

# Stanford

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## Noel Ayoub, MD MBA

Clinical Assistant Professor, Otolaryngology (Head and Neck Surgery)

### CLINICAL OFFICE (PRIMARY)

- **Emeryville Multispecialty Clinic**

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### ACADEMIC CONTACT INFORMATION

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### Bio

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#### BIO

Noel Ayoub is a fellowship-trained rhinologist within the Stanford Health Care Division of Rhinology and Skull Base Surgery and Department of Otolaryngology - Head and Neck Surgery. After receiving his medical degree from Stanford University School of Medicine, he completed residency in Otolaryngology - Head and Neck Surgery at Stanford Health Care and fellowship in advanced Rhinology and Skull Base Surgery at Massachusetts Eye and Ear/Harvard Medical School. In addition to his medical training, Noel holds an MBA from Stanford University Graduate School of Business, where he also earned a Certificate in Public Management and Social Innovation.

Noel is a specialist in rhinology and skull base surgery and utilizes advanced endoscopic techniques to treat a variety of conditions, including complex revision sinus surgery, cerebrospinal fluid leaks, sinonasal and anterior skull base tumors, orbital tumors, and thyroid eye disease. His unique combination of medical and business acumen allows him to approach patient care and healthcare delivery with a comprehensive perspective.

His research spans healthcare innovation, health technology, hospital operations, and health systems leadership. He is particularly focused on leveraging technology to enhance patient care, reduce costs, and reshape the healthcare landscape. He is the co-founder of an international 501(c)(3) nonprofit organization, an initiative that demonstrates his commitment to expanding access to healthcare and leveraging technology to improve patient care globally. He serves on multiple hospital and national committees, including in the North American Skull Base Society, American Rhinologic Society, and American Academy of Otolaryngology-Head and Neck Surgery.

#### CLINICAL FOCUS

- Otolaryngology-Head & Neck Surgery
- Otolaryngology
- Rhinology and Sinus Disease
- Endoscopic Skull Base Surgery

#### ACADEMIC APPOINTMENTS

- Clinical Assistant Professor, Otolaryngology (Head and Neck Surgery)

## **HONORS AND AWARDS**

- Resident Annual Team Player Award, Stanford Department of Otolaryngology-Head and Neck Surgery (2021, 2022, 2023)
- National Otolaryngology Exam Merit Award, Stanford Department of Otolaryngology-Head & Neck Surgery (2021, 2022, 2023)
- Most Cited Manuscript, JAMA Otolaryngology – Head & Neck Surgery (2023)
- Resident Research Symposium Award, Stanford Department of OHNS Resident Research Symposium (2021, 2022)
- Resident Leadership Grant, American Academy of Otolaryngology-Head & Neck Surgery (2021)
- Alpha Omega Alpha (AOA) Inductee, Alpha Omega Alpha (AOA) Honor Society (2021)
- Grand Prize Research Award, Stanford Department of OHNS Resident Research Symposium (2020)
- Resident Travel Grant Award, National Comprehensive Cancer Network (NCCN) (2019)
- Public Management and Social Innovation Certificate, Stanford Graduate School of Business (2018)
- Finalist, Stanford Business Association of Stanford Entrepreneurial Students (BASES) Challenge (2017)
- Prevention and Early Detection Committee Community Service Grant, American Head and Neck Society (AHNS) (2016)
- Fundamentals of Laparoscopic Surgery Medical Student Award, Stanford General Surgery (2015)
- Summa Cum Laude, University of California Los Angeles (2012)
- Phi Beta Kappa, University of California Los Angeles (2012)
- Chancellor's Service Award, University of California Los Angeles (2012)
- Regent's Scholar Award, University of California Los Angeles (2008)

## **BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS**

- Artificial Intelligence (AI) Task Force, American Academy of Otolaryngology-Head & Neck Surgery (2024 - present)
- Medical Devices and Drugs Committee, American Academy of Otolaryngology-Head & Neck Surgery (2024 - present)
- Medical Informatics Committee, American Academy of Otolaryngology-Head & Neck Surgery (2024 - present)
- Quality Improvement Committee, American Rhinologic Society (2024 - present)
- Value-Based Healthcare Committee, North American Skull Base Society (2024 - present)
- Humanitarian Efforts Committee, American Academy of Otolaryngology-Head & Neck Surgery (2022 - 2023)
- Telehealth Committee, American Academy of Otolaryngology-Head & Neck Surgery (2022 - 2023)
- Operating Room Staff Committee, Stanford Health Care (2020 - 2023)
- Medical Devices Committee, American Academy of Otolaryngology-Head & Neck Surgery (2020 - 2021)
- Health Information Management Committee, Stanford Health Care (2020 - 2023)
- Teamwork Advisory Council and Stanford Medicine Center for Improvement (SMCI), Stanford Health Care (2020 - 2023)

