

Research Article

Statewide Prevalence of Stepping on, Tai Chi, and a Matter of Balance Community Fall Prevention Programs at Maryland Senior Centers in 2017 and 2020

Natan Hekmatjah^{1*}, Corey Hamel^{2*}, David N Younessi^{1,3}, Michael Zargari¹, Brandon Sedaghat¹, Mason Eghbali^{1,4}, Leon Kamen^{1,5}, Michael Nazar¹, Michael Tsiang⁶ and Levan Atanelov^{7,8*}

¹University of California, Los Angeles, California, USA

²Touro College of Osteopathic Medicine, Middletown, New York, USA

³Northwestern University Feinberg School of Medicine, Chicago, Illinois, USA

⁴California University of Science and Medicine, Colton, California, USA

⁵SUNY Downstate College of Medicine, Brooklyn, New York, USA

⁶Department of Statistics, University of California, Los Angeles, California, USA

⁷Steady Strides: Fall Prevention and Stroke Rehabilitation Medical Institute, Baltimore, Maryland, USA

⁸Johns Hopkins Physical Medicine and Rehabilitation, Baltimore, Maryland, USA

*Contributed equally to this work

Abstract

Study background: Older adults suffer from fall-related injuries and deaths at disproportionate rates. One recommendation by the Center for Disease Control and Prevention to help prevent falls is that patients utilize Community Fall Prevention Programs (CFPPs). Little is known about the offering of these programs at Senior Centers (SCs).

Methods: We conducted a telephone-based survey to assess the

statewide prevalence and underreporting in Maryland SCs of Stepping On (SO), Tai Chi (TC) and a Matter of Balance (MOB).

Results: 107 SCs were contacted in December 2017, and 111 in January 2020. 76.6% of SCs offered at least one of these three programs in 2017 but only 56.8% in 2020 (95% CI 6.7% to 33.0%; $P=.003$). SO was offered in 27 SCs (25.2%) in 2017 and 7 (6.3%) in 2020 (95% CI 8.6% to 29.2%; $P<.001$). TC was offered in 70 SCs (65.4%) in 2017 and 61 (55.0%) in 2020. MOB was offered in 12 SCs (11.2%) in 2017 and 2 (1.8%) in 2020 (95% CI 2.0 to 16.8%; $P=.01$). Furthermore, telephone operators did not volunteer availability of these programs 72.5% in 2017 and 95.7% in 2020 (95% CI 12.4% to 33.0%; $P<.001$). SO was underreported by 66.7% of SCs in 2017 and 100% in 2020. TC was underreported by 71.4% of SCs in 2017 and 95.1% in 2020 (95% CI 10.2 to 37.1, $P<.001$). MOB was underreported by 91.7% of SCs in 2017 and 100% in 2020.

Conclusion: There are geographical and temporal variations in these three CFPP offerings, with a downward trend in Maryland. Over the span of our study, the prevalence of these three programs has significantly decreased, while underreporting has significantly increased. Evidently, seniors may have difficulty finding CFPPs or receiving correct information about them from local SCs.

Keywords: Falls; Fall prevention; Geriatrics; Older adults; Senior center

Introduction

The Centers for Disease Control and Prevention (CDC) recommends evidence-based Community Fall Prevention Programs (CFPPs) to prevent fall-related injury in older adults [1]. Though access to healthcare is one of the five key areas of social determinants of health, little is known about the offering of CFPPs at Senior Centers (SCs). Prior studies indicate that Stepping On (SO), Tai Chi (TC), and A Matter of Balance (MOB) may be the most common CFPPs at SCs in the US. Prior prevalence literature only examined rural areas [2], or medical center vicinity [3], and did not assess trends over time. The current study assesses statewide availability of SO, TC and MOB in 2017 and 2020 (prior to the COVID19 pandemic) to help better understand access to CFPPs in Maryland.

