

Matthew R. McCulloch, M.D.
Specialist, Digital Health Advocate, Researcher

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Current Position

University of Colorado School of Medicine / Children's Hospital Colorado, Aurora, CO June 2023 —present
Department of Pediatrics
Assistant Professor, Allergy & Immunology

Education

Duke University, Durham, NC July 2024 — Aug 2025
Master of Management in Clinical Informatics (MMCi)
Degree anticipated August 2025

- Relevant coursework: Health IT Business Solutions; Marketing Analysis; Accounting; Operations & Supply Chain Management; Healthcare Business Strategy; Healthcare Finance; Health Technology Data and Information

University of Colorado School of Medicine / Children's Hospital Colorado, Aurora, CO July 2020 — July 2022
Fellow, Allergy & Immunology Fellowship Program
Program Director: Dr. Maureen Bauer

Duke University, Durham, NC 2016 — 2020
Internal Medicine & Pediatrics Combined Residency Program
Program Director: Dr. Jane Trinh

University of Tennessee College of Medicine, Memphis, TN 2012 — 2016
M.D.

Rhodes College, Memphis, TN 2007 — 2011
B.S., Neuroscience (*cum laude*)

Employment Experience

University of California, San Francisco School of Medicine, San Francisco, CA August 2022 — May 2023
Departments of Medicine and Pediatrics
Assistant Clinical Professor, Allergy & Immunology

Methodist University Hospital, Memphis, TN 2011 — 2012
Healthcare Administration Intern

- Worked full-time with Chief Medical Officer on quality improvement projects and identifying areas for innovation
- Example projects: analyzed data to decrease wait times for Orthopedic consults in the ER; secured grant funding for a pain management project; created clinical assessment tool to identify high readmission risk patients before discharge

Quality Improvement Activities

Project ACCESS: Allergy eConsult & Communication Service Strategy Jun 2024 — present
Leading project to redesign and optimize a digital consult program tailored to referring provider needs, leveraging technology to improve access to specialists in underserved areas.

'Pen Pals' Penicillin Allergy Quality Improvement Group April 2021 — June 2022

- Multi-disciplinary team with ongoing goal of reducing cost of care and antibiotic resistance by delabeling penicillin allergy
- Role: Approach admitted patients who qualify for penicillin delabeling pathway and track delabeling metrics

Duke Learning Health Systems Training Program Sept. 2018 — June 2019

- Chosen for advanced study of large-scale healthcare system design and digital innovation
- Role: Developed protocol to improve high-risk patient testing for penicillin allergy

Improving Hepatitis B Vaccination Rates in the Duke Newborn Nurseries

2017 — 2020

Mentors: Dr. Sarah Germana and Dr. Jane Trinh, Duke University, Pediatrics

- Developed clinical care gap into a QI project with multiple PDSA cycles
- Improved HBV vaccination rates in the Duke nurseries from 83% to 95% prior to discharge

Educational Activities

Medical Student Immunology Course Sessions

2023 — present

University of Colorado School of Medicine

- Co-led immunodeficiency and hypersensitivity case-based sessions

M1 Hypersensitivity Small Group Session Leader

27 April 2023

University of California, San Francisco School of Medicine

- Facilitate group learning and discussion of hypersensitivity cases and pathophysiology

Residents and Fellows as Exceptional Educators Elective

May 2022

University of Colorado School of Medicine

- Month-long full-time elective designed to hone medical education skills for rising faculty
- Created med ed-informed drug allergy interactive presentation

M4 Teaching Small Group Session

May 2022

University of Colorado School of Medicine

- Co-facilitated small group session on effective clinical teaching for senior medical students

M1 Immunology Lab Interpretation Team-Based Learning Module

September 2021

University of Colorado School of Medicine

- Co-facilitated first-year medical student class discussion of clinical immunology cases and lab interpretation

Pediatric Intern Allergy Academic Half-Day

August 2021

- Developed and led drug allergy case-based learning session for pediatric interns

Asthma & Technology Group

Jan 2021— June 2022

- Proposed and implemented learning series; conduct educational talks on asthma digital health topics such as digital health interventions for asthma and analysis of asthma machine learning research

Pediatrics Machine Learning School at Duke

2019

- Two half-day sessions provided overview of machine learning methods and its clinical applications

Open School Certificate in Quality & Safety, Institute for Healthcare Improvement

2016

- Online series of modules teaching essential skills to participate in healthcare quality and safety projects

Research Experience

ACCESS: Allergy eConsult & Communication Service Strategy

Jun — present

- PI for internally funded grant aiming to collect referring and specialist provider feedback to redesign EHR workflows and deliver targeted medical education

PATCH: Penicillin Allergy Triage Chatbot Helper

Jun — present

Project Co-lead on grant-funded project to develop and implement a novel patient-facing chatbot to decrease patient wait times and increase patient access to clinic.

