

Health and Economic Impact of Salt and Alcohol Reduction Strategies for Hypertension and Cardiovascular Disease Prevention in Ghana

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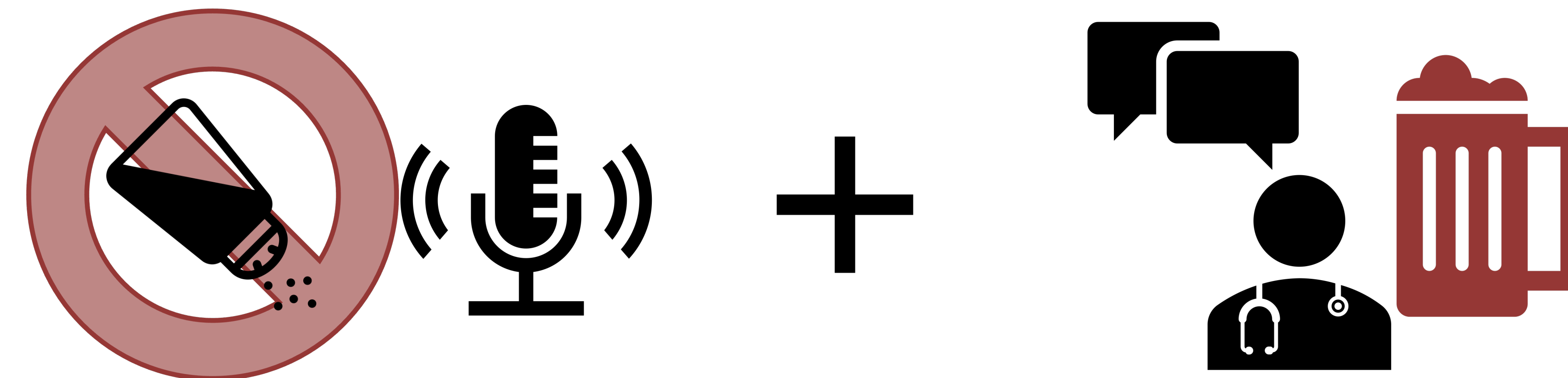


Main findings

- **Health Burden Averted:** The **combined strategy** achieved the **greatest impact**, averting **2.82 million DALYs** (approx. 5% of the lifetime CVD burden), significantly outperforming individual strategies.
- **Economic Headroom:**
 - **Salt Campaign:** \$48.68 maximum justifiable cost per person to remain cost-effective,
 - **Alcohol Intervention:** \$117.40 per person, and
 - **Combined Strategy:** \$193.26 per person.
- **Synergistic Gains:** The combined approach yielded health benefits five times larger than the salt campaign alone, suggesting that **targeting multiple behavioural risks simultaneously amplifies survival**.
- **Short-term vs. Lifetime:** While the salt campaign suggested net cost savings of \$139M in the first 12 years, lifetime savings were more uncertain (\$67M) due to the costs of managing a population surviving longer with chronic conditions like heart failure.