Materials and Methods

Participants

111 SCs across the 24 counties listed in Maryland Department of Aging's 2015 Database [4] were studied. Nursing homes, assisted living facilities, adult day care centers and community wellness programs were excluded.

Study design and survey method

We conducted telephone-based surveys in December 2017 and January 2020 to gather the data. SC telephone numbers were obtained from the 2015 Database [4] and were contacted on weekdays during normal business hours. SCs were excluded if no point of contact was established after three attempts on separate days. We did not differentiate between different types of TC interventions e.g., Tai Chi for

*Corresponding author: Levan Atanelov, Steady Strides: Fall Prevention and Stroke Rehabilitation Medical Institute; Johns Hopkins Physical Medicine and Rehabilitation, 9199 Reisterstown Rd Suit 101B, Owings Mills, MD 21117, USA, Tel: +1 4438988160; E-mail: latanelov@steadystridesmd.com

Citation: Hekmatjah N, Hamel C, Younessi DN, Zargari M, Sedaghat B, et al. (2021) Statewide Prevalence of Stepping on, Tai Chi, and a Matter of Balance Community Fall Prevention Programs at Maryland Senior Centers in 2017 and 2020. J Gerontol Geriatr Med 7: 097.

Received: May 25, 2021; **Accepted:** May 28, 2021; **Published:** June 04, 2021

Copyright: © 2021 Hekmatjah N, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Arthritis (TCA) or Tai Ji Quan: Moving for Better Balance (TJQ), since telephone operators only referred to any of these programs as TC. After reaching a SC, the telephone operator was asked two questions: 1) “For geriatrics, what fall prevention programs do you offer?” and 2) “Does your senior center offer SO?, TC?, or MOB?” If the SC representative requested clarification, we detailed the nature of these programs.

Data measurement

For each question, presence or absence of the three CFPPs queried was noted for each SC in 2017 and 2020.

Additional measures

Median county income (in dollars), county population, and proportion of seniors (>65 years old) for each of the 24 counties were obtained from the 2016 and 2018 US Census Bureau Quick Facts [5]. We hypothesized that these variables may play a role in the prevalence and underreporting of SO, TC and MOB.

Statistical analysis

Descriptive statistics were used to analyze the survey results, and univariate and multivariate logistic models were used to analyze our additional measures. Statistical analysis was performed using R: A Language and Environment for Statistical Computing, version 3.6.3, available at <http://www.R-project.org> (The R Foundation for Statistical Computing). P values were 2-sided at .05 significance.

Results

Across the 24 counties in Maryland, 107 SCs were contacted in December 2017 and 111 in January 2020. 76.6% of SCs offered at least one of these three CFPPs in 2017 but only 56.8% in 2020, a statistically significant decrease of 19.9% (95% CI 6.7% to 33.0%; $P=.003$). TC was offered in 70 SCs (65.4%) in 2017 and 61 (55.0%) in 2020 (95% CI 3.4% to 24.3%; $P=.15$). SO offering significantly decreased by 18.9% (95% CI 8.6% to 29.2%; $P<.001$) from 27 SCs (25.2%) in 2017 to 7 (6.3%) in 2020, whereas MOB by 9.4% (95% CI 2.0 to 16.8%; $P=.01$) from 12 SCs (11.2%) in 2017 to 2 (1.8%) in 2020 (Figure 1). Table 1 demonstrates that there is both regional and temporal variation in offering these CFPPs. Univariate analysis yielded association between SO prevalence and median county income ($P=.05$); TC prevalence and median county income and county population ($P<.001$ and $P=.004$). Multivariate analysis showed that TC prevalence maintained its association with median county income and county population ($P<.001$ and $P=.001$). In both analyses, MOB prevalence was associated with county population ($P=.05$ and $P=.04$).

