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ARTICLE



Epidemiology in Motion: Traumatic Brain Injuries in Mumbai

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ABSTRACT

This paper is an ethnographic account of traumatic brain injuries (TBIs) based on a study of a public hospital trauma ward in urban India. It explores the contexts, causes and consequences of TBIs in order to make several broader claims. Across two case studies, I argue that epidemiological transitions towards non-infectious disease regimens must be understood as problems of somatic movement. The implication is that bodies make transitions through actual and imagined changes in bodily movements that define how persons become patients, how traumatic injury pulls on clinical resources, and how differences in gender, sexuality, class and caste affect the social dynamics of brain injury in urban settings at every turn.

KEYWORDS

Epidemiology; medicine; mobility; movement; Mumbai; 'rowdy'; 'stunt'; trauma

Introduction

The afternoon expands in the trauma ward at Central Hospital; a middle-aged woman named Seema arrives on a stretcher, accompanied by her sister-in-law.¹ Seema was taking her child home from school when a car hit her on the road. This happened last evening. 'Last night?!' the surgeons ask the sister-in-law with incredulity. Her sister-in-law is the authorised story-teller, the history-giver in the face of the doctors' questions and Seema's cognitive impairment: why is Seema only arriving now? Why would someone hit by a car last night show up in the hospital a day later? What accounts for such a delay between the motion that caused the injury and the effort to move her into medical care? It quickly becomes clear that Seema has actually already been to another hospital—she is a transfer case. That first hospital sent her to Central Hospital, along with X-rays that show several fractures, a probable head injury, and a directive to get approval for surgical fitness. There was no neurosurgeon at that hospital. But doctors there ordered a CT scan, which suggests Seema has traumatic brain injury, or TBI. The sister-in-law has already paid for both the X-ray and the CT scan.

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1. All names of interlocutors used in this article are pseudonyms, in accordance with the Institutional Review Board approvals from Duke University and the two ethics board approvals from the Indian hospitals in which I conducted my research.

Seema exhibits some clinical signs of a TBI that mark injury through bodily motion: her limbs jerk and she muddles her words. But she clearly calls out repeatedly for her sister-in-law (husband's brother's wife, *jao/zhao*), who tries to comfort her. The ward's sweeper attempts to remove Seema's ropy silver metal ankle bangles to prepare her for another X-ray. Seema also speaks in cut-off phrases that in other contexts might register as *bakbak* or nonsense. A surgeon asks the sister-in-law if Seema has ever spoken like this before (*pehle se aise baat karti thi kya?*), and she replies yes, but only since yesterday. This is the head injury talking, the surgeon tells her.

The sister-in-law sits on a chair by the ward's altar to Ganesh and absorbs the weight of responsibility that has shifted to her on several fronts. Seema is from Rajasthan but lives in Mumbai (earlier known as Bombay) for work; the sister-in-law has called Seema's natal family to hurry to Central Hospital in Mumbai. Seema is in distress, but the surgeons are saying that it's the brain talking. The sister-in-law grows agitated: why are the doctors not transferring her somewhere to make the brain injury better? As she hears Seema cry out, she calls: 'What are you people doing (*Aap log kya karte hai?*)?' All this waiting, no perceptible movement from the ward, and her relative continues to shout. Her question hangs in the air, adding another layer of agitation to the scene.

The intersection of inquiry into brain injury and bodily movements in Seema's case anchors the question animating this article: how do relations between bodily movements and injured brains constitute broad-scale changes in health from the ground up? To address this question, I frame traumatic brain injuries from traffic accidents in contemporary South Asia as a 'woundscape' and put this idea into conversation with epidemiological thinking. A woundscape is Jennifer Terry's term for the semio-material forms through which combat trauma-related TBIs create forms of power, agency and bodily vulnerability.² This insight might be put into conversation with scholars focused on how wounds and disability are sites to observe often-unexpected productions of social difference.³ For Terry, TBIs constitute a woundscape because they mark out the embodied forces of American war-making. Terry traces how the injured brains of soldiers crystallise the violent techno-politics of the USA and pays close attention to internal differences in soldiers' bodies, especially around gender. I take a cue from this idea and this approach but situate my analysis amid widespread traffic accidents in the city of Mumbai. In this context, I reflect on how the body's differential changes through TBIs mark epidemiological change. Somatic movements, I argue, raise questions about changing disease patterns and the ways in which these matter both in and out of the clinic.

I do so from the space of a trauma ward in a large public, municipal hospital in Mumbai that I call Central Hospital. Since the late 1970s, Central Hospital's trauma ward has focused on treating blunt or penetrating wounds that are immediately life-threatening, and which remain the clinical parameters for traumatic injury. Many of these wounds derive from road and railway accidents. The ward operates at the nexus

2. Jennifer Terry, 'Significant Injury: War, Medicine, and Empire in Claudia's Case', in *Women's Studies Quarterly*, Vol. 37, nos. 1–2 (2009), pp. 200–25.

3. Michele Friedner, *Becoming Normal: Cochlear Implants and Sensory Infrastructures in India* (Minneapolis: University of Minnesota Press, 2022); and Laurence Ralph, *Renegade Dreams: Living through Injury in Gangland Chicago* (Chicago, IL: University of Chicago Press, 2014).

between the somatic and the epidemiological, with the diagnosis and treatment of each case ultimately reflected in broader statistical trends. The trauma ward's work is grueling and tragic, successful and hopeful. As a government facility, the hospital cannot refuse admissions to the trauma ward and thus treats patients who are unable to afford the costs of care at private facilities. It is work that also sketches a broader portrait of the extensive burden of road and railway traffic accidents in today's India and in the Global South. Taking into account the variation found in rural areas less defined by traffic congestion, almost 400 people die each day in India as a result of road traffic injuries. This made India the source of over 20 percent of global road traffic deaths in 2014.⁴

The ward's work on traumatic injuries—including TBIs—is a matter of history, of present calamity, of a possible enduring future of severe injury, and of public health trends that trace patterns between these time frames. Public health experts count the trend towards greater numbers of injuries as evidence of a broader change in disease patterns termed 'the epidemiological transition', a term that refers to the shift from infectious to non-infectious diseases, with injuries from traffic accidents the exemplar of non-communicable forms of harm.⁵

The epidemiological transition model is a key rubric for public health researchers because it suggests changes in health at a macro-historical scale that may inform health policy and resource allocation. Yet, histories of change must begin somewhere, and I suggest that the gestures, shifts and actions of injured bodies exemplify one such site. I investigate the changing disease patterns through an analysis of brain injuries. I take the 'transition' in epidemiological transition seriously to better understand how bodily injuries are caused by movement and the broader patterns of harm that these movements reveal.

