

Annotated Bibliography

Learning from India's Kumbh Mela

2017

Overview

This bibliography is an updated revision of a teaching resource originally created as part of the Harvard University collaborative research project, “Contemporary Urbanism: Mapping India’s Kumbh Mela.” The Kumbh Mela is a Hindu ritual and festival that draws millions of pilgrims to the banks of the Ganges River in Allahabad, India, every twelve years, for spiritual purification. More information about the Harvard project is available at <http://southasiainstitute.harvard.edu/kumbh-mela>. The bibliography includes a curated selection of background readings about the history of the festival, new resources relevant to global health at the Kumbh Mela identified in ongoing literature review, and publications that followed the 2013 Kumbh Mela by Harvard project faculty and researchers (noted with *). Most resources are freely available online.

The bibliography is designed as a companion resource for two Global Health Education and Learning Incubator teaching cases: “[Toilets and Sanitation at the Kumbh Mela](#)” and “[Stampede at the Kumbh Mela: Preventable Accident?](#)” It may also be used in classroom discussions about the study of religion, urbanization in a global world, health governance and governance for health in resource-poor settings, humanitarian aid, and emergency medicine.

This bibliography is organized according to the following topics:

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The Festival: Background and Description

Kumbh Mela Festival: General and Historical Sources

Kumbh Mela Festival 2013

Topic Portal. Kumbh Mela Festival 2013. <http://kumbhmelaallahabad.gov.in>.

This web portal is the home page for the 2013 Kumbh Mela festival in Allahabad, India.

Ardh Kumbh 2007

Topic Portal. Ardh Kumbh 2007. <http://ardhkumbh.up.nic.in>.

This portal is the home page for the 2007 "Ardh Kumbh" festival held in Allahabad, held six years after each major Kumbh Mela festival. The site (and thus the placement of utilities, tents, and resulting maps) of each festival in Allahabad always vary slightly from previous festivals due to variation in the exact site of dry ground when the riverbed is exposed during the annual dry season. This website for the Ardh Kumbh 2007 includes maps, photos, utility, media, and other information specific to the 2007 festival.

Kumbh Mela Festival 2001

Topic Portal. KMP2001: Kumbh Mela Festival 2001. <http://www.kmp2001.com/index.html>.

This web portal features resources from an expedition of filmmakers, photographers, writers, researchers, sound designers, and composers who traveled to Allahabad, India to experience and document the Kumbh Mela in January 2001. Prior to the 2013 festival, this was one of the definitive sources of information and multimedia representations documenting this event. It includes detailed information about the Kumbh Mela; a sky map with astronomical information during the 2001 festival; an "India Audio Travelogue" page with audio sound files incorporating sounds of the Mela; written excerpts by the team reflecting on their experiences; media information about team's documentary film, "Kumbh Mela: Songs Of The River"; and samples from the music album, "On The Road To Allahabad: The Delhi Session."

Making the Colonial State Work for You: The Modern Beginnings of the Ancient Kumbh Mela in Allahabad

Article. MacLean K. Making the Colonial State Work for You: The Modern Beginnings of the Ancient Kumbh Mela in Allahabad. *The Journal of Asian Studies* 2003; 62(3): 873-905.

<https://archive.org/details/TheModernBeginningsOfTheAncientKumbhMelaInAllahabad>.

This article by historian Kama MacLean explores the dynamics of colonialism in India during the early modern Kumbh Mela festivals.

Conflicting Spaces: The Kumbh Mela and the Fort of Allahabad

Article. Maclean K. Conflicting Spaces: The Kumbh Mela and the Fort of Allahabad. *South Asia Journal of South Asian Studies* 2001; 24(2): 135-159. DOI: <http://dx.doi.org/10.1080/00856400108723455>.

In this article, historian Kama Maclean examines the controversies over the administration of religious festivals, or melas under British colonial rule, the risks posed by the warrior-holy men and officiating Brahmans, and concerns to control them. This piece provides an important historical perspective on governmental intervention and colonialism in this religious mass gathering during the nineteenth century.

Prayaga: The Site of Kumbha Mela

Book. Dubey DP. Prayaga: The Site of Kumbha Mela. Aryan Books International 2001.

This book provides an authoritative cultural history of the city of Prayaga (today known as Allahabad), drawing on Vedic, Buddhist, Jain, and foreign sources. The author also draws on archaeological evidence to consider implications for the development of the Kumbh Mela festival and its influence.

Si-Yu-Ki: Buddhist Records of the Western World, Translated From the Chinese of Hiuen Tsiang (AD 629)

Book. Beal S, trans. Si-Yu-Ki: Buddhist Records of the Western World, Translated From the Chinese of Hiuen Tsiang (AD 629). London 1906. <https://archive.org/details/siyukibuddhistro1bealgoog>.

This book, now freely available online through the Internet Archive's digital library, is an important early historic text for the culture and religious practices in ancient India. It includes one of the earliest known descriptions of the charitable bathing festival on the sand banks of the Ganges River just outside Prayaga (modern Allahabad) which is known today as the Kumbh Mela festival (pages 233-234). The author was a Chinese Buddhist monk who was traveling through India on pilgrimage.

The Festival as Media Spectacle

Seeing, Being Seen, and Not Being Seen

Article. Maclean K. Seeing, Being Seen, and Not Being Seen. *Cross Currents* 2009; 59(3): 319-341.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1939-3881.2009.00082.x/abstract>.

This article discusses the role—and controversies over—the visual experience and perceptible intrusion of photographers in the Kumbh Mela festival. It highlights important issues about how we “visualize” and objectify persons and experiences that appear very different from ourselves.

Norms in Absence: Mela and Media

Opinion. Norms in Absence: Mela and Media. *Economic and Political Weekly* 2001; 36(4): 252-253.

<http://www.epw.in/gujournal/2001/04/editorials/mela-and-media-norms-absence.html>.

This short editorial written during the 2001 Kumbh Mela highlights the festival's media marketing in discussion with the unexpected “Mela Act” ban imposed on journalists for photographs of pilgrimage bathing at the sangam. It illustrates the tensions between religious display and the rise in international media coverage at a holy site.

Kumbh Mela: The Greatest Show on Earth

Film. Kermani F. Kumbh Mela: The Greatest Show on Earth. Crescent Films for BBC 2013.

<https://www.youtube.com/watch?v=s1RzYjJ6YCo>.

This hour-long documentary, produced for the BBC and broadcast on BBC Two on July 30, 2013, follows pilgrims who traveled from the United Kingdom to Allahabad to participate in the 2013 Kumbh Mela festival. It explores the philosophies, beliefs, and traditions of Hindus who gather and uses multiple interviews to highlight beliefs, cultural values, and distinctions between how different groups view the celebration.

River of Faith: A Journey to the Maha Kumbh Mela, Prayag (Allahabad), 2013

Film. Arora N. River of Faith: A Journey to the Maha Kumbh Mela, Prayag (Allahabad), 2013. Shunya.net 2013.

<https://www.youtube.com/watch?v=cQNoimABjMQ>.

This 56-minute documentary was created at the 2013 Kumbh Mela festival, by filmmaker Namit Arora, looks at the Kumbh Mela, its history and participants. It focuses on the militant-monastic orders called *akharas*, whose members, including the naked ash-smearing Naga ascetics, see themselves as part of an ancient lineage of defenders and propagators of Sanātana Dharma. Supplemental material about the film is available in a [blog post, “River of Faith,”](#) from February 18, 2013.

Kumbh Mela 2001 – Part 2 of 2

Video. Arora N. Kumbh Mela 2001—Part 2 of 2. Shunya.net 2001. <http://www.youtube.com/watch?v=oFQuxZDg1-Y&feature=relmfu>.

