

Water, Sanitation and Hygiene or Can a PhD change the world?

Val Curtis

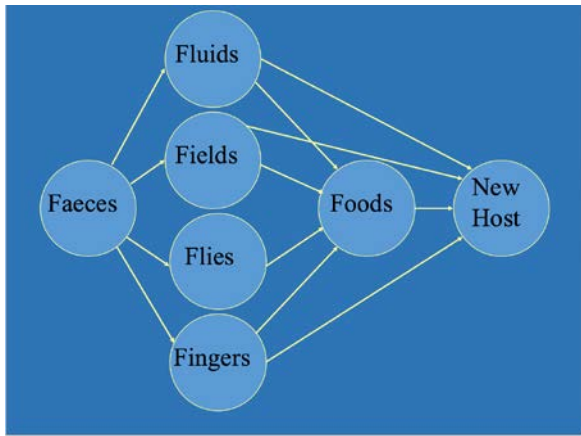
Director, Environmental Health Group
London School of Hygiene & Tropical Medicine



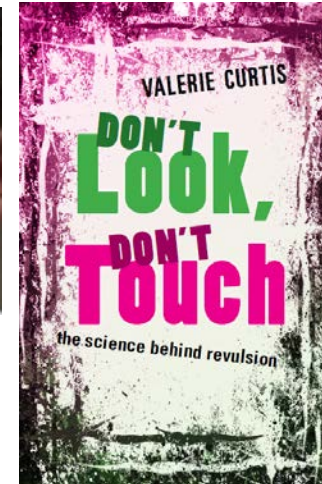
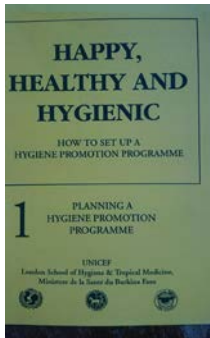
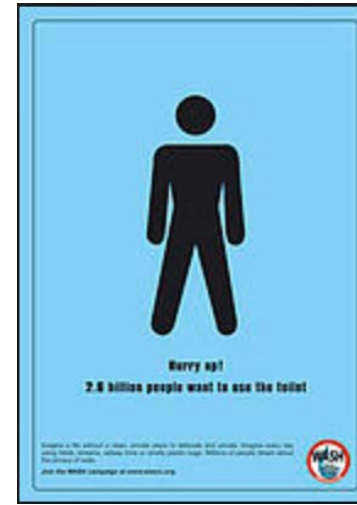
THE
DANGERS
OF
DIRT

HOUSEHOLD HYGIENE AND HEALTH

Valerie Curtis



offspring





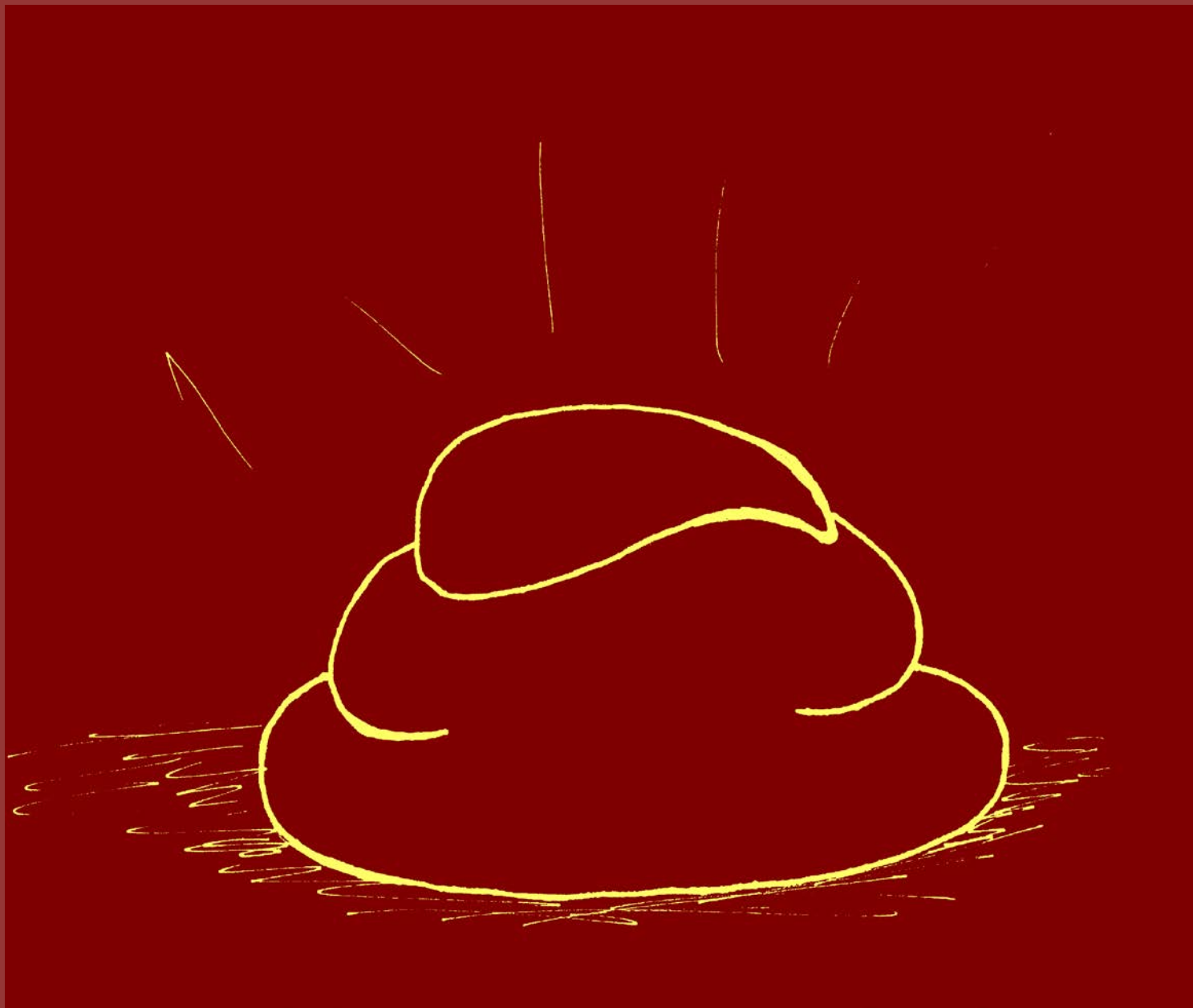
Diarrhoea: Why children are still dying and what can be done

