

One line is missing from India's heart attack protocol

Chew one plain aspirin while calling 108 or 112

21 September 2026 · Ajay Gupta, University of California, Irvine & Charak Laboratories, New Delhi

23 867

Net deaths averted per year at 55% coverage
95% UI 11 452–40 498

65

Deaths averted per day about one every 22 minutes

US\$ 363

Cost per quality-adjusted life year
95% UI 117–949

39.8:1

Benefit-to-harm ratio net benefit in 99.98% of simulations

The gap

India's ICMR Standard Treatment Workflow for unstable angina and NSTEMI begins management at the primary health centre. It specifies the correct aspirin loading dose of 325 mg, but contains **no step before the patient reaches a facility, no instruction to chew, and no statement of formulation** — in a market where enteric-coated 75 mg tablets predominate. ACC/AHA, the European Society of Cardiology, NICE and AHA first aid guidance all specify 150–325 mg non-enteric-coated aspirin, chewed, at first medical contact.

Why this is not simply "Indians don't get aspirin". In the CREATE registry of 20 937 patients, 98.2% of STEMI and 97.4% of NSTEMI patients received antiplatelet drugs *in hospital*. The gap is not access — it is the moment, the route and the formulation. About 60% of infarction deaths occur before any facility is reached.

What adoption would achieve

Scenario	Protocol coverage	Net deaths averted/year	Per day	QALYs gained/year
Conservative	35%	12 619 (6 080–21 729)	35	114 731
Central	55%	23 867 (11 452–40 498)	65	216 406
Ambitious	75%	35 053 (16 650–59 501)	96	318 023

Medians with 95% uncertainty intervals from 10 000 Monte Carlo draws over 35 parameters. Coverage is incremental to the 16.9% baseline prehospital aspirin use recorded in the ACS QUIK trial. Fatal bleeding is subtracted across the entire community chest-pain population.

Three actions

1. **Add one line to the Standard Treatment Workflow**, preceding the primary health centre: at first suspicion of acute coronary syndrome, chew 300–325 mg plain, non-enteric-coated aspirin — absent trauma, active bleeding or known allergy.

2. **Stock plain 300–325 mg tablets**, not only enteric-coated 75 mg, in primary health centres, ambulances and pharmacies; add it to the essential medicines list for this indication.

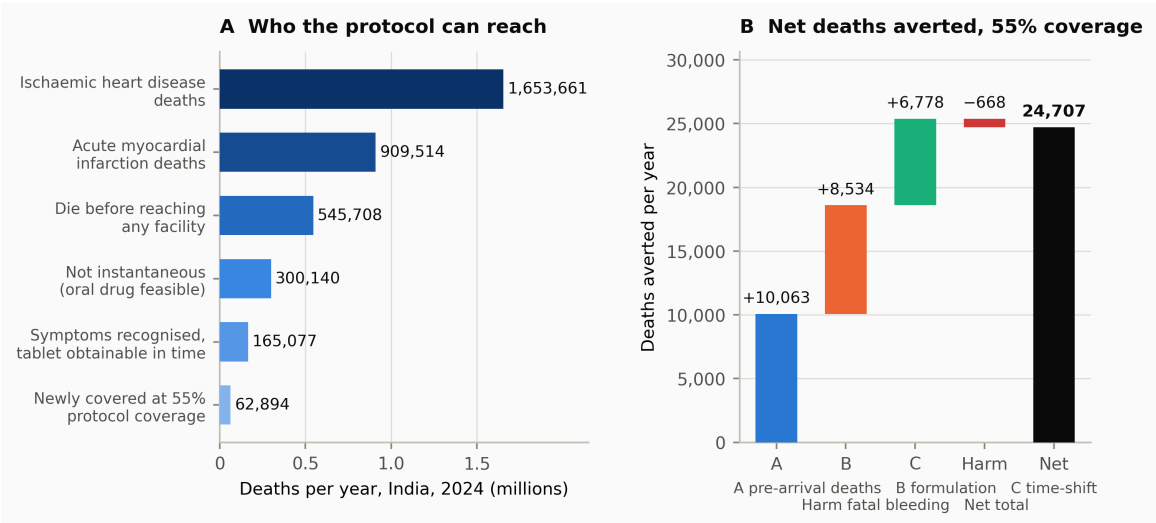
3. **Script dispatchers on 108 and 112** to instruct callers to chew aspirin, and run a public campaign: *Call 108. Chew one plain aspirin. Rest.* Most avertable deaths occur before an ambulance arrives.

