In order of importance, list of ten best papers of the candidate, highlighting the important discoveries/contributions described in them briefly (not to exceed 3000 words)

1. Singh P, Doostkam S, Reinhard M, Ivanovas V, Taschner CA. Immunohistochemical analysis of thrombi retrieved during treatment of acute ischemic stroke: does stent-retriever cause intimal damage? Stroke. 2013;44:1720-2

A clot in an artery supplying blood to the brain is the most frequent cause of stroke that is one of the leading causes of death worldwide. This work helped towards establishing safety of Mechanical Thrombectomy (Stent Retrievers) in the management of Acute Ischemic Stroke. Besides above, this research provided systematic histological analysis of fresh thrombi retrieved from patients with ischemic stroke. It may be pertinent to mention here that knowledge of the composition of the fresh brain clots holds a great promise by not only helping to improve the existing medical and interventional treatment modalities for stroke but also aiding in introduction of newer treatment modalities as well as improved prevention strategies.

2. Singh P, Singh J, Peer S, Jindal M, Ludhiadch A, Munshi A. Assessment of resting state functional Magnetic Resonance Imaging (fMRI) connectivity among patients with major depressive disorder – A comparative study. Annals of Neurosciences (accepted for publication)

This work was 1st of its kind in patients with major depressive disorder (MDD) from Indian subcontinent who underwent analysis by functional MRI (fMRI). The main outcome of this study was a reduced connectivity on functional MRI (fMRI) between certain key regions of the brain in MDD patients, i.e., between the left insular cortex and left nucleus accumbens and between left paracingulate gyrus and bilateral posterior middle temporal gyrus. These findings could explain the basis of clinical features of MDD such as anhedonia, rumination of thoughts, reduced visuo-spatial comprehension, reduced language function and response to external stimuli.

3. Peer S, Singh P. Intraluminal arterial transit artifact as a predictor of intracranial large artery stenosis on 3D time of flight MR angiography: Expanding the application of arterial spin labeling MRI in ischemic stroke. J Clin Imaging Sci 2023;13:17.

It has been rightly stated that “one person’s artifact is another person’s biomarker”. Often dubbed as "Poor Man's PET", Arterial Spin Labelling (ASL) can unearth many aspects of human physiology as well as pathology. This study established the diagnostic value of “intraluminal arterial transit artifact (ATA)” seen on arterial spin labelling (ASL) MRI sequences. Our data suggest that the presence of ATA within the lumen of an intracranial artery is predictive of ≥56% stenosis within the vessel (as evaluated on TOF MRA using the methodology of the present study). We also hypothesized that the presence of intraluminal ATA sign could predict significant ischemic events in the territory of the involved artery. Indeed, our data show that in a multivariate forward stepwise logistic regression model, the presence of intraluminal ATA is an independent predictor of an acute and or chronic infarct in the territory of the involved artery. The outcomes of this study will help the neurologists and other medical professionals in appropriately treating the stroke patients and thus lowering their risk of stroke in the future.

4. Ludhiadch A, Sulena, Singh S, Chakraborty S, Sharma D, Kulharia M, Singh P, Munshi A. Genomic Variation Affecting MPV and PLT Count in Association with Development of Ischemic

Stroke and Its Subtypes. Mol Neurobiol. 2023 Jul 15. doi: 10.1007/s12035-023-03460-2. Epub ahead of print. PMID: 37453995.

Platelets play a significant role in the pathophysiology of ischemic stroke since they are involved in the formation of intravascular thrombus after erosion or rupture of the atherosclerotic plaques. Platelet (PLT) count and mean platelet volume (MPV) are the two significant parameters that affect the functions of platelets. This research study demonstrated the role of higher Mean Platelet volume (MPV) affected by genetic variation in the development of Ischemic stroke (IS) and its subtypes. The results of the current study also indicated that higher MPV can be used as a biomarker for the disease and altered genotypes, and higher MPV can be targeted for better therapeutic outcomes.

5. Zou Z, Liu G, Hay SI, Basu S, Belgaumi UI, Dhali A, Dhingra S, Fekadu G, Golechha M, Joseph N, Krishan K, Martins-Melo FR, Mubarik S, Okonji OC, A MP, Rathi P, Shetty RS, Singh P, Singh S, Thangaraju P, Wang Z, Zastrozhin MS, Murray CJL, Kyu HH, Huang Y. Time trends in tuberculosis mortality across the BRICS: an age-period-cohort analysis for the GBD 2019. EClinicalMedicine. 2022 Sep 17;53:101646. doi: 10.1016/j.eclinm.2022.101646.

The authors analyzed the time trends of tuberculosis mortality across the BRICS countries, emphasizing HIV status from 1990 to 2019. We reported the tuberculosis age-standardized mortality rate (ASMR), death number and relative proportion of tuberculosis to all communicable, maternal, neonatal, and nutritional diseases by HIV status from 1990 to 2019 across the BRICS. We also reported how trends in tuberculosis mortality vary by age, period, and birth cohort to compare the achievements in each country and put forward priority groups in policymaking. This study concluded that the tuberculosis burden was less significantly improved in BRICS' HIV-negative populations compared with the high-income Asia Pacific countries. From 1990 to 2019, India maintained the highest tuberculosis death numbers (422,634 in 2019) and its annual mortality decline was much slower than that of China (-4.1 vs -8.0%). Among HIV-positive populations, Brazil was the first country to reverse the upward trend of HIV/AIDS-tuberculosis (HIV-TB) mortality in 1995 and achieved the most significant reduction (-3.32% per year), while China's improvements barely budged in the last decade. The HIV-TB mortality in South Africa has realized much progress since 2006 but still has the heaviest HIV-TB mortality burden. Unfavorable trends in tuberculosis mortality were observed, especially in HIV-negative middle-aged adults from India and HIV-positive younger birth cohorts (born after 1980) from China.

