
Summary

i Reasons

There have been regular unsubstantiated reports in the literature attributing the occurrence of skin disease to tap water exposure. Some consumers attribute their skin complaints to tap water, therefore water companies and the drinking water regulators have identified the need for more information in order to respond appropriately to these consumer concerns. There is a cost to water companies investigating consumer water quality complaints and any protocol needs to be based on sound science and beneficial to the public.

ii Objectives

To conduct a wide ranging review of the evidence for a possible link between skin irritation and sensitisation and tap water quality/usage and any related health effects, perceived or otherwise.

iii Benefits

Skin disease can be a painful and/or disabling condition, and in extreme circumstances may also result in associated psychological problems and can carry economic burden. Identifying any potential link or negating a link between skin disease and tap water quality is important to either look to identifying means to decrease skin disease, or to dispel any perceived cause.

iv Conclusions

Currently there is insufficient evidence to evaluate the effects of domestic tap water, and its chemical constituents or parameters, on skin irritation in humans. Future studies have been outlined based on potential associations identified from experimental or epidemiological studies, in relation to water hardness, water pH, personal care products, nickel, and chloramination.

v Recommendations

It is recommended from this review that much needed future clinical trials focus on prevention early on in life (from birth) and control for the types of wash product used, the hardness of water and its alkalinity. The next step however, in order to best guide the design of future clinical studies, is to further define the effect of water hardness, the concentration of free calcium and magnesium, the alkalinity of water, and the interaction of these properties with wash products on the biophysical properties of the skin, including measures for irritation, permeability barrier function, skin-surface pH, protease activity, and lipid structure. It remains

unclear whether the putative association between water hardness and skin irritation results from the concentration of free calcium ions, alkalinity, the interaction between one of these factors with wash products, or a combination of all of them. Enhanced data collection from customer contacts to water companies is proposed as the next step to inform a robust study.

vi **Résumé of Contents**

This review covers:

- Chemical parameters and properties of interest;
- Comparison of occupational exposure to potential respiratory, skin and eye irritants and drinking water levels;
- Assessment of animal and *in vitro* studies;
- Assessment of human studies;
- Review of possible associations and causalities of experimental and human studies;
- Future avenues of research including possible experimental and human studies.

Assessment of the potential use of drinking water quality data and customer skin-related health concerns to analyse skin irritation effects of drinking water.