This 9-minute video provides images from the 2001 Kumbh Mela with a contemporary music background without narration. Scenes include the sadhus, processions, and bathing scenes. Part 1 is no longer online.

Harvard University "Mapping the Kumbh Mela" Project

*Mapping India's Kumbh Mela

Topic Portal. Mapping India's Kumbh Mela. Lakshmi Mittal South Asia Institute at Harvard University, Harvard Global Health Institute 2013. <http://southasiainstitute.harvard.edu/kumbh-mela>.

This web portal contains key resources, including videos, articles, images, and links, from the 2012-2013 cross-university collaborative, "Mapping India's Kumbh Mela." Resources highlight Harvard University's engagement with faculty, staff, and students to experience and study the Kumbh Mela as it relates to religion and culture, urban planning, business, and health.

*Mapping the Kumbh Mela: All Harvard Video

Video. Mapping the Kumbh Mela: All Harvard Video. Lakshmi Mittal South Asia Institute at Harvard University 2013. <https://youtu.be/wSDBGaUtkUU>.

This 6-minute video was produced by the Harvard University collaborative "Mapping India's Kumbh Mela" project. It features interviews with faculty directors, students, staff, and university partners on site in Allahabad in January 2013.

*Harvard Gazette Series on Mapping the Kumbh Mela 2013

News Series. Koch K. Harvard Gazette Series on Mapping the Kumbh Mela 2013.

This five-part series of articles on the Harvard Kumbh Mela project was published in the *Harvard Gazette* in early 2013; the author was a journalist who accompanied the project's faculty and students on site in January 2013. Stories in the series include:

- [Inside India's Pop-up City](#)
- [Mapping a Megacity's Metabolism](#)
- [Saving the Mother River](#)
- [Among Millions, a Blank Slate](#)
- [Tracking Disease in a Tent City](#)

*Kumbh Mela: India's Pop-Up Mega-City

Teaching Case. Khanna T et al. Kumbh Mela: India's Pop-Up Mega-City. Harvard Business School Case 214-023. Harvard Business Publishing 2013. <https://cb.hbsp.harvard.edu/cbmp/product/214023-PDF-ENG>.

This 36-page case study draws on market and system field research and discusses the 2013 Kumbh Mela from the perspective of finance and business strategy. The case is available for purchase from Harvard Business Publishing.

*Kumbh Mela: Mapping the Ephemeral Mega City

Book. Khanna T et al. Kumbh Mela: Mapping the Ephemeral Mega City. Hatje Cantz 2015. <http://www.hatjecantz.de/kumbh-mela-january-2013-6458-1.html>.

This book brings together essays, graphics, maps, photos, and drawings from the 2013 Harvard University collaborative project, "Mapping the Kumbh Mela." It highlights the project's activities in monitoring the large-scale 2013 event from its preparation in 2012 to the demolition of the site in spring 2013. It investigates and documents the prototypes for flexible urban planning, and reviews officials' advice on issues concerning environmental protection. The volume presents the comprehensive research findings useful to urban designers and planners, and includes city maps, aerial images, and photographs.

Religious Pilgrimage

Religious Pilgrimage and the Kumbh Mela

Pilgrimage and Power: The Kumbh Mela in Allahabad, 1765-1954

Book. Maclean K. Pilgrimage and Power: The Kumbh Mela in Allahabad, 1765-1954. Oxford University Press 2008.

<https://global.oup.com/academic/product/pilgrimage-and-power-9780195338942>.

This book provides an important scholarly history of the Kumbh Mela festival with a focus on the role of religion and politics in the power dynamics and tensions. The author argues that the festival in its current form began only in the 19th century. For a summary of the book and short interview with the author, see Reddy S. Child of 1857. Outlook 2007; Jan 29. <https://www.outlookindia.com/magazine/story/child-of-1857/233746>.

Glancing: Visual Interaction in Hinduism

Article. Babb LA. Glancing: Visual Interaction in Hinduism. Journal of Anthropological Research 1981; 37(4): 387-401. <http://www.journals.uchicago.edu/doi/abs/10.1086/jar.37.4.3629835>.

This article highlights the importance of visual interaction between deity and worshippers in Hindu spirituality. Underlying the belief that devotees gain benefit from visual engagement is the concept that “seeing” is an extrusive flow that brings seer and seen into actual contact and, under the right circumstances, taking on something of the inner virtue or power of the deity, including the deity’s own power of seeing. The author explores this practice and belief through reflects on three sources: two modern religious movements and a popular religious film.

Initiation Rites Video – Sanyas: Entering the Extraordinary World

Film. Rampuri B. Initiation Rites Video – Sanyas: Entering the Extraordinary World. Baba Rampuri 2012.

<http://rampuri.com/entering-the-extraordinary-world>.

This video follows two men, one Danish and one Swedish, as they are initiated into life as Hindu holy men—sannyas—during the Kumbh Mela festival in Haridwar, India, in 2010. The film is narrated by their guru, Baba Rampuri, who describes the rituals as the men take their vows and are given their guru mantras.

The Householder, the Ascetic and the Politician: Women Sadhus at the Kumbh Mela

Photo Essay. Chhacchi S. The Householder, the Ascetic and the Politician: Women Sadhus at the Kumbh Mela. India International Centre Quarterly 2003; 29(3/4): 224-234.

https://www.jstor.org/stable/23005828?seq=1#page_scan_tab_contents.

This article features a brief introduction followed by eight selected photos from an ongoing visual project on women ascetics. The author highlights the example of Shri Shri Mahant Mira Puri, one of only three female sadhus in the Juna Akhada, one of the most respected communities of sadhus who serve as spiritual leaders for pilgrims during the Kumbh Mela.

Psychological Well-Being and Pilgrimage: Religiosity, Happiness and Life Satisfaction of Ardh-Kumbh Mela Pilgrims (Kalpvasis) at Prayag, India

Article. Maheshwari S, Singh P. Psychological Well-Being and Pilgrimage: Religiosity, Happiness and Life Satisfaction of Ardh-Kumbh Mela Pilgrims (Kalpvasis) at Prayag, India. Asian Journal of Social Psychology 2009; 12(4): 285-292.

<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-839X.2009.01291.x/abstract>.

This article illustrates the viewpoint of many who attend the Kumbh Mela for religious cleansing, who believe it has measurable effects on a sense of well-ness. The authors studied religiosity, happiness, and satisfaction with life among pilgrims during the Ardh-Kumbh Mela (held in Prayag, Allahabad, India) during January and February 2007. The study focuses on a sample population of 154 kalpvasis, pilgrims who live on the festival site throughout the entire fair. Results suggested positive association between religiosity, happiness, and life satisfaction.

A Record of Buddhist Kingdoms: Being an Account by the Chinese Monk Fa-Hien of his Travels in India and Ceylon (AD 399-414) in Search of the Buddhist Books of Discipline

Book. Legge J, trans. A Record of Buddhist Kingdoms: Being an Account by the Chinese Monk Fa-Hien of his Travels in India and Ceylon (AD 399-414) in Search of the Buddhist Books of Discipline. Clarendon Press 1886.

<https://archive.org/details/recordofbuddhistoofahsuoft>.

This book, available free online, is an important early historic text describing travel through India, including pilgrimage practices observed among various groups. The accounts are described by a visiting Chinese monk who went to India to collect books.

Record of the Buddhistic Kingdoms: Translated from the Chinese

Book. Giles HA, trans. Record of the Buddhistic Kingdoms: Translated from the Chinese. London 1900.

