

University of Vermont

UVM ScholarWorks

Family Medicine Clerkship Student Projects

Family Medicine Community

2022

Home Exercise for Patients With Limited Access and Resources

Justin L. Esteban

The University of Vermont

Follow this and additional works at: <https://scholarworks.uvm.edu/fmclerk>



Part of the [Medical Education Commons](#), and the [Primary Care Commons](#)

Recommended Citation

Esteban, Justin L., "Home Exercise for Patients With Limited Access and Resources" (2022). *Family Medicine Clerkship Student Projects*. 805.

<https://scholarworks.uvm.edu/fmclerk/805>

This Book is brought to you for free and open access by the Family Medicine Community at UVM ScholarWorks. It has been accepted for inclusion in Family Medicine Clerkship Student Projects by an authorized administrator of UVM ScholarWorks. For more information, please contact schwks@uvm.edu.

Home Exercise for Patients With Limited Access and Resources

Using exercise to combat chronic disease in socioeconomically
disadvantaged populations

Justin Esteban MS III
Central Main Medical Center
Lewiston, ME
September, 2022
Mentor: Dr. Lauren Nadkarni

Problem Identification & Description of Need

- ▶ Focus Area: Social Determinants of Health
- ▶ 5 out of 6 chronic diseases in Maine can be mitigated with exercise [6].
 - ▶ Hypercholesterolemia
 - ▶ Hypertension
 - ▶ Arthritis
 - ▶ Diabetes
 - ▶ Cardiovascular disease
- ▶ Patients with limited resources and who are socioeconomically disadvantaged, don't have the time or resources available to partake/pursue exercise, as reported anecdotally
- ▶ Mainers (and patients who are socioeconomically disadvantaged) need information and access to exercise
 - ▶ Easily accessible
 - ▶ Maintainable & sustainable

WHAT IS THE IMPACT OF CHRONIC DISEASE ON MAINE?

Partnership to Fight Chronic Disease
FightChronicDisease.org/Maine

Projected total cost of chronic disease 2016-2030 in Maine \$183 BILLION

In 2013, 627 thousand people in Maine had at least 1 chronic disease, 136 thousand had 2 or more chronic diseases.

Chronic diseases could cost Maine \$8.7 billion in medical costs and an extra \$3.5 billion annually in lost employee productivity (average per year 2016-2030).

5% OF PEOPLE ACCOUNT FOR 50% OF HEALTH CARE SPENDING IN MAINE...

HEALTH CARE COSTS ARE CONCENTRATED AMONG THOSE WITH MULTIPLE CHRONIC DISEASES

Number of Chronic Diseases (2013)	Annual Cost Per Person
1	\$1K
2	\$12K
3	\$18K
4+	\$197K

NUMBERS OF PEOPLE WITH 3+ CHRONIC DISEASES IS GROWING

Year	# of People with 3+ Chronic Diseases
2013	133 THOUSAND
2030	326 THOUSAND

\$9,500 PER MAINE RESIDENT Projected per person medical and productivity cost of chronic disease in 2030 if current trends continue

In Maine, 5,400 lives could be saved annually through better prevention and treatment of chronic disease.

TOGETHER WE CAN DO BETTER

Public Health Cost

▶ Chronic diseases could cost the state of Maine \$8.7 billion in medical cost and an extra \$3.5 billion annually in lost employee productivity (average per year 2016-2030) [4]

▶ People with diabetes have medical expenses approx. 2.3 times higher than those who do not have diabetes [5]

American Diabetes Association
Connected for Life

The Burden of Diabetes in Maine

Diabetes is an epidemic in the United States. According to the Centers for Disease Control and Prevention (CDC), over 37 million Americans have diabetes and face its devastating consequences. What's true nationwide is also true in Maine.

Maine's diabetes epidemic:

- Approximately 115,001 people in Maine, or 10.4% of the adult population, have diagnosed diabetes.
- An additional 32,000 people in Maine have diabetes but don't know it, greatly increasing their health risk.
- There are 373,000 people in Maine, 35.1% of the adult population, who have prediabetes with blood glucose levels that are higher than normal but not yet high enough to be diagnosed as diabetes.
- Every year an estimated 8,096 people in Maine are diagnosed with diabetes.

Diagnosed diabetes costs an estimated \$1.4 billion in Maine each year.
The serious complications include heart disease, stroke, amputation, end-stage kidney disease, blindness—and death.

Diabetes is expensive:
People with diabetes have medical expenses approximately 2.3 times higher than those who do not have diabetes.

- Total direct medical expenses for diagnosed diabetes in Maine were estimated at \$1 billion in 2017.
- In addition, another \$365 million was spent on indirect costs from lost productivity due to diabetes.

Improving lives, preventing diabetes and finding a cure:

In 2021, the National Institute of Diabetes and Digestive and Kidney Diseases at the National Institutes of Health invested \$4,997,467 in diabetes-related research projects in Maine.

