registration of NMSCs*
- 2) *There is a need to increase the number of collaborative studies*

Scientific gaps:

- 1) *Further research in genomic medicine is required. It may have implications for patient care, to identify and to educate persons at high risk for melanoma.*

Advancements in policy

Recommendations:

- 1) *There is increasing interest in the connection between climate change and UV radiation. It is therefore recommended*
 - *To identify and evaluate regional UV exposure indicators*
 - *To create national UV projections for improved climate impact risk analysis and adaptation strategies*
 - *To improve registration of UV-induced eye – and skin diseases*
 - *To embed prevention of UV-induced diseases in legal frameworks*
 - *To optimize UV radiation protection concepts*
 - *To enforce implementation of structural prevention measures*

Scientific gaps:

- 1) *Missing dose-response relationship between UV and skin cancer incidence*
- 2) *Missing of national and regional climatology based on measured UV irradiance*
- 3) *Missing of knowledge on weather-dependent behavioral practice and their influence on individual UV exposure*
- 4) *Missing of knowledge on health effects of UV radiation in combination with air pollutants and meteorological factors*

Advancements in primary prevention

Recommendations:

- 1) *Use evidence based scientific research data as a basis for messages, campaigns, interventions in the field of primary and secondary prevention*
- 2) *Use social media (engagement and reactions of target groups) to affect intentions for and attitudes towards risk behavior*
- 3) *Analyze social media (context of use of hashtags/phrases) to tell something about attitude towards prevention issues of the population (users)*
- 4) *Use of new technologies for (social) interaction leads to a range of new interventions approaches, e.g., use of mobile phone apps, or VR gaming. However, evaluation and quality control are needed*
- 5) *Prevention campaigns should not be based on few and simple measures, but on multi-component design. Interdisciplinary teams should be involved in the development of campaigns.*
- 6) *Positive communication and action-oriented messages, tailored to different target groups and risk-zones should be used*
- 7) *Focus the messaging on 'Tanning is not healthy' and self-efficacy*
- 8) *Primary prevention of children: Influence of parents and settings, especially in early childhood, indicate that multifaceted intervention approaches are needed*
- 9) *More investment in insight, behavioral and Programme evaluation. Mixed intervention strategies and programs influencing social behavior should be implemented.*
- 10) *Marketing research can help to investigate what people value and to develop programs that speak to their value*
- 11) *Focus on misbeliefs (link UV and temperature, cloudy sky and UV-radiation, everyday UV-protection and not only on holidays, but trips also etc.) should be addressed.*
- 12) *Technical/physical instruments (UV-Index, dosimeters) can be used in different ways as instrument for skin cancer protection campaigns / sensitization for everyday UV-radiation*
- 13) *Mix of short/quick advices/warnings (stay inside, use cloths) in case of high UV radiation intensity and general, detailed information campaigns are recommended.*
- 14) *Involvement of governmental bodies require a lot of communication and coordination but can reach big target groups, mix of different (coordinated) interventions is always helpful*
- 15) *Use setting specific ways for spreading health messages, e.g., experiments and elaboration for school children to find out about UV-radiation, festival bracelet which changes colour with UV radiation*
- 16) *In order to reduce melanoma incidence, public health messages promoting physical activity should include advice on sun safety during outdoor physical activity*

Scientific gaps:

- 1) *More study on the effect of environmental factors and behavioral factors is needed since increasing awareness and knowledge is not enough to change behavior*
- 2) *Research for (underlying) determining factors of UV exposure of children for their exposure behavior patterns is needed*

Advancements in research and evaluation

Recommendations:

- 1) *Novel UV-activated immune-regulatory pathways have been recently identified. We need to consider whether these additional/alternative pathways can be targeted for skin cancer prevention and immunotherapy*

Scientific gaps:

- 1) *More in-vitro data are needed for simultaneous exposure to different components of the solar spectrum (UVA, UVB, Vis, IR) as well as for exposure to the entire solar spectrum (eSS).*
- 2) *Skin from infants, adults and elderly differ significantly. Deeper understanding of these differences according to UV (and eSS) on the cellular and molecular level is needed.*
- 3) *The whole skin with the interaction of the different skin cells must be considered in further research on the effect of UV/eSS and skin cancer.*
- 4) *There is an urgent need for biomarkers indicating past UV-exposure (risk-biomarker). Cellular communication within different types of cells in the skin as well as the communication of tumors with their micro- and macro-environment must be investigated*

Other topics:

a) Sunscreens and skin cancer:

Recommendations:

- 1) *Sunscreens are generally regarded as safe (benefits outweigh potential risks), but more knowledge on systematic absorption of sunscreen might be helpful to users*
- 2) *Use of broad-spectrum sunscreens should be part of UV protective interventions to prevent skin cancer in combination with, but with more emphasis on, other methods of sun protection (shade, clothes, etc.).*
- 3) *More need to communicate safety issues of sunscreens to public*
- 4) *More emphasis on proper use of sunscreens - when and how*
- 5) *Improvement of people's use of sunscreen:*
 - a. *Addition of icons or visual aid to the Drug Facts Label to inform about the usage and the right amount*
 - b. *Use of adjunctive technology: QR Code-embedded GIFs (Graphics Interchange Format)*
- 6) *Using SPF for labelling overestimates protection in natural sunlight - there is a need for a realistic labelling instead*
 - a. *It is not possible to achieve a protection against sunlight of more than 25-fold*
 - b. *The popular interpretation of the SPF that it can be thought of as how much longer skin covered with sunscreen takes to burn in sunlight compared with unprotected skin can no longer be defended*