<https://babel.hathitrust.org/cgi/pt?id=uva.x030157853;view=1up;seq=7>.

This historic text, free online, offers an alternative translation to an early description of life and cultural practices in India, including pilgrimage, as seen by a visiting Chinese monk who went to India to collect books.

Religious Pilgrimage: General

***India: A Sacred Geography**

Book. Eck DL. India: A Sacred Geography. Penguin Random House 2013.

<https://www.penguinrandomhouse.com/books/44789/india-by-diana-l-eck/9780385531924>.

This book tells the story of the pilgrim's India, considering sacred places of pilgrimage from the ground up, with their stories, connections and layers of meaning. Pages 152-158 discuss the "great festivals," including the Kumbh Mela.

***India's Tirthas: Crossings in Sacred Geography**

Article. Eck D. India's Tirthas: Crossings in Sacred Geography. History of Religions 1981; 20(4): 323-344.

https://dash.harvard.edu/bitstream/handle/1/25499831/Eck_India%27sTirthas.pdf?sequence=4.

This classic article explains the sacred crossing places known as *tirthas*, pilgrimage sites that are believed to be particularly holy in India's religious landscape. The Kumbh Mela festivals are all located at *tirthas*.

Hindu Places of Pilgrimage in India: A Study in Cultural Geography

Book. Bhardwaj SM. Hindu Places of Pilgrimage in India: A Study in Cultural Geography. University of California Press

1973. <https://www.ucpress.edu/book.php?isbn=9780520049512>.

This book is an in-depth study of Hindu pilgrimage sites, including discussion and maps of Kumbh Mela festivals.

Mystic India

Film. Mystic India. BAPS Swaminarayan Sanstha 2005. <http://www.mysticindia.com>.

This 45-minute award-winning film, produced by BAPS Swaminarayan Sanstha, a volunteer-based NGO affiliated with the United Nations, provides an educational journey to understanding the geographic and cultural diversity of India. The film is based on a true story of an 11-year-old boy ascetic, Nilkanth, who set out on a spiritual quest in 1792, and walked, barefoot and unclothed, for 7 years and 8,000 miles across India. As the film follows his journey, it highlights India's art and architecture, music and dance, faces and festivals, customs and costumes. The film, shot in more than 100 locations, is narrated by actor Sir Peter O'Toole. The film website offers an accompanying [Teacher's Guide](#).

Ascetics of Kashi: An Anthropological Exploration

Book. Sinha S, Saraswati B. Ascetics of Kashi: An Anthropological Exploration. N.K. Bose Memorial Foundation 1978.

<https://catalog.hathitrust.org/Record/000122073>.

This book offers a study of Hindu ascetics and how they are organized.

Warrior Ascetics and Indian Empires

Book. Pinch W. Warrior Ascetics and Indian Empires. Cambridge University Press 2006.

<http://www.cambridge.org/gb/academic/subjects/history/south-asian-history/warrior-ascetics-and-indian-empires>.

This book provides a classic summary of warrior asceticism in India from the 1500s to the present. The author argues that Hinduism is not a religion of non-violence, and shows how Hindu warrior ascetics were an important component of the South Asian military labor market.

Encountering the 'Other': Pilgrims, Tourists and Boatmen in the City of Varanasi

Article. Doron A. Encountering the 'Other': Pilgrims, Tourists and Boatmen in the City of Varanasi. *The Australian Journal of Anthropology* 2005; 16(2): 157-178. <http://onlinelibrary.wiley.com/doi/10.1111/j.1835-9310.2005.tb00032.x/abstract>.

This article examines the boatmen of Varanasi (Banaras), India, and their cultural role in negotiating the sacred city for pilgrims and tourists. The author focuses on their relationship with foreign tourists, and the multiple strategies and tactics they have developed to meet needs and shape negotiations to their advantage. Boatmen are quick to “tune in” to those with whom they are dealing, and their close encounters with tourists enable them to critically view Western culture as well as their own local culture.

Religious Fairs and Festivals in India

Article. Banks AL. Religious Fairs and Festivals in India. *The Lancet* 1961; 277(7169): 162-163. DOI:

[http://dx.doi.org/10.1016/S0140-6736\(61\)91330-7](http://dx.doi.org/10.1016/S0140-6736(61)91330-7).

This historical article by a British physician reflects on his four days at the 1960 Kumbh Mela in Allahabad.

Wandering with Sadhus: Ascetics in the Hindu Himalayas

Book. Hausner SL. Wandering with Sadhus: Ascetics in the Hindu Himalayas. Indiana University Press 2007.

http://www.iupress.indiana.edu/product_info.php?products_id=185343.

This book provides an ethnographic portrait of Hindu sadhus—holy men who renounce the world—in northern India and Nepal. The author focuses on the paradox between their ostensibly solitary spiritual practice and their regular interactions with communities and households in ordinary society. As a mobile alternative community, sadhus meet together regularly through pilgrimage festival circuits. The book identifies shared views of space, time, and the body that create the ground for everyday experiences.

A Mahomedan Doctor on the Mecca Pilgrimage

Book Review. Soubhy S. A Mahomedan Doctor on the Mecca Pilgrimage. *The Lancet* 1895; 146(3749): 49-50.

[https://doi.org/10.1016/S0140-6736\(00\)80398-0](https://doi.org/10.1016/S0140-6736(00)80398-0).

This short piece reviews a book, published in French in 1895, by Dr. Saleh Soubhy, a Paris-trained Muslim physician describing his personal journey to the Hajj. The review, written in English, offers a historical summary of the health conditions and risks that pilgrims experienced on their journey to Mecca in the nineteenth century.

History of Dharmasastra: Ancient and Medieval Religious and Civil Law in India

Book. Kane PV. History of Dharmasastra: Ancient and Medieval Religious and Civil Law in India. Bhandarkar Oriental Research Institute 1930-1962.

This classic series provides one of the most comprehensive treatments in print of the religious and civil law in Sanskrit treatises from ancient and medieval India. Originally published in multiple parts between 1930 and 1962, the following volumes are available for free online:

- [Volume 1 \(1930\)](#)
- [Volume 2, Part 1 \(1941\)](#)
- [Volume 2, Part 2 \(1941\)](#)
- [Volume 3, 2nd Edition \(1973\)](#)
- [Volume 4 \(1953\)](#)
- [Volume 5, Part 1 \(1958\)](#)
- [Volume 5, Part 2 \(1962\)](#)

Health Risks and Responses

Cholera

Cholera, the Flickering Flame

Article. Bryceson ADM. Cholera, the Flickering Flame. *Proceedings of the Royal Society of Medicine* 1977; 70(5): 363-365. <https://www.ncbi.nlm.nih.gov/labs/articles/327482>.

This historical overview summarizes occasions of cholera outbreaks that have been associated with religious festivals in India since 1867.

The Natural History of Hardwar Fair Cholera Outbreaks

Article. Herbert H. The Natural History of Hardwar Fair Cholera Outbreaks. *The Lancet* 1895; 146(3752): 201-202. DOI: [http://dx.doi.org/10.1016/S0140-6736\(02\)05306-0](http://dx.doi.org/10.1016/S0140-6736(02)05306-0).

This historical article considers the incidence of cholera at Kumbh festivals with a focus on the factors that may have contributed to the “big cholera year” of 1892.

An Address on Tropical Medicine, 1894 Delivered at the Eighth International Congress of Hygiene and Demography, Budapest, 1894

Article. Duka T. An Address on Tropical Medicine Delivered at the Eighth International Congress of Hygiene and Demography, Budapest, 1894. *The Lancet* 1894; Sep 8. Pages 561-564.