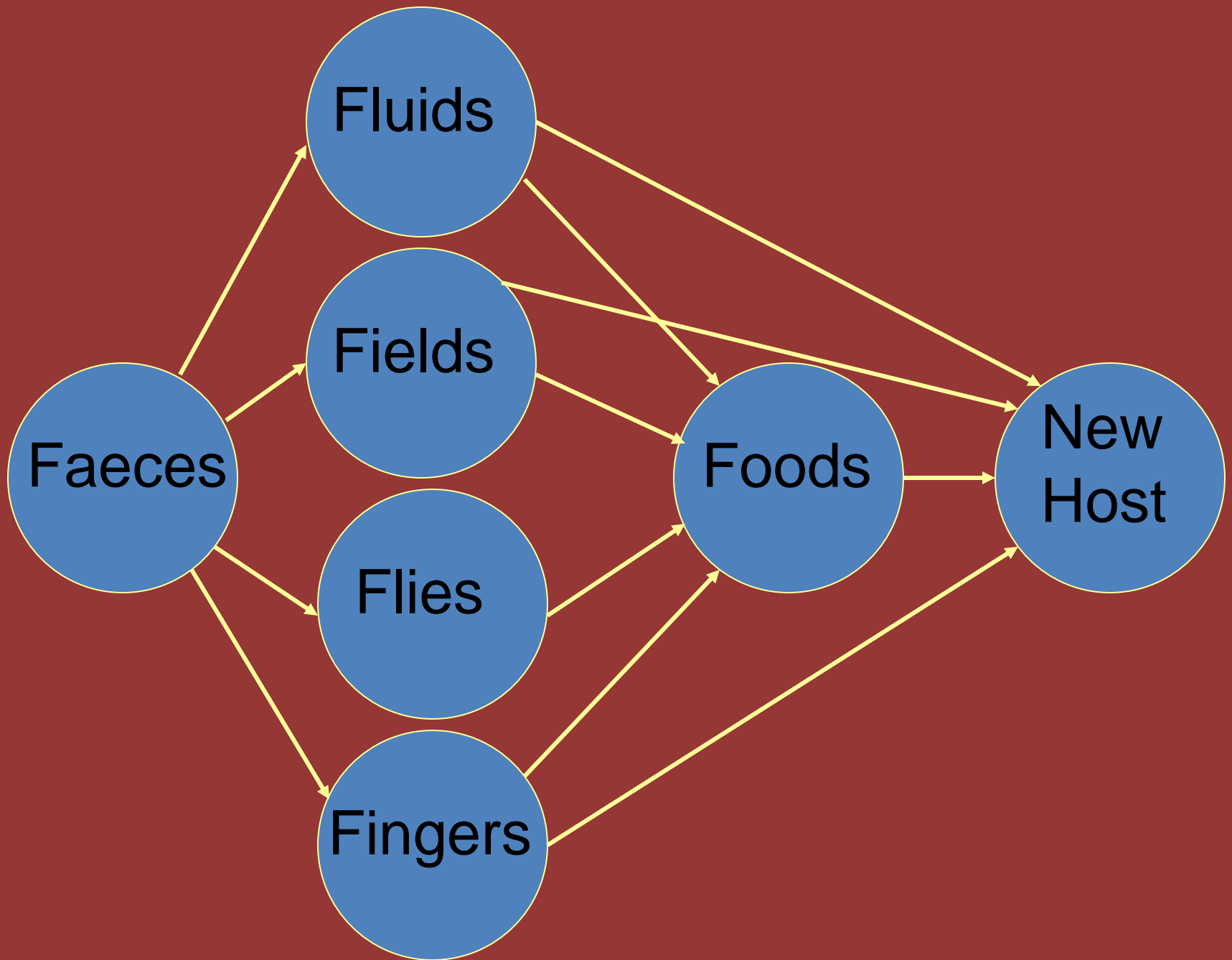


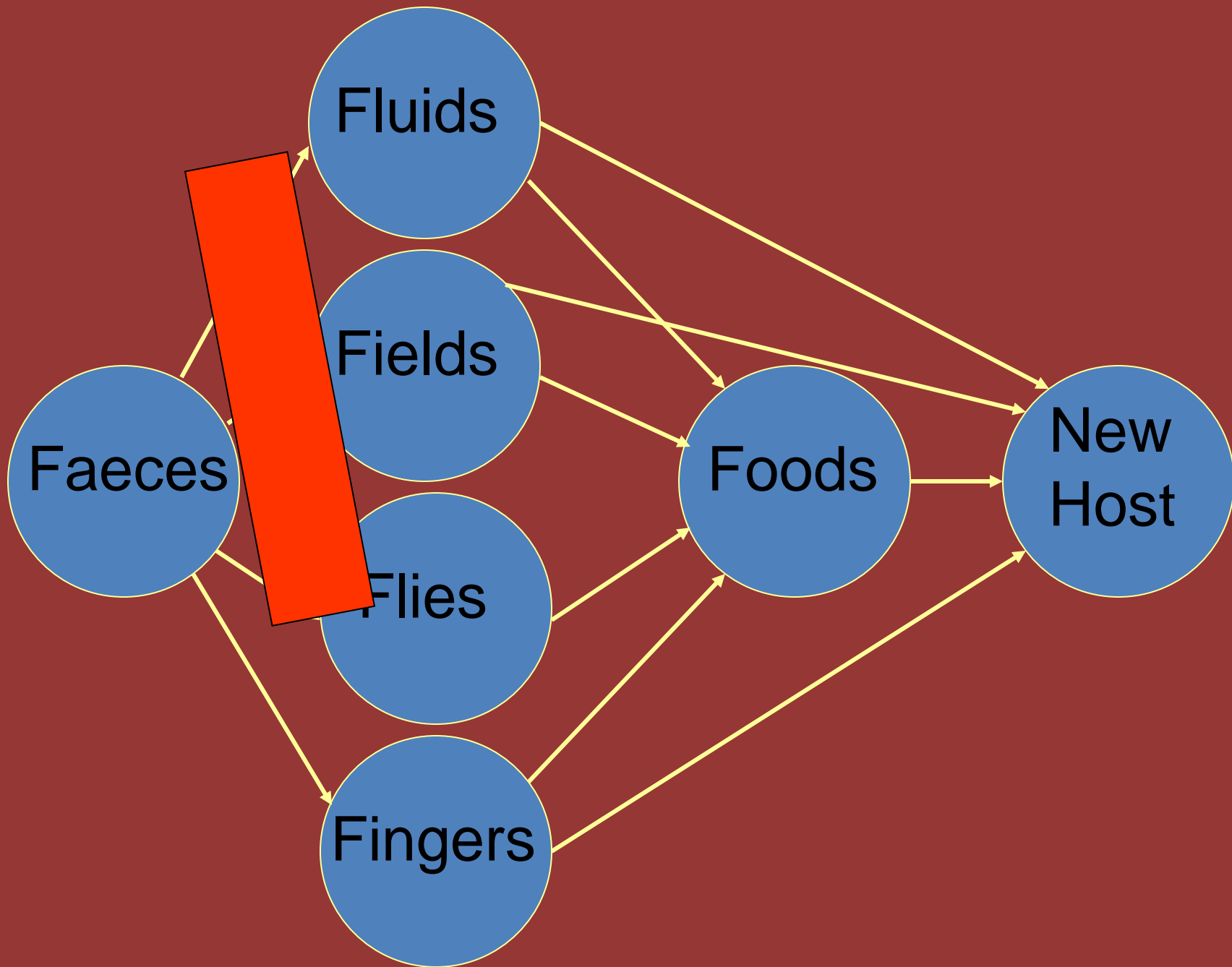
unicef 

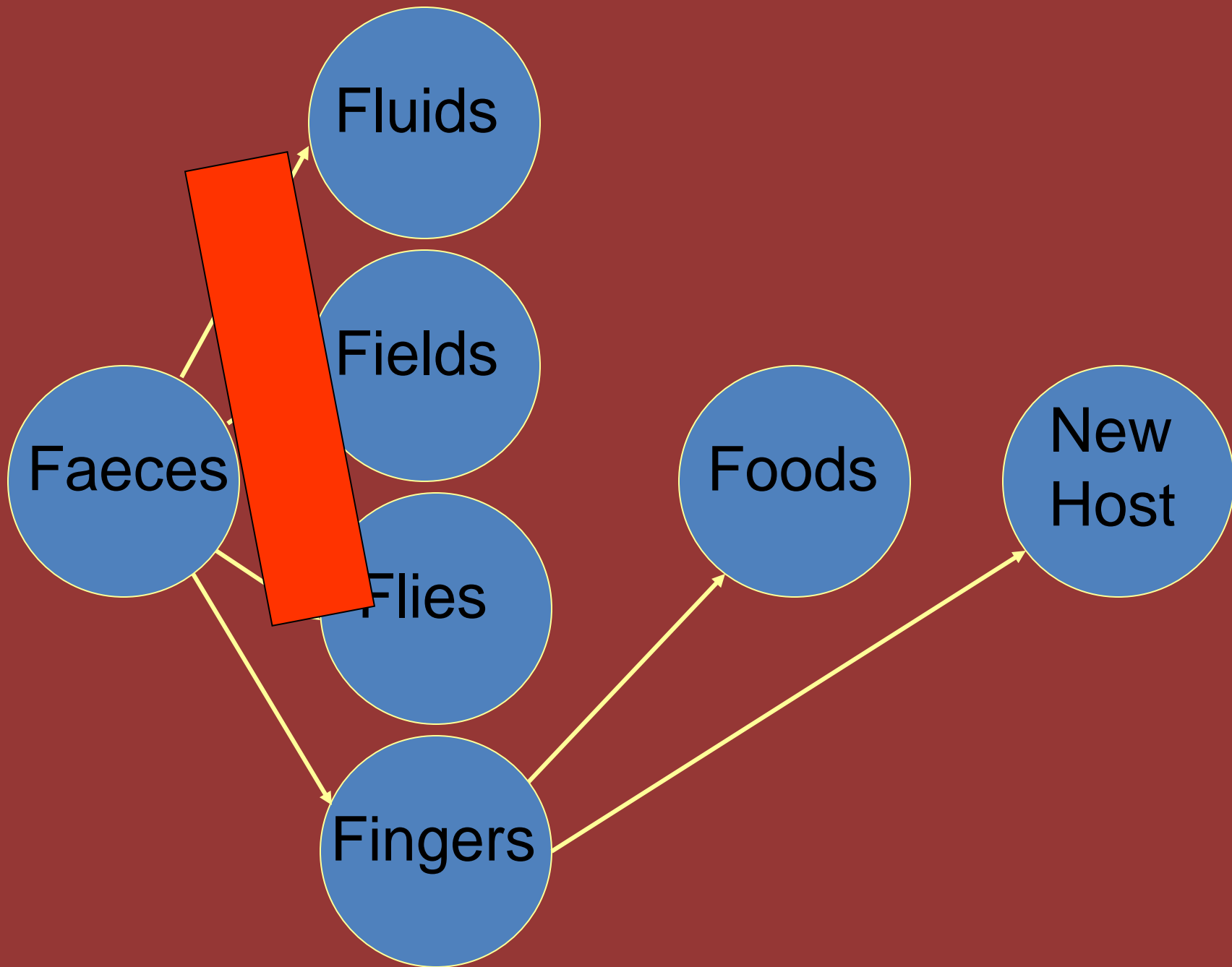
 World Health
Organization

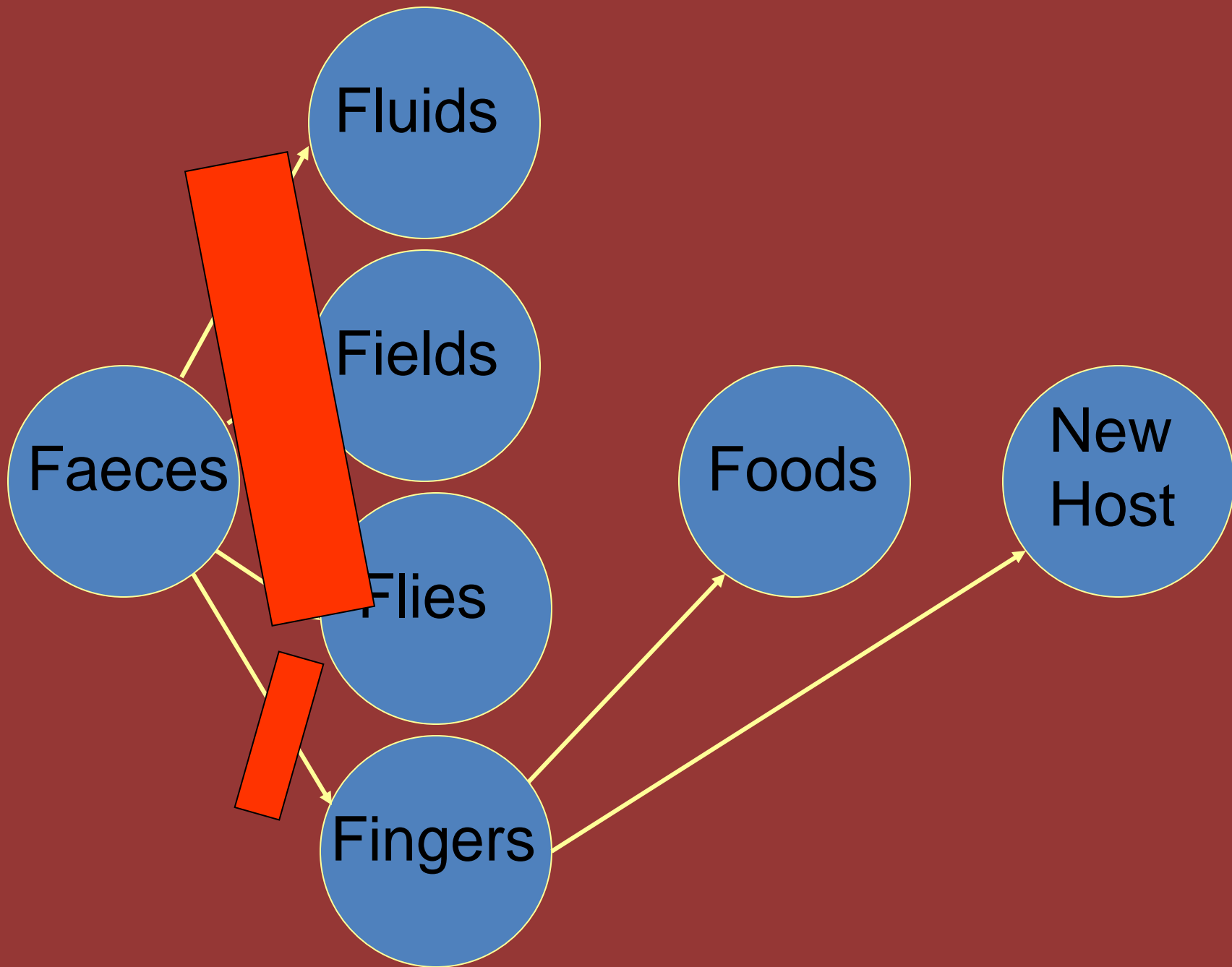
“It kills more young children than
AIDS, malaria and measles
combined.”

