

Chronic Pain and Social Reform

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Preface

This series of essays is about chronic pain and the methods we employ to address it. I believe the best tools for preventing and treating pain pathologies already exist. However these tools, which I collectively refer to as “social reform”, are not easy or straightforward to wield. Social reform’s targets are not always precisely defined. And most importantly, social reform works in opposition to the billionaire class, their profits, and the conditions they insist on for workers around the world.

Biologists will argue that chronic pain is a pathology of sodium channel abnormalities. Most clinicians will argue that it is a pathology of aberrant neuromuscular or musculoskeletal physiology. Neuroscientists will argue that it is a pathology of complex changes of information processing in the central nervous system. But these scientific conceptions are all myopic half-truths.

Chronic pain is a pathology of society. The simple epidemiological finding that ought to stop pain researchers in their tracks is the fact that chronic pain is more common among the poor [1, 2]. This grounding of pain in the social order is something an individual-level approach to pain can never address. Treating a person’s chronic pain, only to release them back into a pain-producing, nocigenic environment, is stopgap medicine. It is a temporary relief that does nothing to address the cause of pain at its origin. To treat the cause instead of the symptom will require social reform. But again, social reform is arduous, political, and defies the capitalist class.

Instead, we have turned to the will-o’-the-wisp of technological solutions. Leading ourselves on, we chase the conceit of a high tech quick fix that is far more nebulous than the goals of social reform. Such a hope is incoherent in light of the societal causes of chronic pain, but its glow through the fog keeps us wandering

down a fruitless path. On the journey, we first turned to the high technology of Big Pharma, which brought us the decades-long opioid epidemic [3]. In the wake of this spectacular failure have come various treatment strategies rooted primarily in digital technology. These efforts are doomed to fail as well. Technological innovation for the treatment of chronic pain will only be successful insofar as it amplifies and interfaces with broad social reform efforts. It is this difficult truth that I explore in the following essays.

I will point out now that I am not categorically opposed to new technology. But the writing has been on the exposed brick walls of Silicon Valley health tech offices for a long time. The Invisible Hand of the market can only offer a haphazard and uncaring approach to technological advancement, and it produces, by and large, expensive garbage.

I first came to understand the societal origins of chronic pain through my work [4] with STAND: The Haiti Project [5]. My efforts to document and understand the rampant reports of pain experienced by our patients in rural Haiti have spanned my schooling and professional life. After my formal education in public health, I launched headlong down the high tech-health rabbit hole, building a career that straddled the tech worlds of both industry and academia. When the disillusionment of high technology set in, I found myself back where I started: considering the condition of the working class. It is through the lenses of public health, technology, and socialism, that I explore the interrelationship of chronic pain and social reform.

Public Health

I got to know the Public Health 101 professor while working on a smoking prevention project with her in India. I had been pre-pre-med since the 6th grade, and in my sophomore year of undergrad I chose the University of Rochester's "Health, Behavior, and Society" major primarily because I thought it would look good on a medical school application. And I wasn't the only one with this idea. The major was teeming with neurotic and preening pre-meds all angling for a spot in the best medical

schools so that they could better angle for a spot in the best residencies.

“Notorious” is too strong a word, but it was known among the public health majors that Dr. Chin [6] encouraged pre-medical students to think broadly about their career options beyond any hospital. As opportunist as we were, most of us also arrived with a commensurate dose of idealism. We wanted to change the world. With some of this in mind, we were sipping our chais and looking out at the foothills of the Himalayas when she finally dropped the question on me.

0.0.0.0.1 * I don’t get it. Why do all these smart, motivated young people who want to change the world go into *medicine*?

0.0.0.0.2 * - Nancy Chin

I responded with some amalgamation of all the platitudes frequently used to inculcate young people into a paradigm of health and health morality that spotlights doctors as heroes. What she was really asking was, “What do you think makes people healthy? Is it really *medicine*?”

And then we moved on. Because Dr. Chin isn’t in the business of telling students what to do. Apparently, her MO is patiently asking students perspicacious questions at indelible moments that will haunt them throughout an adulthood full of mistakes and corrections. The following essays are an attempt to synthesize my learnings from years down a path of trying to address the chronic pain pandemic through a technocratic, treatment-centered approach. They serve as a course correction to the intoxicating arrogance that posits an ever deeper, more scientific, more data-driven understanding of chronic pain can single handedly solve the suffering seen around the world today. Unlike Dr. Chin, professors espousing this high technologic worldview *are* in the business of telling students what to do. And I was eager to take orders.

Technology

I was accepted into Rochester's Take 5 Program and granted a tuition-free fifth year to take classes in a field I hadn't had time to study while completing my public health degree. I titled my application essay **Befriending Big Data and Nurturing the Human-Computer Relationship** and proposed taking a set of Math, Computer Science, and Brain & Cognitive Science courses. It was during my Introduction to Java Programming class that I was first indoctrinated into the gospel of technology.

0.0.0.0.1 * If you want to change the world, learn how to code.

0.0.0.0.2 * - Ted Pawlicki

Pointing out the obvious impact apps like Facebook and Twitter had made on the world, Professor Pawlicki [7] was arguing that computer programmers were the people making decisions that actually affect people day-to-day. Through the power of the internet, everyone can be touched by the code written on *your laptop*. Hot off a degree in public health, I interpreted this in some vague way to mean I could create tech that made people healthy. In fact, one of my Take 5 advisors was Henry Kautz, whose research had recently made headlines like *Your Tweets Can Predict When You'll Get the Flu* [8]. The obligatory comparison to John Snow [9] was plenty to make me envisage my code as part of the impending Big Data revolution in epidemiology and health. This program equipped me with the holy trinity of the high tech-health worldview:

1. A nebulous notion of how `more_technology == better`
2. The suggestion that anyone (including me!) could be the hero who writes the code that saves the lives
3. Some tangible coding skills to immediately start becoming a hero

With some java and python skills under my belt I went on to complete my MPH at the University of California Davis, spending most of my study time learning to connect public health databases with analytic programming languages. This paid off when I was accepted to the first cohort of Kaiser Permanente’s “Programmer/Analyst Training Program.” At Kaiser I learned SAS programming, some more statistics, and how to carry out a digital cohort study. My next job was at an electronic medical records (EMR) company called Practice Fusion. It was here my eyes were opened to what scourge the health tech sector is capable of wreaking.