Understanding such patterns requires addressing a core question: do bodies make epidemiological transitions, or do epidemiological transitions make bodies? This push-and-pull of cause and consequence is a core feature of epidemiological transitions. It occupied much of my previous research on cardiometabolic disease in Mumbai,⁶ in which I show how obesity and diabetes mark out what I term the problem of *absorption*, a dynamic body–environment interface between food, fat and medicine. I crafted an ethnography of absorption to challenge the developmental telos of much of the epidemiological transition literature, a telos that 'has privileged disease transmission over illness', meaning that macro-structural trends become authoritative ways of explaining chronic disease at the expense of individual life stories.⁷ The critique here is twofold: first, it suggests that most public health models affirm change rather than grapple with people's lived experiences of change; second, it contends that framing non-

4. World Health Organization, 'Injuries and Violence: The Facts, 2014' [https://apps.who.int/iris/bitstream/handle/10665/149798/9789241508018_eng.pdf, accessed 15 Sept. 2021].

5. See the introduction to this special section: Marika Vicziany, 'The Modernisation of South Asia's Disease Burden', in *South Asia: Journal of South Asian Studies*, Vol. 44, no. 6 (2021).

6. Harris Solomon, *Metabolic Living: Food, Fat, and the Absorption of Illness in India* (Durham, NC: Duke University Press, 2016).

7. Julie Livingston, *Improvising Medicine: An African Oncology Ward in an Emerging Cancer Epidemic* (Durham, NC: Duke University Press, 2012), p. 32; and Amy Moran-Thomas, *Traveling with Sugar: Chronicles of a Global Epidemic* (Berkeley: University of California Press, 2019).

communicable disease as ‘diseases of modernity’ may miss other epidemics in plain sight—a point that scholars of cancer in India have made at length.⁸

As I completed the work on metabolic illness and began to study the traffic accidents increasingly affecting the lives of my neighbours in a seaside neighbourhood in Mumbai, I began to question the epidemiological transition in its singular form. *Transition*, in the singular form, is arguably an inaccurate term for the multiple *transitions* in play: dynamic, co-occurring and regionally variant forms of disease and injury patterns and their attendant burdens. Standardised measures such as disability-adjusted life years (DALYs) show this. One of the most important research initiatives on this front is the India State-Level Disease Burden Initiative. Their published research is extensive, complex and relevant to my argument here. I will simply note two broad trends: one concerns incidence—the number of total deaths per 100,000 persons from road injuries *increased* between 1990 and 2016;⁹ the second concerns gendered distribution—by 2016, road injuries were among the top ten causes of disability-adjusted life years for men, but not for women. More recent studies show that each year, nearly one million people in India die from trauma, many more are hospitalised, and road injuries have been the primary cause of death for the 15–39 age group among men in India in several studies.¹⁰ Epidemiological transitions do not simply happen; they actively reorganise social structures such as gendered household wage-earning potential and intimate care economies.

Epidemiological crises bridge spatial and social change. For instance, colonial Bombay’s 1896 plague epidemic dynamically shifted the organisation of urban public space, resource allocation and governance.¹¹ In a more contemporary example, Ravi Sundaram shows how the bodily and psychic shock of urban modernism in India emerges from road accidents. Centring his analysis on Delhi in the 1990s, when spectacular car accidents proliferated in tandem with private car ownership, Sundaram argues that traffic accidents constitute urban India’s ‘wound culture’. He describes a public cultural sense of being overwhelmed on and by the road, such that ‘divisions between private trauma and public tragedy blurred, suggesting a traumatic collapse between inner worlds and the shock of public encounters’.¹² In the woundscapes of

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8. Dwaipayan Banerjee, *Enduring Cancer: Life, Death, and Diagnosis in Delhi* (Durham, NC: Duke University Press, 2020); Carlo Caduff and Cecilia C. Van Hollen, ‘Cancer and the Global South’, in *BioSocieties*, Vol. 14 (2019), pp. 489–95; Kavita Sivaramakrishnan, ‘An Irritable State: The Contingent Politics of Science and Suffering in Anti-Cancer Campaigns in South India (1940–1960)’, in *BioSocieties*, Vol. 14 (2019), pp. 529–52; and Cecilia Van Hollen, ‘Handle with Care: Rethinking the Rights versus Culture Dichotomy in Cancer Disclosure in India’, in *Medical Anthropology Quarterly*, Vol. 32, no. 1 (2018), pp. 59–84.
 9. India State-Level Disease Burden Initiative Collaborators, ‘Nations within a Nation: Variations in Epidemiological Transition across the States of India, 1990–2016, in the Global Burden of Disease Study’, in *The Lancet*, Vol. 390, no. 10111 (2017), pp. 2437–60.
 10. R. Dandona *et al.*, ‘Mortality Due to Road Injuries in the States of India: The Global Burden of Disease Study, 1990–2017’, in *Lancet Public Health*, Vol. 5, no. 2 (2020), pp. e86–e98; and Nobhojit Roy *et al.*, ‘30-Day In-Hospital Trauma Mortality in Four Urban University Hospitals Using an Indian Trauma Registry’, in *World Journal of Surgery*, Vol. 40, no. 6 (2016), pp. 1299–307.
 11. Mariam Dossal, *Imperial Designs and Indian Realities* (New York: Oxford University Press, 1997); Prashant Kidambi, ‘“An Infection of Locality”: Plague, Pythogenesis and the Poor in Bombay, c. 1896–1905’, in *Urban History*, Vol. 31, no. 2 (2004), pp. 249–67; and Colin McFarlane, ‘Governing the Contaminated City: Infrastructure and Sanitation in Colonial and Post-Colonial Bombay’, in *International Journal of Urban and Regional Research*, Vol. 32, no. 2 (2008), pp. 415–35.
 12. Ravi Sundaram, *Pirate Modernity: Delhi’s Media Urbanism* (London: Routledge, 2009), pp. 170–1.