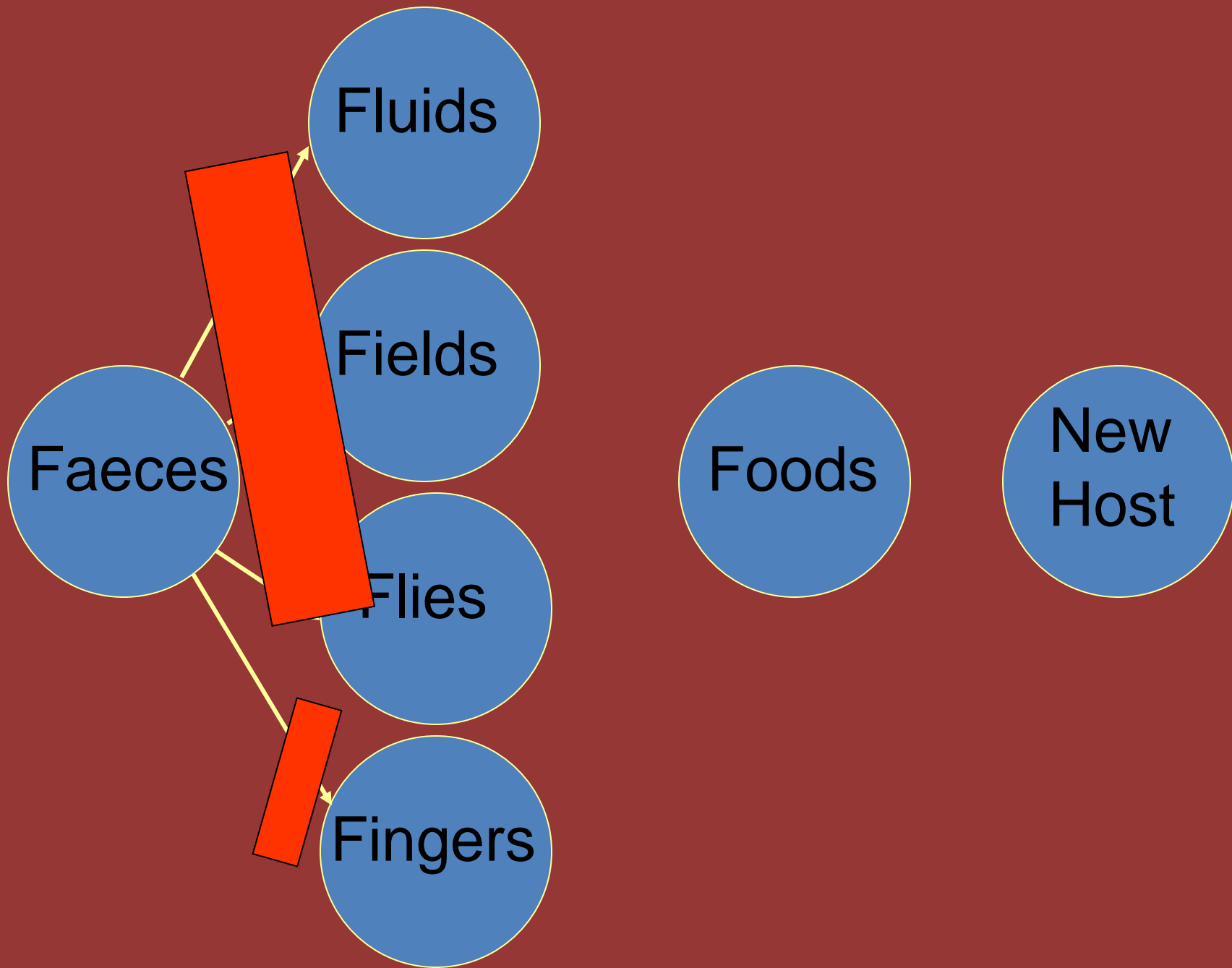


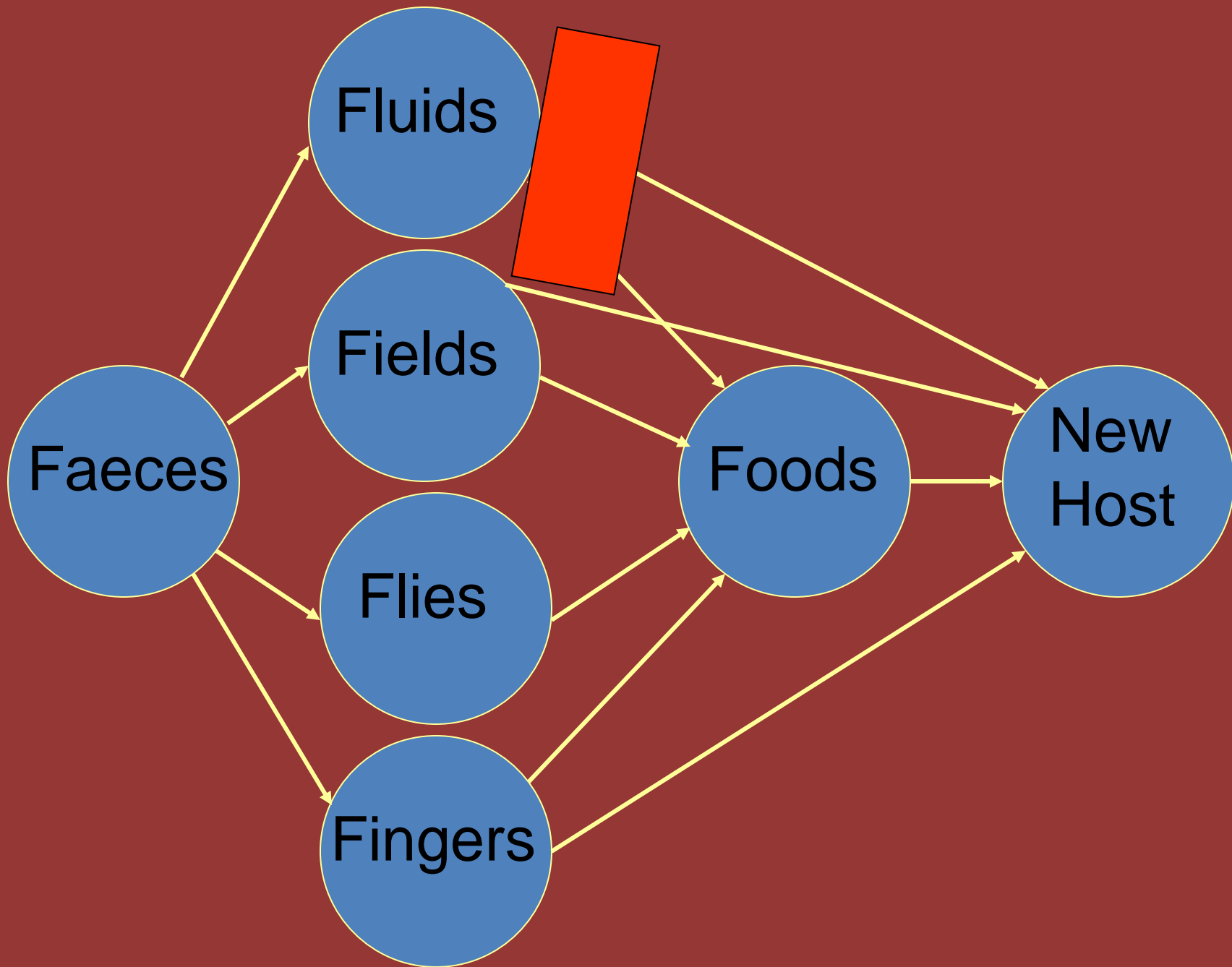


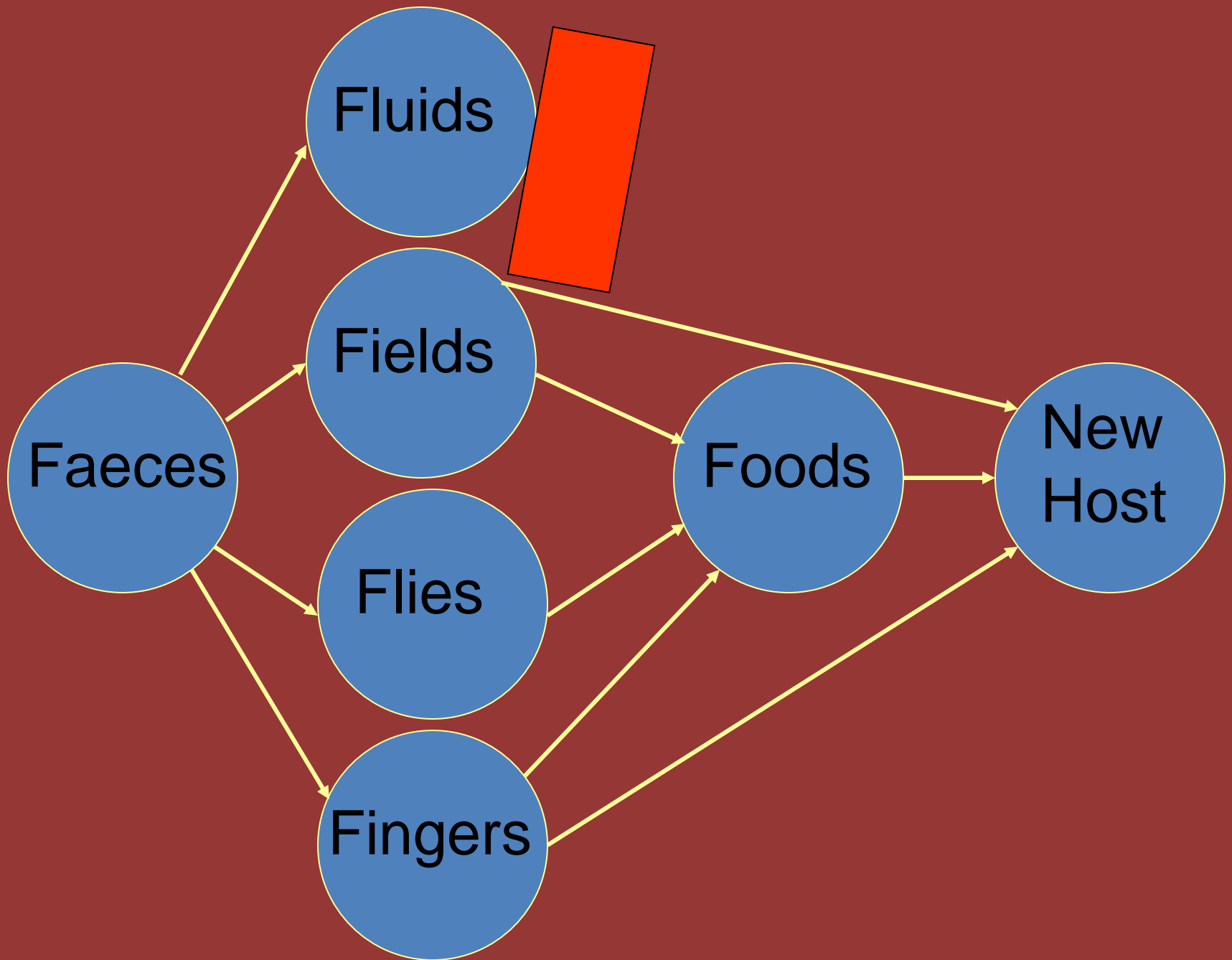














Review: **Domestic hygiene and diarrhoea – pinpointing the problem**

Valerie Curtis¹, Sandy Cairncross¹ and Raymond Yonli²

¹ *London School of Hygiene and Tropical Medicine, London, UK*

² *Regional Centre for Health Education and Sanitation, Ministry of Health, Bobo-Dioulasso, Burkina Faso*

Summary

Improving domestic hygiene practices is potentially one of the most effective means of reducing the global burden of diarrhoeal diseases in children. However, encouraging behaviour change is a complex and uncertain business. If hygiene promotion is to succeed, it needs to identify and target only those few hygiene practices which are the major source of risk in any setting. Using biological reasoning, we hypothesize that any behaviours which prevent stools from getting into the domestic arena, the child's main habitat, are likely to have a greater impact on health than those practices which prevent pathogens in the environment from being ingested. Hence safe stool disposal, a primary barrier to transmission, may be more important than hand-washing before eating, which constitutes a secondary barrier, for example. We review the epidemiological evidence for the effect of primary and secondary barrier behaviours and suggest that it supports this conclusion. In the absence of local evidence to the contrary, hygiene promotion programmes should give priority to the safe disposal of faecal material and the adequate washing of hands after contact with adult and child stools.

keywords hygiene, diarrhoea, excreta, hand washing, developing countries

correspondence Valerie Curtis, Roghorst 123, Wageningen 6708, The Netherlands. E-mail valerie.curtis@ishtm.ac.uk

Introduction: clearing away the fog

Hygiene is a complex and confusing subject. Whilst hygienic practices play a fundamental role in the prevention of infectious disease, they also serve other needs. Amongst these are

process. Programmes have to focus their efforts on a small number of messages of proven public health importance if they are to avoid wasting the resources both of programmes and of the communities which they target (Loevisohn 1990; Huttly *et al.* 1997). Public health planners have thus to make

Water, sanitation and hygiene for the prevention of diarrhoea

Sandy Cairncross,^{1*} Caroline Hunt,¹ Sophie Boisson,¹ Kristof Bostoen,¹ Val Curtis,¹ Isaac CH Fung² and Wolf-Peter Schmidt¹

¹London School of Hygiene & Tropical Medicine, Department of Infectious & Tropical Diseases, London, UK and ²Department of Epidemiology and Biostatistics, College of Public Health, University of Georgia, Athens, GA, USA.

*Corresponding author. London School of Hygiene & Tropical Medicine, Keppel Street, London WC1E 7HT, UK.
E-mail: sandy.cairncross@lshtm.ac.uk

Background Ever since John Snow's intervention on the Broad St pump, the effect of water quality, hygiene and sanitation in preventing diarrhoea deaths has always been debated. The evidence identified in previous reviews is of variable quality, and mostly relates to morbidity rather than mortality.

Methods We drew on three systematic reviews, two of them for the Cochrane Collaboration, focussed on the effect of handwashing with soap on diarrhoea, of water quality improvement and of excreta disposal, respectively. The estimated effect on diarrhoea mortality was determined by applying the rules adopted for this supplement, where appropriate.

Results The striking effect of handwashing with soap is consistent across various study designs and pathogens, though it depends on access to water. The effect of water treatment appears similarly large, but is not found in few blinded studies, suggesting that it may be partly due to the placebo effect. There is very little rigorous evidence for the health benefit of sanitation; four intervention studies were eventually identified, though they were all quasi-randomized, had morbidity as the outcome, and were in Chinese.