Overall, telephone operators did not volunteer availability of CFPPs 72.5% in 2017 and 95.7% in 2020, a statistically significant increase of 23.2% (95% CI 12.4% to 33.0%; $P<.001$) (Figure 2). SO was underreported by 66.7% of SCs in 2017 and 100% in 2020 (95% CI 6.6 to 60.1; $P=.19$). TC was underreported by 71.4% of SCs in 2017 and 95.1% in 2020, a statistically significant increase of 23.7% (95% CI 10.2 to 37.1; $P<.001$). MOB was underreported by 91.7% of SCs in 2017 and 100% in 2020 (95% CI -15.6 to 32.3; $P>.99$). In both univariate and multivariate analyses, TC underreporting was associated with median county income ($P<.00$ and $P<.001$) and county population ($P=.02$ and $P=.01$).

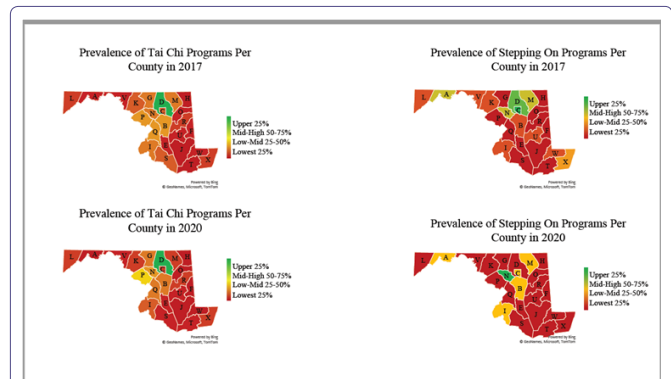


Figure 1: Prevalence of Tai Chi and stepping on programs per Baltimore County in 2017 and 2020.

County abbreviations: A: Allegany, B: Anne Arundel, C: Baltimore City, D: Baltimore County, E: Calvert, F: Caroline, G: Carroll, H: Cecil, I: Charles, J: Dorchester, K: Frederick, L: Garrett, M: Harford, N: Howard, O: Kent, P: Montgomery, Q: Prince George's, R: Queen Anne's, S: St. Mary's, T: Somerset, U: Talbot, V: Washington, W: Wicomico, X: Worcester

Discussion

Though CFPPs are part of the CDC's fall prevention algorithm [1], this is the first study to 1) provide a statewide survey of CFPPs at SCs; 2) assess for change in prevalence over time; and 3) document that telephone operators underreport CFPPs which they know to be offered. The current study examined the three nationally most common CFPPs [2,3] and found that at least half of the SCs offered at least one of them in 2017 and in 2020. That said, the prevalence of these programs decreased by 20% by 2020, even before the onset of the COVID19 pandemic, which caused closures of SCs nationally.

Our results indicate that there are regional and temporal variations. An older adult in Maryland who inquires about such programs at two senior centers is likely to find at least one of the three CFPPs. CFPP statewide prevalence data, combined with a clinical referral algorithm (e.g., Hamel et al., [6]), can help physicians more efficiently guide older adults to the local SC offering the appropriate CFPP. If our findings—which show significant temporal and geographical variation in the offering of CFPP—are nationally representative, then real-time online platforms should be developed to help clinicians direct patients to the SC offering the CFPP best suited to their needs.

Unfortunately, we found that making a phone call to inquire about these programs oftentimes results in receiving misleading information. In over 70% of cases, telephone operators at SCs who knew that a particular CFPP was offered failed to volunteer this information when asked about fall prevention programs at their facility. Now, amid further dissemination of the COVID19 vaccine and the positive prospects of opening SCs soon, a public health initiative may be undertaken to ensure that SC phone operators properly inform customers about the availability of their CFPPs. A national study on CFPP prevalence in SCs across the US near medical centers found that the most common CFPPs are (1) TC, (2) MOB and (3) SO [3]. A national rural-based study found that the most common CFPPs are (1) MOB, (2) SO and (3) TJQ (a type of TC) [2]. Our results indicate that the TC prevalence in Maryland is consistent with trends near medical centers and surpasses rural trends, and that MOB was not well represented in Maryland.

