The Art of Pandemic Prevention

By Frances Fernando

As scientists, we have an intuitive sense to protect what is in front of us—our samples and materials—from contamination. But donning Personal Protective Equipment (PPE), especially masks, has evolved from a simple protective barrier to a social symbol of collective action during a pandemic. For hundreds of years, artwork has portrayed the use of PPE, as our physical responses can be drawn, painted, or photographed, while invisible pathogens cannot. Surveying pandemic art is an exploration into our diary of changing scientific dogmas and public attitudes towards PPE in past pandemics. Artwork created during the Black Death, 1918 influenza, AIDS, and COVID-19 illustrate society’s perception of pathogens and our reaction to PPE.

THE BLACK DEATH

The Black Death was one of the most devastating pandemics, causing 75–200 million deaths.1 While the most catastrophic peak occurred during 1346–1353, yearly recurrences are documented until 1671.1 Art from this pandemic memorializes the shift from connecting disease with faith-based factors to believing the Black Death is a consequence of harmful substance exposure.

During early stages of the Black Death, art depicted the disease from a religious perspective and faith-based imagery predominated. Forms of physical personal protection, like masks, were absent from early artwork.

To the contrary, art during the latter period of the Black Death documents doctors wearing a curved, bird-like beak intended to protect from the plague,

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Letter from the Editor

On March 16, 2020, I received an email stating that schools would be closed until further notice. Months have passed since that first email, and we are now, as a country, finding our way into a new normal and struggling to determine what that should look like. Often art can be a way to express emotions and convey important messages. Thus, in this annual Arts issue—we will look into how artwork has a way of capturing and sharing human behaviors during atypical times.

Postbac fellow Frances Fernando focuses on how art has portrayed societal response to germ theory and personal protective equipment (PPE) throughout several pandemics in history, including the Black Death, the 1918 Influenza, AIDS, and now COVID-19. Messages throughout pandemic artwork reveal the sometimes surprising nature of human reactions to these invisible threats.

We absorb messages about this pandemic caused by SARS-CoV-2 in artwork and from various news and health information outlets every day. These messages can impact the decisions that we make to preserve the health and wellness of our families during this time. I’m frequently approached by friends and family with questions about how the coronavirus affects children—especially as my neighbors and I grapple with decisions about school during the pandemic. In NIH Director Dr. Francis Collins’ “Home Edition” video chat with NICHD Director Dr. Diana Bianchi, Dr. Bianchi presents current information about COVID-19 in children and expectant mothers and the scientific progress being made. We’ve highlighted key points here.

During this chat with Dr. Collins, Dr. Bianchi emphasized that there are vulnerable populations who are underrepresented in coronavirus messaging. In particular, children with disabilities receive fewer in-person support systems for respiratory care, physical therapy and speech therapy. And virtual-only schooling exacerbates educational and social disparities. Providing access to internet, proper equipment, and educational supervision are all important aspects of mitigating negative effects on children who fall into vulnerable populations. I hope this letter from the editor serves as a small contribution to getting this message out so that we can work toward building support for all our vulnerable populations.

We wrap up this issue with new installments of “Clinical Corner,” “Life Outside Lab,” and the August announcements and events. Enjoy the rest of your summer to the fullest extent possible, and we’ll see you in September—or not—let’s just see which way “normal” goes.

Your Editor in Chief,
Shana R. Spindler, PhD

Please send your questions and comments to our editor at shana.spindler@nih.gov.
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as pictured in Paulus Fürst’s *Doctor Schnabel von Rom*. Before the understanding of germ theory, doctors believed the principle agent of disease for the Black Death was noxious air, or miasma. The miasmatic theory of disease suggested that the plague was spread through poisoned air. To improve the smell, and associated quality of the inhaled air, the beak was filled with sweet dried flowers, herbs and spices.²

Artwork in the Black Death highlights actions taken to protect ourselves from invisible threats of the natural world—at least by doctors. The public, at large, had not yet adapted PPE for themselves.

