RASMUSSEN UNIVERSITY

Collection of Vital Signs in Outpatient Orthopedic Physical Therapy: Evidence and "Upstream" Action.

Dr. Austin Sheldon PT, DPT, DSc

Board-Certified Orthopaedic Clinical Specialist

Fellow of the American Academy of Orthopaedic Manual Physical Therapists

OBJECTIVES:

1. Review the epidemiology of hypertension.
2. Review and discuss current evidence regarding vital signs assessment by outpatient physical therapists in orthopedic settings.
3. Highlight a rehabilitation-led standard of work program on vital signs collection, and its outcomes in direct-access settings.
4. Case-based review and discussion.
5. Optional: Discuss benefits of residency and fellowship education.

Epidemiology of Hypertension

- ***Cardiovascular disease (CVD), a blanket term for a multitude of disease processes that includes diagnoses such as "rheumatic fever, hypertensive diseases, ischemic heart disease, pulmonary heart diseases and other diseases of pulmonary circulation, other forms of heart disease, cerebrovascular diseases or stroke, diseases of arteries/arterioles/capillaries, other diseases of veins/lymphatic vessels/lymph nodes***, other and unspecified disorders of the circulatory system, and congenital malformations or birth defects of the circulatory system.[1]"

Epidemiology of Hypertension

- Leading cause of death in the United States in 2020.
  - 690,882 deaths[2].
- 47.3% (116 million) U.S adults have HTN[3].
  - Using criteria established by ACC/AHA HTN Clinical Practice Guidelines 2017.
  - 73.9% (92.1 million) U.S. adults with uncontrolled HTN
    - BP > 130/80 mm HG
  - 34.1 million of U.S adults with uncontrolled HTN are untreated.
    - Not taking prescription medication.

Epidemiology of Hypertension

- 70.7 million outpatient visits to physicians in 2003, while 4.5 million additional visits were to the ER for CVD diagnoses; the primary reasons for the aforementioned visits included high blood pressure (HTN), heart failure (acute and chronic), and chest pain[4].

- HTN alone being the reason for an ambulatory care visit, has demonstrated it is the leading cause for outpatient physician visits[5].

- Heart disease costs a combined 219-400 billion dollars in terms of the cost of health care services, medications, and lost productivity in the United States[4].

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Frese et al, 2002[6]
- 4.4% of total respondents measured BP in new patients the week prior (among ALL PTs surveyed).
- 7.9% of OP PTs measured BP "half, more than half, or always" for IEs.
- The Guide recommends that HR and BP measurement be included in the examination of new patients. Practices related to HR and BP measurement reported by this sample of clinical instructors do not meet the recommendations for physical therapy care described in the Guide.

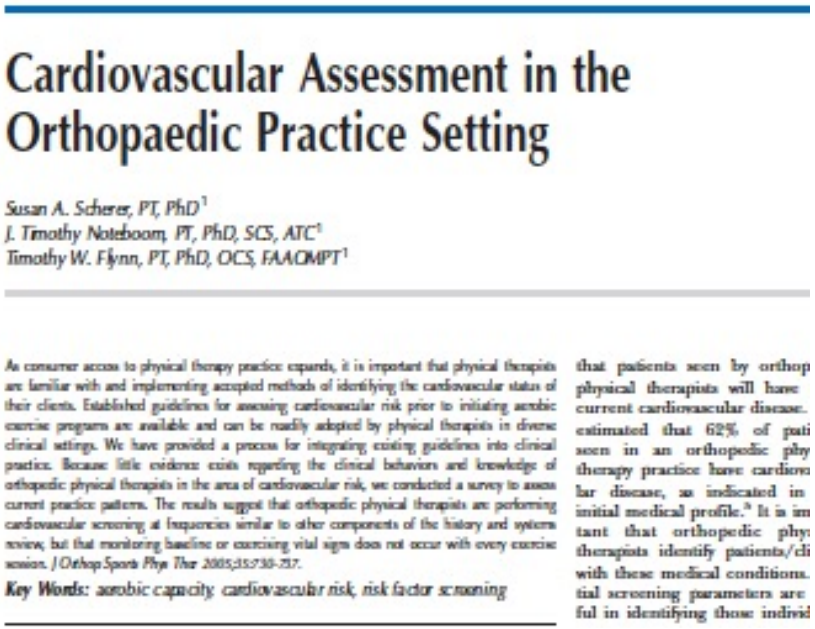
Research

Self-Reported Measurement of Heart Rate and Blood Pressure in Patients by Physical Therapy Clinical Instructors

Background and Purpose. The *Guide to Physical Therapist Practice* (Guide) recommends that heart rate (HR) and blood pressure (BP) measurement be included in the examination of new patients. The purpose of this study was to survey physical therapy clinical instructors to determine the frequency of HR and BP measurement in new patients and in patients already on the physical therapists' caseload. The use of information obtained from HR and BP measures in decision making for patient care and the effects of practice setting and academic preparation on the measurement and use of HR and BP also were examined. **Subjects and Methods.** A sample of 597 subjects was selected from a list of 2,663 clinical instructors at the clinical education sites of the 2 participating universities. Clinical instructors from a variety of practice settings were surveyed. A 26-item survey questionnaire was mailed to the clinical instructors. **Results.** Usable survey questionnaires were received from 387 respondents (64.8%); 43.4% reported working in an outpatient facility. The majority of the respondents strongly agreed or agreed (59.5%) that measurement of HR and BP should be included in physical therapy screening. When asked if routinely measuring HR and BP during clinical practice is essential, opinions were nearly split (strongly agree or agree=45.0%, strongly disagree or disagree=43.7%, no opinion=11.3%). More than one third (38.0%) of the respondents reported never measuring HR in the week before the survey as part of their examination of new patients. A slightly larger percentage (43.0%) reported never measuring BP of new patients in the week before the survey. Conversely, 6.0% and 4.4% of the respondents reported always measuring HR and BP, respectively, of new patients in the week before the survey. When given a list of reasons why HR and BP were not routinely measured in their clinical practice, respondents most frequently chose "not important for my patient population" (52.3%). Relationships were found between practice setting and frequency of HR and BP measurement in new patients. **Discussion and Conclusion.** Practices related

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Scherer et al, 2005[7]
- "Some form of cardiovascular screening was performed by 75% of the survey respondents."
- Less than 50% of respondents reported measuring baseline HR or BP prior to initiating an aerobic conditioning program.
- Exercising HR was a primary or secondary assessment for 52% of respondents.
- Exercising BP was a primary or secondary assessment for 15% of respondents.