Conclusion We propose diarrhoea risk reductions of 48, 17 and 36%, associated respectively, with handwashing with soap, improved water quality and excreta disposal as the estimates of effect for the LiST model. ~~Most of the evidence is of poor quality. More trials are needed, but the evidence is nonetheless strong enough to support the provision of water supply, sanitation and hygiene for all.~~

Keywords Water, sanitation, hygiene, diarrhoea, mortality

HAPPY, HEALTHY AND HYGIENIC

HOW TO SET UP A
HYGIENE PROMOTION PROGRAMME

1

PLANNING A
HYGIENE PROMOTION
PROGRAMME

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DESIGNED TO HELP YOU SET UP AND RUN
A HYGIENE PROMOTION PROGRAMME

PART 1. TARGET PRACTICES:
DECIDING WHAT NEEDS CHANGING

Valerie Curtis and Bernadette Kanki



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PART 2. TARGET PRACTICES:
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PART 3.
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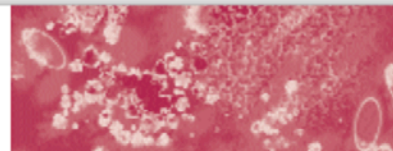
Bernadette Kanki and Valerie Curtis



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Reviews



Effect of washing hands with soap on diarrhoea risk in the community: a systematic review

Val Curtis and Sandy Cairncross

We set out to determine the impact of washing hands with soap on the risk of diarrhoeal diseases in the community with a systematic review with random effects meta-analysis. Our data sources were studies linking handwashing with diarrhoeal diseases. Seven intervention studies, six case-control, two cross-sectional, and two cohort studies were located from electronic databases, hand searching, and the authors' collections. The pooled relative risk of diarrhoeal disease associated with not washing hands from the intervention trials was 1.88 (95% CI 1.31–2.68), implying that handwashing could reduce diarrhoea risk by 47%. When all studies, when only those of high quality, and when only those studies specifically mentioning soap were pooled, risk reduction ranged from 42–44%. The risks of severe intestinal infections and of shigellosis were associated with reductions of 48% and 59%, respectively. In the absence of adequate mortality studies, we extrapolate the potential number of diarrhoea deaths that could be averted by handwashing at about a million (1.1 million, lower estimate 0.5 million, upper estimate 1.4 million). Results may be affected by the poor quality of many of the studies and may be inflated by publication bias. On current evidence, washing hands with soap can reduce the risk of diarrhoeal diseases by 42–47% and interventions to promote handwashing might save a million lives. More and better-designed trials are needed to measure the impact of washing hands on diarrhoea and acute respiratory infections in developing countries.

Lancet Infect Dis 2003; 3: 275–81



Figure 1. Handwashing, a barrier to transmission of enteric pathogens.

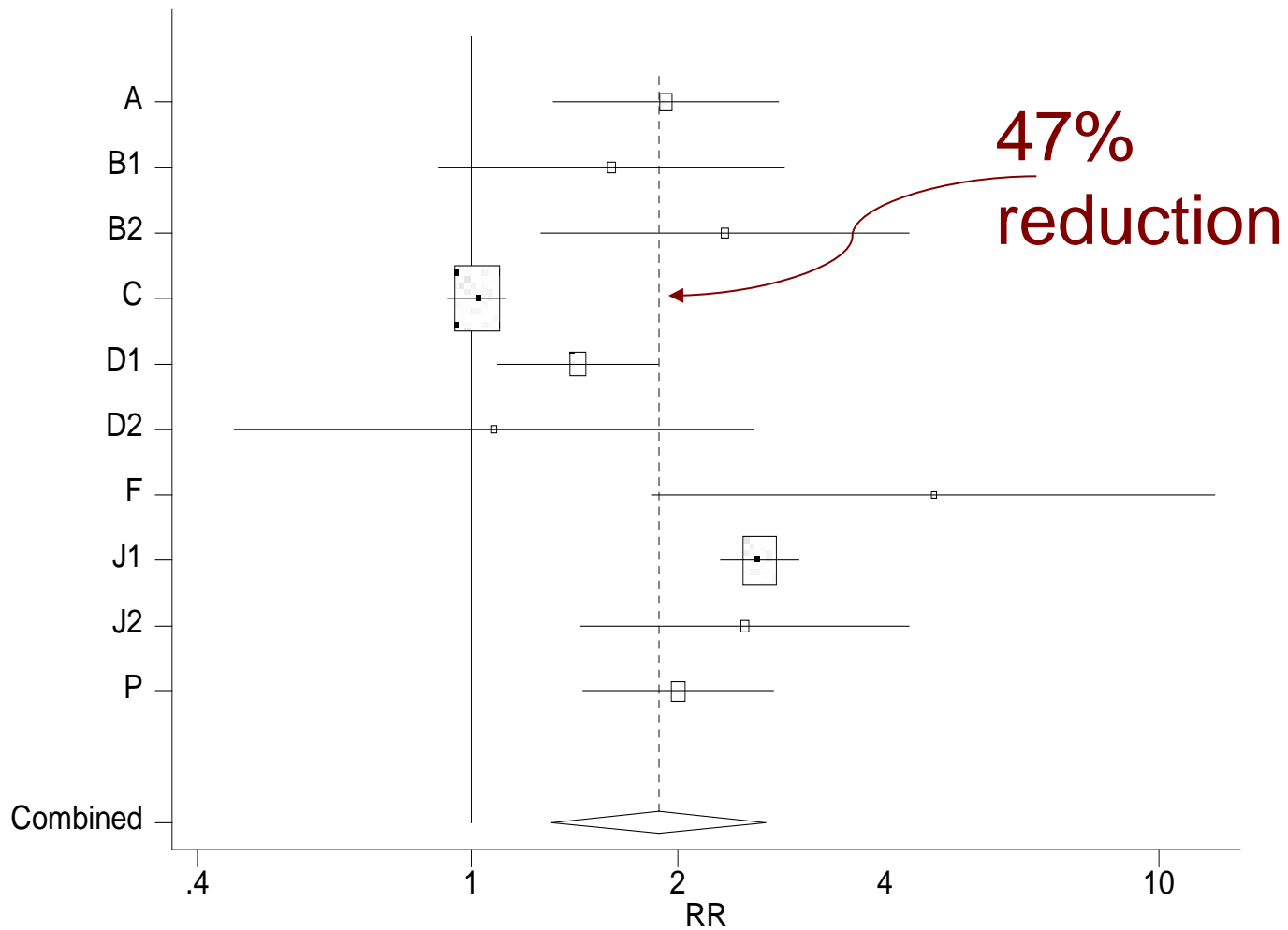
We carried out a systematic review of the effects of washing hands with soap on diarrhoea risk and estimated potential reductions in diarrhoea mortality.

Methods

Search strategy

We aimed to identify all studies published in English up to the end of 2002 relating handwashing to the risk of infectious intestinal or diarrhoeal diseases in the community. Medline, CAB Abstracts, Embase, Web of Science, and the Cochrane Library were systematically searched using appropriate textwords and thesaurus terms for papers relating to handwashing, use of soap, as well as disease terms such as diarrhoea, typhoid, enteric, cholera, shigellosis, dysentery, and

Impact of handwashing with soap on diarrhoea



Impact



71% know TV ad
69% can sing song
Reported HWWS
-after defecation
+ 13%
-before eating
+ 41%



Effect of a behaviour-change intervention on handwashing with soap in India (SuperAmma): a cluster-randomised trial

Adam Biran, Wolf-Peter Schmidt, Kirtu Ba Sankar Varadharajan, Divya Rajaraman, Raja Kumar, Katie Greenland, Baijal Gopalan, Robert Aunger, Vol Cuijts



Summary

Background Diarrhoea and respiratory infections are the two biggest causes of child death globally. Handwashing with soap could substantially reduce diarrhoea and respiratory infections, but prevalence of adequate handwashing is low. We tested whether a scalable village-level intervention based on emotional drivers of behaviour, rather than knowledge, could improve handwashing behaviour in rural India.

Methods The study was done in Chittoor district in southern Andhra Pradesh, India, between May 24, 2011, and Sept 10, 2012. Eligible villages had a population of 700–2000 people, a state-run primary school for children aged 8–13 years, and a preschool for children younger than 5 years. 14 villages (clusters) were selected, stratified by population size (<1200 vs >1200), and randomly assigned in a 1:1 ratio to intervention or control (no intervention). Clusters were enrolled by the study manager. Random allocation was done by the study statistician using a random number generator. The intervention included community and school-based events incorporating an animated film, skits, and public pledging ceremonies. Outcomes were measured by direct observation in 20–25 households per village at baseline and at three follow-up visits (6 weeks, 6 months, and 12 months after the intervention). Observers had no connection with the intervention and observers and participant households were told that the study was about domestic water use to reduce the risk of bias. No other masking was possible. The primary outcome was the proportion of handwashing with soap at key events (after defecation, after cleaning a child's bottom, before food preparation, and before eating) at all follow-up visits. The control villages received a shortened version of the intervention before the final follow-up round. Outcome data are presented as village-level means.

Findings Handwashing with soap at key events was rare at baseline in both the intervention and control groups (1% [SD 1] vs 2% [1]). At 6 weeks' follow-up, handwashing with soap at key events was more common in the intervention group than in the control group (19% [SD 21] vs 4% [2]; difference 15%, $p=0.005$). At the 6-month follow-up visit, the proportion handwashing with soap was 37% (SD 7) in the intervention group versus 6% (3) in the control group (difference 31%; $p<0.02$). At the 12-month follow-up visit, after the control villages had received the shortened intervention, the proportion handwashing with soap was 29% (SD 9) in the intervention group and 29% (13) in the control group.

Interpretation This study shows that substantial increases in handwashing with soap can be achieved using a scalable intervention based on emotional drivers.

Funding Wellcome Trust, SHARE.

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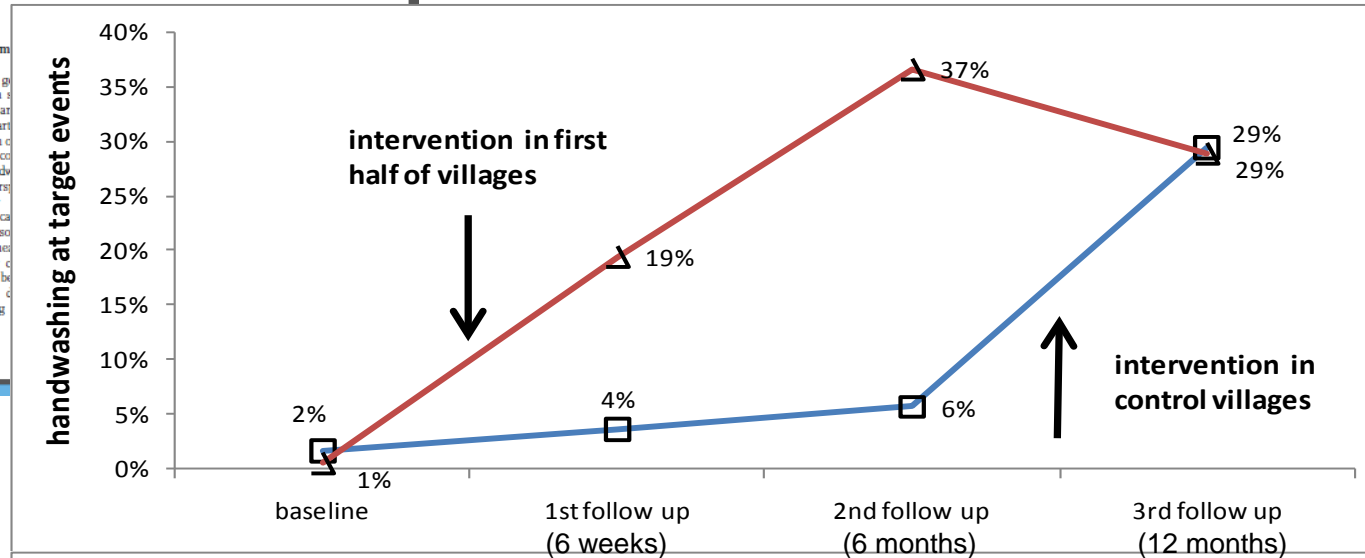
Introduction

Improved hand hygiene has the potential to reduce morbidity and mortality from infections spread by faecal-oral routes and person-to-person contact. Infections preventable by improved hand hygiene include gastrointestinal infections,^{1,2} respiratory infections,^{1,3,4} trachoma,⁵ fatal neonatal infections,^{6,7} and possibly worm infections.⁸ Diarrhoea and respiratory infections remain the two most important causes of child death globally.⁹ Improved hand hygiene can also improve child development and school attendance.^{10,11} Hygiene promotion has been suggested to be one of the most cost-effective interventions for prevention of infectious disease.¹²

Knowledge about the health benefits of handwashing is widespread. For example, 92% of respondents in Kenya

