The Costs of the Old Paradigm

Practical, financial and environmental benefits of cybernetic periodontal theory

Working document for researchers, clinicians, educators, regulators, journalists and public-health decision makers

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Counting the human, financial and environmental costs of treating downstream disease while ignoring the system that produces it.

Purpose. This document examines the practical, financial and environmental costs of continuing with narrow, linear approaches to periodontal and chronic inflammatory disease. It does not claim that cybernetic theory has already quantified every saving. It argues that the potential savings are large enough that failure to quantify them is now irresponsible.

1. The central economic question

The old paradigm treats the diseased mouth chiefly as a local dental problem and treats chronic inflammatory disease by specialty, organ system and downstream intervention. The cybernetic question is larger: what system is producing diseased mouths, inflamed tissues, altered metabolisms and costly chronic disease at scale?

The savings need not be total to be transformative. A one percent reduction in a trillion-dollar disease burden is a ten-billion-dollar public-health event. A five percent reduction is structural reform. This is why the costs of the old paradigm must be counted, not assumed away.

2. Scale of the human burden

Severe periodontal disease affects more than one billion people worldwide according to the World Health Organization. In the United States, national surveillance data reported periodontitis in about 42% of dentate adults aged 30 years or older, with severe disease in about 7.8%. These figures describe a common chronic inflammatory disorder, not a specialist curiosity.

The mouth also sits inside a broader chronic-disease economy. CDC reports that 90% of the United States' USD 4.9 trillion annual healthcare expenditure is for people with chronic and mental health conditions. The American Heart Association projects that total US cardiovascular disease-related costs may reach USD 1.8 trillion by 2050. The International Diabetes Federation estimates that diabetes accounted for USD 1.015 trillion in global health expenditure in 2024.

These figures do not prove causation. They define the stakes. If periodontal disease is a visible marker of diet-mediated, microbiome-mediated and immune-mediated regulatory failure, then cardiology, endocrinology, rheumatology, haematology and immunology cannot treat it as a dental side issue.

3. Children, culture and the hidden cost of pre-cybernetic education

Children are the main hope for future prevention, but they are educated into a culture of isolated nouns and hidden consequences. A child is shown a wolf, a tooth, a soft drink, a lunchbox or a pet dog as if each were a

separate object. Cybernetic education would show the invisible map: diet, microbes, immunity, water, packaging, advertising, waste, disease, cost, regulation, profit and ecology.

This is not abstract philosophy. It is public-health infrastructure. A can of Coca-Cola is not only a drink. It is sugar, acid, water, aluminium, mining, energy, refrigeration, transport, marketing, dental disease, metabolic disease, litter, corporate profit and regulatory choice. Teaching that map early may be one of the cheapest interventions available.

4. Tooth brushing, flossing and rewarded behaviours

Existing oral-health advice is correct but underpowered. CDC advises brushing well twice daily and flossing between teeth to remove dental plaque; CDC also recommends limiting foods and drinks with added sugar. NIDCR gives specific technique advice, including angling bristles toward the gumline and brushing gently. These behaviours are not trivial private habits. They are low-cost, high-frequency regulatory behaviours at a major microbial and inflammatory interface.

The old paradigm often leaves these behaviours to individual compliance and later dental correction. A cybernetic public-health approach would design homes, childcare centres, schools, workplaces, aged-care facilities, insurance systems and public-health budgets so that quality, frequency and continuity are cued, taught, supervised and rewarded.

What gets rewarded gets done. Rewards need not mean crude payments. They include praise, visible progress, school routines, workplace facilities, insurance incentives, digital prompts, social norms, administrator targets and public-health metrics. The point is to convert advice into a functioning system.

5. Cost domains to be counted

Cost domain	Old paradigm	Cybernetic prevention frame	Likely measurable outcome
Dental procedures	Repeated scaling, extraction, anaesthesia, antibiotics and repair	Earlier system correction: diet, hygiene quality, chewing function, inflammation, education	Fewer procedures, less recurrence, lower lifetime cost
Human chronic disease	Specialty management after disease is established	Oral-systemic and diet-microbiome regulation included in prevention	Reduced inflammatory burden; potential gains in diabetes and cardiovascular risk markers
Education	Objects taught as isolated nouns	Objects taught as networks of relationships and feedback	Improved health literacy and decision-making
Behaviour	Advice left to individual willpower	Routines cued, supervised and rewarded	Higher brushing/flossing quality and frequency
Environment	Processing, packaging, waste and treatment costs externalised	Whole-system accounting of diet, disease, treatment and waste	Lower avoidable material, energy and pharmaceutical burden

6. Environmental accounting

Environmental accounting must include more than ingredient inputs. It must include processing, packaging, refrigeration, transport, advertising, waste, overfeeding, disease generated by diet, pharmaceuticals, clinical energy use, disposables and repeated procedures. For companion animals, recent UK modelling estimated that dog-food ingredient production contributes 0.9-1.3% of total UK greenhouse-gas emissions, with wide variation

between product types. That finding does not validate any simplistic diet slogan; it reinforces the need for transparent whole-system accounting.

For human food systems, ultra-processed foods supply more than half of calories in the United States: CDC/NCHS reported 61.9% among youth and 53.0% among adults during August 2021-August 2023. A cybernetic cost model must therefore ask how food processing, marketing and texture affect teeth, microbiomes, metabolism, inflammation, behaviour, waste and healthcare expenditure together.

7. A conservative benefits model

- Start with direct oral-health savings: avoided procedures, avoided extractions, fewer antibiotics, fewer repeat visits and fewer school/work absences.
- Then add behaviour-system gains: improved brushing quality, flossing/interdental cleaning, lower sugar exposure and earlier dental attendance.
- Then add chronic-disease sensitivity analyses: 1%, 2%, 5% and 10% reductions in relevant burden, explicitly labelled as scenarios rather than claims.
- Then add environmental savings: processing, packaging, transport, clinical waste, pharmaceuticals and avoidable treatment infrastructure.
- Keep conservative, moderate and high-impact scenarios separate. The high-impact case may be very large, but credibility requires staged quantification.

8. Public-interest conclusion

The cost of the old paradigm has never been properly counted. That omission is no longer defensible. If periodontal disease is one visible expression of a wider failure of biological regulation, then the largest benefits may come not from a new procedure but from system-level prevention: children taught to see relationships, citizens rewarded for daily oral-health behaviours, food systems judged by biological outcomes, and professions held accountable for the costs of preventable disease.

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