Cardiovascular Assessment in the Orthopaedic Practice Setting

Susan A. Scherer, PT, PhD[1]
J. Timothy Noteboom, PT, PhD, SCS, ATC[1]
Timothy W. Flynn, PT, PhD, OCS, FAAOMPT[1]

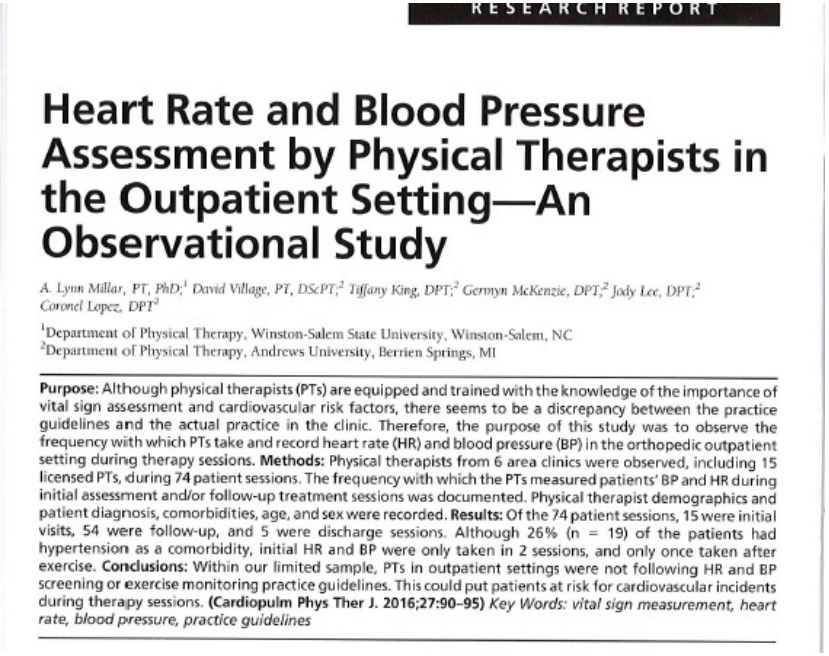
As consumer access to physical therapy practice expands, it is important that physical therapists are familiar with and implementing accepted methods of identifying the cardiovascular status of their clients. Established guidelines for assessing cardiovascular risk prior to initiating aerobic exercise programs are available and can be readily adopted by physical therapists in diverse clinical settings. We have provided a process for integrating existing guidelines into clinical practice. Because little evidence exists regarding the clinical behaviors and knowledge of orthopedic physical therapists in the area of cardiovascular risk, we conducted a survey to assess current practice patterns. The results suggest that orthopedic physical therapists are performing cardiovascular screening at frequencies similar to other components of the history and systems review, but that monitoring baseline or exercising vital signs does not occur with every exercise session. J Orthop Sports Phys Ther 2005;35:730-737.

Key Words: aerobic capacity, cardiovascular risk, risk factor screening

that patients seen by orthop
physical therapists will have
current cardiovascular disease.
estimated that 62% of pati
seen in an orthopedic phy
therapy practice have cardiov
lar disease, as indicated in
initial medical profile.[3] It is im
tant that orthopedic phy
therapists identify patients/cl
with these medical conditions.
tial screening parameters are
ful in identifying those individ

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Millar et all, 2016[8]
- 26% (n = 74) of patients had HTN as a co-morbidity.
- Pre-activity HR and BP was assessed 3% of time.
- Post-activity HR and BP was assessed 1% of time.
- PTs in outpatient settings do not follow HR and BP screening or exercise monitoring guidelines.



RESEARCH REPORT

Heart Rate and Blood Pressure Assessment by Physical Therapists in the Outpatient Setting—An Observational Study

A. Lynn Millar, PT, PhD,[1] David Village, PT, DScPT,[2] Tiffany King, DPT,[2] Gerrnyn McKenzie, DPT,[2] Jody Lee, DPT,[2] Coronel Lopez, DPT[2]

[1]Department of Physical Therapy, Winston-Salem State University, Winston-Salem, NC
[2]Department of Physical Therapy, Andrews University, Berrien Springs, MI

Purpose: Although physical therapists (PTs) are equipped and trained with the knowledge of the importance of vital sign assessment and cardiovascular risk factors, there seems to be a discrepancy between the practice guidelines and the actual practice in the clinic. Therefore, the purpose of this study was to observe the frequency with which PTs take and record heart rate (HR) and blood pressure (BP) in the orthopedic outpatient setting during therapy sessions. **Methods:** Physical therapists from 6 area clinics were observed, including 15 licensed PTs, during 74 patient sessions. The frequency with which the PTs measured patients' BP and HR during initial assessment and/or follow-up treatment sessions was documented. Physical therapist demographics and patient diagnosis, comorbidities, age, and sex were recorded. **Results:** Of the 74 patient sessions, 15 were initial visits, 54 were follow-up, and 5 were discharge sessions. Although 26% (n = 19) of the patients had hypertension as a comorbidity, initial HR and BP were only taken in 2 sessions, and only once taken after exercise. **Conclusions:** Within our limited sample, PTs in outpatient settings were not following HR and BP screening or exercise monitoring practice guidelines. This could put patients at risk for cardiovascular incidents during therapy sessions. **(Cardiopulm Phys Ther J. 2016;27:90–95)** *Key Words: vital sign measurement, heart rate, blood pressure, practice guidelines*

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Arena et al, 2017[9]
- **Attitudes**
- "**51.8%** of respondents **disagreed or strongly disagreed** in regard to" their feeling that **it is important to take a BP reading on every patient during an evaluation or re-evaluation**."
- "**62.6%** and **67.4%** of respondents **disagreed or strongly disagreed**, that **it is important to take a BP reading on every patient before treatment or after treatment**, respectively."
- **94.2%** and **83.7%** **agreed or strongly agreed " feeling able to take an accurate BP reading"** or **" feeling confident in their ability to educate patients/clients about BP related findings**," respectively.

Blood Pressure Attitudes, Practice Behaviors, and Knowledge of Outpatient Physical Therapists

Sara K. Arena, PT, MS, DScPT;[1] Alicia Reyes, SPT;[1] Matthew Rolf, SPT;[1] Nicole Schlagel, SPT;[1] Edward Peterson, PhD[2]

[1]Physical Therapy Program, School of Health Science, Oakland University, Rochester, MI
[2]Department of Public Health Sciences, Henry Ford Health System, Detroit, MI

Human Subject Institutional Review Board Approval: Oakland University #530659.

Purpose: The purpose of this study is to describe and determine correlations among blood pressure (attitudes, practice behaviors, and knowledge among physical therapists (PTs) practicing in the outpatient (settings. **Methods:** A survey was mailed to 1440 OP PTs matching inclusion criteria and through rand selection from the American Physical Therapy Association Listserv. Self-reported demographics, attituc practice behaviors, and knowledge regarding BP measures of survey respondents were recorded. Descript statistics analyzed demographics and question responses; whereas a nonparametric Spearman version of correlation coefficient analyzed correlations between variables. **Results:** Three hundred thirteen surveys fr males (41.3%), females (58.7%), and PTs with greater than 10 years' of experience (57.8%). Although 51.8% respondents did not feel importance in measuring BP during evaluation, 94.2% felt confident in their ability do so. In addition, 85.0% of respondents did not routinely measure BP during evaluations. One-third and tw third of respondents correctly identified criteria matching a prehypertensive or hypertensive BP, respectiv Furthermore, a positive correlation ($r = 0.84$, $P < .001$) was identified between attitude and practice behavi however, not between attitude or practice behavior and knowledge. **Conclusion:** Initiatives to addr misinformed BP attitudes and behaviors as well as gaps in knowledge of PTs providing care in OP setting warranted. **(Cardiopulm Phys Ther J. 2018;29:3–12)** *Key Words: blood pressure, physical therapy, outpatie*

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Arena et al, 2017[9]
- **Practice Behaviors**

  - **85%** of respondents reported performing BP measurements during a patient/client evaluation or reevaluation less than half the time, seldom, or never.