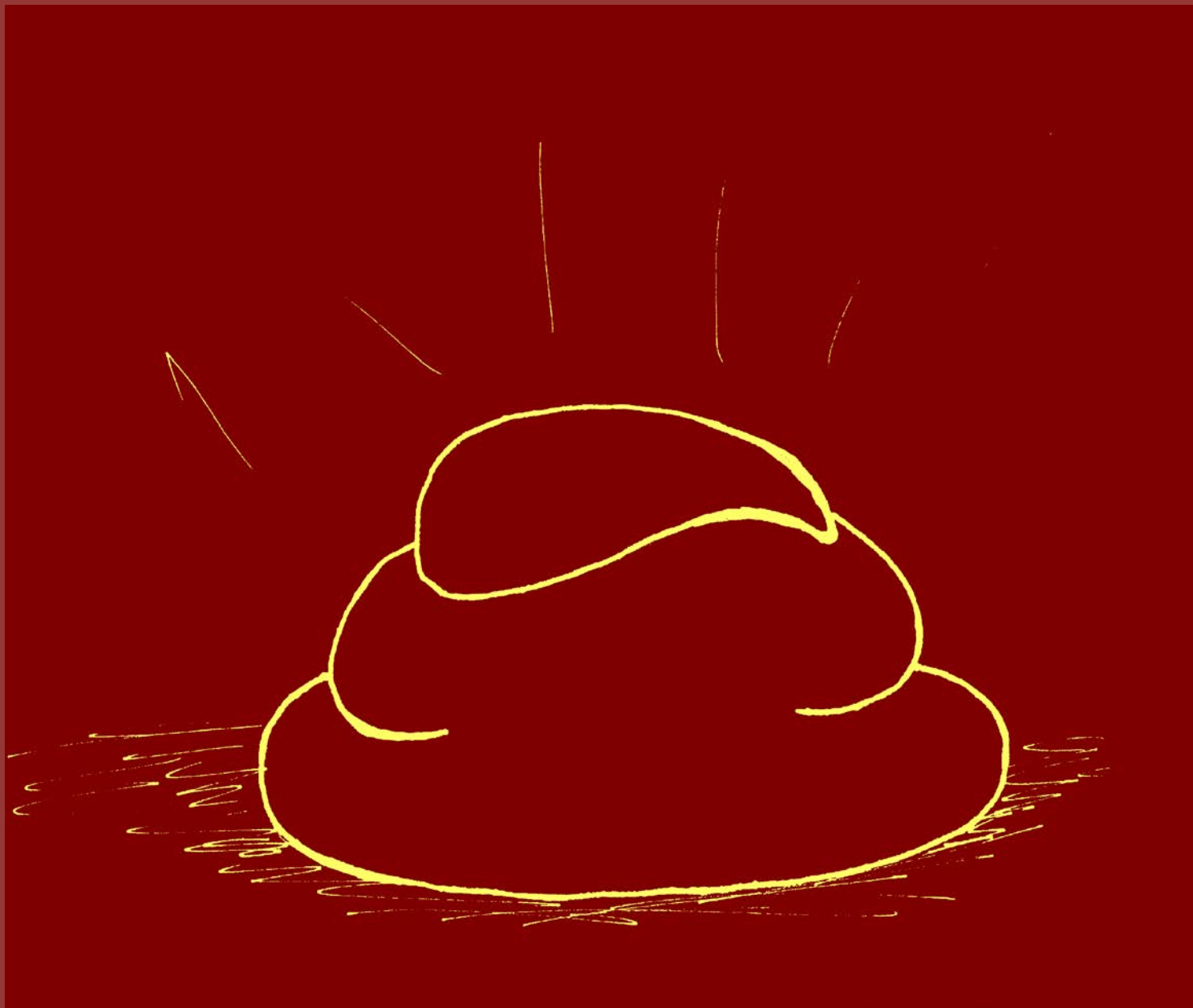
knew that gi studies in s China.¹³ Bar 29% of part defecation c water are co high, handw health pers behaviour communica Several so explain her behaviour c focus on be research¹⁴ underlying

Lancet Glob Health 2014; 2: e145–e154
See Comment page e138
This online publication has been corrected. The corrected version first appeared at the-lancet.com on February 27, 2014.
See Online for an audio interview with Katie Greenland
London School of Hygiene & Tropical Medicine, London, London, UK (A Biran PhD), W P Schmidt PhD, K Greenland MSc, R Aunger PhD, V Cuijts PhD, St John's Research Institute, St John's National Academic of Health Sciences, Bangalore, Karnataka, India (K S Varadharajan MSc), D Rajaraman PhD, R Kumar MSc, and Centre of Gravity, Bangalore, Karnataka, India (B Gopalan Effect) Correspondence: Dr Adam Biran, London School of Hygiene & Tropical Medicine, London WC1E 7HT, UK (adam.biran@lshtm.ac.uk)











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Psychology tests

Disgust

- Test your sensitivity to disgust and take part in a real science experiment.
- It has 20 questions and should take between 5-10 minutes.
- The questionnaire is split into two sections. Section one consists of 19 questions. Section two consists of a single vote.
- It was developed by Dr Val Curtis of the London School of Hygiene and Tropical Medicine.
- Please fill in the demographic data below.
- We will not pass on your personal details to any other organisation without your permission except for the purposes of processing the data for this experiment.

Age:

Gender: Male Female

Do you have a child aged under 24 months? Yes No

In what country did you spend most of your first ten years?

Did you watch Human Instincts part 1 Survival (October 23rd 2002) Yes No

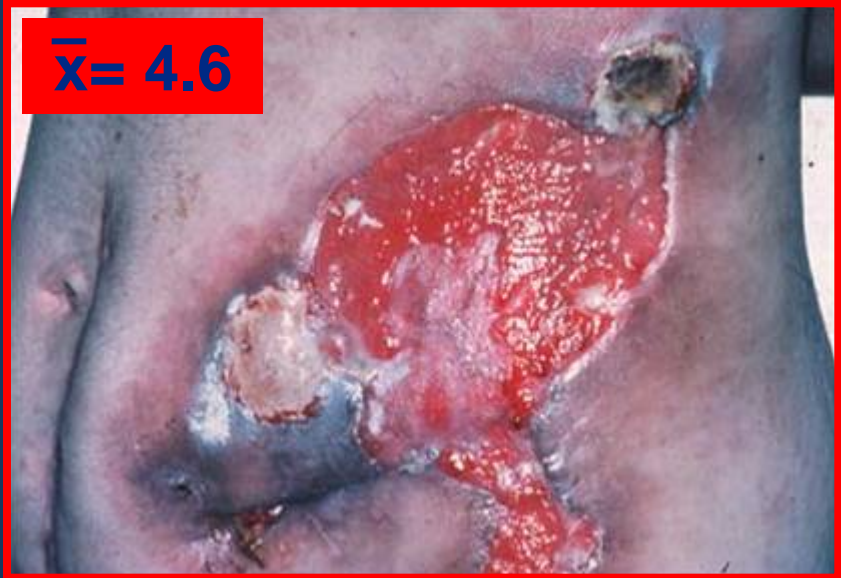
What is your occupation?

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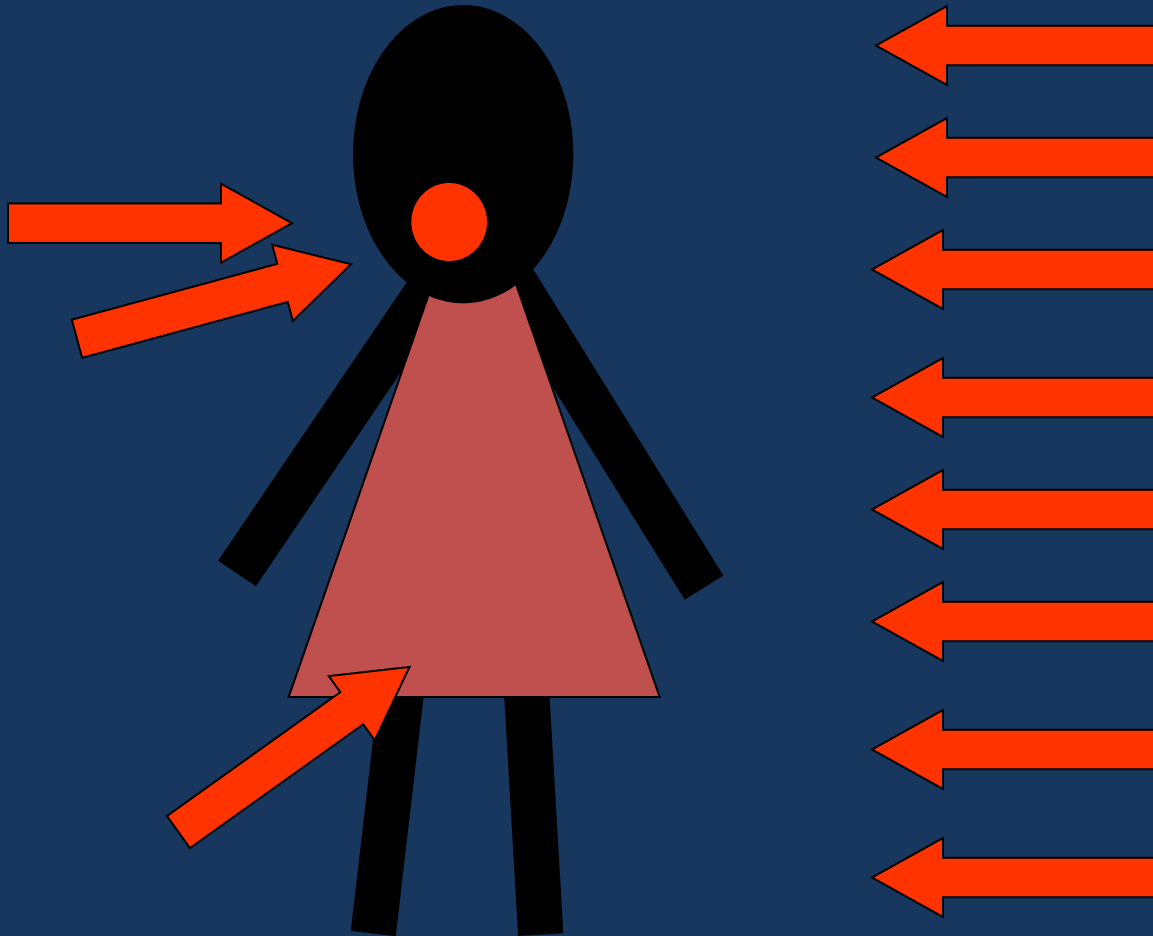






Micro-parasites

Macro-parasites



Evidence that disgust evolved to protect from risk of disease

Vai Curtis*, Robert Aunger and Tamer Rabie

Hygiene Centre, London School of Hygiene and Tropical Medicine, Kepple Street, London WC1E 7HT, UK

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Recd 14.10.03; Acctptd 17.11.03; Published online 19.01.04

Disgust is a powerful human emotion that has been little studied until recently. Current theories do not coherently explain the purpose of disgust, nor why a wide range of stimuli can provoke a similar emotional response. Over 40 000 individuals completed a web-based survey using photo stimuli. Images of objects holding a potential disease threat were reported as significantly more disgusting than similar images with

This pattern of response of the world. Female sensitivity than males; disgust sensitivity of fluids of strangers was those of close relatives that the human disgust response to objects resent threats of infection

Keywords: disgust; disinfectant; web survey; sex differences

1. INTRODUCTION

Humans feel disgust to sweat, spit, blood, pu toenail clippings, rot worms, rats and people theft, tyranny and incest (al. 2000). Disgust is t

adaptive sexual pairings (Fessler & Navarrete 2003). We have proposed that disgust is an adaptation serving to bias behaviour away from risks of infectious disease in general, not just via the oral route (Curtis & Biran 2001). For example, the bodily excretions and secretions of others are avoided because they can contain high concentrations of bacterial and viral pathogens. These parasitic agents enter the host's body through the nose, skin or sexual organs, as well as by the mouth. All schools of thought agree that disgust has also been extended into the social domain, where it may be elicited by immoral and unjust acts.

