Reducing bath water temperature to reduce risk of bath scalds: is it cost effective and who pays?

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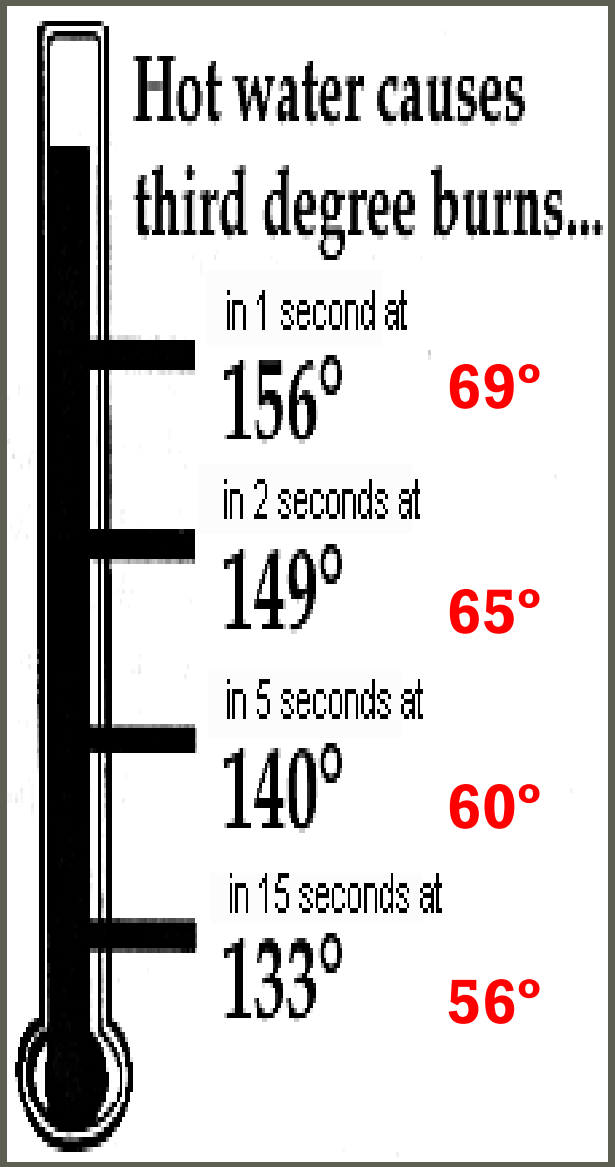
Context

- Each year in the UK approximately 2000 children aged 0-14 years attend A+E departments and 500 are admitted to hospital following a bath water scald.
- Most (86%) admissions occur in children aged under 5 years and 67% of these involve a prolonged inpatient stay or transfer to a specialist hospital or burns unit.
- Scald injuries place a considerable burden on the NHS, with the cost of treating a severe scald estimated to be at least £300,000.
- Longer term effects of scalds can include disability, disfigurement or psychological harm and repeated skin grafts may be required as the child grows.
- There are steep social gradients in thermal injuries, with children from disadvantaged areas being at higher risk. Younger children are at greater risk than older children.
- There has been no discernible downward trend in A+E attendances or admissions for bath water scalds over recent years.



Ten-Minute Rule Bill on Scalding.mht

Design and methods

- Pragmatic parallel arm RCT trial to assess the effectiveness and cost-effectiveness of thermostatic mixer valves (TMVs) in reducing bath hot tap water temperature, their acceptability to families and their impact on bath time safety practices.
- Families were randomised to treatment arm.
  - **Intervention arm families were offered:**
    - **An educational leaflet mailed prior to TMV fitting**
    - **A TMV set at a maximum temperature of 45^0C by a qualified plumber**
    - **A waterproof educational guide on how to use the TMV attached to the tap by the plumber at installation.**
  - **Control arm families were offered the intervention *after* collection of follow-up data.**
- The primary outcome measure was bath hot tap water temperature at 3 and 12 months post TMV fitting (intervention arm) or post randomisation (control arm).