  - **96.1%** and **97.8%** of respondents performed BP measurements less than half the time, seldom, or never before and after PT treatment, respectively.

Blood Pressure Attitudes, Practice Behaviors, and Knowledge of Outpatient Physical Therapists

Sara K. Arena, PT, MS, DScPT;[1] Alicia Reyes, SPT;[1] Matthew Rolf, SPT;[1] Nicole Schlagel, SPT;[1] Edward Peterson, PhD[2]

[1]Physical Therapy Program, School of Health Science, Oakland University, Rochester, MI
[2]Department of Public Health Sciences, Henry Ford Health System, Detroit, MI

Human Subject Institutional Review Board Approval: Oakland University #530659.

Purpose: The purpose of this study is to describe and determine correlations among blood pressure (attitudes, practice behaviors, and knowledge among physical therapists (PTs) practicing in the outpatient (settings. **Methods:** A survey was mailed to 1440 OP PTs matching inclusion criteria and through rand selection from the American Physical Therapy Association Listserv. Self-reported demographics, attituc practice behaviors, and knowledge regarding BP measures of survey respondents were recorded. Descript statistics analyzed demographics and question responses; whereas a nonparametric Spearman version of correlation coefficient analyzed correlations between variables. **Results:** Three hundred thirteen surveys fr males (41.3%), females (58.7%), and PTs with greater than 10 years' of experience (57.8%). Although 51.8% respondents did not feel importance in measuring BP during evaluation, 94.2% felt confident in their ability do so. In addition, 85.0% of respondents did not routinely measure BP during evaluations. One-third and tw third of respondents correctly identified criteria matching a prehypertensive or hypertensive BP, respectiv Furthermore, a positive correlation ($r = 0.84$, $P < .001$) was identified between attitude and practice behavi however, not between attitude or practice behavior and knowledge. **Conclusion:** Initiatives to addr misinformed BP attitudes and behaviors as well as gaps in knowledge of PTs providing care in OP setting warranted. **(Cardiopulm Phys Ther J. 2018;29:3–12)** *Key Words: blood pressure, physical therapy, outpatie*

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Arena et al, 2017[9]
- **Knowledge Gaps**
  - Knowledge of BP measurement criteria indicative of P-HTN or HTN matched established SBP values at rates of 17.9% and 23.6% respectively.
  - Matching of established DBP classifications of P-HTN or HTN were reported correctly at rates of 19.2% and 25.5% , respectively.
- **Barriers**
  - **Time (20.1%)** was most commonly cited barrier.

Blood Pressure Attitudes, Practice Behaviors, and Knowledge of Outpatient Physical Therapists

Sara K. Arena, PT, MS, DScPT;[1] Alicia Reyes, SPT;[1] Matthew Rolf, SPT;[1] Nicole Schlagel, SPT;[1] Edward Peterson, PhD[2]

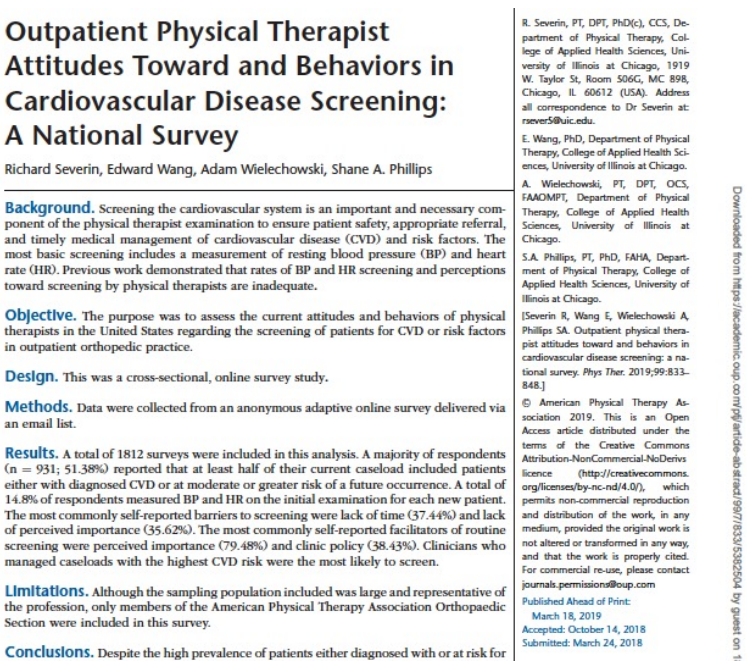
[1]Physical Therapy Program, School of Health Science, Oakland University, Rochester, MI
[2]Department of Public Health Sciences, Henry Ford Health System, Detroit, MI

Human Subject Institutional Review Board Approval: Oakland University #530659.

Purpose: The purpose of this study is to describe and determine correlations among blood pressure (attitudes, practice behaviors, and knowledge among physical therapists (PTs) practicing in the outpatient (settings. **Methods:** A survey was mailed to 1440 OP PTs matching inclusion criteria and through rand selection from the American Physical Therapy Association Listserv. Self-reported demographics, attituc practice behaviors, and knowledge regarding BP measures of survey respondents were recorded. Descript statistics analyzed demographics and question responses; whereas a nonparametric Spearman version of correlation coefficient analyzed correlations between variables. **Results:** Three hundred thirteen surveys fr males (41.3%), females (58.7%), and PTs with greater than 10 years' of experience (57.8%). Although 51.8% respondents did not feel importance in measuring BP during evaluation, 94.2% felt confident in their ability do so. In addition, 85.0% of respondents did not routinely measure BP during evaluations. One-third and tw third of respondents correctly identified criteria matching a prehypertensive or hypertensive BP, respectiv Furthermore, a positive correlation ($r = 0.84$, $P < .001$) was identified between attitude and practice behavi however, not between attitude or practice behavior and knowledge. **Conclusion:** Initiatives to addr misinformed BP attitudes and behaviors as well as gaps in knowledge of PTs providing care in OP setting warranted. **(Cardiopulm Phys Ther J. 2018;29:3–12)** *Key Words: blood pressure, physical therapy, outpatie*

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Severin et al, 2019[10]
- **14.8%** of respondents reported measuring resting HR and BP on the initial examination for every new patient.
- **63.74% of respondents reported measuring HR and BP less than 50%** of the time, 39.8% reported less than 25% of the time, and **13.0% reported never measuring.**



Outpatient Physical Therapist Attitudes Toward and Behaviors in Cardiovascular Disease Screening: A National Survey

Richard Severin, Edward Wang, Adam Wielechowski, Shane A. Phillips

Background. Screening the cardiovascular system is an important and necessary component of the physical therapist examination to ensure patient safety, appropriate referral, and timely medical management of cardiovascular disease (CVD) and risk factors. The most basic screening includes a measurement of resting blood pressure (BP) and heart rate (HR). Previous work demonstrated that rates of BP and HR screening and perceptions toward screening by physical therapists are inadequate.