<https://wellcomelibrary.org/item/b24915750#?c=0&m=0&s=0&cv=4&z=-0.7833%2C0.1964%2C2.5343%2C1.2823>.

This article provides an example of historical “colonialist” views of infection and disease in India, with some reference to the Kumbh Mela.

Sanitary Reform in India

Report. Sanitary Reform in India. *The Lancet* 1908; 171(4408): 582-584. DOI: [http://dx.doi.org/10.1016/S0140-6736\(01\)61742-2](http://dx.doi.org/10.1016/S0140-6736(01)61742-2).

This historical article summarizes birth, death, and disease statistics with a discussion of a cholera epidemic associated with the 1906 Kumbh Mela at Allahabad, India.

Continuing Challenge of Infectious Diseases in India

Article. John TJ et al. Continuing Challenge of Infectious Diseases in India. *The Lancet* 2011; 377(9761): 252-269. DOI: [http://dx.doi.org/10.1016/S0140-6736\(10\)61265-2](http://dx.doi.org/10.1016/S0140-6736(10)61265-2).

This article reviews the Indian health system's progress on controlling infectious diseases, including cholera, and recommends revising national health policy to covers a broader agenda and strengthened public health infrastructure, with a focus on quality and equity. This article is part of the *Lancet* Series, “[India: Towards Universal Health Coverage](#).”

Ending Cholera—A Global Roadmap to 2030

Report. Ending Cholera—A Global Roadmap to 2030. World Health Organization 2017.

<http://www.who.int/cholera/publications/global-roadmap/en>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/11799>

This report from the World Health Organization offers an operational roadmap for the new global strategy for cholera control at the country level. It focuses on early detection and quick response to contain outbreaks; a targeted multi-sectoral approach to prevent cholera recurrence; and an effective mechanism to coordinate technical support, advocacy, resource mobilization, and partnerships. This report includes a snapshot of the current state of cholera in endemic countries, introduces the global cholera control strategy along with a monitoring framework, describes the financing considerations related to implementing the strategy, including the required water, sanitation, and hygiene (WASH) interventions; and includes data tables on the disease burden of cholera by country and “hotspot.”

Global Task Force on Cholera Control

Topic Portal. Global Task Force on Cholera Control. World Health Organization.

http://www.who.int/cholera/task_force/en.

This web portal lists the visions, objectives, meeting reports, and related technical guidance documents of the World Health Organization's Global Task Force on Cholera Control (GTFCC). The Task Force published its global roadmap with a new global strategy for cholera control in 2017.

Haiti in the Time of Cholera

Teaching Case. Gordon R, Moon S. Haiti in the Time of Cholera. Global Health Education and Learning Incubator at Harvard University, Connors Center for Women's Health at Brigham and Women's Hospital, FXB Center for Health and Human Rights, Harvard University 2014. <http://repository.gheli.harvard.edu/repository/10687>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/10687>

This case examines the United Nations' reactions to the cholera epidemic in Haiti in January 2010. The public health community anticipated Haiti to be at risk for many health threats, but did not consider cholera a likely event until, in October, the first case of cholera in more than 100 years was reported, triggering an epidemic. The case discusses the scientific evidence that later linked the source to poor sanitation management practices at a United Nations peacekeepers camp run by Nepal, and the United Nations' refusal to acknowledge responsibility for the outbreak. The case invites readers to consider the role of global governance and accountability in cholera incidence, particularly in resource-poor environments and nations.

Water and Sanitation

*Public Health Aspects of the World's Largest Mass Gathering

Article. Balsari S et al. Public Health Aspects of the World's Largest Mass Gathering: The 2013 Kumbh Mela in Allahabad, India. *Journal of Public Health Policy* 2016; 37(4): 411-427. DOI: <https://doi.org/10.1057/s41271-016-0034-z>.

This article reviews the serious and uncommon public health challenges at the 2013 Kumbh Mela and the need to initiate crowd safety measures where population density and mobility directly contact flowing bodies of water; provide water, sanitation, and hygiene to a population that frequently defecates in the open; and establish disease surveillance and resource use measures within a temporary health delivery system. The authors review the world's largest gathering by observing first-hand the public health challenges, describing the preparations for and responses to them, and recommending ways to improve preparedness.

*Water, Sanitation, and Hygiene at the World's Largest Mass Gathering

Article. Vortmann M et al. Water, Sanitation, and Hygiene at the World's Largest Mass Gathering. *Current Infectious Disease Reports* 2015; 17: 5. DOI: <https://doi.org/10.1007/s11908-015-0461-1>.

This article describes an evaluation and systematic monitoring initiative, implemented at the 2013 Kumbh Mela, to study preparedness and response to public health emergencies at the event. It describes the water, sanitation, and hygiene components, with particular emphasis on preventive and mitigation strategies; the capacity for surveillance and response to diarrheal disease outbreaks; and the implications of lessons learned for other mass gatherings.

*Public Health at the Kumbh Mela

Blog Portal. Public Health at the Kumbh Mela. The FXB Center for Health and Human Rights at Harvard University 2013. <https://fxbkumbh.wordpress.com>.

This blog contains on-the-spot entries reporting on public health at the 2013 Kumbh Mela in Allahabad, India, by a team of doctors, researchers, and medical students affiliated with the Harvard University collaborative project, "Mapping India's Kumbh Mela." The Kumbh Mela Public Health team conducted the first qualitative and quantitative study of the public health parameters of the Kumbh Mela, and documented disease reports at the festival by mapping the complaints, diagnoses, medications, and geographical origins of patients flocking to the organized sector clinics and the central hospital of the Kumbh. Using iPads, volunteers collected information from clinic registries and uploaded it to a central database. While the authors include observations about crowd management and safety, the majority of posts focus on water- and sanitation-related risks and responses.

***Toilets and Sanitation at the Kumbh Mela**

Teaching Case. Holman SR, Shayegan L. Toilets and Sanitation at the Kumbh Mela. Harvard Global Health Institute, Global Health Education and Learning Incubator at Harvard University 2014.

<http://repository.gheli.harvard.edu/repository/10697>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/10697>

This case describes efforts to balance public health concerns with religious and cultural practices of religion pilgrims in India. It examines the toilet and water sanitation practices of pilgrims attending the 2013 Kumbh Mela, a Hindu festival in Allahabad, India. The case describes government officials' efforts to ensure and maintain adequate and appropriate sanitation facilities and the long-term impact of the observed practices on the physical environment. The case introduces students to the conditions and challenges of water and sanitation as it relates to cultural issues (social determinants of health) in global communities with limited resource for optimal health governance. It is accompanied by a Teaching Note and one-page Companion Note summary.

The Mighty Ganga Basin

Infographic. The Mighty Ganga Basin. The World Bank Group 2015.

<http://www.worldbank.org/en/news/infographic/2015/12/30/mighty-ganga-basin>.

This infographic includes three images that illustrate: 1) the geographic location and population of the Ganges River Basin in India and those who live in and near it; 2) the sources, extent, and effects of pollution into the Ganges River; and 3) goals and potential responses to improve water quality, protect biodiversity, enhance ecosystem services, reduce water treatment costs, and enhance economic life for those living in the Ganges River Basin.

Impact of Mass Bathing on Water Quality of Ganga River during Maha Kumbh-2010

Article. Sharma V et al. Impact of Mass Bathing on Water Quality of Ganga River during Maha Kumbh-2010. Nature and Science 2012; 10(6): 1-5. http://www.sciencepub.net/nature/ns1006/001_8615ns1006_1_5.pdf.