Sources: ISIS-2 (Lancet 1988); CREATE registry (Lancet 2008;371:1435–42); ACS QUIK (JAMA 2018;319:567–78); Bhatt et al. (J Am Coll Cardiol 2017;69:603–12); Russo et al. (J Am Heart Assoc 2024;13:e032778); ICMR Standard Treatment Workflow, October 2019; World Bank World Development Indicators. Full model, parameters and code available from the author.

Method, results and what would change the answer

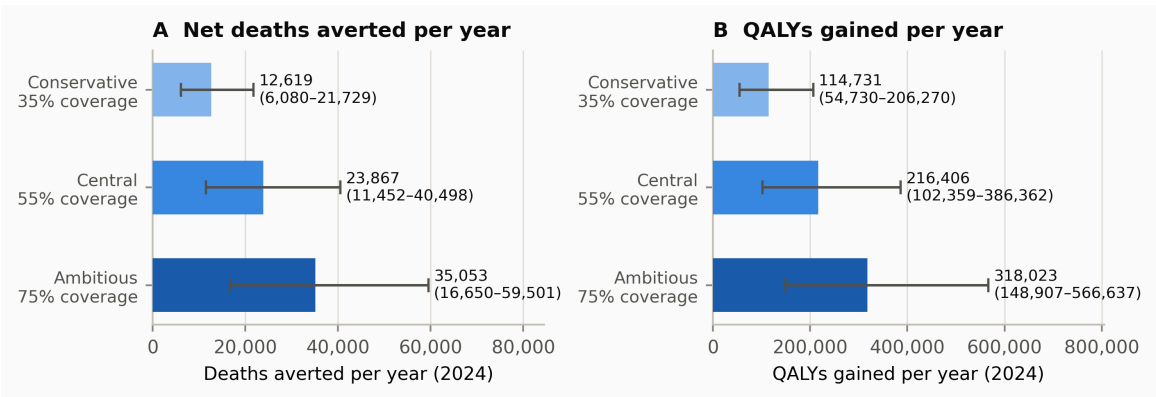
How the estimate is built

Because Indian patients who reach a facility already receive aspirin almost universally, the incremental value of a prehospital protocol comes from three separate channels, not from "aspirin versus no aspirin".



Left: the population a protocol can actually reach. **Right:** where the benefit comes from. Channel A — patients who die before reaching care and receive nothing. Channel B — plain chewed aspirin instead of enteric-coated (52.8% vs 15.8% pharmacodynamic non-response). Channel C — earlier platelet inhibition for those who do arrive, modelled conservatively. Panel B shows the deterministic base case (24 707); the simulated medians on page 1 (23 867) differ slightly because medians of a Monte Carlo distribution do not sum.

Results with uncertainty



Cumulative, 1988–2024

Had India adopted the protocol after ISIS-2 with realistic diffusion from 1990:

Outcome	Median	95% UI
Deaths averted	506,868	251,798–822,888
QALYs gained	4.54 m	2.20–7.91 m
Productivity (US\$)	6.7 bn	2.8–13.5 bn

These figures are far lower than earlier estimates because India's disease burden and output per worker were much smaller in the early years — GDP per person employed in 1990 was 27% of its 2024 value — and because benefits are discounted at 3% and friction-adjusted. Multiplying today's annual figure by 37 years overstates cumulative productivity loss by roughly an order of magnitude.

What would change the answer

- **The ISIS-2 effect size itself** is the single largest source of uncertainty.
- **The formulation channel** contributes about a third of the benefit but rests on a crossover study of just 40 patients with type 2 diabetes taking daily aspirin, extrapolated to a single loading dose. *A small trial of chewed plain versus enteric-coated aspirin in suspected ACS would settle this cheaply.*
- **Efficacy in pre-arrival deaths.** ISIS-2 randomised hospital survivors; deaths before arrival are enriched for arrhythmic mechanisms. We discount efficacy to 0.80 of the trial effect; at 0.55 the central estimate falls about 21%.
- **External check.** Given United States inputs the model returns 8 028 deaths averted against 13 016 in the published US analysis — it is conservative by a factor of about 0.6.