wound culture, changes in somatic motion are changes in the relationship between bodies and brains, and between clinics and cities.

This article's research derives from ethnography conducted between 2014 and 2020 in and around Central Hospital. I documented and followed cases of traumatic injury from traffic accidents in the hospital, at train stations, on the roads, on the railways, in police stations, in ICUs, and in the hospital morgue to trace cases of injuries that resulted in death.¹³ I also visited the homes of the injured who survived and were discharged.¹⁴ My research on trauma is additionally informed by a decade-long ethnographic project about the connections between health and urban life in Mumbai.¹⁵

The following sections describe the contours of traumatic brain injury in urban India, and then situate it in theories of epidemiological transitions. The two sections that follow examine ethnographic materials to highlight two specific cultural figurations of brain injuries: one around the cultural forms of 'stunts', and the other around the cultural forms of the 'rowdy'. Across the sections, I examine how movements of bodies in terms of gestures and imaginations of bodily activity define how persons become part of epidemiological change. Movements make transitions, in this light.

Transitions into trauma: TBIs, epidemiology and the city

Traumatic brain injuries affect over 69 million people globally each year. However, epidemiological evidence suggests that despite public health interventions across Asia, TBIs in South Asia have not decreased over the last two decades. This evidence also suggests that the mortality of TBI cases in India has been especially high in comparison to other Asian countries due to delays in care. Traumatic brain injuries require immediate transport to facilities with imaging and neurosurgery capacity, and demand triage priority due their immanent threat of death.¹⁶

Living with traumatic injury long enough to make it to the hospital is a selective condition: in India, half of the people who experience major trauma, including TBIs, die at the accident scene or during the journey to the hospital. Of those who do make it to the hospital, nearly 20 percent die within thirty days of admission, although clinical researchers believe that more than half in-hospital trauma deaths could be prevented with early resuscitative treatment and close monitoring of physiological signs

13. I conducted participant observation during different hospital shifts (morning, afternoon and overnight) to understand the different rhythms of the ward as well as to ensure repeated, representative interactions with the ward's staff. Individual interviews conducted outside a given shift were tape-recorded when possible, transcribed by me and by a research assistant, and analysed for emergent concepts and connective themes as the corpus of data grew. Broader context about the municipal hospital system came from analysing city newspaper coverage of health care, transit and traffic politics, and reporting on specific accidents. This was done using database software set to search Marathi, Hindi and English news sources. Semi-structured interviews in Hindi, Marathi and English elicited data on a staff member's own educational and work experiences, memories of the first day on the ward as well as subsequent notable/memorable cases, opinions on the ward's functions and more generalised opinions about the social aspects of casualty care in the city.

14. Harris Solomon, 'Shifting Gears: Triage and Traffic in Urban India', in *Medical Anthropology Quarterly*, Vol. 31, no. 3 (2017), pp. 349–64; Harris Solomon, 'Living on Borrowed Breath: Respiratory Distress, Social Breathing, and the Vital Movement of Ventilators', in *Medical Anthropology Quarterly*, Vol. 35, no. 1 (2021), pp. 102–19; and Harris Solomon, *Lifelines: The Traffic of Trauma* (Durham, NC: Duke University Press, 2022).

15. Solomon, *Metabolic Living*.

16. Saksham Gupta et al., 'Third Delay in Traumatic Brain Injury: Time to Management as a Predictor of Mortality', in *Journal of Neurosurgery*, Vol. 138, no. 1 (Jan. 2020), pp. 150–8.

such as systolic blood pressure, which can predict mortality.¹⁷ The costs associated with death, treatment and rehabilitation can easily exceed a household's limits, sending already poor families into situations of catastrophic expenditure, debt and poverty. These facts are telling about the creation of TBIs, but how do they register as social facts?

Movement is the core situation in which traumatic brain injuries arise: without motion, there would be no wound, and no subsequent alteration of 'normal' bodily habits. TBIs belong to a broader category of traumatic injury and are possible only because of shearing or puncturing forces. Clinically, '*traumatic injury*' (and its more abbreviated form, '*trauma*') refers to a blunt or penetrating wound that is immediately life-threatening. Objects at rest cannot cause trauma, only moving forces can. Because trauma has a kinetics, it can cause a disturbance and an infringement: concrete is on the road, now it is in your head; now the surgical instruments in the hands of the neurosurgeon are in your brain. Disparate materials of the world collide as trauma infringes bodily spaces. Trauma medicine does so too.