This article reports on a study to assess the impact of mass bathing on water quality of the Ganges during the 2010 Kumbh Mela. Water samples were collected from three selected bathing locations and analyzed for a number of physico-chemical parameters, including temperature, pH, transparency, turbidity, total dissolved or suspended solid, and more. There was a direct relationship between high parameter values and water disturbance from the bathing pilgrims.

Environmental Study during Kumbh 2001 at Prayag (Allahabad)

Report. Environmental Study during Kumbh 2001 at Prayag (Allahabad). India Central Pollution Control Board 2003.

<http://humane-endpoints.org/pdf/environmental-study-during-kumbh-2001-at-prayag-allahabad->

This report summarizes results of the India Central Pollution Control Board testing of water quality during mass bathing at various places along the Ganges River during the 2001 Kumbh Mela. The goal of the study was to aid environmental management plans for future festivals.

Solid Waste Management at Mansa Devi and Chandi Devi Temples in the Shiwalik Foothills During Kumbh Mela at Hardiwar (Uttarakhand)

Article. Kaushik S, Joshi BD. Solid Waste Management at Mansa Devi and Chandi Devi Temples in the Shiwalik Foothills During Kumbh Mela at Hardiwar (Uttarakhand). Report & Opinion 2012; 4(8): 39-42.

http://www.sciencepub.net/report/reporto408/009_10059reporto408_39_42.pdf.

This article reports data measuring solid waste generated over seven days at two temple sites during the Kumbh festival at Haridwar in 2010. Total amount of solid waste generated for seven days of collection was 7615.0 Kg and 4992.7 Kg at Mansa Devi and Chandi Devi temples, respectively. Waste is categorized into biodegradable, non-biodegradable, and miscellaneous.

Cultural Distance between People's Worldview and Scientific Knowledge in the Area of Public Health

Article. Raza G, Singh S. Cultural Distance between People's Worldview and Scientific Knowledge in the Area of Public Health. Journal of Science Communication 2004; 3(4): 1-5. <https://jcom.sissa.it/archive/03/04/A030401>.

This article reports on research results from interviews with 3,484 individuals at the 1989 Kumbh Mela festival in Allahabad, India, which attempted to apply a “cultural distance” model to measure public understanding of science in the area of health and hygiene.

Resource Collection: Water, Hygiene, Sanitation

Resource Collection. Resource Collection: Water, Hygiene, Sanitation. Global Health Education and Learning Incubator at Harvard University 2017. <http://repository.gheli.harvard.edu/repository/collection/17>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/collection/17>

This resource collection on water, sanitation, and hygiene (WASH) was curated by the Global Health Education and Learning Incubator to facilitate learning about global, regional and national progress. Resources include new global indicators for monitoring Sustainable Development Goal 6 – to ensure availability and sustainable management of water and sanitation for all.

Stampedes and Crowd Management

***Stampede at the Kumbh Mela: Preventable Accident?**

Teaching Case. Holman S, Balsari S. Stampede at the Kumbh Mela: Preventable Accident? Global Health Education and Learning Incubator at Harvard University 2017. <http://repository.gheli.harvard.edu/repository/12027>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/12027>

This teaching case describes the stampede at the Allahabad train station on February 10, 2013, during the Kumbh Mela festival; 36 people died, including 27 women, most of them poor or elderly. The case outlines the general context and specific risk factors, and includes an Instructor's Note and Discussion Questions. It is suitable for classes in the study of religion, humanitarian aid, public health, and emergency medicine, with a focus on unintentional injuries and disaster management.

***The Kumbh Mela Stampede: Disaster Preparedness Must Bridge Jurisdictions**

Opinion. Greenough PG. The Kumbh Mela Stampede: Disaster Preparedness Must Bridge Jurisdictions. *BMJ* 2013; 346: f3254. DOI: <https://doi.org/10.1136/bmj.f3254>.

This opinion brief argues that the 2013 Kumbh Mela stampede, where 36 people died, demonstrated system failure despite extraordinary planning by the Indian state. An honest interagency gap analysis will provide critical lessons that may help make the next Kumbh Mela safer than it already is. The author is an emergency medicine physician who co-led the public health research for the Harvard “Mapping the Kumbh Mela” project.

Human Stampedes during Religious Festivals: A Comparative Review of Mass Gathering Emergencies in India

Article. Illiyas FT et al. Human Stampedes during Religious Festivals: A Comparative Review of Mass Gathering Emergencies in India. *International Journal of Disaster Risk Reduction* 2013; 5: 10-18.

<https://doi.org/10.1016/j.ijdrr.2013.09.003>.

This article summarizes stampede data in India during the past 50 years during religious, entertainment, and political events, what triggers the crowd disturbances that lead to the stampedes, and outlines a framework for risk reduction dependent on inter-agency cooperation and multidisciplinary efforts.

Ram Janki Temple: Understanding Human Stampedes

Article. Burkle FM, Hsu EB. Ram Janki Temple: Understanding Human Stampedes. *The Lancet* 2011; 377(9760): 106-107.

DOI: [http://dx.doi.org/10.1016/S0140-6736\(10\)60442-4](http://dx.doi.org/10.1016/S0140-6736(10)60442-4).

In this “Comment” on the stampede at the Ram Janki Temple in 2010 in Uttar Pradesh, the authors review the health risks caused by stampede events and recommend formal efforts in developing systematic information, data gathering, and analysis to prevent or ameliorate such disasters.

The Dynamics of Crowd Disasters: An Empirical Study

Article. Helbing D et al. The Dynamics of Crowd Disasters: An Empirical Study. *Physical Review E* 2007; 75(4).

<https://doi.org/10.1103/PhysRevE.75.046109>.

This article reports on an analysis of video recordings of the crowd disaster in Mina/Makkah during the Hajj, on January 12, 2006. The results reveal two “flow” transitions that contributed to the pressure which caused sudden displacements

and the falling and trampling of people. These findings are significant for understanding critical crowd conditions and the organization of safer mass gathering events, and allow one to understand where and when crowd accidents tend to occur.

Chronic Diseases and Injuries in India

Article. Patel V et al. Chronic Diseases and Injuries in India. *The Lancet* 2011; 377(9763) 413-428. DOI:

[http://dx.doi.org/10.1016/S0140-6736\(10\)61188-9](http://dx.doi.org/10.1016/S0140-6736(10)61188-9).

The authors identify the top causes of chronic disease in India as cardiovascular and metabolic disorders, sensory loss disorders, cancers, mental health disorders, and injuries, which could be addressed most efficiently through primary prevention strategies such as taxation on tobacco products, improved road systems, and integration between existing vertical programs. This article is part of the *Lancet* Series, "[India: Towards Universal Health Coverage](#)."

Mass Gatherings and Health: General Resources

Mass Gatherings Medicine

Series. Mass Gatherings Medicine. *The Lancet* 2014; May 21. <http://www.thelancet.com/series/mass-gatherings-medicine>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/11118>

This three-part series follows up on the 2012 *Lancet* series on Mass Gatherings Health with a focus on public health challenges and recommendations for large sports and religious gatherings. It highlights the London 2012 Olympic and Paralympic Games; the 2012 European Football Championship finals (Euro 2012), and the Hajj pilgrimages of 2012 and 2013. Series papers include:

- [Hajj: Infectious Disease Surveillance and Control](#)
- [London 2012 Olympic and Paralympic Games: Public Health Surveillance and Epidemiology](#)
- [Euro 2012 European Football Championship Finals: Planning for a Health Legacy](#)

Mass Gatherings Health

Series. Mass Gatherings Health. *The Lancet Infectious Diseases* 2012; Jan 16. <http://www.thelancet.com/series/mass-gatherings>.