6. GBD 2019 Antimicrobial Resistance Collaborators. Global mortality associated with 33 bacterial pathogens in 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2022 Dec 17;400(10369):2221-2248.

Reducing the burden of death due to infection is an urgent global public health priority. Understanding the global burden of common bacterial pathogens (both susceptible and resistant to antimicrobials) is essential to identify the greatest threats to public health. This is the first study to present global comprehensive estimates of deaths associated with 33 bacterial pathogens across 11 major infectious syndromes. The 33 bacterial pathogens were investigated in this study and the authors found that these are a substantial source of health loss globally, with considerable variation in their distribution across infectious syndromes and locations. Deaths associated with these bacteria would rank as the second leading cause of death globally in 2019; hence, they should be considered an urgent priority for intervention within the global health community. Strategies to address the burden of bacterial infections include infection prevention, optimized use of antibiotics, improved capacity for microbiological analysis, vaccine development, and improved and more pervasive use

of available vaccines. These estimates can be used to help set priorities for vaccine need, demand, and development.

7. GBD 2019 Cancer Risk Factors Collaborators. The global burden of cancer attributable to risk factors, 2010-19: a systematic analysis for the Global Burden of Disease Study 2019. Lancet. 2022 Aug 20;400(10352):563-591. doi: 10.1016/S0140-6736(22)01438-6.

Cancer is the second leading cause of death worldwide, and exposure to risk factors plays an important role in the biology and burden of many cancer types. Understanding the relative contribution of modifiable risk factors to cancer burden and their trends over time is crucial to informing cancer control efforts both locally and globally. The authors found that the leading risk factors at the most detailed level globally for risk-attributable cancer deaths and Disability adjusted life years (DALYs) in 2019 for both sexes combined were smoking, followed by alcohol use and high BMI. Risk-attributable cancer burden varied by world region and Socio-demographic Index (SDI), with smoking, unsafe sex, and alcohol use being the three leading risk factors for risk-attributable cancer DALYs in low SDI locations in 2019, whereas DALYs in high SDI locations mirrored the top three global risk factor rankings. Hence, the leading risk factors contributing to global cancer burden in 2019 were behavioral, whereas metabolic risk factors saw the largest increases between 2010 and 2019. Reducing exposure to these modifiable risk factors would decrease cancer mortality and DALY rates worldwide, and policies should be tailored appropriately to local cancer risk factor burden.

8. Goyal LD, Bakshi DK, Arora JK, Manchanda A, Singh P. Assessment of fluoride levels during pregnancy and its association with early adverse pregnancy outcomes. J Family Med Prim Care 2020;9:2693-8.

The study confirmed the presence of excess fluoride levels in the underground and tap water of Faridkot district of north India. This study also concluded that excess fluoride intake during early pregnancy may lead to increased prevalence and severity of maternal anemia as well as adverse fetal outcomes in the form of miscarriages, abortions, intra-uterine deaths, and congenital malformations.

9. Agashe D, Maheshwary S, Pattanaik JK, Prakash J, Bhatt P, Arya SS, Chatterjee S, Kumar P, Singh P, Abbas N, Sharma CK, Chaudhuri CR, Devi P. Career challenges for young independent researchers in India. Curr Sci. 2022;122(2):135-43.

This was a national survey conducted by the authors regarding challenges faced by the Indian young scientists and a white paper was published. Following are the conclusions of this study:

- Limited employment opportunities for young scientists.
- Opaque and unevenly implemented hiring and promotion. There is a strong perception that these processes are unfair, and that they focus too much on pedigree instead of merit and on publication quantity instead of quality.
- Age limits on permanent positions end up penalizing scientists for career breaks, family responsibilities or longer training.
- Lack of seed funding and limited research funding opportunities for contractual staff.
- Poor functioning of funding agencies with frequent delays in the release of funds and lack of transparency during grant review.
- Poorly structured performance review systems that do not incentivize teamwork, participation in

scientific social responsibilities and administrative contributions.

- Poorly implemented Government guidelines on teaching load (especially for contract faculty), making young faculty vulnerable to exploitation.
- Inadequate institutional support or policies to enable young scientists to effectively navigate both family and job responsibilities.

10. Goyal LD, Dhaliwal B, Singh P, Ganjoo S, Goyal V. Management of mullerian development anomalies: 9 years' experience of a tertiary care center. Gynecol Minim Invasive Ther 2020;9:81-7.

Mullerian duct anomalies (MDA) are rare but can lead to poor pregnancy outcomes and are a treatable cause of infertility in females. We did research on these congenital anomalies of the genital tract of females (Mullerian duct anomalies) and summarized our experiences and best practices. This study spanned over 9 years and its outcomes have aided in better awareness, improved diagnosis and management of such patients. This will ultimately lead to improved pregnancy outcomes besides better management of infertility in such patients.