Objective. The purpose was to assess the current attitudes and behaviors of physical therapists in the United States regarding the screening of patients for CVD or risk factors in outpatient orthopedic practice.

Design. This was a cross-sectional, online survey study.

Methods. Data were collected from an anonymous adaptive online survey delivered via an email list.

Results. A total of 1812 surveys were included in this analysis. A majority of respondents (n = 931; 51.38%) reported that at least half of their current caseload included patients either with diagnosed CVD or at moderate or greater risk of a future occurrence. A total of 14.8% of respondents measured BP and HR on the initial examination for each new patient. The most commonly self-reported barriers to screening were lack of time (37.44%) and lack of perceived importance (35.62%). The most commonly self-reported facilitators of routine screening were perceived importance (79.48%) and clinic policy (38.43%). Clinicians who managed caseloads with the highest CVD risk were the most likely to screen.

Limitations. Although the sampling population included was large and representative of the profession, only members of the American Physical Therapy Association Orthopaedic Section were included in this survey.

Conclusions. Despite the high prevalence of patients either diagnosed with or at risk for

R. Severin, PT, DPT, PhD(c), CCS, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago, 1919 W. Taylor St, Room 506G, MC 898, Chicago, IL 60612 (USA). Address all correspondence to Dr Severin at: rsever5@uic.edu.

E. Wang, PhD, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago.

A. Wielechowski, PT, DPT, OCS, FAAOMPT, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago.

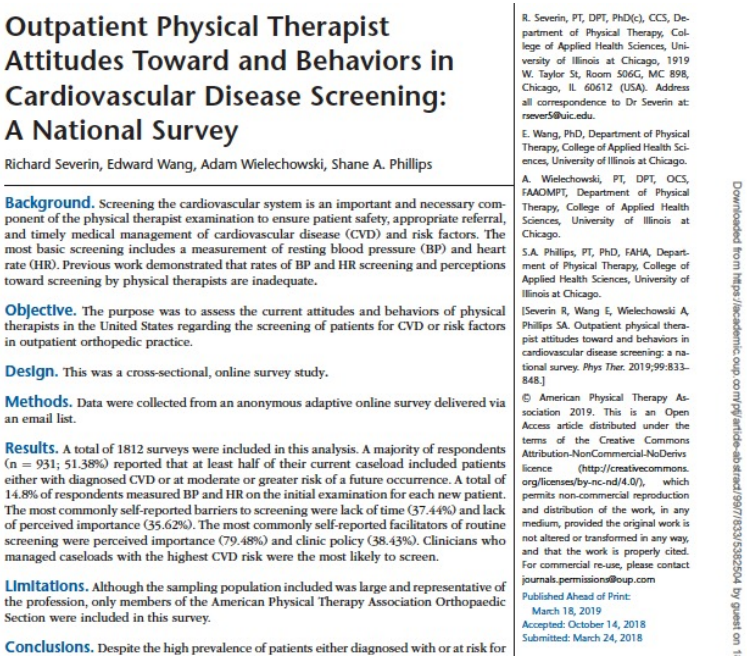
S.A. Phillips, PT, PhD, FAHA, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago.

[Severin R, Wang E, Wielechowski A, Phillips SA. Outpatient physical therapist attitudes toward and behaviors in cardiovascular disease screening: a national survey. *Phys Ther.* 2019;99:833–848.]

Published Ahead of Print: March 18, 2019
Accepted: October 14, 2018
Submitted: March 24, 2018

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Severin et al, 2019[10]
- **Age**, a risk factor for CVD itself**, and encountering higher-risk patients at evaluation** were also **demonstrated to be predictors of BP screening**.
- Physical therapists completing residency or fellowship programs screened BP more often than those without this training.
- Holding a clinical doctorate or terminal doctorate, and more years of practice were also significant predictors of BP screening.
- Barriers to screening:
  - **Time** (37.44%)
  - **Lack of perceived importance** (35.62%)



Outpatient Physical Therapist Attitudes Toward and Behaviors in Cardiovascular Disease Screening: A National Survey

Richard Severin, Edward Wang, Adam Wielechowski, Shane A. Phillips

Background. Screening the cardiovascular system is an important and necessary component of the physical therapist examination to ensure patient safety, appropriate referral, and timely medical management of cardiovascular disease (CVD) and risk factors. The most basic screening includes a measurement of resting blood pressure (BP) and heart rate (HR). Previous work demonstrated that rates of BP and HR screening and perceptions toward screening by physical therapists are inadequate.

Objective. The purpose was to assess the current attitudes and behaviors of physical therapists in the United States regarding the screening of patients for CVD or risk factors in outpatient orthopedic practice.

Design. This was a cross-sectional, online survey study.

Methods. Data were collected from an anonymous adaptive online survey delivered via an email list.

Results. A total of 1812 surveys were included in this analysis. A majority of respondents (n = 931; 51.38%) reported that at least half of their current caseload included patients either with diagnosed CVD or at moderate or greater risk of a future occurrence. A total of 14.8% of respondents measured BP and HR on the initial examination for each new patient. The most commonly self-reported barriers to screening were lack of time (37.44%) and lack of perceived importance (35.62%). The most commonly self-reported facilitators of routine screening were perceived importance (79.48%) and clinic policy (38.43%). Clinicians who managed caseloads with the highest CVD risk were the most likely to screen.

Limitations. Although the sampling population included was large and representative of the profession, only members of the American Physical Therapy Association Orthopaedic Section were included in this survey.

Conclusions. Despite the high prevalence of patients either diagnosed with or at risk for

R. Severin, PT, DPT, PhD(c), CCS, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago, 1919 W. Taylor St, Room 506G, MC 898, Chicago, IL 60612 (USA). Address all correspondence to Dr Severin at: rsever5@uic.edu.

E. Wang, PhD, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago.

A. Wielechowski, PT, DPT, OCS, FAAOMPT, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago.

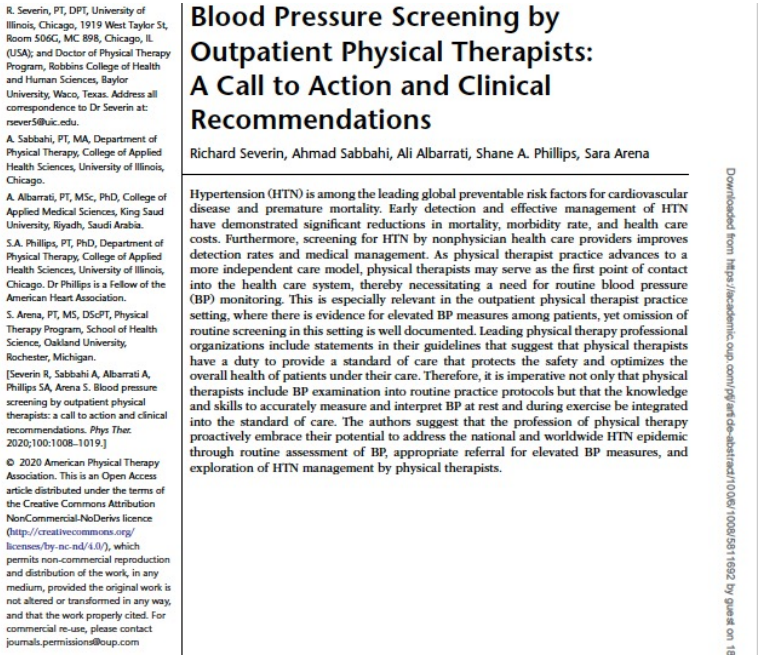
S.A. Phillips, PT, PhD, FAHA, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois at Chicago.