Indoor Air Quality in the Homes of Children with Asthma

August 2023 — present

- PI for ACAAI Foundation-funded (\$10,000) pilot study using remote sensors to collecting long-term air quality data in children with asthma

Utilizing Electronic Medication Monitoring Data in Asthma Severity Scores and Exacerbation Prediction Models

Dec. 2020 — June 2022

Mentor: Dr. William Anderson, Children's Hospital Colorado, Allergy Section

- Examine the impact of an electronic medication monitoring system on asthma severity and control

- Role: Fellow project; primary investigator for project design, IRB submission, data entry, and guiding data analysis with statistical support
- Outcome: Submitted for publication

Outpatient Electronic Consultations in Pediatric Allergy/Immunology

April 2021— June 2022

Mentor: Dr. Kirstin Carel, Children's Hospital Colorado, Allergy Section

- Primary investigator; analyzed all electronic consults for outcomes and effectiveness
- Demonstrated that eConsults may be used for a variety of clinical questions, avoid referrals, and are efficient

Asthma and the built environment

Sept. 2018 — May 2019

Mentors: Monica Tang, MD and Jason Lang, MD, Duke University Hospital, Pulmonology & Allergy Sections

- Connecting asthma symptom severity with built-environment conditions using community data
- Role: Assisted with data entry and verification of participant asthma diagnosis
- Outcome: acknowledged in publication

Neurologic adverse events during ALL chemotherapy and neurocognitive deficits

May – Aug. 2017

Mentor: Kevin Krull, MD, Epidemiology & Cancer Control, St. Jude Children's Research Hospital

- Research Fellow for a full-time summer position in the St. Jude Pediatric Oncology Education Program
- Role: performed retrospective data entry and assistance with analysis design
- Outcome: Best Clinical Research paper from participant cohort, oral presentation of results, abstract publication, and poster presentation at regional conference

Publications

McCulloch MR & Anderson, WA. 'Tis The Season for Dupilumab?' *Ann Allergy Asthma Immunol* 2024; 132(4).

McCulloch MR, Thomas JF, Thompson MA & Carel KD. 'Outpatient electronic consultations in pediatric allergy and immunology.' *Ann Allergy Asthma Immunol* 2022; 8(22).

McCulloch MR, Bothwell S, Brinton J, & Anderson WC. 'Impact of electronic medication monitoring on pediatric asthma severity and control: real-world experience from a multidisciplinary clinic.' *J Allergy Clin Immunol* 2022; 149(2):AB232.

McCulloch MR & Hauk P. 'Common Variable Immunodeficiency.' In: 5-Minute Pediatric Consult 9th Ed., edited Cabana M. *In Press*.

McCulloch MR, Krishnan G, Trinh J, Shaikh S & Germana S. 'Improving adherence to Hepatitis B vaccine administration recommendations in two newborn nurseries.' *BMJ Open Quality* 2021; 10;4.

McCulloch MR. Cellulitis. In: Miko B. & Kelly C.R., ed. *Netter's Integrated Review of Medicine*. Philadelphia: Elsevier, 2019.

McCulloch, MR & Krull, KR. Neurologic adverse events during ALL chemotherapy predict neurocognitive deficit. *Journal of Investigative Medicine*. 2014;62(2):423.

McCulloch, MR. Defining a role for the anterior cingulate cortex in insight. *Rhodes Journal of Biological Sciences*. 2011;26:29-40.

Oral Presentations

'Adult Asthma and Adult-COPD Overlap.' CU/Children's Colorado Allergy Fellowship Didactics. 6 March 2024.

'Asthma Diagnosis and Pulmonary Function Tests.' CU/Children's Colorado Allergy Fellowship Didactics. 16 Sept 2023.

'Angioedema Mechanisms & Treatment. UCSF Neuroendocrine Tumor Lecture Series. 15 Mar 2023.

'Atopic Dermatitis Board Review Jeopardy.' UCSF Allergy/Immunology Fellowship Program Didactics. 25 Jan 2023.

'Drug Allergy for the Pediatric Resident.' UCSF Pediatric Residency Noon Conference, 10 Jan 2023.

'Approach to Immunodeficiency.' University of Colorado Pediatric Residency Program Noon Conference, 8 Feb 2022.

McCulloch MR, Bothwell S, Brinton J, & Anderson WC. 'Impact of electronic medication monitoring on pediatric asthma severity and control: real-world experience from a multidisciplinary clinic.' Presented at: AAAAI Annual Meeting 2022; 28 Feb 2022, Phoenix, AZ.