This six-part series described the scope of health-based approaches to mass-gatherings. Mass gatherings are events such as religious occasions, music festivals, or sports events that attract enough people to exceed the capacity of routine health and public safety measures. The series includes papers on: lessons from the Hajj; global perspectives for preventing infectious diseases; non-communicable health risks; crowd and environmental management; cross-national and cross-disciplinary infectious disease surveillance; and the need for new research and action. Series papers include:

- [Emergence of Medicine for Mass Gatherings: Lessons from the Hajj](#)
- [Global Perspectives for Prevention of Infectious Diseases Associated with Mass Gatherings](#)
- [Non-Communicable Health Risks during Mass Gatherings](#)
- [Crowd and Environmental Management during Mass Gatherings](#)
- [Infectious Disease Surveillance and Modelling Across Geographic Frontiers and Scientific Specialties](#)
- [Research Agenda for Mass Gatherings: A Call to Action](#)

Public Health for Mass Gatherings: Key Considerations

Report. Public Health for Mass Gatherings: Key Considerations. World Health Organization 2015.

http://www.who.int/ihr/publications/WHO_HSE_GCR_2015.5/en.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/10996>

This report from the World Health Organization (WHO) builds on the expertise about health impacts of mass gatherings since 2008, when the WHO published the report, *Communicable Disease Alert and Response for Mass Gatherings: Key Considerations*. The 2015 version has been expanded to cover more than communicable diseases and includes new areas such as legacy, environmental health, and different contexts such as unplanned mass gatherings. The document aims to serve as a resource to support all those who are responsible for the health needs of individuals attending a mass gathering, and to help them plan their actions.

***A Retrospective Analysis of Hypertension Screening at a Mass Gathering in India**

Article. Balsari S et al. A Retrospective Analysis of Hypertension Screening at a Mass Gathering in India: Implications for Non-Communicable Disease Control Strategies. *Journal of Human Hypertension* 2017; 31: 750-753.

<https://www.nature.com/articles/jhh201754>.

This article outlines the potential for reducing non-communicable disease (NCD) mortality in India through opportunistic hypertension awareness screening at a mass gathering, the 2015 Kumbh Mela in Nashik and Trimbakeshwar. More than one-third of those who agreed to a blood pressure measurement screened positive for hypertension, a measure of cardiovascular disease, the leading cause of NCD mortality in India.

Preparing for Infectious Disease Threats at Mass Gatherings: The Case of the Vancouver 2010 Olympic Winter Games

Article. Khan K et al. Preparing for Infectious Disease Threats at Mass Gatherings: The Case of the Vancouver 2010 Olympic Winter Games. *Canadian Medical Association Journal* 2010; 182(6): 579-583.

<http://www.cmaj.ca/content/182/6/579.long>.

This article applies an infection control preparedness model to the Vancouver 2010 Olympic and Paralympic Winter Games. It includes estimates on air traffic patterns, global surveillance for infectious diseases, integrated risk assessment, policy considerations, and planning for next steps. The authors highlight the importance of web-based global communication efforts in disease prevention.

Global Public Health Implications of a Mass Gathering in Mecca, Saudi Arabia during the Midst of an Influenza Pandemic

Article. Khan K et al. Global Public Health Implications of a Mass Gathering in Mecca, Saudi Arabia during the Midst of an Influenza Pandemic. *Journal of Travel Medicine* 2010; 17(2): 75-81. <http://www.ncbi.nlm.nih.gov/pubmed/20412172>.

This article reports on a study of worldwide migration patterns of pilgrims to the 2008 Hajj, using estimates based on airline tickets and countries of origin to assess potential risk of H1N1 and needs for vaccination.

Rapid Spread of Zika Virus in the Americas—Implications for Public Health Preparedness for Mass Gatherings at the 2016 Brazil Olympic Games

Article. Peterson E et al. Rapid Spread of Zika Virus in the Americas—Implications for Public Health Preparedness for Mass Gatherings at the 2016 Brazil Olympic Games. *International Journal of Infectious Diseases* 2016; 44: 11-15.

<https://doi.org/10.1016/j.ijid.2016.02.001>.

This article summarizes the global spread of the Zika virus since 1947, its known and potential health risks, and implications for enhanced preparedness and surveillance before, during, and after mass gatherings, particularly the 2016 Olympic games in Brazil, to prevent epidemic infectious disease.

Should Cities Hosting Mass Gatherings Invest in Public Health Surveillance and Planning? Reflections from a Decade of Mass Gatherings in Sydney, Australia

Article. Thackway S et al. Should Cities Hosting Mass Gatherings Invest in Public Health Surveillance and Planning? Reflections from a Decade of Mass Gatherings in Sydney, Australia. *BMC Public Health* 2009; 9: 324. DOI:

<https://doi.org/10.1186/1471-2458-9-324>.

This article argues that mass gathering events can help catalyze innovation and new opportunities for ongoing planning, training, and surveillance of public health concerns with positive effects that help the community beyond the events themselves.

Pandemic H1N1 and the 2009 Hajj

Article. Ebrahim SH et al. Pandemic H1N1 and the 2009 Hajj. *Policy Forum. Scienceexpress* 2009; 326(5955): 938-940. <http://science.sciencemag.org/content/early/2009/10/29/science.1183210>.

This article reports on the avian flu (influenza A, or H1N1 virus) pandemic affecting the 2009 Hajj pilgrimage. The Hajj is an annual Islamic pilgrimage to Mecca that draws more than 2.5 million Muslim pilgrims from more than 160 countries to the Kingdom of Saudi Arabia; it is considered a mandatory religious duty for Muslims to make this journey at least once in their lifetimes. The authors outline the realities associated with meeting World Health Organization recommendations to mitigate effects of the pandemic influenza A virus during the 2009 gathering.

Interim Planning Considerations for Mass Gatherings in the Context of Pandemic (H1N1) 2009 Influenza

Report. Interim Planning Considerations for Mass Gatherings in the Context of Pandemic (H1N1) 2009 Influenza. World Health Organization 2009. http://www.who.int/csr/resources/publications/swineflu/cp002_2009-0511_planning_considerations_for_mass_gatherings.pdf.

This guide outlines key planning considerations for organizers of mass gatherings in the context of pandemic (H1N1) 2009 influenza. It was designed for use in conjunction with the World Health Organization's communicable disease alert and response for mass gatherings.

Communicable Disease Alert and Response for Mass Gatherings: Key Considerations

Report. Communicable Disease Alert and Response for Mass Gatherings: Key Considerations. World Health Organization 2008. http://www.who.int/csr/mass_gathering/en/index.html.

This document highlights key issues in setting up and implementing communicable disease alert, response, and operation plans for mass gatherings. It sets out methods for assessing needs, determining a system's ability to meet those needs, and modifying and strengthening systems where necessary. The document was developed for communicable disease directors and other public health professionals who manage communicable disease alert and response, as well as key policy makers, planners, and executive personnel.

Environment, Pollution, and India's Sacred Rivers

National Mission for Clean Ganga

Topic Portal. National Mission for Clean Ganga. <http://nmcg.nic.in/index.aspx>.

This web portal highlights a national initiative in India to promote public participation among stakeholders to collectively help clean the Ganges River. It identifies and supports efforts being done at state, national, and international levels, and serves as a platform for opinions and shared knowledge.

Ganga Action Parivar

Organization. Ganga Action Parivar. <http://www.gangaaction.org>.