The hypothesis that disgust is an adaptation that serves to prevent disease has never, to our knowledge, been quantitatively demonstrated. If disgust did arise to prevent disease then it should: (i) be felt more strongly when faced with a disease-salient stimulus than with a similar stimulus with less salience; (ii) operate similarly across cultures; (iii) be more pronounced in females, since they play a double role in protecting both self and offspring from disease; (iv) become less potent as an individual's reproductive potential declines; and (v) be more strongly evoked by contact with strangers than close relatives, because strangers may carry novel pathogens. We report a test of these predictions using data provided by almost 40 000 participants in an international Web site experiment employing visual

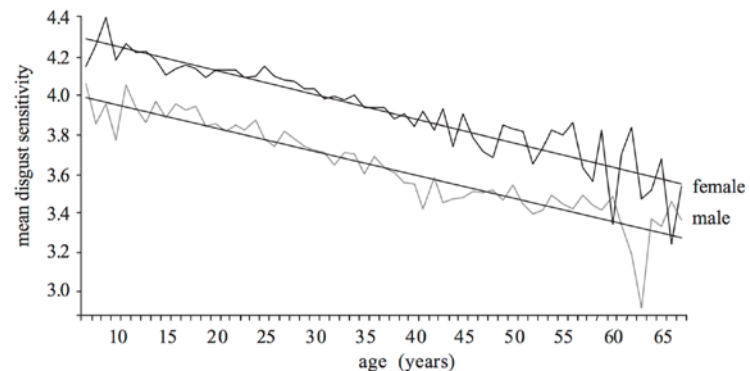


Figure 2. Disgust sensitivity by age and gender.

Acknowledgements

V.C. designed the experiment and wrote the first and several subsequent drafts of the paper. R.A. directed the data analysis and considerably rewrote the paper. T.R. cleaned and analysed the data and contributed to the paper. The authors thank Paul Rincon and Dun-

Fessler, D. & Navarrete, C. 2003 Domain specific variation in disgust sensitivity across the menstrual cycle: evidence in favour of an evolutionary account of sexual disgust. *Hum. Behav. Evol.* 24, 406–417.

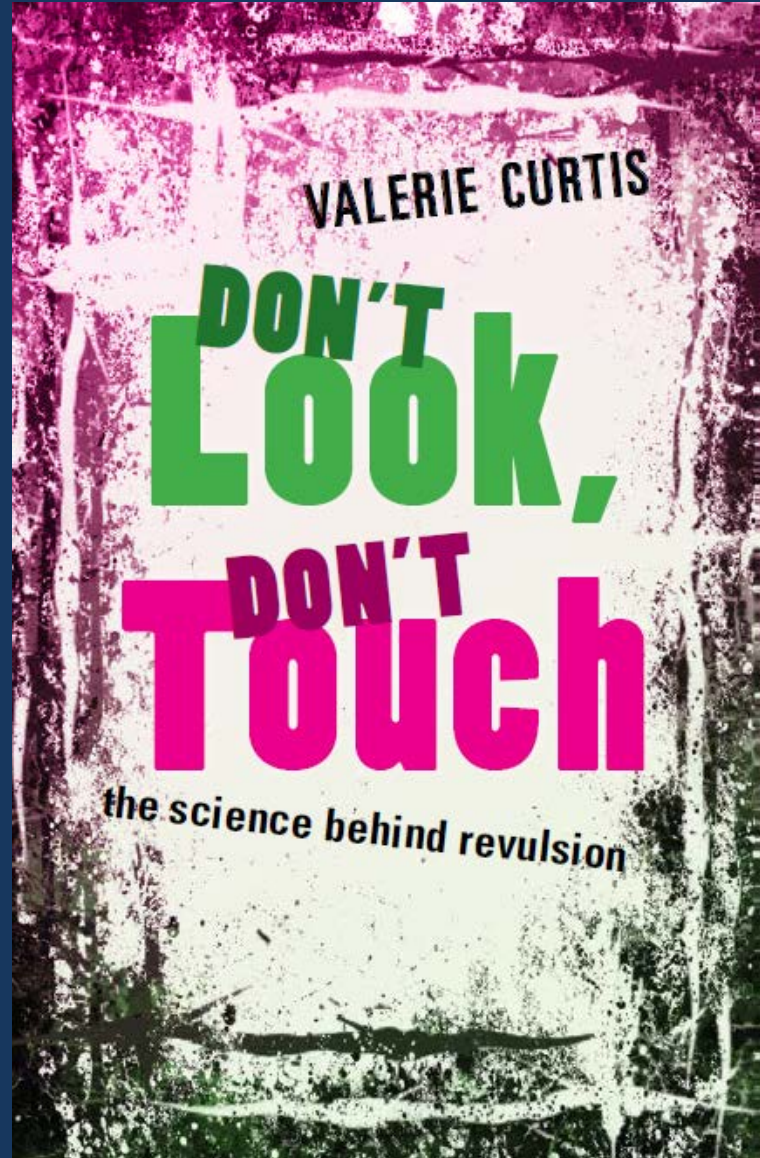
Fessler, D. M., Arguello, A. P., Mekdara, J. M. & Macias, R. 2003