**THE 1918 INFLUENZA**

The 1918 Influenza occurred from January 1918 to December 1920. Highly contagious and virulent, it infected 500 million people, and caused at least 50 million deaths globally.¹ The milieu of major cities during the 1918 pandemic is eerily familiar to those hard-hit by COVID-19, with quarantines, abandoned streets, and masked workers. The art, reportage, and visual imagery of the time capture the pandemic experience: the adoption of germ theory with a government push for PPE, and a mixed public acceptance and resistance to personal protections.

Drawings and advertisements in municipal archives, US Public Health Service cartoons, and Department of Health bulletins from the period document the public health response.³ These drawings are not only accounts of public health measures and safe practices, but also evidence of the ideological shift abandoning miasmatic thinking for germ theory and pathogenesis at the turn of the century.

Societal acceptance of PPE is prominent in newspapers and reportage of the 1918 influenza. Mask wearing gained popularity as an emblem of discipline and public spiritedness or patriotic displays. Newspapers featured guides to create and launder masks

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and handkerchiefs, which became fashion statements as chiffon and patterns replaced gauze for the wealthy or fashionable. Social acceptance is clearly seen in a cartoon that normalizes the use of PPE at the level of a birthday gift for a child—a handkerchief that’s “good for a hundred sneezes.”

Media artwork of the time also captured resistance to PPE, highlighting improper use of masks and mocking the evolution of masks into fashion statements. Mask wearing faced opposition from the perceived infringement on individual freedoms or civil liberties, such as smoking, and a fear of feminization that prevented men from easily accepting the practice.

The 1918 Influenza outbreak is a foreshadowing of pandemics to follow. The scientific body of knowledge is strong enough to support germ theory and offer recommendations to protect oneself. However, the public reaction to those recommendations is mixed, with citizens weighing the risks of an invisible threat against the loss of strongly held identities and personal freedoms.

ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS)
Since the AIDS epidemic began in 1981, more than 32 million people have died from AIDS, and 38 million are...
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currently infected with HIV (the virus that causes AIDS). Unlike the Black Death and 1918 influenza outbreak, the AIDS epidemic is ongoing. While we can use masks for respiratory illnesses, sexual transmission of HIV is prevented by using condoms which can also be considered a form of PPE. With germ theory firmly established, condom depiction in wall murals, street art, and public health campaign messaging promote its usage to prevent HIV transmission, and ultimately result in public acceptance.

Public campaigning pushes the important message of using condoms into daily life and culture, as eye-catching posters become part of the local landscape. Brightly colored and eclectic imagery has peppered HIV/AIDS campaign materials. Familiar artwork styles and the association of familiar, positive wording with condoms help to normalize its usage.

Artistic messaging throughout the AIDS era encourages the use of condoms to prevent the spread of disease—like the public service announcements seen in government publications during the 1918 Influenza epidemic. In both cases, artwork serves as a powerful tool to cement germ theory and remind society to protect themselves against disease.

COVID-19
Declared a Public Health Emergency of international concern by the World Health Organization (WHO), the ongoing COVID-19 pandemic has resulted in 13.4 million cases and over 571,000 deaths globally at the time of this writing. COVID-19 is caused by the SARS-CoV-2 coronavirus, which is primarily spread through small droplets produced during coughing, sneezing, or speaking. Face coverings ranging from N95 to homemade cloth masks are an integral component of coronavirus PPE. Masks and safe coronavirus practices are displayed in murals, street art, and photographs that

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reflect PPE integration into daily life. Art during the coronavirus pandemic has been dynamic, simultaneously capturing changes in scientific knowledge about the virus while portraying both rejection and acceptance of safe practices, like wearing PPE and physical isolation.

At the beginning of the coronavirus pandemic, little was known about the novel infectious agent SARS-CoV-2. However, since the virus was first isolated and analyzed, scientists have been able to classify it as a novel coronavirus, image the virion’s structure, identify transmission and prevention mechanisms and create real-time PCR tests to detect viral fragments. Art shows the trickledown dissemination of information from scientific institutions to the general public, as an Iranian street artist painted a fairly accurate image of the virus, with spike proteins, on a wall.

Artists are taking to the streets to paint important COVID-19 messages promoting social acceptance of PPE and physical distancing. Masks are found in murals, graffiti, paintings, and sculptures across America, too numerous to count. Artists even mask the Statue of Liberty herself as a reminder for residents to heed public health warnings. For some, masks have morphed

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into wearable art—forms of self-expression, blank slates to express creativity and social values.