Practice Fusion brought me a high salary, catered lunches, beer and wine on tap, and huge parties. And we were working on a product that helped patients! Right? RIGHT?! I learned a lot of programming there. And our mission was ostensibly to build a free EMR to help bring small doctors’ offices into the 21st century. We were going to combine their medical records and do important epidemiology, which would, in turn, even further benefit patients! Where is the harm in that?

It is exactly this sort of hard-to-argue-with *symbolism*, of technology as progress, that I hope to cross-examine in this writing. Because who doesn’t want to appropriate the Algorithms to help cure disease? Who doesn’t want people to have access to “precision medicine,” where capital “B” capital “D” Big Data is utilized to help doctors make hyperpersonalized medical decisions? It is hard for anyone who doesn’t spend all day rummaging around in this data to articulate why it might not be the best investment. Even those of us most entrenched in the industry’s dirty technical details fall for the same abstract promises CEOs continue to sell to investors. Because remember, this technology is going to

Change.

The.

World.

After a few years at Practice Fusion, I got tired of working with EMR data and left. It is worth mentioning that shortly after leaving I learned the company had been pushing opioids to patients for chump change [10]. Anything to keep the startup

dream alive though right? At any rate, I suspected our EMR studies weren't telling us anything meaningful. I decided that I needed to venture further into the technical weeds if I was going to find quality enough data to...err...change the world(?). Or whatever Professor Pawlicki had sold me. It sounded so cool when he said it.

I left Silicon Valley and moved to Boulder, Colorado to work as a research assistant in a "famous" neuroscience lab. Having watched an entire Youtube series on fancy statistical analytic methods using functional magnetic resonance imaging data, I was convinced that this was the field I needed to dig into if I were going to be the one to solve chronic pain. The lab moved to Dartmouth the following year, and I was accepted as a PhD student there.

At Dartmouth I spent a lot of time thinking about how to find specific patterns of brain activity called "biomarkers" that would tell us when a person is experiencing various types of pain. You see, the lab I belonged to was already known for developing this type of biomarker for acute thermal pain. If you burned someone's arm inside of an fMRI scanner, this biomarker would light up. However, if you only warmed up someone's arm or showed them a picture of their ex-lover while in the scanner, the biomarker wouldn't light up as much. Pretty neat, right? Further, one of the main selling points is that these biomarkers are made using *machine learning*. And when I say "selling point", I mean millions [11] and millions [12] and millions [13] and millions [14] and millions [15] of NIH dollars are being funneled into the pain biomarkers enterprise [16].

I remember taking long walks at Dartmouth and explaining this research to my friends on the phone. With varying degrees of tenderness, the conversation would always lead to the question "so like, let's say you had all these biomarkers. And they worked. Then what? Is the plan to put all pain patients one-by-one into an fMRI scanner for an hour just to arrive at a more 'objective' measure of the pain they already told you they have?" I knew, deep in my bones, that this was a legitimate question with no good answer. I usually said something like "as a neuroscientist, health care delivery isn't my problem."

This is, I now argue, a useless-at-best position. But this is the position of huge swaths of publicly-funded biotech research today. It is the *de facto* excuse that allows the private and academic high tech-health sectors to squander unconscionable sums of money each year advancing technology that is either obviously impotent or so inaccessible to the global working class that it is effectively non-existent. It is a feckless pursuit to develop high technology without incorporating class consciousness. I now believe it is only in tandem with efforts toward broad social improvement that high technology can be useful in improving the health of ordinary people around the world.

My time in the Ivory Tower indirectly led me to socialist politics. The most important lesson I learned in my neuroscience PhD work (before leaving early) was that organized labor is central in shaping health and well-being. As I documented in “The Dartmouth Prison Experiment” [18], a defining characteristic of academic high tech science is extracting cheap labor through the promise and mirage of heroism. The cringe and irony involved in watching a pain-neuroscience lab foster a toxic culture of stress and overwork is itself painful. But this example also explicates the essence of what the following essays are about. Even in the closest proximity to brain scans, the avant-garde of pain regulation science, and health-tech heroes, it is working and living conditions that drive the quality of our lives.

Toward the end of my Dartmouth sojourn I joined the Upper Valley Democratic Socialists of America [19] in their Care not Cops campaign. In some ways this was a totally new experience to me. I had never gone door-to-door before to discuss politics with other community members. Nor had I given public comment to a city council. But in other ways joining DSA was a return to form. Before my Dartmouth degree, before my tech jobs and my infatuation with high health-technology, before I had written even a single line of code, way back before I even took Public Health 101 with Nancy Chin, I signed up for my first public health course to see if the field might be a good fit for me. Departing the fog of an ill-conceived career in neuroscience, I found myself digging out old books I bought for *History 208: Health, Medicine, and Social Reform*.

Conversely, the biggest regret I have from my time in New Hampshire is that I didn’t stick around long enough to witness and support the expert-level organizing that won Dartmouth grad students their union [17].