## **PROFESSIONAL EDUCATION**

- Fellowship, Mass Eye and Ear/Harvard Medical School , Rhinology & Skull Base Surgery (2024)
- Residency, Stanford University School of Medicine , Otolaryngology - Head & Neck Surgery (2023)
- Medical Degree (MD), Stanford University School of Medicine (2018)
- MBA, Stanford University Graduate School of Business (GSB) (2018)
- BS, University of California, Los Angeles , Integrative Biology and Physiology (2012)

## Publications

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### PUBLICATIONS

- **Large Language Models in Otolaryngology Residency Admissions: A Random Sampling Analysis.** *The Laryngoscope*  
Halagur, A. S., Balakrishnan, K., Ayoub, N.  
2024
- **Artificial Intelligence in Rhinology.** *Otolaryngologic clinics of North America*  
Ayoub, N. F., Glicksman, J. T.  
2024
- **The utility of ChatGPT as a generative medical translator.** *European archives of oto-rhino-laryngology : official journal of the European Federation of Oto-Rhino-Laryngological Societies (EUFOS) : affiliated with the German Society for Oto-Rhino-Laryngology - Head and Neck Surgery*  
Grimm, D. R., Lee, Y. J., Hu, K., Liu, L., Garcia, O., Balakrishnan, K., Ayoub, N. F.  
2024
- **Inherent Bias in Large Language Models: A Random Sampling Analysis** *Mayo Clinic Proceedings: Digital Health*  
Ayoub, N. F., Balakrishnan, K., Ayoub, M. S., Barrett, T. F., David, A., Gray, S.  
2024; 2 (2): 186-191
- **Redefining "Value" in Surgery: Development of a Comprehensive Value Score for Outpatient Endocrine Surgery.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*  
Ayoub, N. F., Noel, J., Orloff, L. A., Balakrishnan, K.  
2023
- **Time-Driven Activity-Based Cost Comparison of Thyroid Lobectomy and Radiofrequency Ablation.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*  
Ayoub, N. F., Balakrishnan, K., Orloff, L. A., Noel, J. E.  
2023
- **Comparison Between ChatGPT and Google Search as Sources of Postoperative Patient Instructions.** *JAMA otolaryngology-- head & neck surgery*  
Ayoub, N. F., Lee, Y., Grimm, D., Balakrishnan, K.  
2023
- **Price Transparency and Compliance With Federal Regulation for Pediatric Tonsillectomy.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*  
Ayoub, N. F., Balakrishnan, K.  
2021: 1945998211047146
- **Assessment of Opioid Use and Analgesic Requirements After Endoscopic Sinus Surgery: A Randomized Clinical Trial.** *JAMA otolaryngology-- head & neck surgery*  
Ayoub, N. F., Choby, G., Turner, J. H., Abuzeid, W. M., Raviv, J. R., Thamboo, A., Ma, Y., Chandra, R. K., Chowdhury, N. I., Stokken, J. K., O'Brien, E. K., Shah, S., Akbar, et al  
2021
- **Transsphenoidal retrieval of a needlefish beak remnants from the optic canal.** *International forum of allergy & rhinology*  
Sbeih, F., Zhou, H. W., Ayoub, N. F., Ringel, B., Chiou, C. A., Rizzo, J. F., Bleier, B. S.  
2024
- **Complications Associated with AMBU™ Scope Use: An FDA MAUDE Analysis.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*  
Grimm, D. R., Halagur, A. S., Ayoub, N.  
2024
- **Contemporary practice patterns for chronic rhinosinusitis with nasal polyps.** *International forum of allergy & rhinology*  
Ayoub, N. F., Sbeih, F., Bleier, B. S.  
2024
- **The ophthalmologic crescent blade in endonasal surgery.** *International forum of allergy & rhinology*