Cost-effectiveness

- Costs
  - Valve
  - Installation
  - Hanger
  - Leaflet
  - Repairs and maintenance
- Effects
  - Reduction in at-risk families
  - Reduction in risk of bath scalds

Costs

Item	Agency	Cost (£)	Notes
valve	HA	15	annualised capital charges (3 years)
hanger	NHS	1.21	
leaflet	NHS	0.1	
installation	HA	103.02-260.28	depends on extent of refitting
repairs	HA	3.16	assuming 5% valves require repair

Cost of treating scald (NHS) ~ £18,000
Cost of treating severe scald (Judkins, personal communication) ~ £400,000

Baseline scald risk

- 2000 children aged 0-14 attend A+E for bath scalds per annum
  - 500 hospital admissions
    - 86% admissions occur in children aged 0-4 (n=430)
      - 67% of which involve LOS > 5 days i.e 288 per annum
      - 142 children aged 0-4 admitted for ≤5 days
  - 1500 non-admissions
    - 79% of attendees aged 0-4 years (n=1185)

- Number of children aged 0-4 = 3,496,200
  - Risk of bath scalds in children aged 0-4 requiring long hospitalisation = 288/3496200 = 1 in 12,100
  - Risk of bath scalds requiring shorter hospitalisation = 1 in 24,600
  - Risk of bath scalds requiring A+E = 1 in 2,950
  - OVERALL RISK = 1 in 2,160

Reduction in scald risk

- Percentage in intervention group with at-risk bath water temperature pre installation = 100%
- Percentage in intervention group with at-risk bath water temperature at follow up = 19%
  - **Reduction in scald risk = 0.81**
- Percentage in control group with at-risk bath water temperature pre installation = 100%
- Percentage in control group with at-risk bath water temperature at follow up = 87%
  - **Reduction in scald risk = 0.13**
  - ***Difference between groups = 0.68***
- **Reduction in risk:**
  - long hospitalisation ~ 1 in 12,100 to 1 in 37,900
  - shorter hospitalisation ~ 1 in 24,600 to 1 in 77,000
  - A+E ~ 1 in 2,950 to 1 in 9,220
  - OVERALL RISK ~ 1 in 2,160 to 1 in 6,765

Cost-effectiveness

- Scenarios:
  1. Installation costs to HA; education materials to NHS – *base-case*
  2. 'Zero' installation costs; repair costs to HA; education materials to NHS
  3. Repair costs to HA; installation costs and education materials to NHS
  4. Only NHS costs
- Costs of treatment
  - NHS perspective
  - Societal

Scenario one

- NHS perspective
  - Cost per % reduction in at-risk families = £0.29
  - Cost of averting one bath scald = £44,000
- Societal perspective
  - Cost per % reduction in at-risk families = £0.29
  - Cost of averting one bath scald = -£338,000

Scenario two

- NHS perspective
  - Cost per % reduction in at-risk families = £0.07
  - Cost of averting one bath scald = -£3,900
- Societal perspective
  - Cost per % reduction in at-risk families = £0.07
  - Cost of averting one bath scald = -£386,000

Scenario three

- NHS perspective
  - Cost per % reduction in at-risk families = £0.73
  - Cost of averting one bath scald = £139,000
- Societal perspective
  - Cost per % reduction in at-risk families = £0.73
  - Cost of averting one bath scald = -£243,000

Scenario four

- NHS perspective
  - Cost per % reduction in at-risk families = £0.02
  - Cost of averting one bath scald = -£13,900
- Societal perspective
  - Cost per % reduction in at-risk families = £0.02
  - Cost of averting one bath scald = -£396,000

Conclusion

- Highly cost-effective when intervention is part of refurbishment or rebuild – as with 'new' building regulations – when societal perspective employed.
- Less cost-effective if imposed across the board for health protection purposes from perspective of NHS.
- But who should pay? Should housing association be 'compensated' by health service?