Social Reform

Ted Brown [20] walked in, as was his custom, with a few pieces of paper covered in handwritten notes. The elbows of his worn, burgundy sweater were patched where he rested them on the podium as he began his lecture. Ninety minutes at a time, I was pummeled with evidence demonstrating the ways health is grounded in the social order. I hadn't known how simultaneously incisive, scathing, hopeful, and compassionate a critical historical lens could be. I was forced to consider how Cuba, a small socialist country, could have equal or better health outcomes than the United States while paying drastically less for medical care. I learned how the failed Global Malaria Eradication Program relied so heavily on **vertical, technocratic approaches** to public health and how the Gates Foundation continues to apply technologic lipstick to new renditions of this humanitarian failure [21]. It was in this course I first read "The Condition of the Working Class in England" [22], and where I first heard of a person called Marx.

These lessons are the type that once you see them, you can never un-see them. Health, medicine, and social reform, from a socialist perspective, go a long way in explaining how the world works for people on planet earth. I was hooked on this type of analysis and took the rest of Ted's courses, one of which was an Introduction to the U.S. healthcare system. It was in this course that I picked up this mantra, which I've had stuck in my head over the last few years:

0.0.0.0.1 * Every budget is a *moral* document.

What any group or society decides to pay for is a representation of what it values. I found myself thinking of this every time a lowly research assistant at Dartmouth was stuck running fMRI scans late into the evening after a full work day, fearful of punishment for any mistakes, having been told explicitly they would collect no overtime pay. All so we could...mmm...look for brain patterns that would...ermmm...help us predict when people who tell us they're in pain are...in pain. The lab's budget

I am aware that people in the field will be more or less outraged with this description of the pain biomarker endeavor and clamor to explain the nuances of what they do. I also think this issue is a fractal, and every deeper level of nuance reveals equal impotence of the "technology", even if it successfully confuses funding agencies.

relied on the extraction of labor with impunity and the suppression of workers' wages, so that it could provide the Principal Investigator fame and fortune. And lots and lots of scans to build the brand. A huge proportion of this money came through public funding sources like the National Institutes of Health (NIH). If every budget is a moral document, is there a name for this flavor of morality? The lab's budget was a high-fidelity representation of health tech values under capitalism. Abuse of workers, high CEO salaries, flashy presentations promising a nebulous panacea that will never materialize, and no plan to make such a cure available to those who most need it; this is *our* morality when we throw our hands up and pray to the Invisible Hand for good health.

Outside of any individual lab, as I will argue in the following essays, the way the United States allocates its pain research money is a similar moral disaster. The government continues to budget for the *symbolism* of high tech magic bullets that will never arrive. At the same time, private equity firms pour billions into the creation of health tech startups that are not designed to, and will never, improve the lives of ordinary people. When the banks funding these useless companies fail, the government makes room in the budget to rescue them while stiffing low-income communities [23]. All this, while pain *prevention* researchers receive a pittance, and social safety nets for poor people, who are most at risk for developing chronic pain, fray and decay. Our budgets reflect our capitalist economy's moral values, and those moral values are ill-conceived, scandalous and repugnant.

I attended a webinar on February 24, 2023 hosted by the Canadian Pain Society titled, "*National Pain Rounds: Are We Treating Chronic Pain All Wrong?*" . There was a lot of hype around the event, and I remember seeing a tweet that read, "join us as we step back and ask big questions about how we are thinking about and treating chronic pain." The panel included physicians, psychology PhDs, and an advocate for people living with chronic pain. There was a lot of obligatory emphasis that pain is not "all in our heads". But there were no big questions and even fewer answers about what to do. A nod to mindfulness here, a recapitulation of some "new" psychological therapy there. The clinicians seemed excited to recount stories

After publishing "The Dartmouth Prison Experiment", I received 2 final emails from Dartmouth. The first was from my former adviser, informing me that my writing only served to hurt him and the graduate student carrying out his orders. The second was from the Department Chair, whose email said, "I'm emailing you of course because of your blog post. I'm sorry that you had such a negative experience here, but I'm glad that you've described your concerns about the treatment of the RAs working on the Spacetop project. The new department administrator and I are looking into your concerns. It's already clear that some of the RAs were not properly compensated for the hours they worked." These research assistants were eventually and quietly back paid thousands of dollars. I don't know if any of that money came out of the lab's budget. I'm not aware of any departmental policies that were created to prevent worker mistreatment.

of patients they've seen whose experience in the workplace had something to do with their chronic pain. But their explanations, at their most wide reaching, centered on the interpersonal relationships of people with pain. Politics were not mentioned, and they seemed unaware of the ways in which societal structures might create pain-producing environments for patients. Having omitted this entire realm of the human experience on earth, the biggest question for pain clinicians today went unasked. Why should we expect psychological therapies and modern neuroscience to treat (let alone prevent) chronic pain, when it is a pestilence that is grounded in the social order?

It is this question, and questions about how we might effectively work towards a societal treatment for chronic pain, that I hope these essays begin to answer. The most beautiful thing about replacing technocratic approaches to chronic pain with social reformist solutions isn't that it's the correct thing to do to reduce the prevalence of chronic pain, but that it is the compassionate, human, and right thing to do to reduce all forms of suffering around the world. Let's get organized.

At the behest of Captain Ludd [24],

Luke

References

1 High Technology and the Chronic Pain Pandemic

A family of billionaires agreed to pay \$6 billion in 2022 in response to thousands of lawsuits inculcating their company, Purdue Pharma, for its role in creating a nation-wide opioid crisis [25]. This money will do little to stem the current of these life-ruining prescriptions, while also failing to address the dilemma opioids were originally purported to solve: people across the globe are struggling with very real and persistent pain. In a world still ravaged by deadly parasites like malaria and non-infectious killers like cancer, pain may appear an unfortunate, though relatively inconsequential, externality of our economic system. But our pain ought to amount to something much greater than that. Chronic pain is uniquely poised to be a lodestar for public health efforts in this moment and a point of solidarity for the working class the world over.