[Severin R, Wang E, Wielechowski A, Phillips SA. Outpatient physical therapist attitudes toward and behaviors in cardiovascular disease screening: a national survey. *Phys Ther.* 2019;99:833–848.]

Published Ahead of Print: March 18, 2019
Accepted: October 14, 2018
Submitted: March 24, 2018

Assessment of Vital Signs in Outpatient Orthopaedic Practice

- Severin et al, 2020[11]
- "Growing evidence supports the need for outpatient physical therapists to regularly screen and assess BP at rest and with exercises."
- "Physical therapists (should) proactively embrace their potential to curtail the national and worldwide HTN epidemic through routine assessment of BP, appropriate referral for elevated BP measures, and exploration of HTN management by physical therapists."



R. Severin, PT, DPT, University of Illinois, Chicago, 1919 West Taylor St, Room 506G, MC 898, Chicago, IL (USA); and Doctor of Physical Therapy Program, Robbins College of Health and Human Sciences, Baylor University, Waco, Texas. Address all correspondence to Dr Severin at: rsever5@uic.edu.

A. Sabbahi, PT, MA, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois, Chicago.

A. Albarrati, PT, MSc, PhD, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia.

S.A. Phillips, PT, PhD, Department of Physical Therapy, College of Applied Health Sciences, University of Illinois, Chicago. Dr Phillips is a Fellow of the American Heart Association.

S. Arena, PT, MS, DScPT, Physical Therapy Program, School of Health Science, Oakland University, Rochester, Michigan.

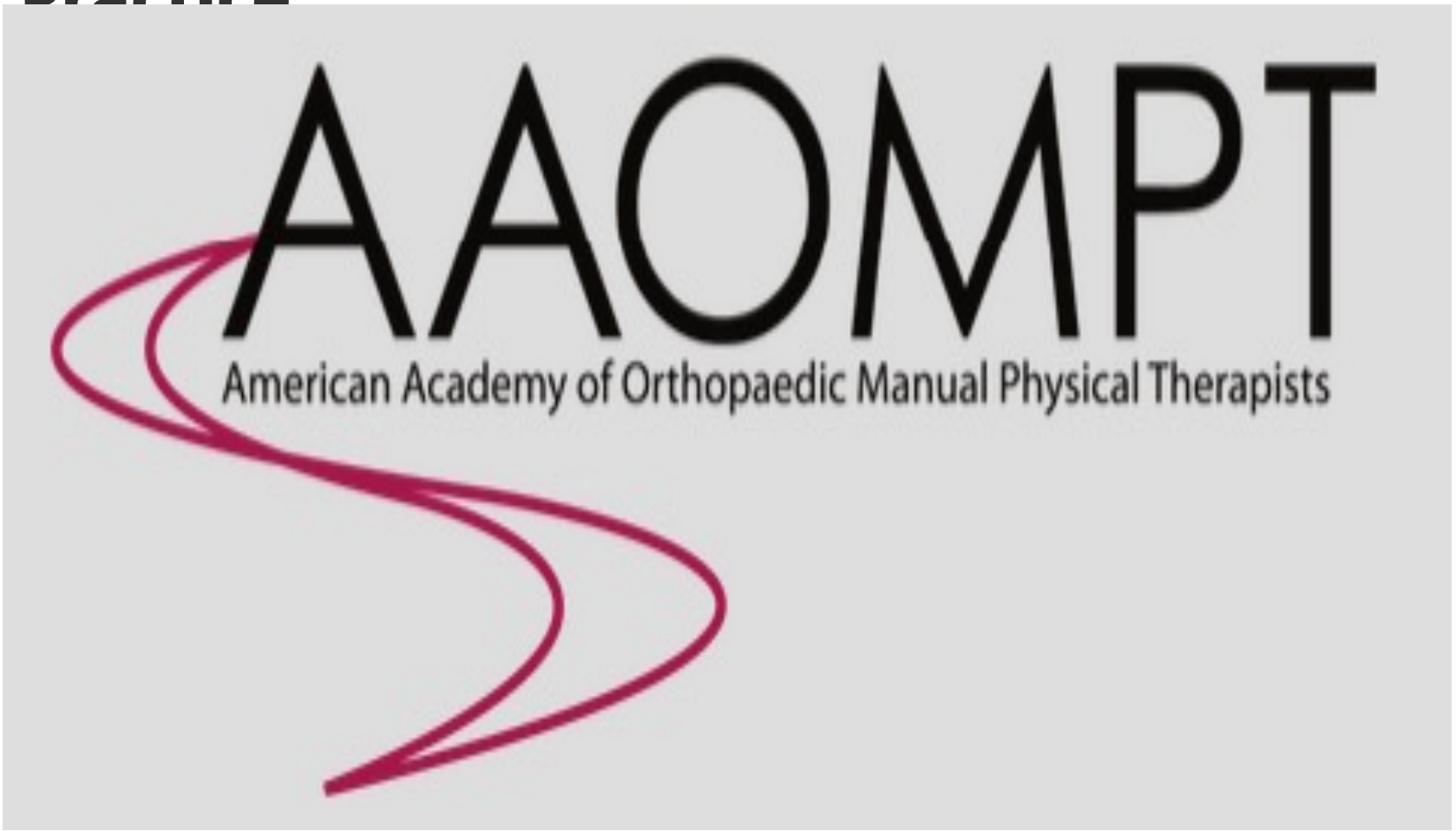
[Severin R, Sabbahi A, Albarrati A, Phillips SA, Arena S. Blood pressure screening by outpatient physical therapists: a call to action and clinical recommendations. *Phys Ther.* 2020;100:1008–1019.]

Blood Pressure Screening by Outpatient Physical Therapists: A Call to Action and Clinical Recommendations

Richard Severin, Ahmad Sabbahi, Ali Albarrati, Shane A. Phillips, Sara Arena

Hypertension (HTN) is among the leading global preventable risk factors for cardiovascular disease and premature mortality. Early detection and effective management of HTN have demonstrated significant reductions in mortality, morbidity rate, and health care costs. Furthermore, screening for HTN by nonphysician health care providers improves detection rates and medical management. As physical therapist practice advances to a more independent care model, physical therapists may serve as the first point of contact into the health care system, thereby necessitating a need for routine blood pressure (BP) monitoring. This is especially relevant in the outpatient physical therapist practice setting, where there is evidence for elevated BP measures among patients, yet omission of routine screening in this setting is well documented. Leading physical therapy professional organizations include statements in their guidelines that suggest that physical therapists have a duty to provide a standard of care that protects the safety and optimizes the overall health of patients under their care. Therefore, it is imperative not only that physical therapists include BP examination into routine practice protocols but that the knowledge and skills to accurately measure and interpret BP at rest and during exercise be integrated into the standard of care. The authors suggest that the profession of physical therapy proactively embrace their potential to address the national and worldwide HTN epidemic through routine assessment of BP, appropriate referral for elevated BP measures, and exploration of HTN management by physical therapists.