This volunteer organization, founded by Swami Chidanand Saraswati, is dedicated to protecting and preserving the Ganges River and its tributaries in a clean and free-flowing state, and to find workable solutions to the problems of pollution and obstruction. A special section is devoted to the organization's "[Eco-Friendly Green Initiative Kumbh Mela](#)," which sought to beautify the grounds and waters of the Kumbh region, educate festival-goers about the importance of protecting the river and surrounding environment, and introduce technologies during the festival such as ecofriendly toilets and efficient water filtration systems.

Sankat Mochan Foundation

Organization. Sankat Mochan Foundation. <http://sankatmochan.tripod.com>.

This non-profit, non-political, secular, non-governmental organization, founded in 1982, is dedicated to alleviating the environmental degradation of the Ganges River.

Ganges and Yamuna Rivers Granted Same Legal Rights as Human Beings

News. Safi M et al. Ganges and Yamuna Rivers Granted Same Legal Rights as Human Beings. The Guardian 2017; Mar 21. <https://www.theguardian.com/world/2017/mar/21/ganges-and-yamuna-rivers-granted-same-legal-rights-as-human-beings>.

This news article reports on a ruling that grants the Ganges and Yamuna Rivers the legal status of living human entities. The ruling, which follows a legal precedent for a Maori sacred river in New Zealand, may help support environmental protection efforts in India by making damages such as water pollution legally equal to harming a person.

What it Takes to Clean the Ganges

Opinion. Black G. What it Takes to Clean the Ganges. The New Yorker 2016; Jul 25.

<https://www.newyorker.com/magazine/2016/07/25/what-it-takes-to-clean-the-ganges>.

This article summarizes longterm concerns about the pollution of the Ganges River, and the role of controversial Prime Minister Narendra Modi and the Hindu-nationalist government in religious and caste politics as they influence ongoing

restoration initiatives. The article is based on the author's forthcoming book: *On the Ganges: Encounters with Saints and Sinners on India's Mythic River*.

India Stems Tide of Pollution into Ganges River

News. Morrison D. India Stems Tide of Pollution into Ganges River. National Geographic Daily News 2011; Nov 23. <http://news.nationalgeographic.com/news/2011/11/111123-india-ganges-river-pollution>.

This news story on pollution of the Ganges River is part of a National Geographic News series on global water issues.

Ganga: A Journey Down the Ganges River

Book, Podcast. Hollick JC. Ganga: A Journey down the Ganges River. Island Press 2008.

<http://www.npr.org/books/titles/138267563/ganga-a-journey-down-the-ganges-river>.

This book documents a journalist's journey through northern India along the Ganges River from its source high in the Himalayas to the point where the river meets the sea. It details encounters with priests and pilgrims, dacoits and dolphins, fishermen who subsist on the river, and villagers whose lives have been destroyed by the river. The author, also an independent radio producer, generated a six-part podcast for National Public Radio based on the book (available at the above link).

River of Love in an Age of Pollution: The Yamuna River of Northern India

Book. Haberman DL. River of Love in an Age of Pollution: The Yamuna River of Northern India. University of California Press 2006. <https://www.ucpress.edu/book.php?isbn=9780520247901>.

This book traces the Yamuna River, significant for its "sacred" merging with the Ganges at Allahabad, across India's heartland. The author focuses on the region of Braj, where the river is especially revered and an object of ongoing environmental protection efforts. The book combines aspects of religious beliefs and practices, religious environmentalism, poetic contemplation, scientific measurement, and environmental activism. Chapter 1, "[A River of Delights, a River of Troubles](#)," is available as a sample download.

The Ganges' Next Life

News. Stille A. The Ganges' Next Life. The New Yorker 1998; Jan 19. <http://archives.newyorker.com/?i=1998-01-19#folio=058>.

This essay explores the problem of pollution with sewage, human remains, and industrial waste in the Ganges River. In some places at Varanasi, for example, the fecal-coliform count has been known to reach 340,000 times acceptable levels. More than 100 cities dump their raw sewage directly into the river and waterborne illnesses such as amebic dysentery, typhoid, and cholera contribute to child mortality rates. Wastewater plants along the Ganges are ill-suited to India due to common power outages and monsoons. The author describes clean-up attempts by religious leaders, civil engineers, and private organizations with a focus on the Sankat Mochan Foundation, and outlines remaining governmental obstacles.

Environmental Economics: Implications of Cultural and Religious Practices on Ganga River

Presentation. Khandelwal A, Garg C. Environmental Economics: Implications of Cultural and Religious Practices on Ganga River. <https://www.scribd.com/presentation/75143799/Implication-of-Cultural-and-Religious-Practices-on-Ganga>.

This undated PowerPoint presentation, by two students in electronics and communication engineering at IIT Roorkee, summarizes the cultural and religious practices and beliefs about the Ganges River common among those in India who attend the Kumbh Mela festival.

Health Surveillance Technology

***EMcounter**

Data Portal. EMcounter. <http://www.emcounter.com>.

This portal highlights a data tool originally developed in 2008 and refined and used in a variety of low-resource settings to remotely monitor disease outbreaks, measure healthcare-related protocol compliance, and track inventory. Used by public health teams at two Kumbh Mela festivals, the tool enabled successful documentation of thousands of patient encounters at festival clinics. Its ability to access real-time epidemiological data makes it useful for sanitation teams investigating water-borne disease outbreaks. The portal includes a 5-minute video illustrating its use by the Harvard

South Asia Institute at the Nashik Kumbh Mela in 2015, a 1-minute data demo video, and links to media features from the New York Times, PBS, and others.

***Using Mobile Technology to Optimize Disease Surveillance and Healthcare Delivery at Mass Gatherings: A Case Study from India's Kumbh Mela**

Article. Kazi DS et al. Using Mobile Technology to Optimize Disease Surveillance and Healthcare Delivery at Mass Gatherings: A Case Study from India's Kumbh Mela. *Journal of Public Health* 2017; 39(3): 616-624. DOI: <https://doi.org/10.1093/pubmed/fdw091>.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/11824>

This article describes how public health experts developed an inexpensive, tablet-based disease surveillance system with real-time analysis and piloted it at five field hospitals during the 2013 Kumbh Mela in Allahabad, India. The system reported on 43,131 patient visits over three weeks and documented common complaints that included musculoskeletal pain, fever, cough, coryza, and diarrhea, as well as prescribed treatments. The authors highlight the model's importance for effective epidemic surveillance at mass gatherings that take place in resource-scarce settings.

***Social and Spatial Clustering of People at Humanity's Largest Gathering**

Article. Barnett I et al. Social and Spatial Clustering of People at Humanity's Largest Gathering. *PLoS ONE* 2016; <https://doi.org/10.1371/journal.pone.0156794>.

This article reports on a study to examine population trends using digital cell phone data to understand crowd behavior and social and spatial homophily—"the notion that individuals tend to interact with others who resemble them"—of those who made calls during the 2013 Kumbh Mela festival in Allahabad, India. The data also helped estimate daily and cumulative attendance and trends in calls to particular regions across India.

***Investigating Population Dynamics of the Kumbh Mela through the Lens of Cell Phone Data**

Article. Onella JP, Khanna T. Investigating Population Dynamics of the Kumbh Mela through the Lens of Cell Phone Data. *arXiv.org* 2015. <https://arxiv.org/ftp/arxiv/papers/1505/1505.06360.pdf>.

This paper is the preliminary report of the authors' findings from cell phone data of 390 million records of participants attending the 2013 Kumbh Mela festival. The data helps to illustrate daily fluctuations in location on the site, number of calls, and length of stay, and provides an example of using technology to better understand human behavior.

Technologies for Global Health

Report. Howitt P et al. Technologies for Global Health. *The Lancet* 2012; 380: 507-535. DOI: [http://dx.doi.org/10.1016/S0140-6736\(12\)61127-1](http://dx.doi.org/10.1016/S0140-6736(12)61127-1).