Chronic pain today has three important features. First, it is ubiquitous [26]. Across the globe pain is the most common reason people seek medical care and its subtypes comprise three of the four leading causes of years lived with disability – a common measure of quality of life. Second, people’s pain is being endured in the context of the popular [27], ongoing [28] and catastrophic [29] failure of “high-tech” prescription opioids. This means that pain researchers today are at least considering alternatives to pill-popping, and workers are familiar with how devastating a purely biotechnological approach to health can be. Lastly, perhaps more than any other ailment, chronic pain can now be seen as a poignant reflection of the structure of capitalist society [See Chapter 2]. Unstable housing, long hours, poverty wages, food insecurity, and a general lack of social security coalesce in the human brain to produce much of the hurt we feel day-to-day.

Together, these three features can give new direction. Big Pharma’s and Big Medicine’s overtly technocratic attempt to address the pain pandemic trumpets a fresh reprise of a tale as old as time in public health. High-tech gadgets, without broad societal improvement, rarely create lasting positive change. In fact, they often have devastating consequences. And yet, funding for pain research is being pumped into brand new tech “solutions” while ignoring the dire need for social reorganization. The result has been a vast dearth of pain treatment options, sparsely littered with feeble non-pharmacological strategies. Costly MRI scans here, inaccessible therapy there, with mindfulness apps scattered throughout. But it is in this vacuum the working class has an opportunity to act on old wisdom: good health is won through class struggle, and disease prevention is best fortified with social reform.

1.1 Pain, Class, and a BioPsychoSocietal Model

Best estimates show the incidence of chronic pain in the US now surpasses that of diabetes, depression, and high blood pressure [30]. Globally, it is estimated that 3 in every 10 people are affected by chronic pain [26]. If you aren’t living with pain yourself, it is likely you’re interacting with someone who routinely suffers from pain. However, rates of chronic pain are not uniform throughout society. Persistent pain is more likely to be found in adults currently unemployed and adults living in poverty [31]. Workers living below the federal poverty level (FPL) are four times as likely to have high-impact chronic pain than those making at least 400% of the FPL. In other words, as with diseases like malaria and cancer, the most economically vulnerable members of society suffer the most [32].

This link between chronic pain and the social order has implications for how pain should be studied, treated, and prevented. Today’s psychologists and neuroscientists frequently argue the need for a “biopsychosocial” approach. Published in 1977, George Engel’s Biopsychosocial Model [33] of disease emphasizes that a strict biological approach “leaves

no room within its framework for the social, psychological, and behavioral dimensions of illness.” However, while nominally embracing a biopsychosocial framework, today’s clinicians and researchers have adopted an incomplete interpretation of the word “social”. In modern pain studies, “social” implies various aspects of interpersonal, one-on-one social interactions such as handholding [34], clinician-patient relationships [35], and information based on others’ experiences [36]. While these things may play a small role in influencing a person’s pain, they fail to clarify the role of enormous pain-producing forces that come into view when “social” is interpreted as “societal”.

George Engel actually specified a more expansive meaning of “biopsychosocial” 46 years ago:

“This approach, by treating sets of related events collectively as systems manifesting functions and properties on the specific level of the whole, has made possible recognition of isomorphies across different levels of organization, as molecules, cells, organs, the organism, the person, the family, the society, or the biosphere.”

This interpretation of “biopsychosocial” as “biopsychosocietal” would subsume social policies and structures in its attempt to understand the origins of chronic pain pathology. So what is the impact on pain of a lack of social housing, basic nutrition and income, and medical insurance? What effect would wealth and land redistribution programs have on the huge prevalence of chronic pain around the world? Instead of focusing on these questions, pain researchers today pay lip service to George Engel while distracting themselves with increasingly complex technological answers to pain.

1.2 Policy Framing and Victim Blaming

Faced with over 260,000 deaths from prescription opioids [37] in the last 20 years, the US has spent a significant amount of money trying to better understand and treat pain. But research

initiatives to find safe opioid replacements remain focused on the technocratic treatment of individuals while failing to embrace a population-focused biopsychosocietal perspective. The research agenda takes our current form of uncaring capitalism as an immutable starting point and tries to invent its way to a better place. Without so much as considering possible societal origins of pain, the US continues to prioritize the discovery of complex biotech solutions to treat pain after it arises, one person at a time.

Amid a record-setting incidence of prescription opioid deaths in 2010, the Affordable Care Act (ACA) provisioned the creation of a new committee [38] to harmonize pain research efforts across federal agencies. To this end, the committee published an analysis [39] detailing a \$430,000,000 annual budget for pain research. This money was distributed to over 1,200 research projects. Investigations of “neurobiological/glia mechanisms” and pain treatment received the lion’s share with 35% of the budget. In comparison, pain prevention received a pitiful 1.4%.

Table 1.1: Percentage of the Pain Research Portfolio by Category

Research Category	Percent of Budget
Neurobiological/Glia Mechanisms	20.4
Pharm Mechanisms & Treatment	8.3
Non-Pharm Mechanisms & Treatment	7.3
Training in Pain Research	6.9
Biobehavioral & Psychosocial Mechanisms	5.9
Development of Animal and Human Pain Models	5.2
Outcomes & Health IT for Decision-Making	4.6
Genetics and Genomics	4.2
Unique Populations	4.2
Mechanisms of Transition Phases	4.1
Pain & Non-Pain Comorbidities	2.8
Analgesic Development	2.7
Device & Therapy Delivery Systems Development	2.3
Comparative Effectiveness Research	2.0
Diagnosis & Case definitions	1.9
Epidemiology	1.8