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice



Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Describe the clinical practice of vital sign assessment by outpatient physical therapists with:
  - Various levels of entry-level education
  - Various terminal degrees
  - Various levels of post-graduate training including:
    - Specialists certification/s
    - Manual therapy certifications
    - Residency
    - Fellowship
- Examine the influence and frequency of vital assessment for various conditions, body regions, and/or co-morbidities among these physical therapists.

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Methods:
  - 47 questions
  - Data collection
    - Survey participants were initially solicited via AAOMPT's newsletter via inserted hyperlink and subsequently solicited on social media platforms including LinkedIn and Twitter.
      - » Inclusion criteria included: being active in outpatient physical therapy practice and currently licensed to practice physical therapy, and active AAOMPT member (initially).
      - » Exclusion criteria: physical therapists not practicing primarily in an outpatient orthopedic setting or unlicensed to practice
    - Observational, web-based, cross-sectional study

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Results
  - 97 respondents over a two-year period.
  - Total time of completion: 8 minutes and 48 seconds.

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- APTA members = 88
- AAOMPT members = 79
- OCS credentials = 62
- SCS credentials = 3
- MTC = 10
- Residency = 21
- FAAOMPT = 52

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Location of Practice
  - Hospital-based OP = 31
  - Private practice = 53
  - “Other” respondents included: POPTS, and University professors

- Hours/Week in Clinic
  - 67 respondents in clinic 31+ hours/week
  - 30 respondents in clinic 30 hours or less/week

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Are vital signs an appropriate assessment for PTs?
  - 100% responded: YES
- Did post-graduate training encourage VS assessment?
  - 25% responded: NO

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Did your residency training encourage VS assessment?
  - 33% responded: NO
- Did your fellowship training encourage VS assessment?
  - 22% responded: NO

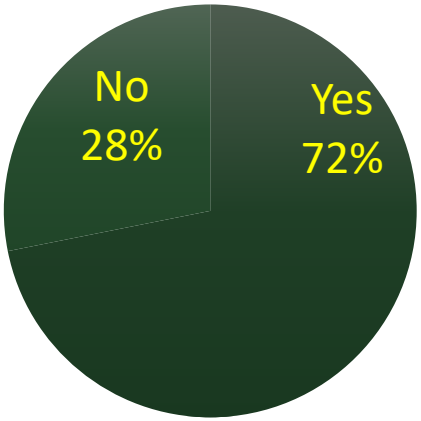
Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- **What is/are determining factors to assess VS in the patients you see? (check all that apply)**

	# of Respondents	% of Respondents
Establish a baseline	55	57.9%
Screening for primary referral	56	59.0%
Measuring physiological response to exercise	54	56.9%
Safety/risk factor considerations	90	94.74%
Medico-legal	24	25.26%

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- **In YOUR practice, does age influence frequency of VS assessment?**



- 88% who responded “yes” noted ages 55+ was most common range for VS assessment in their clinical practice.

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- **In YOUR practice, does medical diagnosis and/or co-morbidities influence the frequency of VS assessment?**

	# of respondents	% of respondents
Yes	94	96.91
No	3	3.09

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- For what diagnoses are you MOST LIKELY to assess vital signs?

HTN (n = 57)	DM (n = 39)	CAD (n = 34)	Hx of CVA/TIA (n = 24)	COPD (n = 19)

- And the five next most common responses…..

Cardiac Hx (n = 19)	Obesity (n = 17)	Pulmonary (=n = 12)	C-spine/HA (n = 11)	Recent Sx (n = 10)

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- For what diagnoses are you LEAST LIKELY to assess vital signs?

Ankle Injuries (n = 17)	Knee injuries (n = 14)	Wrist/Hand Injuries (n = 11)	Elbow Injuries (n = 8)	OA (n = 4) Lumbar spine pain (n = 4)

- And the five next most common responses…..

ACL Repair (n = 3)	RTC Repair (n = 3)	Osteopenia (n = 3)	Shoulder Impingement (n = 2)	Sprains/Strains (n = 2)

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- **What vital signs do you regularly assess on the initial examination/evaluations?**

BP	80
HR	14
RR	1
O2 sat	2
All of the above	6
I don't assess at all ever	7
Based on subjective, medial hx, and/or co-morbidities	5
RPE	1
Blood glucose	1

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

What vital signs do you regularly assess on follow-up visits? (check all that apply) ?

BP	65
HR	50
RR	12
O2 saturation	21
“As warranted”	11
Temperature	2
Blood glucose	1
Never	4

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- For the VS assessment in patients with primary axial skeleton complaints:
  - Cervical spine
    - Most respondents measured “a few times a week” (26%) or “less than a month to never” (25%)
  - Thoracic spine
    - Most respondents measured “a few times a week” (21%) or “less than a month to never” (31%)
  - Lumbar spine
    - Most respondents measured “a few times a week” (22%) or “less than a month to never (33%)

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- For the VS assessment in patients with primary appendicular skeleton complaints:
  - Shoulder
    - Most respondents measured “a few times a week” (25%) or “less than a month to never” (34%)
  - For the rest of the UE and LE, most respondent for every area (elbow, wrist/hand, hip, knee, foot/ankle) measured “less than month to never (45-52%)

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Are there medical diagnoses that you are aware of that may mimic musculoskeletal pain?
  - What are some of these?

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- **What are the barriers for you to assess vital signs in clinical practice?**

	# of respondents	% of respondents
Time	62	78.48
Not important	5	6.33
Likely to not affect how I treat patients	26	32.91
Medical providers to do not value screening and referral if VS are abnormal	6	7.59

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- What is the PRIMARY BARRIER for YOU when assessing vitals signs?

	# of respondents	% of respondents
Time	46	74.19
Finding equipment	9	14.51
Will not change the way I practice	7	11.3

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Beyond the descriptive statistics, we found:
  - Significant predictors for the assessment of VS were ($p<.05$):
    - Entry-level degree
    - Post-graduate degree
      - Residency
      - Fellowship
    - APTA membership
    - AAOMPT membership
      - VS at IE
      - Frequency of VS assessment
      - Cervical spine complaints
        - IFOMPT 2020 Framework influence?