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- Sbeih, F., Ayoub, N. F., Gass, V., Bleier, B. S.  
2024
- **The Effect of Surgeon Vocal Pitch and Gender on Patient Satisfaction**  
Nuyen, B., Wang, A., Ayoub, N. F., Rakkar, M., Kearney, A., Alyono, J.  
LIPPINCOTT WILLIAMS & WILKINS.2023: S264
  - **International consensus statement on allergy and rhinology: Sinonasal tumors.** *International forum of allergy & rhinology*  
Kuan, E. C., Wang, E. W., Adappa, N. D., Beswick, D. M., London, N. R., Su, S. Y., Wang, M. B., Abuzeid, W. M., Alexiev, B., Alt, J. A., Antognoni, P., Alonso-Basanta, M., Batra, et al  
2023
  - **Head-to-Head Comparison of ChatGPT Versus Google Search for Medical Knowledge Acquisition.** *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*  
Ayoub, N. F., Lee, Y., Grimm, D., Divi, V.  
2023
  - **Mind + Machine: ChatGPT as a Basic Clinical Decisions Support Tool.** *Cureus*  
Ayoub, M., Ballout, A. A., Zayek, R. A., Ayoub, N. F.  
2023; 15 (8): e43690
  - **Safety and effectiveness of vocal fold injection laryngoplasty in infants less than one year of age.** *International journal of pediatric otorhinolaryngology*  
Ayoub, N., Balakrishnan, K., Meister, K., Grimm, D., Johnson, A., Maida, K., Sidell, D. R.  
2023; 168: 111542
  - **Addressing hearing loss for 38 million Americans**  
Ayoub , N., Lin , F., Schulman , K.  
Harvard Business Review and Stanford Graduate School of Business.  
2023
  - **Mind + Machine: ChatGPT as a clinical decision support tool**  
Ayoub , M., Ballout , A., Zayek , R., Ayoub , N.  
Cureus.  
2023
  - **The Inferior Turbinate: Role in Normal Respiration and Airway Obstruction** *CURRENT OTORHINOLARYNGOLOGY REPORTS*  
Thamboo, A., Ayoub, N., Maul, X., Nayak, J.  
2021
  - **Pulmonary Embolism and Sigmoid Sinus Thrombosis After Translabyrinthine Vestibular Schwannoma Resection: A Retrospective Case Series.** *The Annals of otology, rhinology, and laryngology*  
Song, Y., Ayoub, N., Chen, J. X., Alyono, J. C., Welling, D. B.  
2021: 34894211036864
  - **Oral Corticosteroids Following Endoscopic Sinus Surgery for Chronic Rhinosinusitis Without Nasal Polyposis: A Randomized Clinical Trial.** *JAMA otolaryngology-- head & neck surgery*  
Chang, M. T., Noel, J. n., Ayoub, N. F., Qian, Z. J., Dholakia, S. n., Nayak, J. V., Patel, Z. M., Hwang, P. H.  
2021
  - **Comparison of Parotidectomy With Observation for Treatment of Pleomorphic Adenoma in Adults.** *JAMA otolaryngology-- head & neck surgery*  
Kligerman, M. P., Jin, M., Ayoub, N., Megwalu, U. C.  
2020
  - **Nasal Symptoms Following Laryngectomy: A Cross-sectional Analysis.** *American journal of rhinology & allergy*  
Ayoub, N., Kearney, A., Sayyid, Z. N., Erickson-DiRenzo, E., Jeffrey, C., Hwang, P. H.  
2020: 1945892420901631
  - **Facial Paralysis and Communicative Participation: The Importance of Facial Symmetry at Rest.** *The Annals of otology, rhinology, and laryngology*  
Ayoub, N. F., Abdelwahab, M. n., Zhang, M. n., Ma, Y. n., Stranberg, S. n., Okland, T. S., Pepper, J. P.  
2020: 3489420912446