In the trauma ward at Central Hospital, the English-based clinical term '*trauma*' is used in Hindi and Marathi (the hospital's operating languages) to classify such wounds. The ward treats two categories of trauma from traffic accidents: road traffic accidents (RTAs) and railway accidents (RAs). It also treats trauma caused by falls and wounds from physical assault. In the latter group, it tends to refer sexual assault to the hospital's gynaecological and obstetrics department ('gyn/ec'). This has consequences for the gendering of trauma in the trauma ward and is a reminder of how violence achieves unequal forms of clinical visibility.¹⁸ It matters that epidemiological data on traumatic injury come largely from casualty and trauma wards and may or may not account for injuries registered in the gyn/ec ward. The result is that patterns of intimate partner violence may not register as part of public health concerns about trends in traumatic injury, further walling off certain forms of harm from visibility and resources. Simply put, traumatic brain injuries constitute an unequal politics of survivorship. Who and what gets to constitute a woundscape are matters to be ascertained rather than assumed.¹⁹ There are multiple, co-occurring forces that stretch the labour demands on neurosurgeons responding to brain injuries; these also affect clinical care. India's intensified cardiometabolic disease burdens make strokes increasingly common, and this

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17. Prashant Bhandarkar *et al.*, 'An Analysis of 30-Day In-Hospital Trauma Mortality in Four Urban University Hospitals Using the Australia India Trauma Registry', in *World Journal of Surgery*, Vol. 45, no. 2 (Feb. 2021), pp. 380–9; Martin Gerdin *et al.*, 'Predicting Early Mortality in Adult Trauma Patients Admitted to Three Public University Hospitals in Urban India: A Prospective Multicentre Cohort Study', in *PLoS One*, Vol. 9, no. 9 (2014), p. e105606; Vineet Kumar *et al.*, 'The Great Indian Invisible Railroad Disaster', in *Prehospital Disaster Medicine*, Vol. 27, no. 2 (April 2012), p. 216; and Nobhojit Roy, 'Towards Improved Trauma Care Outcomes in India: Studies of Rates, Trends and Causes of Mortality in Urban Indian University Hospitals', unpublished PhD dissertation, Karolinska Institutet, Solna, Sweden, 2017 [<https://openarchive.ki.se/xmlui/handle/10616/45531>, accessed 15 Sept. 2021].
 18. See Sameena Mulla, *The Violence of Care: Rape Victims, Forensic Nurses, and Sexual Assault Victims* (New York: New York University Press, 2014). In speech, injury's circumstances may become known as an 'accident'. This is glossed as *haadsa* in Hindi, *apghat* in Marathi and *aksident* in Mumbai's colloquial Hindi dialect. Both the Hindi term *chat* (meaning 'wound') and the English-derived term *injury* are used in conversation to refer to an accident's outcomes. Public health scholars tend to use the term 'injury' to assert that there are really no accidents because all events have underlying causes. I am mindful of this distinction, and it is indeed important. However, I will stay with local linguistic forms to reflect the terms that ground the work of the ward.
 19. This issue could potentially be addressed by ensuring that data from the 'gyn/ec' wards of Central and other hospitals are co-ordinated with case reports in the trauma ward, and vice versa.

also pulls on neurosurgeons with increasing regularity. Furthermore, neurosurgery for trauma—which tends to occur more in public hospitals given the basic fact that traumatic injury is more prevalent in poorer populations—means that neurosurgeons practising in public hospitals are choosing their work in contrast to the high-profit potentials of private hospital-based practice. Additionally, the proliferation of CT scans and body scans via the private diagnostic industry increases demands from general practitioners and patients themselves for neurosurgical consults and possible actions on imaging. Neurosurgery moves along many parameters of technology, political economy, vocation and craft.

In public hospitals like Central, care proceeds in this dynamic context. Time may stretch between calling for a neurosurgery referral and the actual arrival of a neurosurgeon to the trauma ward. For patients, these trends add up to several things at once. Neurosurgeons are scarce. They may be available to perform surgery, but follow-up is hard to mobilise. Specific neurosurgical procedures may be employed during an operation depending on whether or not senior neurosurgeons and nurses trained in more complex procedures are available, or if more junior resident doctors and nurses are taking the lead.

For instance, the most common approach to brain haemorrhages employed in Central's trauma ward is to perform a craniotomy. The neurosurgeon makes an incision in the scalp, creates burr holes in the skull, opens a flap of bone, evacuates the brain bleed, sutures the dura²⁰ together, places a drain, and keeps the removed bone flap in the patient's abdomen (where the body can keep it sterile). But if more complex variations of craniotomies are necessary for a given trauma case, it immediately requires neurosurgeons with expanded expertise.

Location matters in the ties between bodies and brains. Some scholars of India's epidemiological trends argue that urban settings *accelerate* epidemiological transitions, and that urbanites experience the morbidity and mortality of traffic accidents more acutely than rural populations.²¹ This conclusion resonates with humanistic accounts in trauma studies regarding the ties between neurological trauma and urban space. From the urban sociology of Georg Simmel to the critical theory of Walter Benjamin, the shock of cities often grounds how scholars think through trauma as a general form of psychic distress. This framework produces a concept-space that treats the city as 'a torrent of stress-inducing stimulation (visual, auditory, affective)—with the urban dweller, in her turn, understood as the fretful recipient of its hectic, and often pathological, energy'.²² In multiple, transdisciplinary accounts, then, the city presents a space too dangerous for liveable life because it accelerates bodies towards harmful overload that becomes deadly in the context of crowds.

The city's threats to life are never abstractions in Central's trauma ward, they are always materialisations with immanent stakes. Each case that appears also conjures the social fact of embodied motion: that both persons and their risks of injury are mutually invested with particular propulsions, inertias and repulsions that derive from gender,

20. The dura is the outermost tissue membrane that surrounds the brain.

21. Suryakant Yadav and Perianayagam Arokiasamy, 'Understanding Epidemiological Transition in India', in *Global Health Action*, Vol. 7, no. 1 (May 2014), article no. 23248, n.p.