This report summarizes findings from a collaboration between *The Lancet* and Imperial College London, UK in a new Commission to examine how medical technology should best be used to improve health in low- and middle-income countries. The report concludes that in many cases, medical technology—almost exclusively developed in rich countries—is simply inappropriate for use in poorer nations.

Use of Telemedicine in Evading Cholera Outbreak in Mahakumbh Mela, Prayag, UP, India: An Encouraging Experience

Article. Ayyagari A et al. Use of Telemedicine in Evading Cholera Outbreak in Mahakumbh Mela, Prayag, UP, India: An Encouraging Experience. *Telemedicine Journal and e-health* 2003; 9(1): 89-94. <https://doi.org/10.1089/153056203763317693>.

This article reports on an early pilot project to assess the efficacy of a pilot telemedicine center based at the main hospital of the 2001 Kumbh Mela in Allahabad, on health management. When daily reporting of in-patient and outpatient cases revealed a surge of diarrhea cases among pilgrims, *Vibrio cholerae* was isolated in 22.6 percent (7/31) of the samples. The system facilitated an immediate online alert to the hospital and health authorities, who took prompt measures to improve hygiene, diverting an epidemic disaster.

Designing the Mobile City

Mahakumbh: The Greatest Show on Earth

Report. Mishra JS. Mahakumbh: The Greatest Show on Earth. Har-Anand Publications 2007.

http://books.google.com/books?id=1pCXqynwwQcC&pg=PP13&lpg=PP13&dq=Mishra+Mahakumbh+%22Greatest+Show+on+Earth%22&source=bl&ots=BcuEWH7Z_n&sig=atT-wEa9l_yVuhwMMQ2_4HPUKVk&hl=en&sa=X&ei=kLySUIamMcG1oQGf-oC4Cw&sqi=2&ved=0CCoQ6AFwAw.

This 120-page guide is a valuable handbook on the management process and challenges involved in successful administration of the Kumbh Mela to meet attendees' and pilgrims' basic needs as well as spiritual aspirations. The author is a civil engineer who was the nodal officer for the successful conduct of Mahakumbh 2001.

North Eastern Railway Monitoring Committees for Kumbh Mela 2013

Data Visualization. North Eastern Railway Monitoring Committees for Kumbh Mela 2013. Indian Railways 2013.

<http://www.ner.indianrailways.gov.in/uploads/files/1349434602519-Kumbh%20Mela%20Monitoring%20Committees%20with%20Contact%20No%2005.10.12.pdf>.

This document illustrates organizational aspects of the Kumbh Mela from the perspective of the Indian Railways, with coded numbers and abbreviations in charts listing committees related to sanitation and cleanliness, watering, passenger amenities, security and crowd management, and catering.

Perfect Mix of Planning, Teamwork, and Commitment

Article. Dar P. Perfect Mix of Planning, Teamwork, and Commitment. Manage India 2011; 3(1): 7-9.

<http://pmi.org.in/manageindia/volume3/issue01/manage.india.pdf>.

This article discusses the factors involved in organization, planning, and management of the 2010 Kumbh Mela in Haridwar.

The Spatial Development of India

Report. Desmet K et al. The Spatial Development of India. Policy Research Working Paper 6060. South Asia Region Poverty Reduction and Economic Management Unit; The World Bank Group 2012. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2012/05/07/000158349_20120507132211/Rendered/PDF/WPS6060.pdf.

This report considers the spatial consequences for India of its rapid economic growth, a growth that has also resulted in widening disparities. While cities such as Hyderabad have emerged as major clusters of high development, many rural areas have been left behind with few development benefits. The report asks questions for policy makers to help government planning of space and urban infrastructure.

***Five Stages of Squatting**

Blog Entry. Mehrotra R. Five Stages of Squatting. Encountering Urbanism 2009; Sep 13.

<http://encounteringurbanism.blogspot.com/2009/09/five-stages-of-squatting.html>.

This blog essay by architect, urbanist, and design school professor Rahul Mehrotra, sketches out how populations who arrive in a city and seek low-cost housing come to fill space, and what these transitions mean for establishing market space in the informal economy. The author co-directed the Harvard "Mapping the Kumbh Mela" project.

***Kinetic City: Research Seminar on Temporal Urbanism**

Course Syllabus. Mehrotra R. Kinetic City: Research Seminar on Temporal Urbanism. Harvard University Graduate School of Design 2013. <http://www.urbandesignresources.org/wp-content/uploads/2013/12/GSD-09129-Kinetic-City-.pdf>.

This syllabus outlines a research seminar class that explores the issue of temporal urbanism. The course aimed to expose students to existing literature and construct new ways and methods to map, understand, and theorize how "temporality" could inform current debates on urbanism more broadly. The course was designed to inform and analyze research on the 2013 Kumbh Mela, as its temporal architectural and design components may inform ephemeral housing that includes celebratory festivals, emergency settlements, and refugee camps.

Trash/Track

Topic Portal. Trash/Track. SENSEable City Lab; Massachusetts Institute of Technology.

<http://senseable.mit.edu/trashtrack>.

This web portal challenges viewers to innovative thinking about household trash. It is based on a trash-tracking project in Seattle that helps users imagine a world that understands the 'removal chain' as well as the 'supply chain' and can use this knowledge to build more efficient and sustainable urban infrastructure and promote behavioral change.

Virtual Space: The City to Come

Book Chapter. Nabian N, Ratti C. The City to Come. Innovation: Perspectives for the 21st Century. Open Mind, BBVA Group 2010. Pages 383-397. <http://realtimecities.wikispaces.com/file/view/W01-3+Nashid+Nabian+and+Carlo+Ratti-City+To+Come.pdf>.

This chapter explores how new technologies and cybernetics may change the shape and dynamics of the cities in the future. The authors highlight the potential for urbanity to merge with digital information so that the built environment is dynamically sensed and synchronously actuated to perform more efficiently, intelligently, and sustainably, a desirable place in which to live and work.

Shaping Cities for Health: Complexity and the Planning of Urban Environments in the 21st Century

Article. Rydin Y et al. Shaping Cities for Health: Complexity and the Planning of Urban Environments in the 21st Century. The Lancet 2012; 379(9831): 2079-2108. DOI: [http://dx.doi.org/10.1016/S0140-6736\(12\)60435-8](http://dx.doi.org/10.1016/S0140-6736(12)60435-8).

This article summarizes the analysis and recommendations of a Lancet Commission between 2009 and 2011 that sought to understand how better health outcomes can be delivered through interventions in the urban environment in cities across the world. It draws on examples from the "Healthy Cities" movement, launched in 1984, and outlines recommendations that address the multiple complexities of urban systems.

Hidden Cities: Unmasking and Overcoming Health Inequities in Urban Settings

Report. Hidden Cities: Unmasking and Overcoming Health Inequities in Urban Settings. World Health Organization, United Nations Human Settlements Programme 2010.

http://www.who.int/kobe_centre/publications/hidden_cities2010/en.

GHELI repository link: <http://repository.gheli.harvard.edu/repository/11501>

This report from the World Health Organization (WHO) and the United Nations Human Settlements Programme (UN-Habitat) examines the global issue of health inequities within urban settings. Aiming to identify health inequities, including those based in economic status and geographic location, and recommend policies and interventions, the report provides several example sources of data, including the WHO's Urban HEART and UN-Habitat's UrbanInfo. The report concludes with a call to action for policy makers and health officials to address these issues, arguing that the global community is collectively responsible to ensure that cities are healthy places for people as the world moves towards an urban future.