VALERIE CURTIS

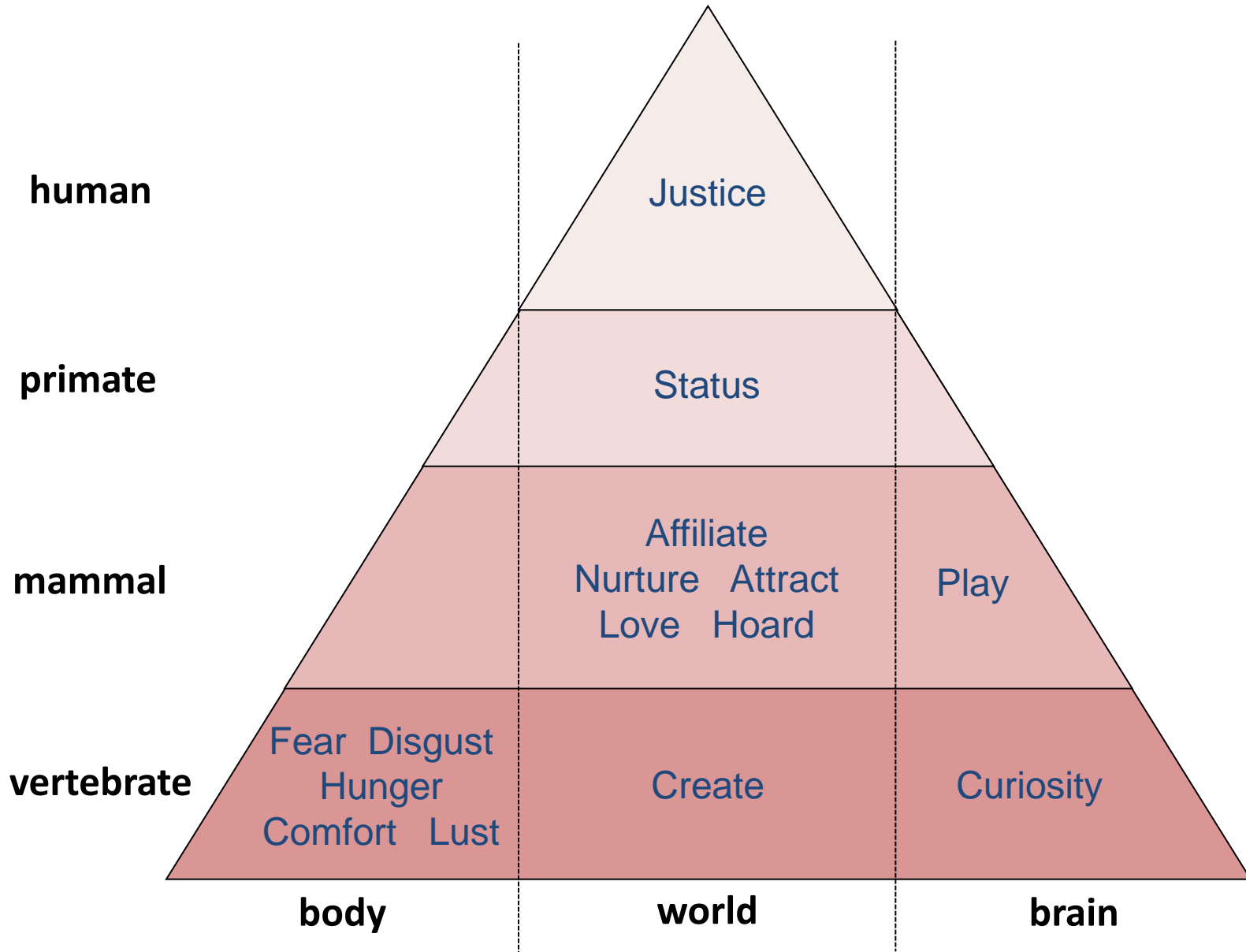
**DON'T
Look,**

**DON'T
Touch**

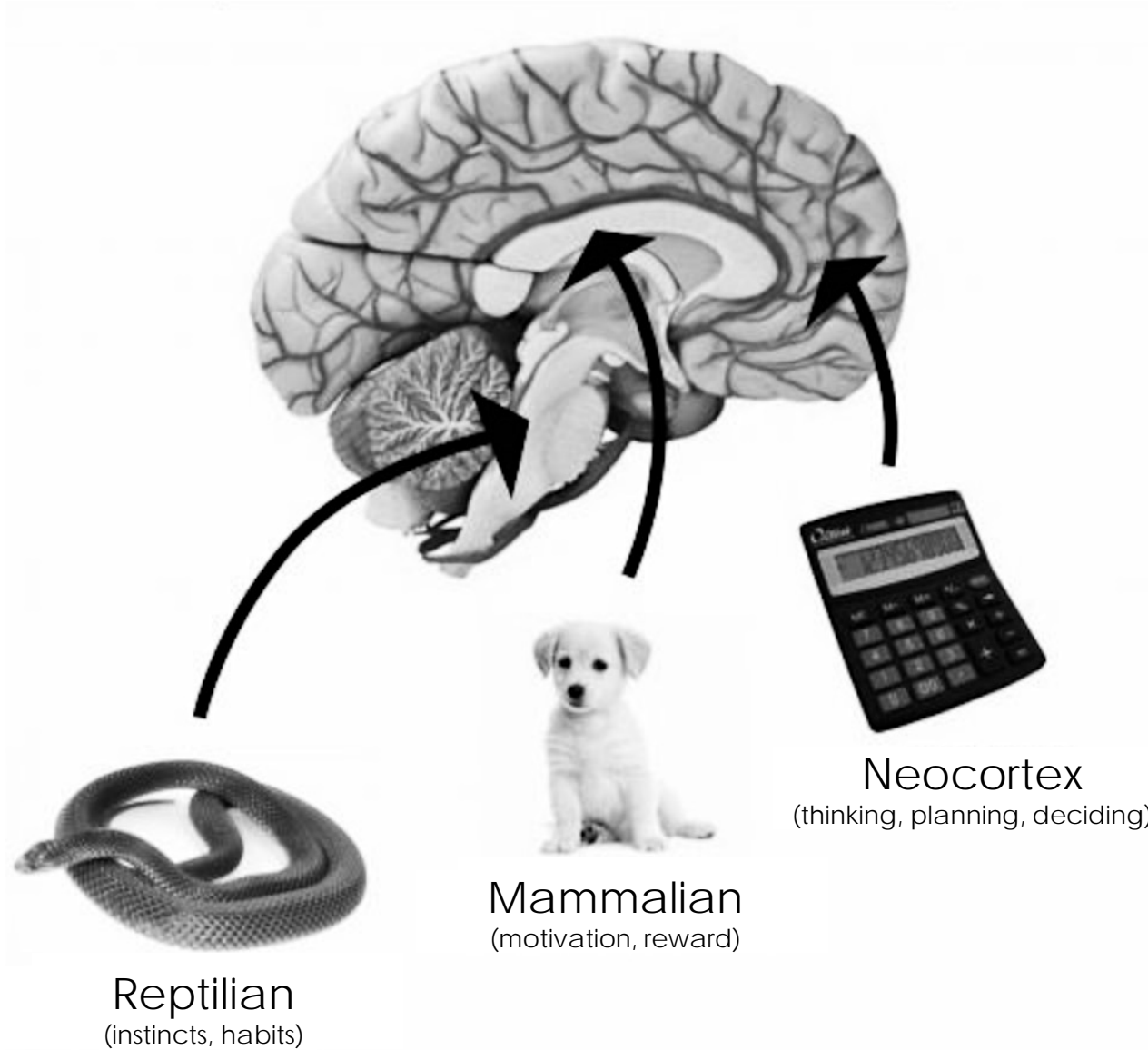
the science behind revulsion



Human Motives

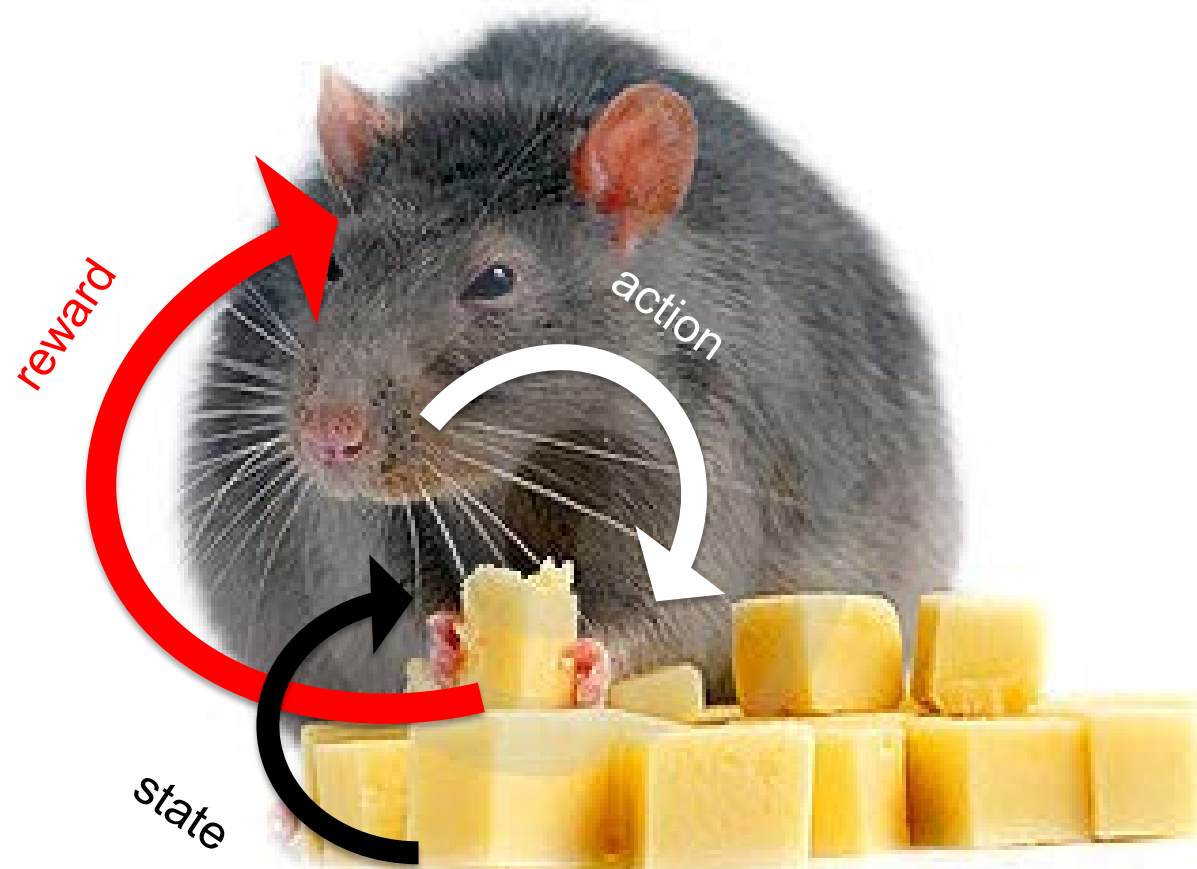


The evolving brain





Reinforcement learning





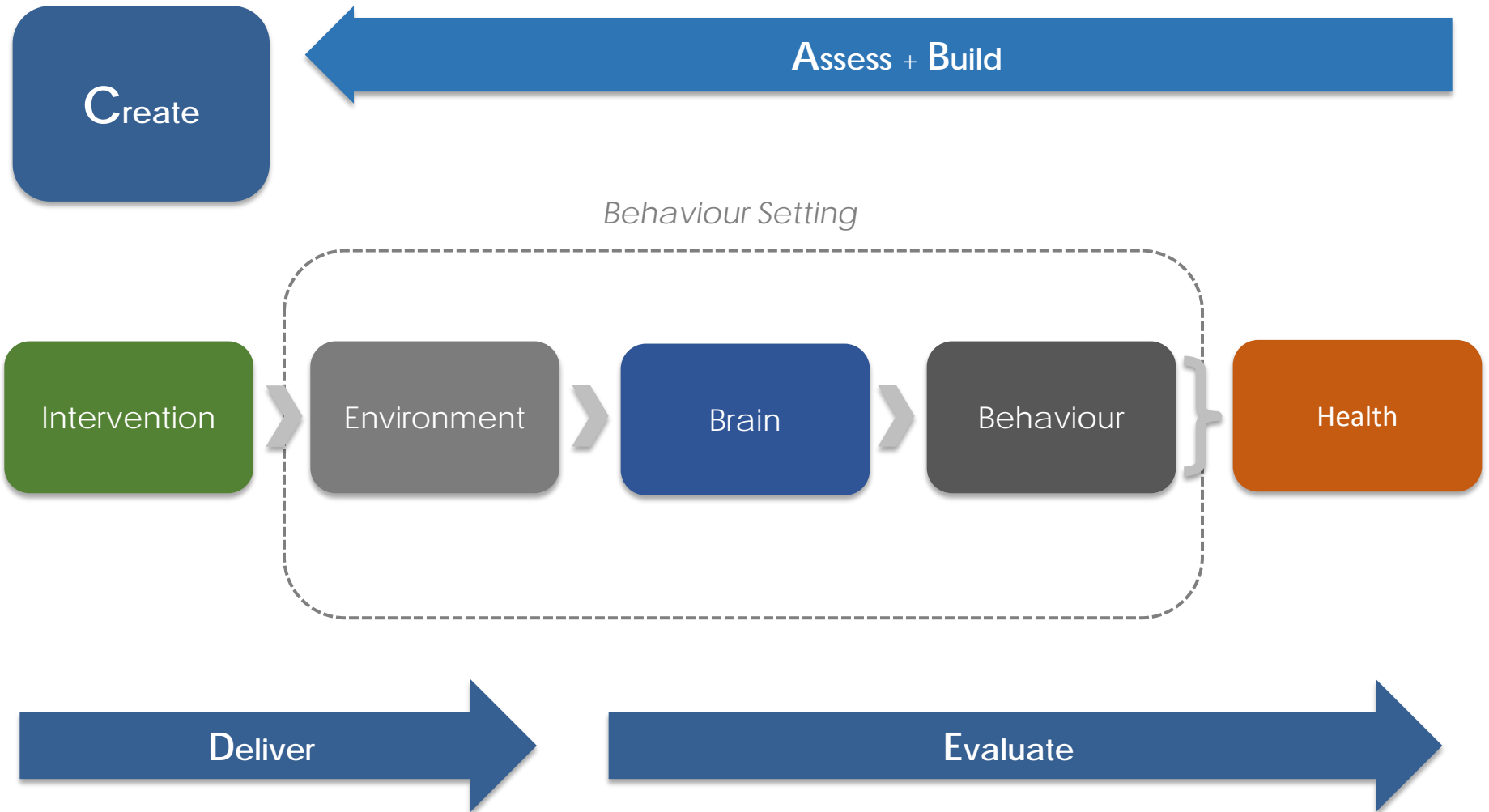
ROBERT AUNGER + VALERIE CURTIS

GAINING CONTROL

HOW HUMAN BEHAVIOUR EVOLVED

OXFORD

Behaviour Centred Design



Food Hygiene in Nepal



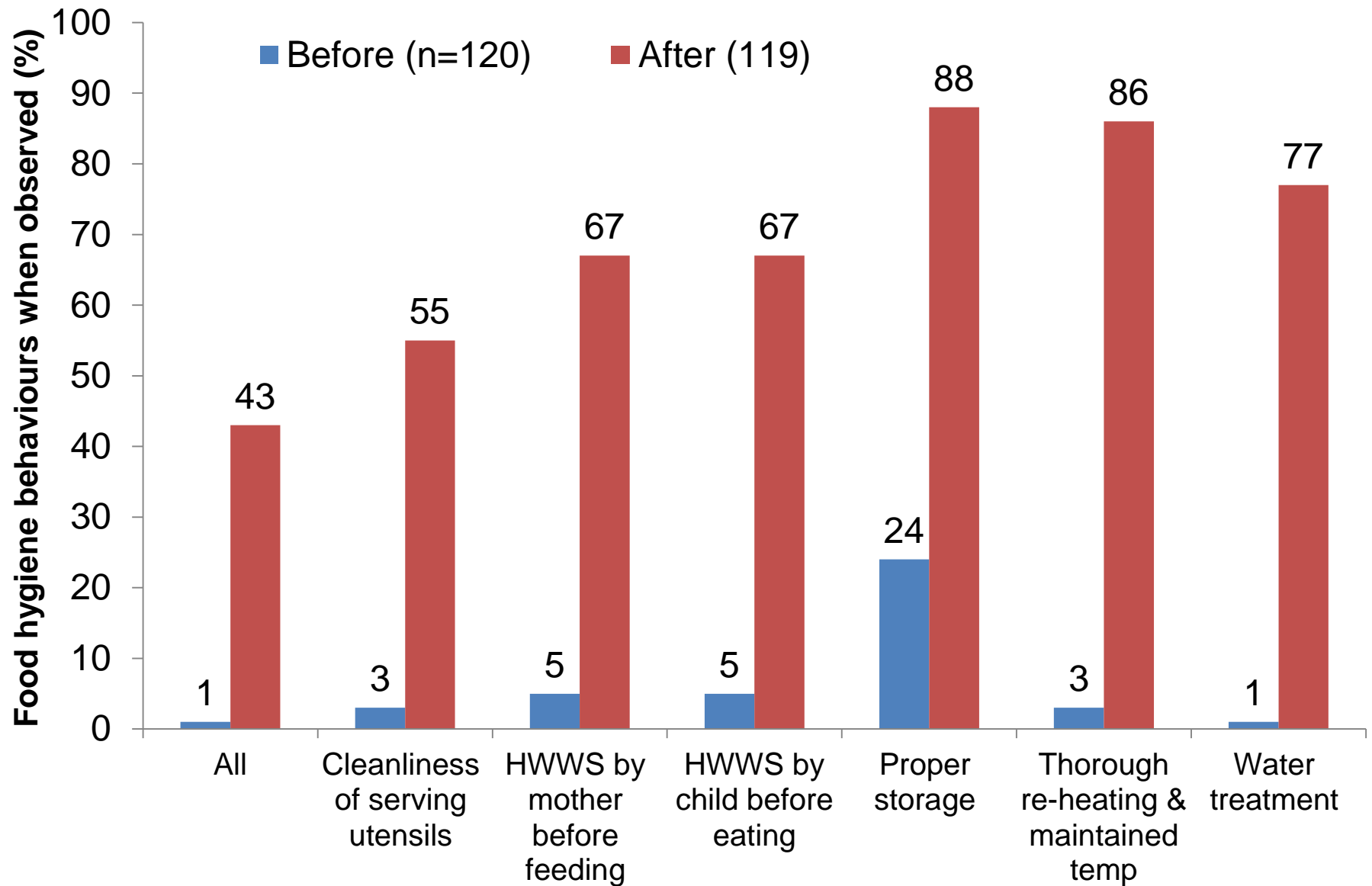
Five key food hygiene behaviours



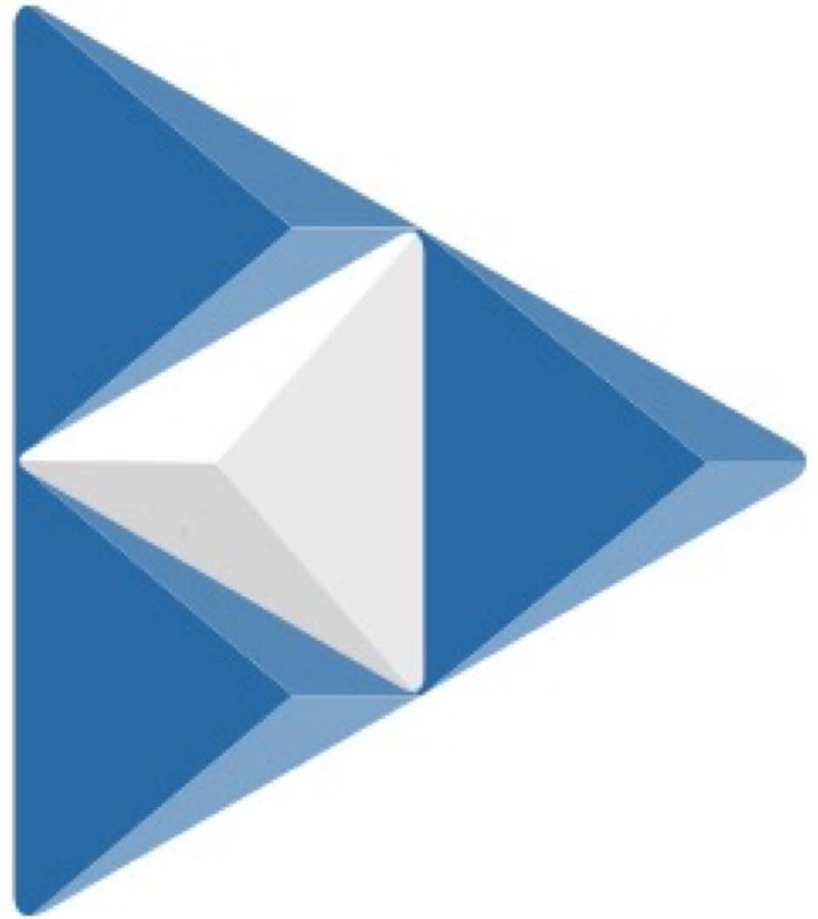
Setting disruptions



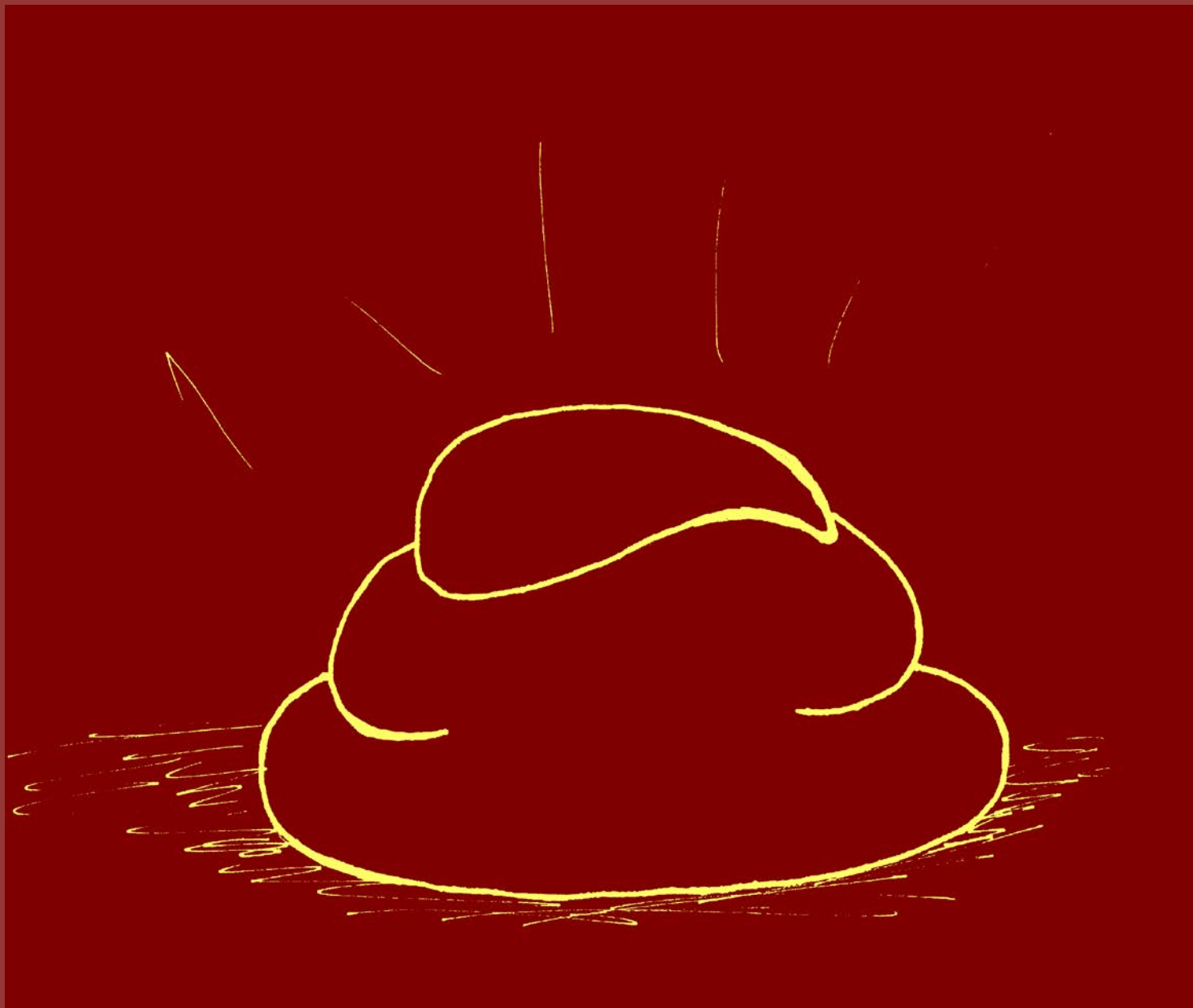
Prevalence of key food hygiene behaviours







behaviour
centred design





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How the SaTo toilet works.



We're Not Animals

DISGUST STATUS
make it DESIRABLE

CONTEXT,
OBJECTIVES, SCOPE,
PROCESS

TARGET AUDIENCE &
BEHAVIOUR CHANGE

THE PROPOSITIONS

VISION & NEXT STEPS

APPENDICES



The social marketing WASH toolkit was developed with support from:



This proposition was inspired by this WASH communication which our experts stated has triggered movement from open defecation to a home toilet toilet.

The image is disgusting but also has an implicit status message – *I'm above that.*

A couple of takes on this were suggested...



Or turn the tables to show dogs being more civilised than us – at school, at work, getting married, etc.

Everyone's doing it - Ideas

AFFILIATE make it
DESIRABLE

CONTEXT,
OBJECTIVES, SCOPE,
PROCESS

TARGET AUDIENCE &
BEHAVIOUR CHANGE

THE PROPOSITIONS

VISION & NEXT STEPS

APPENDICES



Create a PR stunt where a lone guy wanders onto the cricket pitch, wearing his lungis with his little pot of water and starts to squat before realising he's all on his own - and being watched. A message comes up on a screen "Don't be left behind everyone else get a toilet".



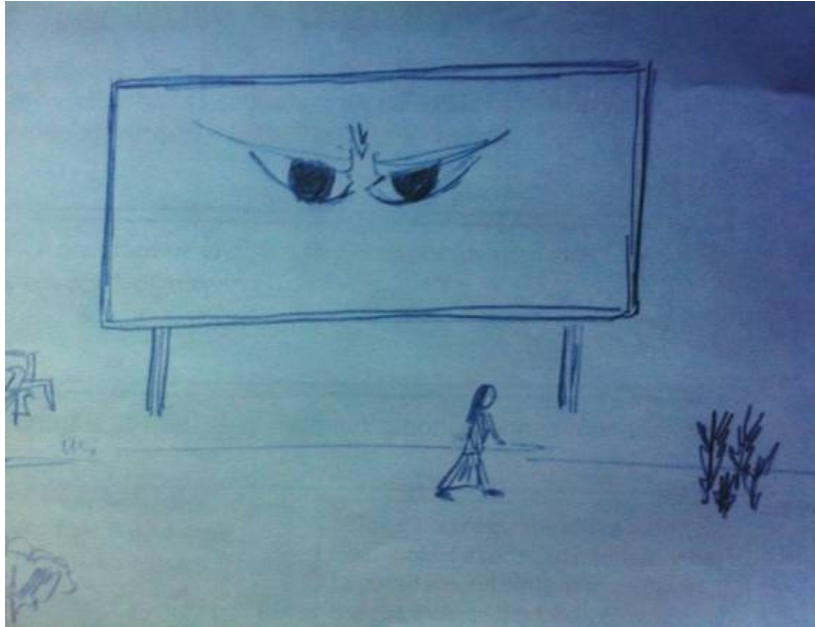