Allocation of Pain Research Money Grouped by 29 IPRCC Pain Research Categories¹

Pain Education	1.8
Substance Use and Abuse/Addiction	1.7
Medical Management	1.4
Pain Prevention	1.4
Other "Omics" of Pain	1.3
Women's & Minority's Health Research	1.3
Informatics, Databases & IT Development	1.2
Chronic Overlapping Conditions	1.2
Sex & Gender Differences	1.1
Analgesic Drug Safety	0.9
Pain and Trauma	0.9
Health Disparities & Access to Care	0.9
Health Care Utilization	0.3

¹Interagency **Pain Research Coordinating Committee**
Source: [IPRCC Federal Pain Research Portfolio Analysis Report](#)

Even more tragic, the focal point of the nominally preventive research was “pain prevention through various approaches including self-directed activity, diet, life style programs and education campaigns for many disorders.” This up-by-your-bootstraps conceptualization of prevention despicably foists the burden on people who are relegated to the most pain-inducing environments. Those driving for Uber all morning and bussing tables all evening for low wages and no medical insurance are also expected to find time to meditate and meal prep in order to relieve their chronic low back pain. A truly preventive approach would focus on creating analgesic societies for the working class to inhabit. And while we can't expect too much from “prevention's” 1.4% of the pain budget, we could at least hope that significant strides have been made in translating our well-funded understanding of the neurobiological and glial underpinnings of pain into successful treatment strategies.

	Percent of Budget
Neurobiological Mechanisms and Treatment	

Table 1.2: Funding of technologically-driven research to the neglect of prevention. Mechanisms and Treatment vs. Prevention Funding Comparison

Neurobiological/Glial Mechanisms	20.4
Pharm Mechanisms & Treatment	8.3
Non-Pharm Mechanisms & Treatment	7.3
<i>Group Total</i>	36.0
Prevention	
Pain Prevention	1.4
<i>Group Total</i>	1.4

No such luck. Most pain neuroscience involving human participants uses functional magnetic resonance imaging (fMRI) to measure activity in the brain while study participants lie in a small magnetic tube and perform simple tasks. This type of research is still barely able to identify when a person is currently experiencing chronic pain [40], let alone reduce their pain in a meaningful way. It also primarily recruits young healthy college students and fails to include participants from diverse income levels [41], all but ensuring study findings will not generalize to black and brown workers or poor white workers. As far as treatment goes, some clinical guidelines [42] now recommend against using certain types of imaging in the treatment of patients with chronic pain. The last 14 years of ACA-funded pain research have produced a lot of neat and high-tech studies but taught us very little about how to prevent or treat pain in the global proletariat. Unfortunately, this sort of fetishization of high technology is not new in the world of public health.

1.3 Technology on the Horizon

Public health practitioners in the first half of the nineteenth century weaponized broad social reform strategies to combat disease and promote health. Such work aimed to clean the environment, improve housing and working conditions, and provide water and sewage systems throughout society. But in the latter half of the 1800s, public health shifted its gaze with the advent of bacteriological research methods. The late doyenne of public health history and health leftism, Elizabeth Fee [43], wrote that

“Public health practice required a diverse set of disciplines and skills: economics, sociology, psychology, politics, law, statistics and engineering, as well as the biological and clinical sciences. In the period immediately following the brilliant experimental work of Pasteur, Koch, and the German bacteriologists, however, the bacteriological laboratory became the primary symbol of a new, scientific public health.” [44]

Reverberations of this new technologic symbolism, and its promise of a “scientific public health”, shaped approaches to treating and preventing acute and then chronic conditions for the next century and a half. During that time, the tools and technologies buttressing the promise of scientific, or technologic, public health have been embroiled in the product life-cycle of racial capitalism. In this cycle, health concerns are deracinated, cleansed of all sociopolitical context, and placed neatly in a biomedical framework where they are to be shot dead with expensive magic bullets. Given its roots in racial capitalism, we cannot expect technologic public health to be able to capital “S” Solve societal health issues caused by racial capitalism. Time and again it has failed to do so without

The irony should not be overlooked that the vanguard of scientific public health has become obsessed with magic.

Today, with rise of Big Tech and silicon valley, the promise of technology often takes the form of a vague magic bullet to sell investors. Technobabble like “precision medicine”, “biofeedback”, “multi-modal real world data”, and “AI enriched health models” fills board rooms across the country as slavering CEOs vie for angel funding. What’s common to these promises is the hyperpersonalization of the products health tech wants to sell. <https://www.cigionline.org/articles/technology-theatre/> <https://jacobin.com/2022/03/high-tech-pandemic-solutions-tracing-apps-profits> <https://jacobin.com/2023/12/big-tech-mental-health-data-collection-colonization>

Broken high tech health promises have been seen around the world addressing acute diseases like malaria, chronic diseases like cancer, and diseases like chronic pain that are somewhere in between.

It’s worth noting that “scientific public health” gets its

name from the perception of its rigorous use of the scientific methods and the use of extremely precise technology. But the accuracy of neuroscience, especially with fMRI is dubious (rotem paper) and the meta science in other fields shows that they are not faring well either (nature paper) and here: <https://ascopubs.org/doi/full/10.1200/JCO.23.02399?bid=345348313&md5=e29a45b06dc110ac02a3f981b483377b>

1.3.1 Acute Malaria and Technology

Most people today understand Malaria to be an acute, infectious disease caused by mosquitoes. These mosquitoes, living near the equator and carrying one of the malaria parasites, bite and infect people. UNICEF [reports](#) that malaria infections kill a child under 5 years of age every minute. To save these kids and many adults, we need to directly kill either the mosquitoes or the parasites, right?

This is the logic that came to prevail around the turn of the twentieth century following the discovery of the malaria parasite. Malariologists began to describe the disease's epidemiology in increasingly narrow biological terms because for the first time they could see with their own eyes the immediate cause of malaria in a person's blood. New medical discoveries like these were made using the achromatic microscope, the latest and greatest microbiological technology of the time. These discoveries undoubtedly played important roles in curing patients and saving lives. But over time they served to close the aperture of the public health lens. What could not be seen under the new microscopes were the more proximal social structures ("[the causes of the causes](#)") sustaining malaria transmission in the tropics.