Despite widespread adoption of coronavirus safe practices, art also captures the rejection of PPE by society. In a street mural, a couple seems to blatantly disregards safe practices regarding PPE and lowers their masks to kiss. The art here captures a juxtaposing approach to PPE.

Pandemic period artwork records the medical and social history of human adaptation to invisible pathological threats. The types of PPE depicted in pandemic artwork memorializes the shift into germ theory—forgoing the plague doctors’ bird beaks for face masks, gloves, and condoms in murals and modern-day artwork. As scientists, masks and PPE have become a part of our daily lives in and out of lab to protect ourselves and others from pathogens. And yet, as germ theory is widely accepted and PPE has become commonplace in daily life during the current COVID-19 pandemic, not all of society has accepted protective practices. Art has captured this reaction to disease, allowing us to observe how we have—or haven’t—masked our most human of features to protect our communities and prevent further pandemic spread.
Key Points from Dr. Bianchi’s “Home Edition” Chat with Dr. Collins

During the 15th edition of “Home Edition” with NIH Director Dr. Francis Collins, NICHD Director Dr. Diana Bianchi answered questions about COVID-19 in children and expectant mothers, the rare occurrence of Multi-system Inflammatory Syndrome in Children (MIS-C), and a new NICHD study to investigate MIS-C. Here we've highlighted a few key points from the video chat below.

- **2%** of COVID-19 cases are in children.
- **60%** of children have fever (symptoms tend to be mild and might include respiratory and GI issues).
- **20%** of children are asymptomatic.
- **0.5%** of children develop Multi-system Inflammatory Syndrome in Children (MIS-C).

**WE DON’T KNOW WHY THE COVID-19 RATE IS SO LOW IN KIDS**

- Social and biological factors could be at play:
  - Social isolation without school makes it less likely to contact an infected person.
  - Kids host fewer SARS-CoV-2 docking sites (ACE2 receptors) in their noses.
- Studies suggest low risk of transmission from mother to fetus.
- There is no evidence of COVID-19 related birth defects to date.

**MIS-C REQUIRES QUICK ACTION—BUT IT APPEARS THAT MOST KIDS GET WELL**

- Symptoms begin 2 to 4 WEEKS after infection.
- Children might exhibit fever, abdominal pain, cardiac issues and shock.
- Most children respond to available treatments, including intravenous immunoglobulin, steroids and anti-IL-6 and anti-IL-1.

**THE NICHD, IN COLLABORATION WITH THE NIAID, IS CONDUCTING A THREE-PART STUDY TO LEARN MORE ABOUT MIS-C**

- The first study arm collects biospecimens with open data sharing.
- The second study arm assesses ethnic and biological risks, such as viral variants.
  - SARS-CoV-2 has at least two variants, D and G, referring to an amino acid change in a protein used by the virus to dock onto cells.
  - We DO NOT yet know if they correlated with MIS-C.
- The third study arm determines long-term consequences of MIS-C.
Clinical Corner: Meet Dr. Skand Shekhar

Skand Shekhar, MD, is a clinical fellow in adult endocrinology in NIH’s Inter-Institute Endocrinology Training Program. We encourage you to check out his inspirational words on clinical fellowship during a pandemic in our May Clinical Corner column. For our annual arts issue, we learn a bit more about Dr. Shekhar, including his interests in landscape photography.

For his medical training, Dr. Shekhar attended medical school at the University of Delhi, India. He completed his residency training in internal medicine and medical chief residency in Saint Peter’s University Hospital/Rutgers Robert Wood Johnson Medical School in New Jersey. Dr. Shekhar’s research interests include reproductive endocrinology, neuroendocrinology, and thyroid disorders.

We asked Dr. Shekhar a few questions about himself to get to know the person behind the degree. Introducing Dr. Shekhar:

Where are you from, and what path brought you to NIH?
I grew up in New Delhi, India and always dreamed of being an academic physician being born in a family of doctors. While in medical school, I quickly realized that medical research deeply interested me, making me feel like I would be able to leave a long-lasting mark and, in the process, move medicine forward.