The Division of Diabetes Translation at the CDC provided \$758,400 in diabetes prevention and educational grants in Maine in 2018.

Source: Includes:
 • Diabetes Prevalence: 2018 state diagnosed diabetes prevalence, cdc.gov/diabetes/data/2018-state-diagnosed-diabetes-prevalence.pdf
 • Diabetes Prevalence: 2018 state diagnosed diabetes prevalence, cdc.gov/diabetes/data/2018-state-diagnosed-diabetes-prevalence.pdf
 • Diabetes Prevalence: National Diabetes Statistics Report—2021, cdc.gov/diabetes/data/statistics-reports/national-diabetes-statistics-report-2021.html
 • Cost of Diabetes: National Diabetes Statistics Report—2021, cdc.gov/diabetes/data/statistics-reports/national-diabetes-statistics-report-2021.html
 • Research investments: 2021 NIDDK Funding, niddk.nih.gov/news-events/2021-03-02-nidddk-funding
 • Research investments: 2018 CDC Diabetes Prevention Grant, cdc.gov/diabetes/prevention/grants/2018-cdc-diabetes-prevention-grants.html

Learn more at diabetes.org | 1-800-DIABETES (800-342-2383) 4/2022

Community Perspective

- ▶ Interview with detective of Lewiston Police Department/ advisor to the board of directors for New Beginnings (program for runaway and homeless youth and families)
 - ▶ Many of the communities, especially Lewiston, are combating poverty
 - ▶ Poverty makes addressing health concerns extremely difficult
 - ▶ Lack of income/resources make it difficult to manage their health, let alone provide an opportunity to exercise
- ▶ Interview with community volunteer
 - ▶ Time is a barrier when trying to begin/commit to exercising
 - ▶ Feels that a home program would be beneficial to the community
- ▶ Interview with a community volunteer
 - ▶ After working with the community, has found anecdotally that access to resources is one of the many challenges that the community faces
 - ▶ Feels that the community would benefit from an accessible resource for exercise

Intervention & Methodology

- ▶ Evidence supports moderate-intensity physical activity between 150-250 mins/week to be effective [3]
- ▶ Low frequency high intensity interval training (at least once weekly) improved cardiorespiratory fitness, body composition, and blood pressure in overweight/obese adults [1]
- ▶ Studies have shown that high intensity interval training and sprint interval training can be as enjoyable and preferable to moderate-intensity continuous training in inactive individuals [2]
- ▶ Resistance training does not enhance weight loss, but may increase fat-free mass and increase fat loss and is associated with reduction in health risk [3]
- ▶ Endurance physical activity or resistance physical activity without weight loss, still improves health risk [3]

Intervention & Methodology

- ▶ 5 exercises: push up, body weight squat, shoulder press, row, TRX row
- ▶ Routine
 - ▶ Do each exercise for 2 minutes, do as many as you can without compromising form
 - ▶ Starting with push up → squat → shoulder press → row → TRX row
 - ▶ Rest one minute in-between each exercise
 - ▶ Once you finish the TRX row, start again at push ups, one more time through
 - ▶ Push ups → squat → shoulder press → row → TRX row
 - ▶ Total of 30 mins
- ▶ Scaling
 - ▶ Squat: start with standing and sitting from chair → progress to body weight
 - ▶ Push up: start pushing up on inclined surface (wall → chair → on knees → on toes)
 - ▶ Shoulder press: can use milk jugs and fill with water for weight, can start small (quart → gallon)
 - ▶ Row: can use milk jugs and fill with water for weight, can start small (quart → gallon)
 - ▶ TRX Row: use bed sheets/rope and secure to door frame

Instruction & Resources

CrossFit | The Push-Up [7]

THE PUSH-UP

- HANDS APPROXIMATELY SHOULDER-WIDTH APART
- LEGS TOGETHER WITH ONLY THE BALLS OF THE FEET ON THE GROUND
- START WITH ARMS EXTENDED
- BODY REMAINS RIGID
- LOWER CHEST AND THIGHS TO THE GROUND
- ELBOWS IN CLOSE TO THE BODY
- COMPLETE AT FULL ARM EXTENSION



CrossFit | The Air Squat [7]

THE AIR SQUAT

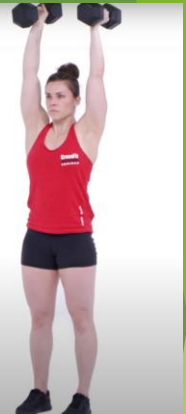
- SHOULDER-WIDTH STANCE
- KNEES IN LINE WITH TOES
- LUMBAR CURVE MAINTAINED
- HIPS DESCEND BACK AND DOWN
- HIPS DESCEND LOWER THAN KNEES
- HEELS DOWN
- COMPLETE AT FULL HIP AND KNEE EXTENSION



CrossFit | The Dumbbell Push Press [7]