Prior to the fanfare surrounding parasites and mosquitoes, a body of evidence had accumulated showing that malaria epidemiology is heavily influenced by agricultural practices. For example, a lack of decent housing often forces farm workers to sleep outside, exposing them to infected mosquito bites. Facing low wages, these same workers migrate elsewhere at the end of a harvest season in search of alternative income sources. When their new work lands them in an area with little or no malaria, a new epidemic can be triggered. Continuing to sleep

in unprotected areas, workers are again bitten, this time by mosquitoes that are not yet infected with Malaria. The parasites in the workers' blood can now complete their reproductive cycle in the mosquitoes and go on to infect other people. Such epidemics are [not confined to tropical regions](#) and have flared up in places as far north as [city] Russia, [city] Italy, and the Chicago river basin.

1.3.2 Chronic Cancer and Technology

1.3.3 But What About Vaccinations?

1.3.4 Pain and Technology

deracination of the brain and the whiteness of neuroscience, including MNI and ICBM space. Not only was the average brain implied to be white, but the brains that were used to create the template that almost all fMRI images are mapped to included 0 black brains. <https://nist.mni.mcgill.ca/icbm-152lin/> “129 caucasian, 15 asian, 1 mixed decent [sic]” <https://www.sciencedirect.com/science/article/pii/S0925492716301147> Population differences in brain morphology: Need for population specific brain template

The treatment of pain (and then treatment for the treatment of pain) has spawned its own technological mascots. At the turn of the 21st century, opioids and the brain scanner became the primary symbols of a new approach to pain management.

Congress resolved *House Joint Resolution 174* in 1989 declaring “That the decade beginning January 1, 1990, hereby is designated the ‘Decade of the Brain.’” The first recital of this resolution correctly identifies the broad need to address illnesses associated with the brain:

“Whereas it is estimated that fifty million Americans are affected each year by disorders and disabilities that involve the brain, including the major mental illnesses; inherited and degenerative diseases; stroke; epilepsy; addictive disorders; injury

We should not be deluded into thinking that ours is the first American opioid or prescription drug epidemic. Addiction to opioids and cocaine spiked primarily in white, native born Americans who had access to medical care in the wake of the civil war. Around the same time, a rise in opium smoking was tied to racial logic about the inferiority and danger of Chinese immigrant laborers. The discrepancy in how these two “addiction crises” were dealt with racialized addiction and laid the groundwork for a century’s long habit of medicalizing white addiction while policing and incarcerating black and brown addiction. [45]

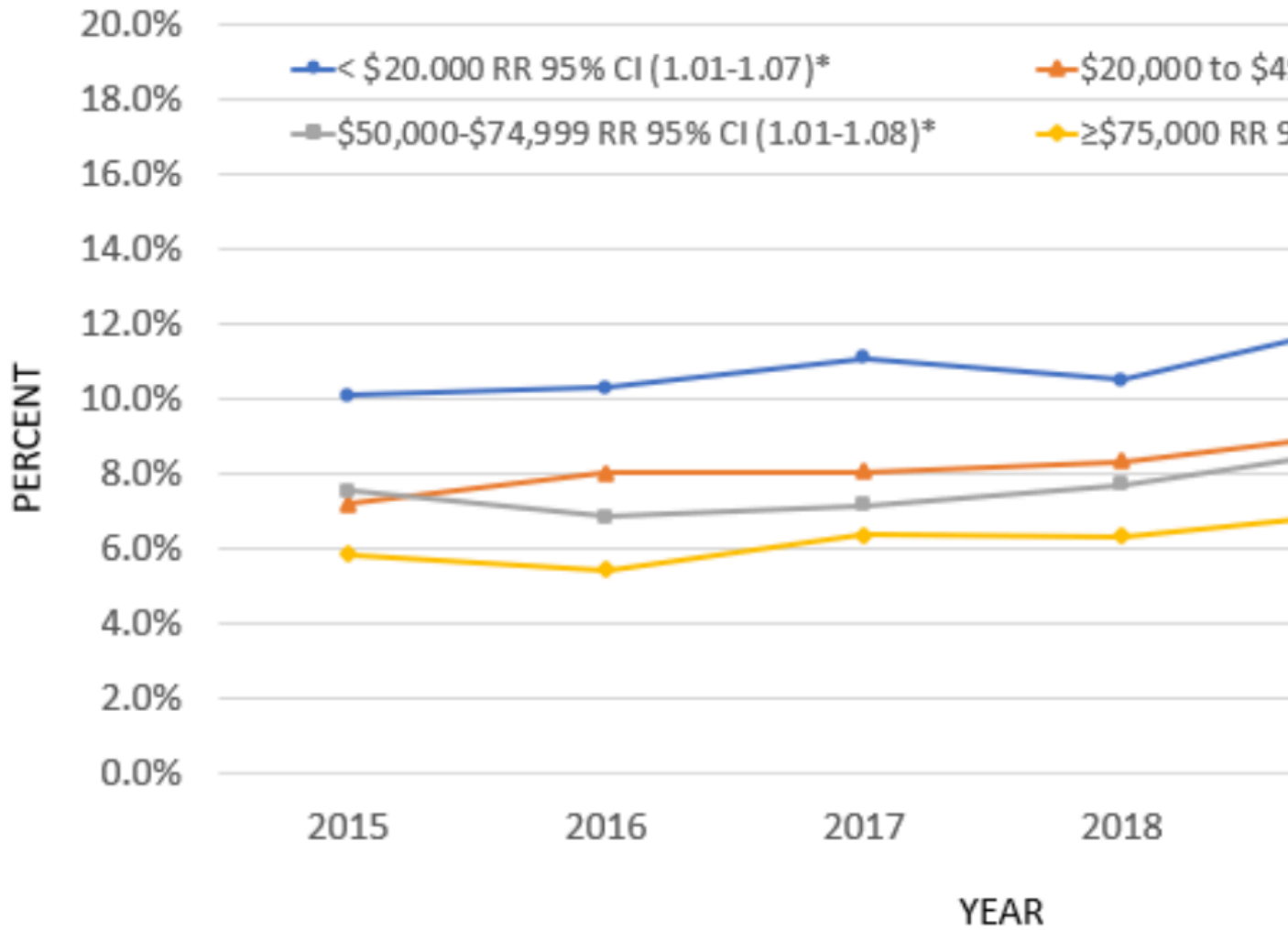
resulting from prenatal events, environmental neurotoxins and trauma; and speech, language, hearing and other cognitive disorders”