In the second year of medical school, I conducted a study in pediatric malnutrition, which went on to influence government policy in India, affirming my belief in the power of medical research. Pursuing this interest, I decided to explore my options for postgraduate medical training in the United States. In 2013, I was accepted for a clinical endocrinology rotation at NIH for the fourth year of my medical school training.

From the day I entered the NIH campus, my imagination was captured, and I was inspired to return to this institution in the future. After completing my internal medicine residency in New Jersey, I was accepted into a clinical fellowship in endocrinology at NIH, allowing me to join the specialty and institution of my dreams. I have been living that dream since 2018 and have enjoyed every moment of it.

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What influenced you to study endocrinology in particular?
When I entered medical school, I searched for a field where I could apply basic physiology knowledge to improve human health and deepen our understanding of human evolutionary processes. I firmly believe that a global approach to modern diseases goes a long way in providing long term solutions. I joined reproductive endocrinology research and found the world of hormones to be fascinating. By modifying the hormonal milieu, one could prevent and cure cardiovascular disease, infertility, diabetes, obesity and hypertension—to name a few examples of modern conditions plaguing humanity.

Nearly all non-communicable conditions and some infectious conditions, including COVID-19, are influenced by hormonal alterations. To be able to help many people with these diseases, as well as to pursue my scientific endeavors, I decided to train in endocrinology. My endocrinology training experience has exceeded my expectations in terms of both providing clinical benefit to those in need and contributing to the advancement of medical sciences.

What is your most memorable experience so far while at NICHD?
This is a very difficult question to answer purely because I have innumerable memorable moments—from seeing basic physiology applications in the clinical care of patients with the rarest of rare conditions to assisting with developing “first-in-human” diagnostic and therapeutic strategies. However, I am reminded of two unforgettable moments. The first was my meeting with Drs. Francis Collins and Anthony Fauci in the first year of fellowship. I was inspired by their humility, their words of guidance for physician scientists in training, and their enthusiasm for science. The second was my meeting with Dr. Michael Young, the Nobel laureate in medicine in 2017, when he visited the NIH. He shared his experiences with a small group of us and encouraged us to pursue our scientific interests ceaselessly.

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In your profile on the NICHD website, you mention you enjoy landscape photography. How did you become interested in it, and what do you like about it?

My interests outside academic medicine are many, but the major ones include travelling and photography. Photography initially started as a part of travelling but has evolved into an independent hobby for me. I love the fact that every picture can speak a thousand words and convey a story without a script. It allows me to take my mind off everything else and enjoy nature's beauty. I am still a work in progress, but I'm happy to share a few pictures that I've captured.
Life Outside Lab

Artwork by Sonal Vaid, MD, a first year NICHD adult endocrine fellow

“Glass Bottles” – medium: oil pastel

“Charcoal Details” – medium: charcoal pencil
August Announcements

DUE NEXT MONTH: INTRAMURAL RESEARCH FELLOWSHIP (IRF)

*Funding opportunity for all NICHD fellows*

In 2017, DIR launched the Intramural Research Fellowship (IRF), a competitive research funding opportunity for NICHD postdoctoral, visiting, and clinical fellows. Its main objective is to promote grant writing among our intramural trainees, while enhancing awareness of the various components of an NIH grant application.

The IRF submission date is Monday, **September 14, 2020**.

For more information on the IRF, please visit [NICHD Intramural Research Fellowships](https://www.nichd.nih.gov/research/fellowships) or email Dr. Erin Walsh ([erin.walsh@nih.gov](mailto:erin.walsh@nih.gov)).

**SALZMAN VIROLOGY AWARD APPLICATION DEADLINE IS SEPTEMBER 21**

The Salzman Virology Awards honor the 40-year career of Dr. Norman P. Salzman in virology research and his accomplishments in mentoring of young scientists. Two awards will be given. One postdoctoral fellow will receive a plaque and an award of $2,500. One graduate student/postbaccalaureate trainee will receive a plaque and an award of $1,000. The mentors of the awardees will each receive a plaque. The winners will give talks during the 22nd Annual Norman P. Salzman Memorial Symposium while selected other applicants will be invited to present posters.