Objectives

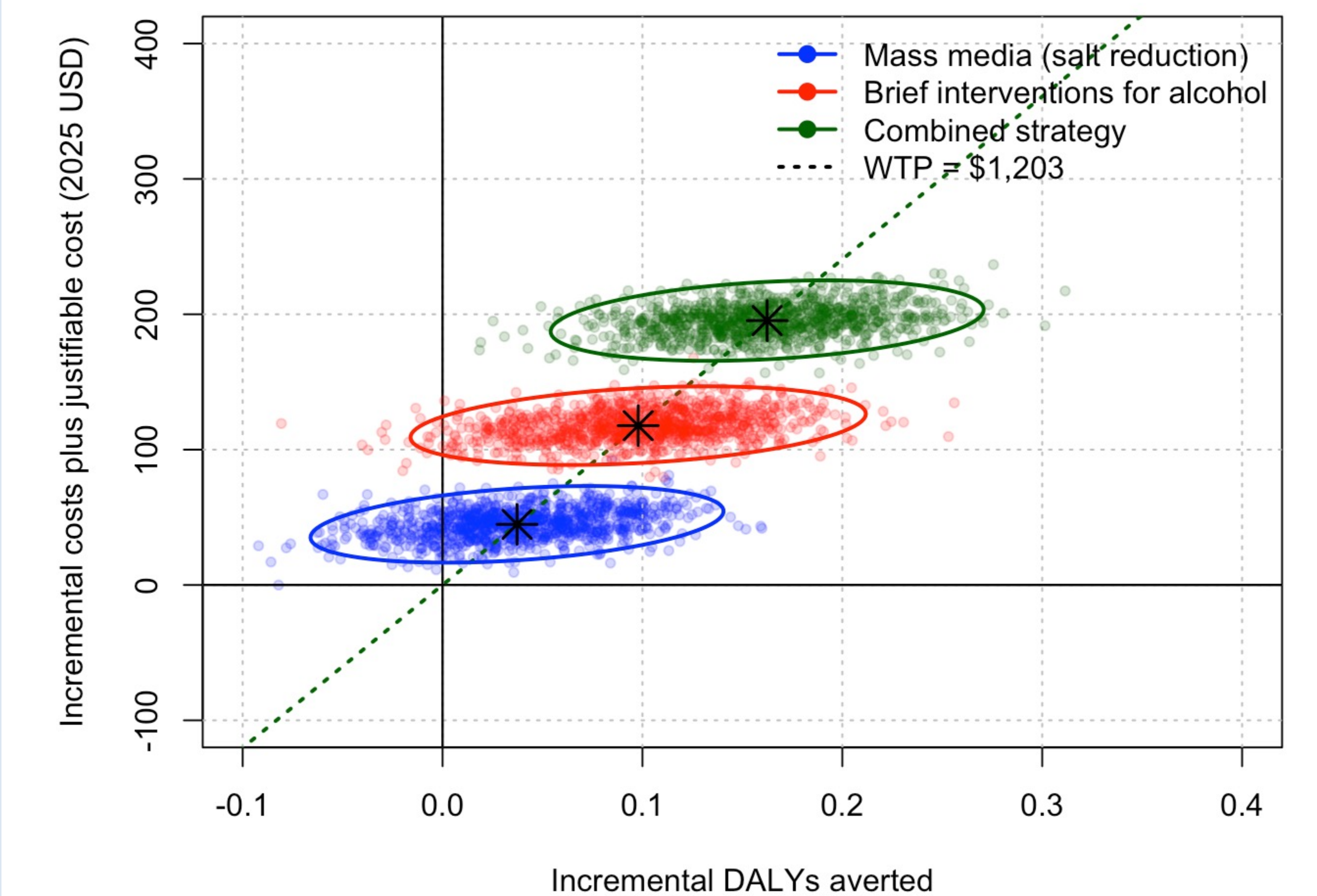
- **Evaluate Long-Term Impact:** Quantify the lifetime health and economic consequences of two priority public health strategies in Ghana: national salt-reduction mass media campaigns and primary care-based alcohol brief interventions.
- **Inform Resource Allocation:** Calculate the **maximum justifiable cost** per person for each intervention to remain cost-effective under a specified **Willingness-to-Pay (WTP) threshold**.
- **Analyse Synergistic Effects:** Assess the potential for additive or multiplicative health gains by implementing a combined, layered intervention strategy.
- **Address Evidence Gaps:** Use **Real-World Evidence** and **locally adapted modelling** to provide evidence-based benchmarks for Ghanaian NCD policy.



Mass-media campaign for salt reduction

Brief interventions for alcohol use problems

Figure 1. Cost-Effectiveness Plane: Incremental Costs vs. DALYs Averted for Prevention Strategies