Limitations include only examining 3 CFPPs at SC in only one state and not differentiating between different types of TC. Although

	Prevalence Number/Total Number of SC (%)						Underreporting Number/Total Number of SC* (%)					
	SO		TC		MOB		SO		TC		MOB	
	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020	2017	2020
Allegany (n=4)	3/4 (75)	1/4 (25)	1/4 (25)	0/4 (0)	0/4 (0)	0/4 (0)	0/3 (0)	1/1 (100)	0/1 (0)	N/A	N/A	N/A
Anne Arundel (n=8)	1/8 (13)	1/8 (13)	5/8 (63)	4/8 (50)	1/8 (13)	1/8 (13)	1/1 (100)	1/1 (100)	4/5 (80)	4/4 (100)	1/1 (100)	1/1 (100)
Baltimore City (n=13)	5/13 (38)	1/13 (8)	3/13 (23)	2/13 (15)	0/13 (0)	1/13 (8)	5/5 (100)	1/1 (100)	1/3 (33)	2/2 (100)	N/A	1/1 (100)
Baltimore County (n=19)	4/19 (21)	0/19 (0)	17/19 (89)	17/19 (89)	0/19 (0)	0/19 (0)	3/4 (75)	N/A	13/17 (76)	15/17 (88)	N/A	N/A
Calvert (n=3)	0/3 (0)	0/3 (0)	1/3 (33)	1/3 (33)	0/3 (0)	0/3 (0)	N/A	N/A	1/1 (100)	1/1 (100)	N/A	N/A
Caroline (n=2)	0/2 (0)	0/2 (0)	1/2 (50)	0/2 (0)	0/2 (0)	0/2 (0)	N/A	N/A	0/1 (0)	N/A	N/A	N/A
Carroll (n=5)	0/5 (0)	0/5 (0)	4/5 (80)	4/5 (80)	1/5 (20)	0/5 (0)	N/A	N/A	4/4 (100)	4/4 (100)	1/1 (100)	N/A
Cecil (n=1)	0/1 (0)	0/1 (0)	0/1 (0)	0/1 (0)	0/1 (0)	0/1 (0)	N/A	N/A	N/A	N/A	N/A	N/A
Charles (n=4)	1/4 (25)	1/4 (25)	4/4 (100)	3/4 (75)	1/4 (25)	0/4 (0)	1/1 (100)	1/1 (100)	3/4 (75)	3/3 (100)	1/1 (100)	N/A
Dorchester (n=2)	0/2 (0)	0/2 (0)	0/2 (0)	0/2 (0)	0/2 (0)	0/2 (0)	N/A	N/A	N/A	N/A	N/A	N/A
Frederick (n=4)	1/4 (25)	0/4 (0)	3/4 (75)	2/4 (50)	1/4 (25)	0/4 (0)	0/1 (0)	N/A	3/3 (100)	2/2 (100)	1/1 (100)	N/A
Garrett (n=3)	1/3 (33)	0/3 (0)	2/3 (67)	2/3 (67)	0/3 (0)	0/3 (0)	1/1 (100)	N/A	1/2 (50)	2/2 (100)	N/A	N/A
Harford (n=6)	3/6 (50)	1/6 (17)	4/6 (67)	2/6 (33)	0/6 (0)	0/6 (0)	1/3 (33)	1/1 (100)	3/4 (75)	2/2 (100)	N/A	N/A
Howard (n=7)	3/7 (43)	2/7 (29)	4/7 (57)	5/7 (71)	0/7 (0)	0/7 (0)	3/3 (100)	2/2 (100)	4/4 (100)	5/5 (100)	N/A	N/A
Kent (n=1)	0/1 (0)	0/1 (0)	1/1 (100)	0/1 (0)	1/1 (100)	0/1 (0)	N/A	N/A	1/1 (100)	N/A	1/1 (100)	N/A
Montgomery (n=7)	0/7 (0)	0/7 (0)	5/7 (71)	7/7 (100)	1/7 (14)	0/7 (0)	N/A	N/A	2/5 (40)	7/7 (100)	1/1 (100)	N/A
Prince George's (n=8)	0/8 (0)	0/8 (0)	5/8 (63)	4/8 (50)	0/8 (0)	0/8 (0)	N/A	N/A	5/5 (100)	3/4 (100)	N/A	N/A
Queen Anne's (n=3)	0/3 (0)	0/3 (0)	2/3 (67)	2/3 (67)	1/3 (33)	0/3 (0)	N/A	N/A	1/2 (50)	2/2 (100)	1/1 (100)	N/A
St. Mary's (n=1)	1/1 (100)	0/1 (0)	1/1 (100)	1/1 (100)	1/1 (100)	0/1 (0)	1/1 (100)	N/A	1/1 (100)	1/1 (100)	1/1 (100)	N/A
Somerset (n=3)	0/3 (0)	0/3 (0)	3/3 (100)	1/3 (33)	2/3 (67)	0/3 (0)	N/A	N/A	1/3 (33)	1/1 (100)	1/2 (50)	N/A
Talbot (n=1)	0/1 (0)	0/1 (0)	0/1 (0)	1/1 (0)	0/1 (0)	0/1 (0)	N/A	N/A	N/A	1/1 (100)	N/A	N/A
Washington (n=1)	1/1 (100)	0/1 (0)	1/1 (100)	1/1 (100)	0/1 (0)	0/1 (0)	0/1 (0)	N/A	0/1 (0)	1/1 (100)	N/A	N/A
Wicomico (n=1)	1/1 (100)	0/1 (0)	1/1 (100)	0/1 (0)	1/1 (100)	0/1 (0)	0/1 (0)	N/A	1/1 (100)	N/A	1/1 (100)	N/A
Worcester (n=4)	2/4 (50)	0/4 (0)	2/4 (50)	2/4 (50)	1/4 (25)	0/4 (0)	2/2 (100)	N/A	1/2 (50)	2/2 (100)	1/1 (100)	N/A