Households name the date they plan to get a toilet by and then have a plaque put on their door. (They could be incentivised to complete on time). Even if it's a long way off they get a plaque. These make visible intention and put social pressure on others to commit too.

No Prying Eyes

FEAR

STATUS

make it
DESIRABLE



A Prying Eyes campaign with big eyes on billboards and near open defecation sites.

If we are clever these could have a double impact: a trigger to purchase as they heighten anxiety around being watched and, for those *with* prying eyes, a reminder that they are not invisible... The link below shows how in a social science experiment eyes encouraged 'good' behaviour.

<http://www.sciencedaily.com/releases/2006/06/060628091247.htm>

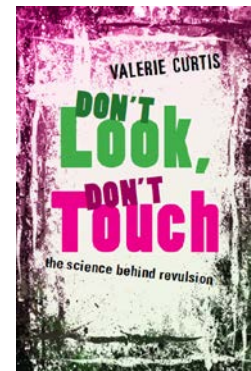
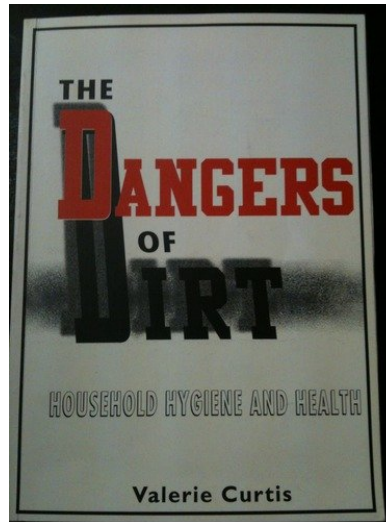
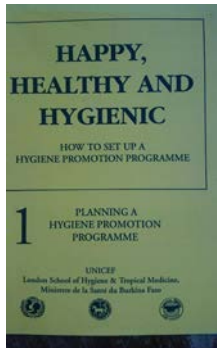
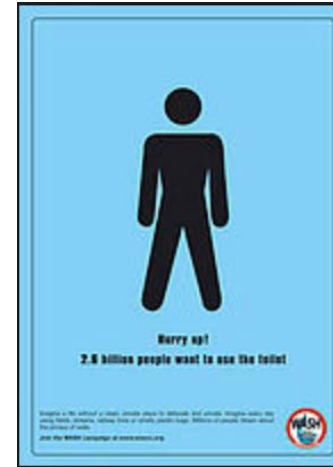
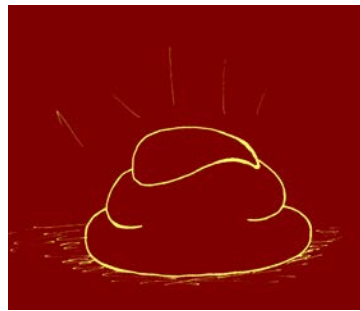
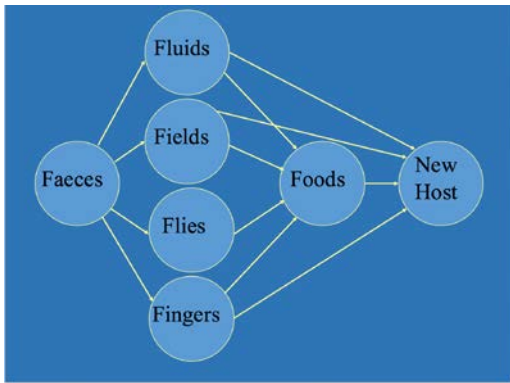


This more humorous take focuses on boys who maybe do the prying. Inspired by Kamil Kar's anecdote about more toilets leading to less boys up palm trees trying to spy on the girls once toilets were installed!

"What Sanjeev does now..." would show a wistful Sanjeev who since stopping spending all his time watching the girls has had to find other things to do. As a result his studies improved, he got a good job and now works in IT and has been able to buy his own family a toilet, TV, fridge, bike...

What's next?





Conclusions

- Find the gaps
- Follow your nose
- Go Global
- Build a team
- Communicate, advocate
- Personal success vs impact



PhDs can change the world!

Thanks

- Bob Aunger, Adam Biran, Micheal deBarra, Katie Greenland, Jessie deWitt Huberts, Wolf Schmidt, Sian White, Om Gautam, Gaby Judah, Myriam Sidibe, Sandy Cairncross, Thierry Mertens, Anke Neihof
- Funders: Wellcome, ESRC, DFID, SHARE, World Bank, Unicef, Gates, GAIN, EU, WaterAid, WSSCC, Unilever.

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