Assessment of Vital Signs in Outpatient Orthopaedic Practice: An Analysis of Practice

- Future Direction
  - If we, as members of AAOMPT, and as Fellows in the Academy, purport to be the experts we are then we should –
    - Practice like experts do by -
      - Doing the basics well
    - In current direct access environments we should –
      - Leverage our position to improve interdisciplinary care by….
        - Assessing vital signs before, during, and after our intervention, thereby…..
          - Playing a direct and active role in the management of CVD (and HTN particularly)
            - And by doing so –
              - Perhaps make a dent in the HTN problem we have by –
                - Reducing downstream costs by -
                - Becoming “UpStreamists” (credit to Matt DeBole and Crossover)
                - MODIFIABLE RISK FACTORS

Assessment of Vital Signs in Outpatient Orthopaedic Practice: "Upstream" Action

- Rehabilitation professionals were trained in a standardized BP assessment using criteria established by American College of Cardiology/American Heart Association HTN Clinical Practice Guidelines 2017[13].
- Assessment principles and training adapted from Severin completed[11].
- A pilot study was conducted in a single city, three-clinic system prior to adoption and implementation to thirty clinics nationally.
  - Authors trained managers→ managers trained staff
  - Preference to automatic cuffs due to accuracy[14].
- Patients with elevated BP were referred to primary care for further assessment.
- Patients with new diagnosis co-managed with PCP, dieticians (all health coaches) and physical medicine (physical therapy and chiropractic

Assessment of Vital Signs in Outpatient Orthopaedic Practice: "Upstream" Action

- Pilot study (3 clinics; 3 months)

Total patients	Screening Rate	Referral Rate	New Dx of HTN
225	115 (45%)	25 (21.5%)	8 (36.3%)

- National (30 clinics; 12 months)

Total Patients	Screening Rate	Referral Rate	New DX of HTN
8,472	2,541 (30%)	559 (22%)	268 (48%)

- Diagnoses

LBP	Shoulder pain	Knee pain	Hip pain	Neck pain
43 (15.8%)	31 (11.4%)	18 (6.7%)	11 (4.0%)	10 (3.7%)

Assessment of Vital Signs in Outpatient Orthopaedic Practice: “Upstream” Action

- In total, 276 patients were newly diagnosed with hypertension and are now under interdisciplinary management for hypertension[15].
- This program is now standard practice within a large, national clinical system, and may serve as a model to others.
- Updates and cost-effectiveness of this program are currently underway.
- Rehabilitation professionals should look beyond the neck (and adverse event avoidance) when considering assessing BP.
- Think "upstream prevention” rather than reactionary and/or defensive care.
  - Consider patient outcome, referral sources, and “reverse” referral potential.
- Consider adopting best practice standards into your clinical practice.

Assessment of Vital Signs in Outpatient Orthopaedic Practice: "Upstream" Action

- Case Example #1
  - A 16 year-old female with her legal guardian presents to OP PT s/p ACL tear 3 days ago[16].
  - The surgeon wants PT to focus on pain management and edema control for 1 week prior to surgery.
  - Do you asses vitals?
    - If "yes," which ones?
    - If "no," why?

Assessment of Vital Signs in Outpatient Orthopaedic Practice: "Upstream" Action

- Case Example #2
  - An 18 year-old male of African descent presents to OP PT with an grade II MCL sprain 3 weeks ago[17].
  - Pertinent medical history
    - + Sickle cell anemia
  - Do you measure vital signs?
    - If "yes," why and when?
    - If "no," why?

Assessment of Vital Signs in Outpatient Orthopaedic Practice: "Upstream" Action

- Case Example #3
  - A 66 year old male who is 4 weeks s/p R TKA is progressing well with ROM and strength.
  - One of his goals is to be able to walk/lightly jog a half-marathon in 2 months
    - He wants to start walking on a treadmill in clinic and also start to increase the incline
  - Generally healthy, but pertinent medical history is positive for abdominal aortic aneurysm (AAA) and a 20 pack-year hx of smoking unfiltered Pall Malls
    - Diameter 4.9 cm
  - Do you assess vital signs[18-20]?
    - If "yes," which ones, when, and why?
    - If "no," why?

Assessment of Vital Signs in Outpatient Orthopaedic Practice: "Upstream" Action

- Case Example #4
  - A 43 year old female of African descent presents to OP PT s/p 1 week CVA in Detroit, MI[21].
  - Her husband carries her into the clinic – she has a subluxed R GH joint (no sling), no AD, R foot drop.
  - She c/o headache and has fallen 2x since discharge home. No HH. Poor historian.
  - Reports she could not afford BP meds and had a stroke.
  - What do you?

Residency and Fellowship Education

- What is a residency?
    - "A post-professional learning experience comprised of a curriculum encompassing the essential knowledge, skills, and responsibilities of an *advanced physical therapist* within a defined area of practice."
    - Prepares the resident graduate with requisite knowledge and skill set to pass the ABPTS specialist examination.

Residency and Fellowship Education

- What is a residency?
    - TYPICALLY, an orthopedic clinical residency includes:
        - A minimum of 1,800 total program hours:
            - 1,500 patient-care clinic hours INCLUDING 150 hours of 1:1 mentoring
                - 100 hours MUST BE IN PERSON
            - 300 educational hours

Residency and Fellowship Education

- What is a fellowship?
  - Is designed for the graduate of a residency or board-certified therapist to focus on a subspecialty area of clinical practice, education, or research.
  - Applicants of a clinical fellowship program must have the following qualifications:
    - 1) specialist certification or completion of a residency in a specialty area
    - 2) substantial clinical experience in a specialty area.
    - 3) demonstrable clinical skills within a particular specialty area.

Residency and Fellowship Education

- What is a fellowship?
  - Minimum of 700 clinical hours
  - 150 hours of 1:1 clinical mentoring
  - Formative and summative assessments
  - Fellowship project

Residency and Fellowship Education

- What types of residencies are available?
  - Acute Care, Cardiovascular & Pulmonary, Clinical Electrophysiology, Geriatrics, Neurology, Oncology, Orthopaedics, Pediatrics, Sports, Women's Health, and Wound Management.
- What types of fellowships are available?
  - Critical Care, Hand Therapy, Movement System, Neonatology, Orthopaedic Manual Physical Therapy, Performing Arts, Spine, Sports Division 1, and Upper Extremity Athlete.

Residency and Fellowship Education

- **INTRINSIC**
- Found *consistent* themes for all stakeholders (program directors, faculty members, and current residents)[22].
    1. A desire to provide better patient care.
    2. Preparation for specialty practice.
    3. Fast track to expert practice.
    4. Career advancement.
- Found two *larger meta-themes*:
    1. Improved clinical reasoning
    2. ***Mentorship***

- **EXTRINSIC**
- Residency training and board certification MAY lead to:

1. Improved salary?
    1. Efficient, effective practice
    2. Faster positive patient outcomes
2. Faster career advancement?
    1. Climb the clinical and/or operational ladder faster?
3. Gateway to additional opportunities?
    1. Research
    2. Faculty
    3. Residency program involvement

Residency and Fellowship Education

- Evidence[23]:
  - “Residency training resulted in high ratings on:
    - Ability to logically reason
    - Thoroughly examine
    - Treat effectively
    - Treat efficiently
    - Diagnose
  - "Career interest and fulfillment" was ranked as the single greatest benefit of residency training on career.
  - “Therapists with OCS were more efficient than therapists without OCS..
    - Fewer visits
    - Less cost
    - Fewer treatment procedures

- Evidence[24]:
  - “Therapists with OCS were more efficient than therapists without OCS..
    - Fewer visits
    - Less cost
    - Fewer treatment procedures

Residency and Fellowship Education

- Evidence[25]
  - Respondents rated residency- and/or fellowship-trained employees higher in domains ***of Leadership, Communication, Clinical Aptitude, Scholarship/Evidence Based Practice, and Teaching*** when compared to experienced-matched colleagues.
  - Employers rated fellowship-trained employees higher than residency-trained employees in areas of Leadership, Communication, and Clinical Aptitude.