- **Acute Exacerbations in Recurrent Acute Rhinosinusitis: Differences in Quality of Life and Endoscopy.** *The Laryngoscope*  
Beswick, D. M., Ayoub, N. F., Mace, J. C., Mowery, A., Hwang, P. H., Smith, T. L.  
2019
- **Correlation between extent of sinus surgery, radiographic disease, and postoperative outcomes.** *Rhinology*  
Ayoub, N., Walgama, E., Thamboo, A., Chitsuthipakorn, W., Patel, Z. M., Nayak, J. V., Hwang, P. H.  
2019
- **Static endoscopic swallow evaluation in children.** *The Laryngoscope*  
Meister, K. D., Okland, T., Johnson, A., Galera, R., Ayoub, N., Sidell, D. R.  
2019
- **Implementation of a targeted HPV educational program in a population with HIV.** *World journal of otorhinolaryngology - head and neck surgery*  
Ayoub, N., Sunwoo, J. B., Starmer, H. M.  
2019; 5 (2): 105–11
- **The Horizon Sign and Frontal Bar: Two Topographic Landmarks to Confirm Endoscopic Frontal Sinusotomy** *OTOLARYNGOLOGY-HEAD AND NECK SURGERY*  
Walgama, E. S., Thamboo, A., Tangbunrngtham, N., Ayoub, N., Patel, Z. M., Nayak, J. V.  
2019; 160 (4): 740–43
- **Appropriateness criteria predict outcomes for sinus surgery and may aid in future patient selection** *LARYNGOSCOPE*  
Beswick, D. M., Mace, J. C., Soler, Z. M., Ayoub, N. F., Rudmik, L., DeConde, A. S., Smith, T. L.  
2018; 128 (11): 2448–54
- **Correlations Between Cystic Fibrosis Genotype and Sinus Disease Severity in Chronic Rhinosinusitis** *LARYNGOSCOPE*  
Abuzeid, W. M., Song, C., Fastenberg, J. H., Fang, C. H., Ayoub, N., Jerschow, E., Mohabir, P. K., Hwang, P. H.  
2018; 128 (8): 1752–58
- **'Addressed to you not as a smoker... but as a doctor': doctor-targeted cigarette advertisements in JAMA** *ADDICTION*  
Jackler, R. K., Ayoub, N. F.  
2018; 113 (7): 1345–63
- **Nose blowing after endoscopic sinus surgery does not adversely affect outcomes** *LARYNGOSCOPE*  
Ayoub, N., Chitsuthipakorn, W., Nayak, J. V., Patel, Z. M., Hwang, P. H.  
2018; 128 (6): 1268–73
- **Epithelial separation theory for post-tonsillectomy secondary hemorrhage: evidence in a mouse model and potential heparin-binding epidermal growth factor-like growth factor therapy** *EUROPEAN ARCHIVES OF OTO-RHINO-LARYNGOLOGY*  
Beswick, D. M., Santa Maria, C., Ayoub, N. F., Capasso, R., Santa Maria, P.  
2018; 275 (2): 569–78
- **'Addressed to you not as a smoker... but as a doctor': doctor-targeted cigarette advertisements in JAMA.** *Addiction (Abingdon, England)*  
Jackler, R. K., Ayoub, N. F.  
2018
- **Efficacy of endoscopic sinus surgery for chronic rhinosinusitis following primary radiotherapy and concurrent chemotherapy for nasopharyngeal carcinoma** *INTERNATIONAL FORUM OF ALLERGY & RHINOLOGY*  
Ayoub, N., Walgama, E., Thamboo, A., Nayak, J. V., Hwang, P. H.  
2017; 7 (11): 1045–51
- **Radioanatomic Study of the Greater Palatine Canal Relevant to Endoscopic Endonasal Surgical Landmarks** *OTOLARYNGOLOGY-HEAD AND NECK SURGERY*  
Ayoub, N., Thamboo, A., Hwang, P. H., Walgama, E. S.  
2017; 157 (4): 731–36
- **The impact of developing a speech and swallow rehab program: Improving patient satisfaction and multidisciplinary care.** *Laryngoscope*  
Starmer, H. M., Ayoub, N., Byward, C., Kizner, J., Le, Q., Hara, W., Holsinger, F. C.  
2017

- **Determinants and outcomes of upfront surgery versus medical therapy for chronic rhinosinusitis in cystic fibrosis.** *International forum of allergy & rhinology*  
Ayoub, N., Thamboo, A., Habib, A., Nayak, J. V., Hwang, P. H.  
2017
- **Evidence for a 'preinvasive' variant of fungal sinusitis: Tissue invasion without angioinvasion.** *World journal of otorhinolaryngology - head and neck surgery*  
Paknezhad, H. n., Borchard, N. A., Charville, G. W., Ayoub, N. F., Choby, G. W., Thamboo, A. n., Nayak, J. V.  
2017; 3 (1): 37-43
- **Leading-Brand Advertisement of Quitting Smoking Benefits for E-Cigarettes.** *American journal of public health*  
Ramamurthi, D., Gall, P. A., Ayoub, N., Jackler, R. K.  
2016; 106 (11): 2057-2063
- **Distinguishing computed tomography findings in patients with empty nose syndrome.** *International forum of allergy & rhinology*  
Thamboo, A., Velasquez, N., Ayoub, N., Nayak, J. V.  
2016; 6 (10): 1075-1082
- **Objective and subjective scar aesthetics with topical Manuka honey post-thyroidectomy: A randomized control study.** *World journal of otorhinolaryngology - head and neck surgery*  
Thamboo, A. n., Mulholland, G. n., Matthews, K. n., Ayoub, N. n., Anderson, D. n.  
2016; 2 (4): 203-7
- **Experience With Aflibercept for the Treatment of Neovascular Age-Related Macular Degeneration.** *Ophthalmic surgery, lasers & imaging retina*  
He, L., Silva, R. A., Ayoub, N., Moshfeghi, D. M., Leng, T.  
2015; 46 (5): 542-549
- **Management of Recurrent Hepatocellular Carcinoma in Liver Transplant Recipients: A Systematic Review** *EXPERIMENTAL AND CLINICAL TRANSPLANTATION*  
Rubin, J., Ayoub, N., Kaldas, F., Saab, S.  
2012; 10 (6): 531-543
- **Differences in Health-Related Quality of Life Scores After Orthotopic Liver Transplantation With Respect to Selected Socioeconomic Factors** *LIVER TRANSPLANTATION*  
Saab, S., Bownik, H., Ayoub, N., Younossi, Z., Durazo, F., Han, S., Hong, J. C., Farmer, D., Busuttil, R. W.  
2011; 17 (5): 580-590