Table 1: Telephone survey results collected in 2017 and 2020 by Maryland County.

*Total number of senior centers which offer the program.
N/A values are indicated for counties where the specific fall prevention program was not offered that year
Abbreviations: SC: Senior Center; SO: Stepping On, TC: Tai Chi, MOB: A Matter of Balance

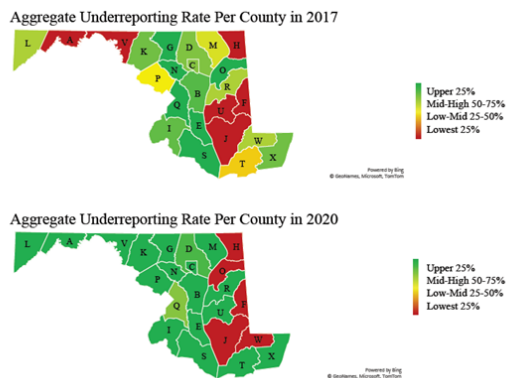


Figure 2: Aggregate underreporting rates of Tai Chi, stepping on, and a matter of balance programs per Baltimore County in 2017 and 2020.
County abbreviations: A: Allegany, B: Anne Arundel, C: Baltimore City, D: Baltimore County, E: Calvert, F: Caroline, G: Carroll, H: Cecil, I: Charles, J: Dorchester, K: Frederick, L: Garrett, M: Harford, N: Howard, O: Kent, P: Montgomery, Q: Prince George's, R: Queen Anne's, S: St. Mary's, T: Somerset, U: Talbot, V: Washington, W: Wicomico, X: Worcester

SCs are the most common places where CFPPs are delivered [7], our study did not evaluate other venues that may offer these programs. Additionally, this study only evaluated inquiries over the phone, whereas SCs may also communicate their programs in other ways, e.g., email. CFPP availability landscape may change in the post-COVID19 era. In summary, at least 50% of SCs offer CFPPs. There are geographical and temporal variations in CFPP offering, with a downward trend in Maryland. Telephone operators at SCs in Maryland do not commonly volunteer information about CFPP availability.