- Evidence[26]:
  - Expert vs. Average
  - "Expert" = OCS, AAOMPT grads, manual therapy certified.
    - "Average" = Less likely to have any or all of the above..

Residency and Fellowship Education

- Rodeghero, et al, JOSPT, 2015[27]
  - Results
    - The fellowship-trained group of physical therapists achieved functional status changes and efficiency that were greater than those of the other groups.
    - No difference in functional status change was observed between the residency group and the therapists without residency or fellowship training.
    - The group without residency or fellowship training was more efficient than the residency-trained group.
    - Fellowship-trained therapists were more likely to achieve greater treatment effect sizes than therapists without residency or fellowship training.
    - Residency-trained therapists were less likely to achieve greater treatment effect sizes than the therapists without residency or fellowship training

References

1. World Health Organization, International Classification of Diseases and Related Health Problems, Tenth Revision (Geneva: WHO, 1992)
2. Ahmad FB, Anderson RN. The Leading Causes of Death in the US for 2020. *JAMA*.2021; 325(18):1829-1830. DOI:10.10001/jama2021.5469
3. National Center for Health Statistics, Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey (NHANES), 2015-2018. Definitions: ACC/AHA Criteria adapted from Ritchey MD, Gillespie C, Wozniak G, et al. Potential need for expanded pharmacologic treatment and lifestyle modifications services under the 2017 ACC/AHA Hypertension Guideline. *J Clin Hypertens.* 2018;20:1377-1391. https://doi.org/10.1111/jch.13364
4. Mensah GA, Brown DW. An overview of cardiovascular disease burden in the United States. *Health Affairs*. 2007;26(1):38-48.
5. T. Thom et al., "Heart Disease and Stroke Statistics—2006 Update: A Report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee," Circulation 113, no. 6 (2006): e85–e151

References

6. Frese EM, Richter RR, Burlis TV. Self-reported measurement of heart rate and blood pressure in patients by physical therapy clinical instructors. *Phys Ther.* 2002;82:1192-1200.

7. Scherer SA, Noteboom JT, Flynn TW. Cardiovascular assessment in the orthopaedic practice setting. J Orthop Sports Phys Ther. 2005;35:730–737.

8. Millar, A. L., Village, D., King, T., McKenzie, G., Lee, J., & Lopez, C. (2016). Heart rate and blood pressure assessment by physical therapists in the outpatient setting—an observational study. *Cardiopulmonary Physical Therapy Journal*, *27*(3), 90-95.

9. Arena SK, Reyes A, Rolf M, Schlagel N, Peterson E. Blood pressure attitudes, practice behaviors, and knowledge of outpatient physical therapists. *Cardiopulmonary Phys Ther J*. 2018; 29(1):3-12

10. Severin R, Wang E, Wielechowski A, Phillips SA. Outpatient physical therapist attitudes toward and behaviors in cardiovascular disease screening: a national survey. *Phys Ther*. 2019;99:833–848.

References

11. Severin R, Sabbahi A, Albarrati A, Phillips SA, Arena S. Blood pressure screening by outpatient physical therapists: a call to action and clinical recommendations. Phys Ther. 2020;100:1008–1019.
12. Sheldon A. Oakley E, Karas S. (2021) Assessment of Vital Signs by Outpatient Physical Therapists – A Stratified Analysis of Practice. AAOMPT Annual Conference, Cleveland, OH. (Platform)
13. Whelton P, Carey R, Aronow W, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults. *J Am Coll Cardiol.* 2018 May, 71 (19) e127–e248.https://doi.org/10.1016/j.jacc.2017.11.006
14. Myers, M. G., & Godwin, M. (2012). Automated office blood pressure. *Canadian Journal of Cardiology*, *28*(3), 341-346.

References

15. Sheldon A, Leonard J, Williams R. (2022) Neck or (Knot): Vital Signs Assessment by Rehabilitation Professionals in a Direct-to-Employer, Direct Access, Interdisciplinary Clinical System. AAOMPT Annual Conference, San Diego, CA (5x5 Presentation).

16. Saab, P. G., Llabre, M. M., Ma, M., DiLillo, V., McCalla, J. R., Fernander-Scott, A., ... & Schneiderman, N. (2001). Cardiovascular responsivity to stress in adolescents with and without persistently elevated blood pressure. *Journal of hypertension*, *19*(1), 21-27.

17. Pegelow, C. H., Colangelo, L., Steinberg, M., Wright, E. C., Smith, J., Phillips, G., & Vichinsky, E. (1997). Natural history of blood pressure in sickle cell disease: risks for stroke and death associated with relative hypertension in sickle cell anemia. *The American journal of medicine*, *102*(2), 171-177

References

18. Aggarwal, S., Qamar, A., Sharma, V., & Sharma, A. (2011). Abdominal aortic aneurysm: A comprehensive review. *Experimental & Clinical Cardiology*, *16*(1), 11.

19. Kobeissi, E., Hibino, M., Pan, H., & Aune, D. (2019). Blood pressure, hypertension and the risk of abdominal aortic aneurysms: a systematic review and meta-analysis of cohort studies. *European journal of epidemiology*, *34*(6), 547-555.

20. Myers, J., Mcelrath, M., Jaffe, A., Smith, K., Fonda, H., Vu, A., ... & Dalman, R. (2014). A randomized trial of exercise training in abdominal aortic aneurysm disease. *Medicine and science in sports and exercise*, *46*(1), 2-9.

21. Schulz, A., Israel, B., Williams, D., Parker, E., Becker, A., & James, S. (2000). Social inequalities, stressors and self reported health status among African American and white women in the Detroit metropolitan area. *Social science & medicine*, *51*(11), 1639-1653.

References

22. Osborne, R., Janson, C., Black, L., & Jensen, G. M. (2020). Motivations to pursue physical therapy residency training: A Q-Methodology study of stakeholder perspectives. *Physical therapy*, *100*(1), 57-72.

23. Smith, K. L., Tichenor, C. J., & Schroeder, M. (1999). Orthopaedic residency training: a survey of the graduates' perspective. *Journal of Orthopaedic & Sports Physical Therapy*, *29*(11), 635-655.

24. Hart, D. L., & Dobrzykowski, E. A. (2000). Influence of orthopaedic clinical specialist certification on clinical outcomes. *Journal of Orthopaedic & Sports Physical Therapy*, *30*(4), 183-193.

25. Briggs, M. S., Whitman, J., Olson-Kellogg, B., Farrell, J., Glaws, K. R., Walker, J. M., ... & Tichenor, C. J. (2019). Employer Perceptions of Physical Therapists' Residency and Fellowship Training: Insights for Career Development Planning. *Journal of Physical Therapy Education*, *33*(1), 40-48

26. Resnik, L., & Hart, D. L. (2003). Using clinical outcomes to identify expert physical therapists. *Physical Therapy*, *83*(11), 990-1002

References

27. Rodeghero, J., Wang, Y. C., Flynn, T., Cleland, J. A., Wainner, R. S., & Whitman, J. M. (2015). The impact of physical therapy residency or fellowship education on clinical outcomes for patients with musculoskeletal conditions. *Journal of orthopaedic & sports physical therapy*, *45*(2), 86-96.

Thank you.

RASMUSSEN
UNIVERSITY