The application due date for the Salzman Virology Awards is **September 21, 2020**. Application forms and eligibility information can be found at [fnih.org/SalzmanSymposium](http://fnih.org/SalzmanSymposium).

**GAIN PROGRAMMING SKILLS WHILE TELEWORKING FROM HOME**

During this time of extended telework, the NICHD’s Bioinformatics and Scientific Programming Core (BSPC) is offering to help fellows gain valuable programming and data analysis skills. BSPC can provide several resources for learning the R programming language as well as develop custom learning plans using online resources to meet specific learning goals. If you are interested in programming and data analysis, please contact Dr. Ryan Dale at [ryan.dale@nih.gov](mailto:ryan.dale@nih.gov).

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SAVE THE DATE: FINAL SUMMER WEBINAR SERIES IS SEPTEMBER 24
Making the Most of Your PhD and Postdoc: How to Develop Career Relevant Skills in Academia
Lauren Celano, CEO Propel Careers
Thursday, September 24, 1–2 p.m.

This webinar will provide advice on ways to proactively build, develop, and enhance specific skills during your PhD or postdoctoral training in order to build transferrable skills that are valuable for your career. Lauren will provide an overview of skills useful for both research and non-research careers such as consulting, business development, communications, and medical affairs. She will also highlight ways to build transferrable skills such as collaboration, leadership, management, and presentation skills, as well as hard skills like budgeting, vendor management, protocol development, and writing. Additionally, she will showcase ways to highlight these skills on a resume so that organizations looking to hire you are aware of the value you bring to them.

Please email Ms. Monica Cooper (cooperm@mail.nih.gov) if you are planning to participate.

CALL FOR SUBMISSIONS!
Behind the Mask: Real Stories from NIH Staff About Life During the COVID-19 Pandemic

Since January 2020, COVID-19 has impacted the NIH community in many ways—from researching and providing information about the disease, to developing therapeutics and vaccines, to caring for patients in the Clinical Center, to re-configuring the ways we perform our jobs. To preserve this important period in NIH history, the Office of NIH History and Stetten Museum has initiated “Behind the Mask: Real Stories from NIH Staff About Life During the COVID-19 Pandemic.” The project is seeking personal reflections about how those who work at NIH have experienced the COVID-19 pandemic and is collecting documents, photos, objects, and other types of media that will help narrate the story of COVID-19. Materials in languages other than English, such as Spanish, will be accepted.

To learn more about the project and to participate, visit: https://history.nih.gov/display/history/Behind+the+Mask.
August Events

TUESDAY, AUGUST 18, 1–3 PM
Speaking about Science: Giving Virtual Scientific Talks
Scott Morgan

The “Speaking about Science” webinar led by public speaking coach Scott Morgan, offers tips on scientific storytelling, speaking in plain language while addressing the human health relevance for your research, and creating effective visual aids. Given the recent transition to online platforms, Scott will also focus on ways you can enhance and modify your talks for virtual presentations.

Please contact Ms. Monica Cooper (cooperm@mail.nih.gov) to register for this virtual workshop.

WEDNESDAY, AUGUST 19, 11 AM–12 PM
Tips to Navigate a Successful Virtual Interview Process
Lauren Celano, CEO Propel Careers

Lauren Celano will provide advice for how to prepare for and navigate a virtual interview process, since most companies are moving to virtual platforms such as Skype, Zoom, and WebEx during the COVID-19 pandemic. She will provide advice for tailoring responses, depending on the interviewer—HR representative, hiring manager, or direct colleague. This webinar will cover different scenarios, including one-on-one and group interviews, and interviews that require a presentation. Lauren will provide advice on questions you can ask during your interview and how to appropriately follow up after interview day. In addition, advice will be provided regarding how to evaluate and negotiate an offer.

Please email Ms. Monica Cooper (cooperm@mail.nih.gov) if you are planning to participate.

ONGOING EVENTS AROUND CAMPUS

NIH-Wide Office of Intramural Training and Education (OITE) Events
For more information and registration, please visit Upcoming OITE Events.

NIH Library Training and Events
For more information and registration, please visit the NIH Library Calendar.