Statements

Acknowledgment

Ilan Lavian, New York University School of Law, provided comments and edits on the manuscript; Chaniesha Burnett, Steady Strides: Fall Prevention and Stroke Rehabilitation Medical Institute, assisted with data collection.

Conflicts of interest

The authors have no conflicts of interests to declare.

Funding sources

The authors have no funding sources to declare.

Author's contribution/commitment

LA: Study concept and design

NH, CH, DNY, MZ, BS, ME, LK, MN, MT, and LA: Acquisition of data, analysis and interpretation of data

MT: Statistical analysis

NH and CH: Preparation of manuscript

NH, CH, DNY, MZ, BS, ME, LK, MN, MT, and LA: Read and approved the final manuscript

Data Deposition: Not needed, Table 1 included

References

1. Centers for Disease Control and Prevention (2020) Algorithm for Fall Risk Screening, Assessment, and Intervention. CDC, Atlanta, Georgia, USA.
2. Smith ML, Towne SD, Herrera-Venson A, Cameron K, Horel SA, et al. (2018) Delivery of fall prevention interventions for at-risk older adults in rural areas: Findings from a national dissemination. *Int J Environ Res Public Health* 15: 2798.
3. Hamel C, Hekmatjah N, Hakakian B, Banooni M, Lalezari J, et al. (2019) Evidence-Based Community Fall Prevention Programs at Senior Centers Near 10 US Academic Centers. *J Am Geriatr Soc* 67: 1484-1488.
4. Maryland Department of Aging (2015) Maryland Senior Centers. Maryland Department of Aging, Baltimore, USA.
5. US Census Bureau (2019) US Census Bureau Quick Facts. US Census Bureau Maryland, USA.
6. Hamel C, Atanelov L (2020) Community-based programs to prevent the risk of elderly falls: mini review. *J Card Pulm Rehabil* 4: 129.
7. National Council on Aging (2015) Get the Facts on Senior Centers. National Council on Aging, Virginia, USA.