Scientific gaps:

- 1) *Increase research on adverse effects of sunscreens on nature, e.g., potential threat to coral reef ecosystems*
- 2) *Increase research on adverse effects of sunscreens on humans, e.g., hormone disturbers*

b) Indoor tanning and skin cancer:

Recommendations:

- 1) *There is strong evidence that indoor tanning increases skin cancer. Age registration (with effective systems for age control) and education are important, but are most probably not sufficient to decrease usage and control and compliance are insufficient so an outright ban should be our goal*
- 2) *In the case of tanning, there is a big industrial interest, so critiques/discretization of scientific evidence should be taken seriously and answered objectively to avoid misleading discussions*

Conclusions and Findings:

- 1) *Danish data show that savings from an outright ban of sunbeds are much larger than from age restriction alone because most skin cancers occur much later than the age of 18*
- 2) *A Belgian calculation model shows benefits of banning sunbeds (Markov state-transition cohort model). Other countries should use this model to calculate country-specific effects of sunbed ban to persuade policy:*
 - a. *Avoidance of MM, BCC and SCC*
 - b. *Less Deaths in case of MM*
 - c. *Less illness costs*
 - d. *More productive years of life*
- 3) *The artificial tanning industry has contributed to the mongering of the „vitamin D deficiency “hype. Vitamin D deficiency was a unique opportunity for image rebuilding of the indoor tanning industry: ,from skin cancer factory to net contributor to healthy life ‘*
 - a. *There is a need for campaigns to expands people’s knowledge on vitamin D*
 - b. *Ban on advertising and false claims*
- 4) *No harmonization of regulation of sunbeds in the EU: 11 of the 27 countries have no regulation.*
- 5) *Low compliance with legislation in all countries.*
- 6) *The EU Beats Cancer Plan:*
 - a. *supports strengthening of protection against exposure to UV radiation at EU level*
 - b. *calls on to the member states to fully implement the rules on artificial tanning devices and to work together towards the phasing out of sunbeds for cosmetic purposes*

Scientific gaps

- 1) *There is a need for*
 - a. *Measurements of total number of sunbeds in all countries*
 - b. *Measurements of employment and economic impact*
 - c. *EU behavior monitoring survey on sunbeds usage and motivations*

c) Occupational skin cancer:

Recommendations:

- 1) *Exceeding threshold levels of UV-radiation are a global problem for outdoor workers that needs to be addressed. Working conditions should be harmonized, and risk protection promoted*
- 2) *UV safety measurements should be included in industrial safety regulations.*
- 3) *Interventions should be adapted to job profiles*

d) Secondary Prevention/Skin Cancer Screening:

Recommendations:

- 1) *Provide conclusive evidence on the possible benefits of earlier detection, e.g., for policy makers, citizens, and health care providers*
- 2) *Start small scale innovative implementation studies and risk-stratify*

Conclusions and Findings:

- 1) *Skin cancer screening meets international screening criteria and there is evidence of effectiveness, but much more evaluation is needed to answer, for example, who should screen, who should be screened and what type of screening is most (cost)effective*
- 2) *Skin cancer screening is a complex procedure with different actors and components, so structural and process quality must be central*
- 3) *Both skin cancer screening and skin cancer prevention are associated with long-term effects that are not easy to record, for example differentiation between screening effects and impact of new therapies.*

Scientific gaps:

- 1) *More research is required in order to quantify the harm-benefit ratio of screenings, e.g., false-negative, over diagnosis versus mortality reduction, increased quality of life*

e) UV Index and UV monitoring

Recommendations:

- 1) *High quality dosimetry with calibrated dosimeters is recommended (e.g. in accordance with the requirements of the World Radiation Center / World Meteorological Organization)*
- 2) *Modelling for a more precise UV Index calculation is needed (landscape, weather, aerosols, cloud modification factor etc.)*
- 3) *Communication:*
 - a. *Communicate the UV index as a daily course*
 - b. *Simplify the UV Index Communication to motivate behavior change (e.g., WHO App): Focus on protection measurements and use data from trusted institution*
 - c. *Increase the awareness and accessibility of the validated UV Index at holiday destinations*
 - d. *Making UV Index forecasts more visible in weather forecasts*
 - e. *If the UV index is predicted as a course of the day, take a resolution of about an hour. If the resolution is longer, the daily maximum may not be visible. However, most people do not need a resolution less than an hour for planning their activities.*

Scientific gaps:

- 1) *More research is required to understand why information on UV index does not always impact sun protection.*
- 2) *More research is required in combining ground-based measurements and satellite (model) maps (topography, albedo, cloud scenarios).*

f) Cost effectiveness of prevention

Recommendations:

- 1) *Need for Improvement of evaluation of interventions:*
 - a. *Need for QUALY-based CEA (Cost-effectiveness analysis)*
 - b. *Consideration of intervention costs*
 - c. *Identifying evidence for relevant parametrization*
 - d. *Tools for execution and evaluation of randomized studies*
- 2) *Optimizing skin cancer detection in dermatology practice:*
 - a. *General population: systematic screening not cost-effective*
 - b. *Lesion-Directed Screening seems to be more effective*

Conclusions & Findings:

- 1) *Danish Sun Safety Campaign showed that future cost-savings from avoided cancer cases are higher than campaign costs*
- 2) *Findings from Belgium:*
 - a. *Non-inferior detection rates in lesion-directed screening compared to total body examination*
 - b. *Lesion-directed: 5x faster*
 - c. *Value for patient*
 - d. *Further total body examination does not add much value if the index lesion was benign but is useful if the index lesion is suspicious*