22. Des Fitzgerald *et al.*, 'Living Well in the Neupopolis', in *The Sociological Review*, Vol. 64, no. 1 (2016), pp. 221–37 [222].

caste, class and community of origin (to name several among many interlocking forms of social stratification). As Rashmi Sadana notes, urban mobility 'is a complex of institutions that bear on the social and affective relations between individuals and notions of self, family, and caste'.²³

Bodies reflect these inequalities by relating back to the unequal conditions of movement that exposed them to the potential for traumatic injury in the first place. For traffic accidents, these conditions can be understood by disaggregating 'traffic' into multiple uneven exposures. Traffic in Mumbai keeps many roads at a trickling gridlock, meaning that vehicle-to-vehicle collisions are low; however, the intervals between speed-up and slow-down make accidents between cars, pedestrians, motorcycles and trucks very high.²⁴ Those who can afford to be in the protective cage of a car or in less-crowded, more expensive train compartments experience exposure to risk differently than pedestrians or commuters in more crowded, less expensive train compartments. These inequalities shape the contours of injury in terms of its cause but also in terms of its aftermath, such as the movement towards a public hospital instead of a private facility.

Once a TBI case arrives to the trauma ward, doctors, nurses, orderlies and ward staff get to work to attenuate neurological and physiological damage. As they do, they may also reflect on how each case adds to, changes or defies injury patterns over time, turning the specific into the general. As he examines a patient's CT brain scan, one surgeon notes that approximately two-thirds of the ward's patient load in the past decade involves head injury cases, which is double the figure of previous decades. This surgeon runs complex epidemiology studies in the trauma ward and is attempting to create India's first trauma registry. He attributes the increasing number of head injuries to transformations in local and national political economies.²⁵ During the 1980s and 1990s, which he describes as the heyday of Mumbai's gang violence and communal rioting, he would have to separate young men in the trauma ward according to their different gang affiliations. But in line with India's economic liberalisation in the 1990s, the world adjustment that brought in Toyota compact cars and Hero Honda motorbikes, social class dynamics shifted these patterns. More people moved through the city in vehicles owned, rented or borrowed. The economic precarity of others amplified the number of passengers on the local trains, particularly in the less expensive but more crowded second-class compartments. Everyone negotiated spatial displacement as skyrocketing rents made living in the city's centre unaffordable, and as work became

23. Rashmi Sadana, 'On the Delhi Metro: An Ethnographic View', in *Economic & Political Weekly*, Vol. 45, no. 46 (13–19 Nov. 2010), pp. 77–83. Also see Sareeta Amrute, 'Moving Rape: Trafficking in the Violence of Postliberalization', in *Public Culture*, Vol. 27, no. 2(76) (2015), pp. 331–59; Tarini Bedi, 'Taxi Drivers, Infrastructures, and Urban Change in Globalizing Mumbai', in *City & Society*, Vol. 28, no. 3 (2016), pp. 387–410; Tarini Bedi, 'Urban Histories of Place and Labour: The Chhillia Taximen of Bombay/Mumbai', in *Modern Asian Studies*, Vol. 52, no. 5 (2018), pp. 1604–38; and Solomon Benjamin and R. Bhuvaneshwari, 'Democracy, Inclusive Governance and Poverty in Bangalore', IDD Working Papers, no. 26 [<https://gsdrc.org/document-library/democracy-inclusive-governance-and-poverty-in-bangalore/>], accessed 15 Sept. 2021].

24. On 'the interval' as a critical spacetime form, see Michael Fisch, *An Anthropology of the Machine: Tokyo's Commuter Train Network* (Chicago, IL: University of Chicago Press, 2018).

25. It is true that some traumatic injuries derive from falls, and that falls can be attributed to cardiometabolic disease events such as strokes. Arguably, this overlap between traumatic injury and other forms of non-communicable disease can happen if someone loses control of a car during hypoglycemia. But it is so rare as to be a theoretical possibility that hardly bears out.

synonymous with extensive commutes. The underworld invested in lucrative real estate and construction, diminishing gang fights but intensifying the ways in which everyday urban mobility entailed navigating an obstacle course of concrete and potholes.

The shifting surfaces of the city's skin—the materials of its modernisation—shape forms of injury and the ways in which injuries become socially meaningful. Brain injuries become folded into the ways that Mumbai's 'progressive registers of infrastructural modernization have a dual face—of building and making and of destruction, demolition, and phasing-out'.²⁶ TBIs constitute the city, even as the city creates TBIs. In an epidemiological regime of high levels of brain trauma, TBIs are as much part of the city as are diversions around iron rods (*salli*), tumbles over potholes, trips over stray paver bricks, falls into open manholes, and skids over sudden changes in the grip of asphalt.²⁷ Yet, bodily lacerations are not just urban glitches. Rather, the city is a normal space of normal wounding. When the city is at work, it is also at work wounding.

The 'stunt'

In urban South Asia, traumatic brain injuries from traffic accidents are embedded in broader concerns about cognitive overload and bodily threats amidst urban cultural and political forms. Ravi Sundaram explains that the fear and anxiety of the city entails 'moving between the body of the crowd, traffic, neighbourhoods and also in the material traffic of images and objects. It is the ability to move rapidly between unequal social groups, spaces and media that gives the contemporary experience of urban fear an edgy, neurological feeling'.²⁸ Edginess is a signature effect of film noir in South Asia; filmmakers create atmospheres of paralysis, desperation and vigilante action in cities to elicit in viewers 'a dystopic imagination'.²⁹ States of bodily movement on thoroughfares and roads—especially riding, driving, following and escaping—feature prominently in portrayals of urban crises.

The trauma ward absorbs the unintended consequences of such movements. Healthcare workers simultaneously treat bodies incapacitated and unable to move, while also imagining what brought them to the hospital in the first place. They often draw on pervasive cultural forms of dangerous urban action, such as a common form of railway injury connected to young men 'doing stunts'. The term 'stunt' is used in both Hindi and Marathi and refers to the feats at the open doors of the train, where young men attempt to tap poles, dodge pylons, and brush their feet against platforms as the train moves at high speed. In the ward, there was always the potential for talk about how young men in railway accidents had done stunts. I began to think about stunts as an accusation when a young man, yelping, was told to be quiet by one of the nurses as he

26. Bedi, 'Taxi Drivers, Infrastructures, and Urban Change in Globalizing Mumbai', p. 388.

27. Harris Solomon, 'Death Traps: Holes in Urban India', in *Environment and Planning D: Society and Space*, Vol. 39, no. 3 (2022), pp. 423–40.