And then the fourth recital establishes a vague technocratic symbolism of brain science that will (hopefully) solve the above illnesses:

“Whereas a technological revolution occurring in the brain sciences, resulting in such procedures as positron emission tomography and magnetic resonance imaging, permits clinical researchers to observe the living brain noninvasively and in exquisite detail, to define brain systems that are implicated in specific disorders and disabilities, to study complex neuropeptides and behavior as well as to begin to learn about the complex structures underlying memory”

Two decades beyond *The Decade of the Brain*, and the technological revolution has not done much to move the needle on mental health. “Major mental illnesses” like anxiety and depression continue on an upward trajectory. This trend is not the same for all groups of people. Behold how consistently those groups with low incomes live with higher rates of these diseases.

Appendix Figure 3. Prevalence of past-year depression in the US from family income.



Even with the additional hundreds of millions of dollars devoted to pain-specific neuroscience (see Section 1.2), the trend is the

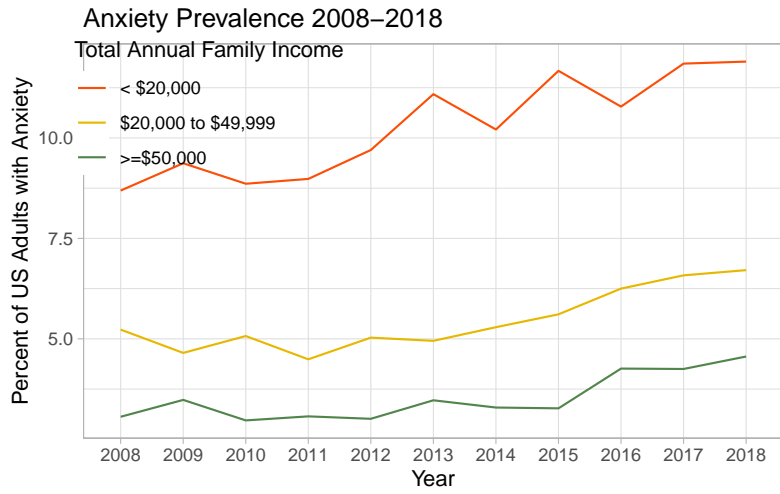
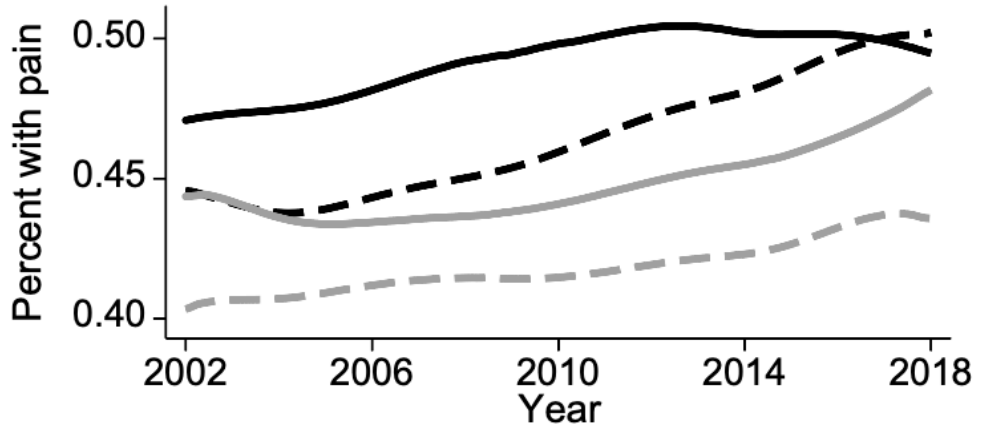


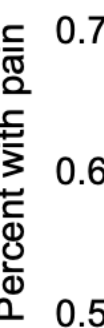
Figure 1.1: Anxiety Prevalence 2008-2018 by Income

Appendix Figure 1. Pain Trend 2002-2018 by Income

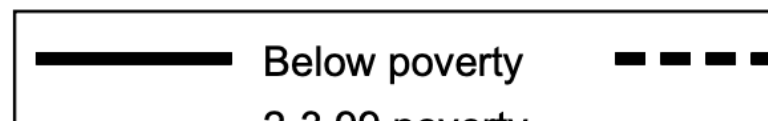
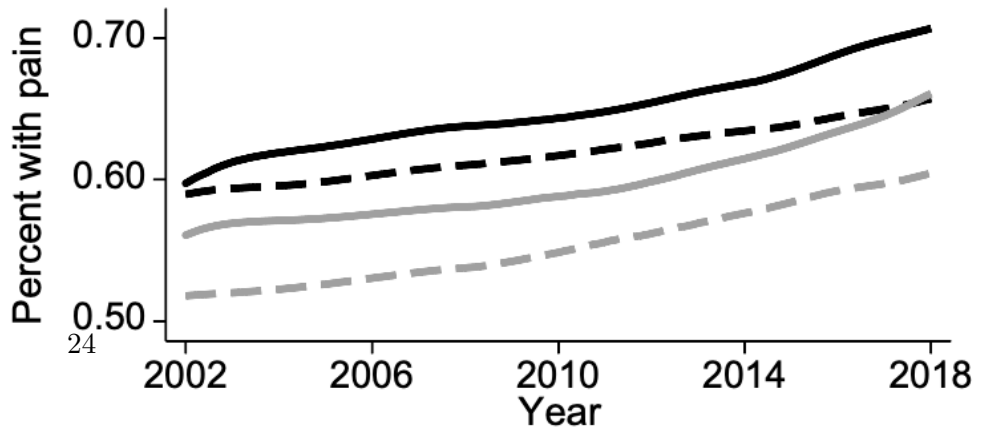
A. Adults 25-44



