

What can hand hygiene do for the world?

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Handwashing with soap is regarded as one of the most cost-effective interventions to improve public health [1]. This is mainly because the simple action of washing hands with soap can interrupt the transmission of the pathogens that cause diarrhoea and pneumonia, the two biggest killers of children under-five [2]. The latest estimates of the global causes of child mortality attribute 0.751 million (uncertainty range 0.538 - 1.031 million) deaths among children aged 1 to 59 months a year to diarrhoea and 1.071 million (uncertainty range 0.977 - 1.176 million) to pneumonia [2]. Reviews of epidemiological studies suggest that universal practice of handwashing with soap could reduce the risk of severe diarrhoea by 48% and the risk of any diarrhoea by 47% [3]. A further review [4], updated by the authors to include findings from a subsequent study [5, 6] concludes that handwashing with soap could reduce the risk of lower respiratory tract infections like pneumonia by up to 23%.

In 2003, Curtis and Cairncross estimated the number of deaths due to diarrhoea preventable by handwashing with soap [3]. The subsequent growth of evidence quantifying the impact of handwashing with soap on respiratory infections, and the recent publication of updated mortality estimates provide the opportunity to update estimates of the number of lives that could be saved by handwashing. Assuming that the number of lives saved is proportional to the reduction in disease risk as described by Curtis and Cairncross (2003) [3] and other authors [7, 8], we estimate that the lives of 0.603 million children aged 1-59 months could be saved annually from diarrhoea and pneumonia by handwashing with soap (table 1).

Table 1. Lives saved by handwashing with soap, children 1-59 months

Preventable cause of death	Calculation*	Estimated number of lives saved
Diarrhoea	$((0.751 \text{ million} \times 0.48) + (0.751 \text{ million} \times 0.47)) / 2$	0.357 million
Pneumonia	$1.071 \text{ million} \times 0.23$	0.246 million
Total		0.603 million

**Assumption: the number of lives saved is proportional to reduction in risk of diarrhoea.*

We do not include in this estimate the lives of neonates that could be saved by handwashing. Given that around 33% of the 3.1 million annual deaths occurring among neonates are due to infectious causes [2], and that clean birth and postnatal practices – of which handwashing with soap is a component – have been estimated to reduce death due to sepsis and tetanus by up to 40% [9], the number of lives that could be saved by handwashing with soap may well exceed the estimates we report here.

In addition to saving lives, a plethora of other health benefits have been attributed to handwashing with soap, including reductions in health-care associated infections [10], puerperal sepsis [11], skin infections [5], eye infections [12], including trachoma (the latter health improvements come from face washing combined with antibiotic usage) [13], and diarrhoea, co-infections and disease progression among people living with HIV/AIDS [14, 15]. Other benefits include increased school attendance as a result of less episodes of illness [16-18] and possible improvements in child growth and development as a result of improved nutritional status (hypothesised to be mediated via reduction in diarrhoea and environmental enteropathy) [19, 20]. These benefits are described more fully elsewhere [21].

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