28. Sundaram, *Pirate Modernity*, p. 31.

29. Ranjani Mazumdar, 'Spectacle and Death in the City of Bombay Cinema', in Gyan Prakash (ed.), *The Spaces of the Modern City: Imaginaries, Politics, and Everyday Life* (Princeton, NJ: Princeton University Press, 2008), pp. 401–32; and Ranjani Mazumdar, 'Friction, Collision, and the Grotesque: The Dystopic Fragments of Bombay Cinema', in Gyan Prakash (ed.), *Noir Urbanisms: Dystopic Images of the Modern City* (Princeton, NJ: Princeton University Press, 2011), pp. 150–86. Mazumdar's analysis of the film *Borivali Fast* exemplifies this imaginative form. Also see Gyan Prakash, *Mumbai Fables* (Princeton, NJ: Princeton University Press, 2010).

lay on the metal gurney waiting for another diagnostic test. ‘*Tu kai kelas? Stunt? Huh?*’ she asked sharply, meaning ‘Did you do a stunt?’ It seemed more an answer than a question.

Many of the videos of stunts end badly. In one, the teenager being filmed is successful at his stunts, but a rock comes out of nowhere and hits him in the head. In another, a teen holds on as the train moves quickly, but loses his grip and falls off. These videos circulate on WhatsApp, on television news channels, and in newspaper reportage. Workers in the trauma ward watch them often. On the one hand, the images affirm the feats of parkour-like confrontations with urban machinery. On the other hand, when the person performing the feats is wheeled into the ward, unconscious, it is more difficult to affirm mobility’s possibilities of representing freedom because the freedoms of commuting may have downstream negative consequences.

In one video, a young man named Hanif Sheikh performs a train stunt, sliding his legs along train platforms and slapping poles, but escapes injury. The newspaper *Mid-Day* ran a story on Hanif to catch up with him four years after the video appeared. Hanif was in the video, the video circulated widely, and railway authorities published still shots from the video in public warnings *not* to perform stunts. In the newspaper article, Hanif poses next to a poster with stills from the YouTube video. The sign reads, ‘Do not do stunts on the train car or on the railway premises (*Rail gaaḍi aur rail parisar mein kartab nahin kare*)’. Hanif speaks to the reporter in a similar preventative mode: ‘Do not repeat what I did. It is not a good thing to be infamous for such wrong acts. I have suffered a lot; my family and I lived under constant fear every time the video was played on TV’, he says, meaning fear of potential public shame. Subsequently, Bollywood stuntmen saw the video and offered him a contract to perform stunts in Dubai. Stunts, skirting death, may indeed generate life, but it is only because Hanif lived to tell the story of the stunt that he was *not* counted as an injury. Such transitions from a stunt to being able to tell a story about a stunt are possible without having injury or death cut things off in the middle—but not always.

Yet, in all of the concern about the risky movements of the stunt itself, several questions arise. One concerns the curious omission of one critical movement required for the stunt’s publicity: that of a hand holding a phone to capture the stunts on video. That is, we only know about stunts because someone is right there, turning movement into digital bits. What does it mean, then, that deaths and injuries from the trains are almost always being witnessed by others, and, furthermore, that the witnessing can be active, engaged and documentary? The stunt is a public performance, and ‘public’ must be understood as a bridge between the public of the crowd on the train, the public of the public hospital, and the public watching the video recording. Second, when stunt cases arrive in the trauma ward, they conjure questions about ‘neurological personhood’, the term medical anthropologists use to refer to assumptions of personality based on clinical signs of brain function.³⁰ This makes the effect of brain traumas on clinical spaces similar in some senses to case studies of psychosis in the ways that persons come to be defined through interpretations of their

30. Joseph Dumit, *Picturing Personhood: Brain Scans and Biomedical Identity* (Princeton, NJ: Princeton University Press, 2004); and Barry Saunders, *CT Suite: The Work of Diagnosis in the Age of Noninvasive Cutting* (Durham, NC: Duke University Press, 2010).

neuropathology.³¹ And third, there is a question of fault to be asked here: where does 'fault' lie when the city is simply working as usual, failing to keep bodies upright and at a distance from danger?

I ask several of the ward's workers about stunts and they begin to point them out to me in reference to specific cases that arrive. One arrives the night of the Muslim holiday of Shab-e-Barat, a night of graveside remembrance of ancestors, reflections on one's deeds, and praying for divine forgiveness. The accident was one of several that night involving young men who were hanging out of the open doors of the local trains; two cases resulted in death and another, a patient named Irfan, lay in the ward in a critical condition. The police suspect that while the train moved past a station platform, Irfan attempted to gesture to people standing on the platform and in the process hit a pole. As a matter of research ethics, I do not speak to patients in such conditions until they are deemed stable and ready to be transferred to non-critical step-down units in the hospital or ready to be discharged home. Once this happened, I visited Irfan and chatted with him, his mother and his aunt. He says that he remembers little of the incident, except that he fell from the train (*gir gaya*) and that he only had a tenuous handhold on the stability pole inside the train. He describes what happens afterwards as '*slipping slipping*': he rolled onto the platform, then rolled onto the track.

To those who work in the ward, cases like Irfan's are regular occurrences, and they are tragic. They are also sites to monitor differences in gender and religion, in this case, a young Muslim man. These social typologies may bleed into juridical forms. Because all cases of traumatic injury in this hospital are automatically considered medico-legal cases, the police must come to the ward and register the case formally with a First Information Report (FIR). One constable who arrives to handle this accident case notes that young men who perform stunts on the local trains are a problem, and he feels the law is too lenient—just a fine of Rs1,200, which he thinks is far too low a cost to change their comprehension (*samajh*) of the danger. He explains that for a time, the Railway Police focused intently on stunt cases while the train was in motion, but when they attempted to chase young men performing stunts, the young men would jump out of the train to escape the police and get hit by another train. 'Who is responsible then (*Zimmedar kaun*)?' he asked. Where does the stunt end and the punishment for the stunt begin? Fault can be slippery; assumptions about certain bodily movements as problematic will receive police attention while others may pass unnoticed.