'Immunologic Tolerance and Autoimmunity.' Children's Hospital Colorado Allergy & Immunology Fellowship Board Review, 15 Feb 2022.

'Lymphocyte Development and Antigen Receptor Gene Rearrangement.' Children's Hospital Colorado Allergy & Immunology Fellowship Board Review, 15 Dec 2021.

'Transforming Asthma Care with Digital Health.' Presented at: UCSF Allergy & Immunology Didactics, 14 Dec 2021 (virtual).

"Digital Health Interventions for Pediatric Asthma Management: A Review of the Literature." Children's Hospital Colorado Pediatric Asthma Clinical Research Group. 2 June 2021, Denver, CO.

'B Cell Activation & Antibody Production.' Children's Hospital Colorado Allergy & Immunology Fellowship Board Review, 10 Mar 2021.

'Antibody Structure and Antigens.' Children's Hospital Colorado Allergy & Immunology Fellowship Board Review, 2 Jan 2021.

'Immunology of COVID-19.' Children's Hospital Colorado Fellow Didactic Series, 2 December 2020.

"Severe Asthma Evaluation and Management." Department of Medicine Noon Conference Series, Duke University Hospital, Durham, NC. 17 April 2020.

"Electronic Noses in Asthma." Children's Hospital Colorado Pediatric Asthma Clinical Research Group. 21 January 2021, Denver, CO.

McCulloch, MR & Krull, KR. Neurologic adverse events during ALL chemotherapy predict neurocognitive deficit. Pediatric Oncology Education Program Summer Lecture Series. 7 August 2013, Memphis, TN.

Poster Presentations

McCulloch MR, Thomas JF, Thompson MA & Carel KD. 'Outpatient electronic consultations in pediatric allergy and immunology.' Western Society of Allergy, Asthma, and Immunology Annual Meeting 2023, 5 Feb 2023, Kona, HI.

McCulloch MR & Hsieh E. Management Conundrums In Multiple Intestinal Atresia With Combined Immunodeficiency. Presented at: ACAAI National Meeting 2022, 6 November 2021, New Orleans, LA.

McCulloch MR & Hauk, P. From Asplenia to a Spleen. Presented at: AAAAI National Meeting, 26 Feb 2021, Online.

McCulloch MR, Krishnan G, Shaikh S et al. Improving Hepatitis B Vaccination in Duke University and Duke Regional Hospital Newborn Nurseries. Presented at: Academic Pediatric Association Region IV Meeting, 9 Feb 2019, Charlottesville, VA.

Moorthy G & **McCulloch MR**. An atypical presentation of anorexia nervosa. North Carolina Pediatrics Society Annual Meeting, 18 Aug 2017, Asheville, NC.

McCulloch, MR & Krull, KR. Neurologic adverse events during ALL chemotherapy predict neurocognitive deficit. American Federation for Medical Research Southern Regional Meeting, 21 February 2014, New Orleans, LA.

McCulloch, MR & Taylor, JP. TDP-43 and USP10 proteinopathies in ALS. Undergraduate Research & Creative Activity Symposium, 30 April 2010, Memphis, TN.

Honors and Awards

Outstanding Community Service Award, UTHSC College of Medicine Graduation	2016
Dorothy Snider Foundation Scholarship	2015 — 2016
University of Tennessee College of Medicine Merit Scholar	2012 — 2016

Best Clinical Research Paper, St. Jude Pediatric Oncology Education Program	2013
Mr. Rhodes Award	2012
• Awarded to one male and female senior chosen by classmates as exemplifying college values	
Phi Beta Kappa Honor Society	2011

Leadership, Committees, and Service

CCTSI Pilot Grant Study Section Committee Member	April 2024
Member, Health Information Technology & Education Committee of the AAAAI	August 2023 — present
Mentor, UCSF LGBTQ+ Mentorship Program	February 2023 — May 2023
UCSF Allergy & Immunology Faculty Recruitment Committee	October 2022 — May 2023
AAAAI Chrysalis Project Mentor	Jan – Feb 2022
Student Reviewer, Journal of Student-Run Clinics	2015 - 2016
Clinica Esperanza Student-Run Clinic Steering Committee	2015 - 2016
Medical Student Executive Committee Class Representative	2012 - 2016

Certification and Licensure

American Board of Allergy & Immunology, Board Certified	October 2022
American Board of Internal Medicine, Board Certified	August 2021
American Board of Pediatrics, Board Certified	October 2020
California State Medical License	June 2022 — present
Colorado State Medical License	2020 — present

Professional Memberships and Activities

Colorado Allergy & Asthma Society, Member	2020 — present
American College of Allergy, Asthma, & Immunology, Member	2020 — present
American Academy of Allergy, Asthma, & Immunology, Member	2018 — present