Advances In Industrial Biotechnology | ISSN: 2639-5665

Advances In Microbiology Research | ISSN: 2689-694X

Archives Of Surgery And Surgical Education | ISSN: 2689-3126

Archives Of Urology

Archives Of Zoological Studies | ISSN: 2640-7779

Current Trends Medical And Biological Engineering

International Journal Of Case Reports And Therapeutic Studies | ISSN: 2689-310X

Journal Of Addiction & Addictive Disorders | ISSN: 2578-7276

Journal Of Agronomy & Agricultural Science | ISSN: 2689-8292

Journal Of AIDS Clinical Research & STDs | ISSN: 2572-7370

Journal Of Alcoholism Drug Abuse & Substance Dependence | ISSN: 2572-9594

Journal Of Allergy Disorders & Therapy | ISSN: 2470-749X

Journal Of Alternative Complementary & Integrative Medicine | ISSN: 2470-7562

Journal Of Alzheimers & Neurodegenerative Diseases | ISSN: 2572-9608

Journal Of Anesthesia & Clinical Care | ISSN: 2378-8879

Journal Of Angiology & Vascular Surgery | ISSN: 2572-7397

Journal Of Animal Research & Veterinary Science | ISSN: 2639-3751

Journal Of Aquaculture & Fisheries | ISSN: 2576-5523

Journal Of Atmospheric & Earth Sciences | ISSN: 2689-8780

Journal Of Biotech Research & Biochemistry

Journal Of Brain & Neuroscience Research

Journal Of Cancer Biology & Treatment | ISSN: 2470-7546

Journal Of Cardiology Study & Research | ISSN: 2640-768X

Journal Of Cell Biology & Cell Metabolism | ISSN: 2381-1943

Journal Of Clinical Dermatology & Therapy | ISSN: 2378-8771

Journal Of Clinical Immunology & Immunotherapy | ISSN: 2378-8844

Journal Of Clinical Studies & Medical Case Reports | ISSN: 2378-8801

Journal Of Community Medicine & Public Health Care | ISSN: 2381-1978

Journal Of Cytology & Tissue Biology | ISSN: 2378-9107

Journal Of Dairy Research & Technology | ISSN: 2688-9315

Journal Of Dentistry Oral Health & Cosmesis | ISSN: 2473-6783

Journal Of Diabetes & Metabolic Disorders | ISSN: 2381-201X

Journal Of Emergency Medicine Trauma & Surgical Care | ISSN: 2378-8798

Journal Of Environmental Science Current Research | ISSN: 2643-5020

Journal Of Food Science & Nutrition | ISSN: 2470-1076

Journal Of Forensic Legal & Investigative Sciences | ISSN: 2473-733X

Journal Of Gastroenterology & Hepatology Research | ISSN: 2574-2566

Journal Of Genetics & Genomic Sciences | ISSN: 2574-2485

Journal Of Gerontology & Geriatric Medicine | ISSN: 2381-8662

Journal Of Hematology Blood Transfusion & Disorders | ISSN: 2572-2999

Journal Of Hospice & Palliative Medical Care

Journal Of Human Endocrinology | ISSN: 2572-9640

Journal Of Infectious & Non Infectious Diseases | ISSN: 2381-8654

Journal Of Internal Medicine & Primary Healthcare | ISSN: 2574-2493

Journal Of Light & Laser Current Trends

Journal Of Medicine Study & Research | ISSN: 2639-5657

Journal Of Modern Chemical Sciences

Journal Of Nanotechnology Nanomedicine & Nanobiotechnology | ISSN: 2381-2044

Journal Of Neonatology & Clinical Pediatrics | ISSN: 2378-878X

Journal Of Nephrology & Renal Therapy | ISSN: 2473-7313

Journal Of Non Invasive Vascular Investigation | ISSN: 2572-7400

Journal Of Nuclear Medicine Radiology & Radiation Therapy | ISSN: 2572-7419

Journal Of Obesity & Weight Loss | ISSN: 2473-7372

Journal Of Ophthalmology & Clinical Research | ISSN: 2378-8887

Journal Of Orthopedic Research & Physiotherapy | ISSN: 2381-2052

Journal Of Otolaryngology Head & Neck Surgery | ISSN: 2573-010X

Journal Of Pathology Clinical & Medical Research

Journal Of Pharmacology Pharmaceutics & Pharmacovigilance | ISSN: 2639-5649

Journal Of Physical Medicine Rehabilitation & Disabilities | ISSN: 2381-8670

Journal Of Plant Science Current Research | ISSN: 2639-3743

Journal Of Practical & Professional Nursing | ISSN: 2639-5681

Journal Of Protein Research & Bioinformatics

Journal Of Psychiatry Depression & Anxiety | ISSN: 2573-0150

Journal Of Pulmonary Medicine & Respiratory Research | ISSN: 2573-0177

Journal Of Reproductive Medicine Gynaecology & Obstetrics | ISSN: 2574-2574

Journal Of Stem Cells Research Development & Therapy | ISSN: 2381-2060

Journal Of Surgery Current Trends & Innovations | ISSN: 2578-7284

Journal Of Toxicology Current Research | ISSN: 2639-3735

Journal Of Translational Science And Research

Journal Of Vaccines Research & Vaccination | ISSN: 2573-0193

Journal Of Virology & Antivirals

Sports Medicine And Injury Care Journal | ISSN: 2689-8829

Trends In Anatomy & Physiology | ISSN: 2640-7752

Submit Your Manuscript: <https://www.heraldopenaccess.us/submit-manuscript>