Many of the ward staff live either within walking distance of the hospital in nearby slum neighbourhoods, or far enough away that they must take the train to work. They often see accidents and injuries during their commutes, and scold people for doing stunts near the open doors of the moving train, or not paying attention when crossing the road. Sister Nidhi, a nurse, says: 'I do take care while travelling, like not hanging on the door, not catching the running train. I always advise young people who hang on the doors, catch the running train, or do stunts that we get many patients daily from accidents, so they should take care while travelling'. One orderly is straightforward with those he sees performing stunts on the train: 'I will see you in the hospital', he warns them, anticipating epidemiological body counts before they materialise.

31. Sarah Pinto, *Daughters of Parvati: Women and Madness in Contemporary India* (Philadelphia: University of Pennsylvania Press, 2014).

The 'rowdy'

A major feature of traffic accident-related traumatic injury noted by people working in the trauma ward is that it is mostly a problem for young men. But mostly does not mean always, and the fact that young women do appear with traumatic injury—often lethally so—signals how trauma often operates through gendered positioning at the margins of moving containers, from riding pillion on motorcycles to standing at the edges of train compartments.

One evening, a mobile phone with the message-alert notification on a cracked screen beeps incessantly as text messages accumulate. It lies next to the body of a young woman under a printed cloth. Her boyfriend sits at the medical officer's table. His hands alternate in jerky motions, between gripping the table, sporadically swiping paper piles, and cradling his face. Shock is not always freeze—it can be erratic and energised. He drove the motorcycle, his girlfriend rode pillion. A truck hit the bike. He fell to one side, the girlfriend to the other, and she was run over by another car and killed instantly. Someone was still trying to reach her on the phone. Her parents do not know yet what happened, and the medical officer strategises with the young man on how best to inform them. His actions as the driver are not questioned. The workers in the ward agree that this death, like all the deaths, is tragic and need not have happened. But some workers tie the girlfriend's death back to the boyfriend: he will never drive a motorbike again, they suspect. Her deadly immobility will forever imprint his mind; brains and injuries can be relational in ways that exceed a singular wounded or dead person.

Such scenes of agitation in survivors and in the recollection of the injury's cause may result in the stilling of a body, in death. Yet, at the same time, the problem of agitation lingers in the ward: there is a deep history to agitation and its rebuke in South Asia, a history that continues to thread through clinical space. Some hospital staff deem agitations, especially in men's bodies, as marking when a patient gets rowdy (*patient rowdy zhala*). This is meant to be more than a description of action because 'rowdy' is a term that appears across India to refer to a figure—most often a man—who causes public disturbance.³² Rowdiness conjoins masculinity with disorder, and manifests in the ward as an agitated body that needs a shift towards stillness so that medicine may do its work. I began to see rowdiness as a sign of the underlying movements at play in injury patterns.

The 'rowdy' is often a masculinised figure in the ward, even if it is a woman at the centre of attention. Yet rowdiness also can manifest through gender's disappearance, so that frequently it is women's lives, deaths and injuries that are forgotten in the over-attention to rowdy masculinity. This erases the range of effects gender, sexuality, kinship and intimacy have on mobility in South Asia.³³ Different approaches to morality might ensue. One could contrast the above case, of the boyfriend facing a medical

32. Shreyas Sreenath, 'Rowdy', in *South Asia: Journal of South Asian Studies*, Vol. 40, no. 2 (2017), pp. 392–94. A related term one hears is *badmaash*, 'of bad livelihood': see Radhika Singha, 'Punished by Surveillance: Policing "Dangerousness" in Colonial India, 1872–1918', in *Modern Asian Studies*, Vol. 49, no. 2 (2015), pp. 241–69.

33. Amrute, 'Moving Rape'; Rashmi Sadana, 'At the "Love Commandos": Narratives of Mobility among Intercaste Couples in a Delhi Safe House', in *Anthropology and Humanism*, Vol. 43, no. 1 (2018), pp. 39–57; and Jan Brunson, 'Scooty Girls: Mobility and Intimacy at the Margins of Kathmandu', in *Ethnos*, Vol. 79, no. 5 (2014), pp. 610–29.

authority who poses little to no moral question of his risky driving, with the case of the young man scolded by the nurse. Precisely when and how stunts become threats to moral order is a question to be asked of a single case, rather than assumed from the start, and may constitute gender as much as it constitutes trauma.

Doctors and staff tend to give film examples when I ask about who best defines a rowdy person. 'It's a bully, an anti-social person, a hooligan, a *mawaali* (rogue, loafer), a ruffian', one senior surgeon says.³⁴ These examples accord with South Asian studies scholars who argue that the rowdy is a historical figure whose legacy partly lies in colonial police charge ledgers called 'rowdy-sheets'. Its contemporary form is a person who 'inhabits the dark zone of the city ... [who is] always threatening to spread to the safer, cleaner habitat of the city'.³⁵ For Dhareshwar and Srivatsan, writing in conversation with Subaltern Studies scholarship, the rowdy is a figure that embodies the lumpen proletariat in contemporary India. While the authors are more concerned with what the rowdy means than how it is embodied, they do note that the politics at stake is the disincorporation of persons from politics. By this, the authors mean that the rowdy is a middle-class nightmare precisely because he is the disorderly, activated counterpart of the middle-class body.