B. Ad



C. Adults 65-84



Note on how removing the brain from the patient from the society cannot account for this trend. In prevalences, don't forget to include rate of untreated depression from that paper.

A truly revolutionary brain science would require explicit consideration of the racial capitalism in which our brains work, live, and suffer. And if its ends extend beyond the simple explanation of the origins of chronic pain, to prevention and treatment, it would also require the re-politicization of the brain and the pain patient. It would require a biopsychosocietal understanding and a politics that centers class conflict, led by those most at risk. It would provide effective means for the political mobilization of the working class.

The symbol of technology as a perpetually impending solution to disease is recapitulated in public health budgets throughout the world. The magic bullet seems always on tomorrow's horizon while people suffer today. And as high tech pain science develops, similar to other health tech fields and "precision medicine" in particular, it exposes itself as a fraud. The last 3 decades of pain neuroscience provide state-of-the-art statistical models that ultimately depict biopsychosocietal origins of chronic pain. What we know about pain in the brain already supports broad societal improvement initiatives over additional technology [See Chapter 2].

At first blush, chronic pain might seem like an entirely new category of pathology. Scientists can't point to something like a parasite or a tumor cell as its origin. Therefore one approach to managing pain is to spend exorbitant resources trying to pin down an objective measure, or "biomarker", of its neurological provenance. Having dragged subjectivity into the objective realm, scientific public health could then deploy its usual methods. In this case that would include developing technology that specifically targets the pain biomarker and beating pain with experience. The only snag is that the history of public health demonstrates that addressing even more diseases solely through the development of high-technology rarely leads to lasting prevention or cure.

1.4 References

2 Neuroscience and Chronic Pain

Ironically, at the acme of modern cognitive neuroscientific theory lies a refutation of the neurobiological approach to the pain pandemic. One of the most recent and promising frameworks for understanding what the brain does is called “predictive coding”. Put simply, the PC framework asserts that our qualitative experiences arise when our brains create hypotheses about the state of the world around us and then test those predictions. But when scrutinized, even this technical neuroscientific approach to pain control seems to support socialist preventive strategies over expensive neuroscientific treatment.

Imagine for a second that you’re a brain: a dense set of 86 billion neurons trapped inside of a dark, wet cavern. You cannot directly see or hear or touch. Instead, you receive noisy electrochemical signals that are related to what’s going on around the skull you inhabit. The problem of figuring-out-what’s-going-on-out-there requires combining these inputs to make an informed guess about the environment causing those signals in the first place. As you make informed guesses you receive immediate feedback as to whether or not they were correct via the next set of electro-chemical signals. Guess and check. Guess and check.

But you’re smart. So you write down notes of specific guesses you made and how correct they turned out to be. Of course not all guesses get one line in your notebook. Things are crossed out, underlined, and bolded and circled in the margins. As you make and test your little guesses every second of every day for your entire life, you develop an extensive understanding of what various signals from your environment likely mean. Neuroscientists call this palimpsest of memories you have a “model” of

the environment. It is a detailed user manual for the world you inhabit. Your model is a powerful thing.

Predictive coding theory emphasizes that conscious experiences are not simply the result of signals arriving at the brain. Your brain's model of the world sits between the world and your experience of it. Imagine walking into a shed in the afternoon on a hot day. On the ground is a coiled up piece of rope. Upon entering the shed your brain leafs through its notebook to the page that says "hot day, 2pm, shed in low light, small coil on the ground" and follows the arrow it drew to the note "THIS WAS A SNAKE ONCE!" And for a moment, you literally perceive the rope to be a snake.

The rope snake is a silly example of the power your model holds over your experience. It is also an example of an illusion; the rope wasn't a snake, after all. But what happens when the scary, caps lock warning in your notebook indicates exactly the situation you're currently facing?

A lot of people believe their chronic pain is the rope snake – the pain is not actually there. But it's actually the second case – your body is in serious danger!

[Some studies](#) have shown that people who expect an upcoming stimulus to be painful experience stronger pain than those who expect a benign stimulus. And the more certain they are that pain is coming, the stronger they feel it. In fact, many chronic pain patients are now being diagnosed with "primary", "nonspecific", "nociplastic", or "centralized" pain. These are essentially synonyms for when clinicians find the volume knob for a patient's pain signals is inexplicably high. It is [estimated](#) that in 85% of chronic back pain cases, the most common type of persistent pain, no definitive source of bodily harm can be found.

So where is all this pain coming from? In the context of PC, the absence of bodily damage means there shouldn't be strong bottom-up pain signals. And yet, day in and day out, people are experiencing debilitating pain. If chronic pain isn't coming from the sensorium, a good guess as to where it originates is a person's model of the world. Faced with a lack of social safety nets, a compulsion to sell one's labor, and the ever looming

threats of joblessness, homelessness, and poverty, how could we expect the human brain to predict much other than “Pain! Pain! Pain!”? Our 86 billion neurons curate a sophisticated model of the expanse of an avaricious civilization, and the truth they discover hurts.

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