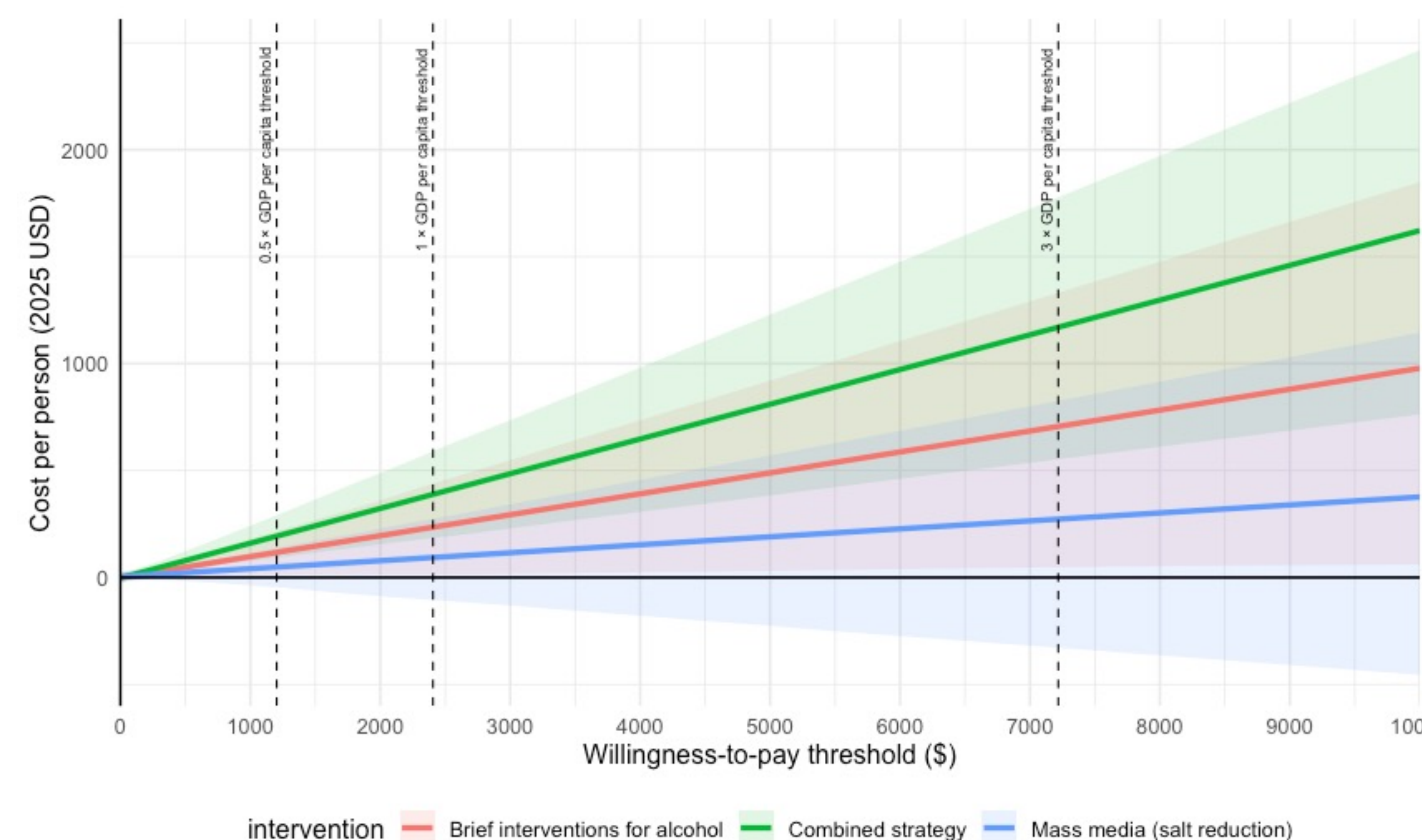
So What Does This Mean?

- **Value-Based Design:** The maximum justifiable cost estimates provide a "price ceiling" for policymakers; any intervention delivered below these per-person costs represents a high-value investment for Ghana.
- **The "Survival Paradox":** Reductions in acute CVD deaths (MI and Stroke) lead to increased survival, which may subsequently increase the long-term prevalence and management costs of chronic heart failure.
- **Strategic Prioritisation:** Integrated, population-wide campaigns paired with targeted primary care engagement offer the most robust "headroom" for implementation and the highest net monetary benefit.
- **Policy Roadmap:** Findings support the transition from isolated interventions to **layered public health strategies**. Despite high uncertainty in regional effect sizes, the results serve as a critical guide for resource allocation under uncertainty.

What Did We Do? (Methods)

- **Microsimulation Model:** Developed a locally adapted health economic microsimulation model using a nationally-representative synthetic population of 17.38 million adults based on the 2014 Ghana Demographic and Health Survey (GDHS).
- **Intervention Modelling:** Intervention effects on salt and alcohol consumption were informed by regional effectiveness studies and modelled with attenuation.
 - **Mass Media Campaign:** Modelled as a reduction in excessive salt intake with a one-year effect half-life.
 - **Alcohol Brief Interventions:** Modelled as motivational interviewing in primary care resulting in a downward shift in AUDIT-C scores.
- **Economic Framework:** Conducted from a **societal perspective** using a lifetime horizon. Costs were expressed in 2025 USD with a 3% discount rate for both costs and **DALYs** (Disability-Adjusted Life Years).
- **Cost-Effectiveness Threshold:** The CEA threshold was set at 0.5 times Ghana's GDP per capita (\$1,203 per DALY averted).
- Performed **Probabilistic Sensitivity Analysis (PSA)** with 1,000 Monte Carlo simulations to address parameter uncertainty.

Figure 2. Impact of WTP Thresholds on Maximum Justifiable Intervention Costs



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