In the trauma ward, 'rowdy' carries these meanings but also can be applied more broadly, retrospectively in the case of actions deemed dangerous, and in terms of injured brains. In Central's trauma ward, rowdiness in brain injury cases conjures caste and class and partly marks the publicness of the public hospital. The staff in the ward, medical and otherwise, often remark that the *cause* of rowdiness tends to be brain injuries due to accidents that can shift mood and behaviour—that is, that the accident makes a person rowdy. But they also note that brains are more than interior and organic; they are also tied to gender, kinship, social class, geography and caste. Social shifts converge with anatomical shifts, as rowdiness asserts excessive masculinity, class status and neurological impairment, all at once. This often crystallises when medical authorities attempt to render the rowdy more still.

Brain injuries are a key site for ward workers to dampen rowdiness towards stillness. This happens in both action and in language; as anthropologist Stacey Langwick points out, ways of talking about a case can shape ways of caring for a case.³⁶ One morning, the police bring a young man named Emran who had been in a railway accident, and who was agitated. The resident attempts to insert an IV and Emran yells at her to stop what she's doing. He profusely apologises a moment later: '*Sorry, sorry yaar, sorry!*' The resident asks an orderly to help her and the orderly proceeds to tie Emran's hand and feet to the bed. When CT scans arrive and it is decided that he requires neurosurgery, the sister calls a senior orderly to shave his head. This is compulsory, but fraught. Emran thrashes when he sees the razor. The orderly holds him with one arm and

34. She thought Aamir Khan's character in *Rangeela* was a quintessential rowdy. Others thought that Gabbar Singh was a rowdier rowdy. And, they reminded me, there was *Rowdy Rathore*.

35. V. Dhareshwar and R. Srivatsan, 'Rowdy-Sheeters: An Essay on Subalternity and Politics', in S. Amin and Dipesh Chakrabarty (eds), *Subaltern Studies IX: Writings on South Asian Society and History* (Delhi: Oxford University Press, 1997), pp. 201–31. Also see Thomas Blom Hansen, 'Governance and State Mythologies in Mumbai', in Thomas Blom Hansen and Finn Stepputat (eds), *States of Imagination: Ethnographic Explorations of the Postcolonial State* (Durham, NC: Duke University Press, 2001), pp. 221–54.

36. Stacey Langwick, 'Devils, Parasites, and Fierce Needles: Healing and the Politics of Translation in Southern Tanzania', in *Science, Technology, & Human Values*, Vol. 32, no. 1 (2007), pp. 88–117.

wields the straight razor with the other, swiping sharply with controlled arcs, ultimately managing a clean shave. ‘Don’t talk! Don’t do drama! Don’t shake!’ the orderly warns him as he works (*Bol mat! Naatak mat kar! Hilo mat!*). Emran relaxes, and more swipes are applied more slowly. The scene is a twist on the mundane homosocial intimacy between barbers and their clients in South Asia. In pacifying rowdiness—‘Don’t do drama’—the orderly might be understood to be making an effort to change the pattern of speeding-up towards one of slowing-down. Perhaps the stunts of the city never really end.

Conclusion: The transition town

Across the cases in this article, I have suggested that traumatic brain injury constitutes a woundscape of urban life, and in the process, creates broader-scale questions about the inseparability of injury’s incidence and treatment on the one hand, and the inseparability of bodies and urban society on the other. This occurs in terms of embodied movements such as agitation and stillness, and creates meaningful relations to the city and to epidemiology together. In these woundscales of brain trauma, neither activation nor deactivation of bodies with TBIs tend to be clear-cut binary poles. Instead, the social resonance of categories such as ‘stunt’ and ‘rowdy’ turn movements into both problem and fix. Thinking about the neurological and the epidemiological at the same time through woundscales in a Mumbai hospital reveals how the contemporary South Asian urban health system is a critical site of crisis, and how brain injuries recalibrate urban orders from within clinical settings.

Consequently, traumatic injury can be understood as connective nodes of motion between the spaces of the clinic and the city. In a time when COVID-19 has unevenly reshaped the social order in India and elsewhere, many scholars have reflected on the ways in which the management of infectious disease might be understood as the grounds of politics. There are spatial dimensions to this claim. Critical theory operating in the Foucauldian tradition has frequently tied concepts of urban space to concepts of infectious disease (originally the bubonic plague but since extended to other disease outbreaks). Stuart Elden elaborates this point and argues that the spatial form of the ‘plague town’ haunts Foucault’s theorisation of medicine in *The Birth of the Clinic*, as well as Foucault’s ideas about disciplinary power in other key texts.³⁷ Epidemics such as the plague would shape the very spaces and purposes of the modern clinic, in terms of a hospital’s aims, organisational structure, architecture, and forms of disciplinary power. In the contemporary moment wherein the hospital’s centrality has been amplified by the pandemic, it may seem as if politics itself is ineluctably connected to infectious disease.

Yet, given the chronic features of COVID-19 for some, its downstream effects on care for chronic disease as resources get reallocated, and the enduring importance of non-communicable diseases, what might be done with models of knowing a city through disease? What if the plague town is also a crash town, a place where infection and collision co-occur? The ever-increasing number of traffic accidents and their

37. Stuart Elden, ‘Plague, Panopticon, Police’, in *Surveillance & Society*, Vol. 1, no. 3 (2003), pp. 240–53.

resulting head injuries challenge us to look at new connections between epidemiology and urban space. Through these connections, the dynamics of epidemiological transitions may be better understood as bellwethers of survival in cities. For instance, how might we frame survival through lives shaped by tuberculosis *and* the cardiometabolic sequelae of air pollution? Of cancer *and* dengue? Of COVID-19 *and* diabetes? Of waterborne diseases *and* injurious wounds? Bodily materials, from brains to lungs and beyond, are at once bio-moral and biopolitical.³⁸ The challenge at hand is to reflect on these materials not only in terms of their materiality, but also in terms of their movements. What is necessary are accounts of these changes to track not just bodies but imagined and actualised bodily motion, as they constitute patterns of harm.

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38. Jacob Copeman, *Veins of Devotion: Blood Donation and Religious Experience in North India* (New Brunswick, NJ: Rutgers University Press, 2009).