THE DUMBBELL PUSH PRESS

- HIP-WIDTH STANCE
- DUMBBELLS REST ON THE SHOULDERS
- ELBOWS SLIGHTLY IN FRONT OF THE BODY
- TORSO DIPS STRAIGHT DOWN
- HEELS DOWN UNTIL HIPS AND LEGS EXTEND
- HIPS AND LEGS EXTEND RAPIDLY, THEN PRESS
- DUMBBELLS REMAIN OVER THE MIDDLE OF THE FOOT
- COMPLETE AT FULL HIP, KNEE, AND ARM EXTENSION



The Dumbbell Row is a Classic Muscle-Building Exercise | BarBend [8]

THE DUMBBELL ROW



- Step 1: Grip and set back
- Step 2: Initiate row
- Step 3: lower weight

TRX Row Exercise: Strengthen Your Back – PopWorkouts [9]

Weekend Challenge

TRX ROWS

Work two to three sets of eight reps into your routine.

A Hold on to the TRX and back away until you feel tension in the straps. Your body should form a 45- to 60-degree angle to the floor, and your arms should be close to parallel to the floor, palms facing down.

B Pull your body toward the anchor point by bringing the handles toward the sides of your chest as you rotate your palms inward. Your elbows should be at 45 degrees. Pause and return to the starting position.

Inverted Row Split Feet with TRX

BACK EXERCISE

1. START

Tighten abs

2. PULL UP

Pull chest up

Results & Response

- ▶ Positive response from the community to the suggestion of an at home workout program
- ▶ Positive response from providers, in hopes of encouraging lifestyle modification
- ▶ Forms given to providers to determine best method to distribute to patients; whether as part of after visit summary, as an informational handout, or as an informational flyer in exam rooms

Evaluation of Effectiveness & Limitations

▶ Effectiveness

▶ Formal Study design

- ▶ Enroll patients with chronic disease that would benefit from increased exercise as treatment modality (diabetes, HTN, HLD,...etc)
- ▶ Assign patients into home program group versus no program/self program
- ▶ Have patients maintain fitness logs
- ▶ At 3 month intervals, obtain objective data (weight, BMI, BP, HbA1C, labs...)
- ▶ Perform T-test analysis to compare average change between program vs self program

▶ Limitations

- ▶ Patient adherence to program
- ▶ Many changes are needed to combat chronic disease, not just exercise
 - ▶ If patient exercises, but continues to not alter daily diet or other habits, may not see any results
- ▶ Even if given a resource, patients may still be reluctant to exercise; need intrinsic motivation
- ▶ In the study evaluating HIIT, HR monitors were used, not accessible for patients with socioeconomic disadvantages

Recommendations for future interventions/projects

- ▶ Survey patients who participate in home program and see if it has changed their level of activity
- ▶ Follow up in 1 year to re-assess intrinsic motivation to exercise
- ▶ Follow up in 1 year to assess if any injuries occur due to program, and alter accordingly
- ▶ Develop additional exercise programs that are accessible to patients
- ▶ Create DOT phrase that can be added to after visit summaries

References

1. CHIN, EDWIN C.1; YU, ANGUS P.1; LAI, CHRISTOPHER W.2,3; FONG, DANIEL Y.4; CHAN, DERWIN K.1,5; WONG, STEPHEN H.6; SUN, FENGHUA7; NGAI, HEIDI H.8; YUNG, PATRICK S. H.9; SIU, PARCO M.1. Low-Frequency HIIT Improves Body Composition and Aerobic Capacity in Overweight Men. *Medicine & Science in Sports & Exercise*: January 2020 - Volume 52 - Issue 1 - p 56-66 doi: 10.1249/MSS.0000000000002097
2. STORK, MATTHEW J.1; GIBALA, MARTIN J.2; MARTIN GINIS, KATHLEEN A.1,3. Psychological and Behavioral Responses to Interval and Continuous Exercise. *Medicine & Science in Sports & Exercise*: October 2018 - Volume 50 - Issue 10 - p 2110-2121 doi: 10.1249/MSS.0000000000001671
3. DONNELLY, JOSEPH E. Ed.D (Chair); BLAIR, STEVEN N. PED; JAKICIC, JOHN M. Ph.D.; MANORE, MELINDA M. Ph.D., R.D.; RANKIN, JANET W. Ph.D.; SMITH, BRYAN K. Ph.D.. Appropriate Physical Activity Intervention Strategies for Weight Loss and Prevention of Weight Regain for Adults. *Medicine & Science in Sports & Exercise*: February 2009 - Volume 41 - Issue 2 - p 459-471 doi: 10.1249/MSS.0b013e3181949333
4. What is the impact of chronic disease in Maine? *Partnership to Fight Chronic Disease*. [PFCD_ME_FactSheet_FINAL1 \(fightchronicdisease.org\)](#)
5. The Burden of Diabetes in Maine. *American Diabetes Association*. Published 4, 2022 [Microsoft Word - ADV_2022_State_Fact_sheets_all_rev_APR.docx \(diabetes.org\)](#)
6. State of Chronic Disease in Maine. *Chronic Care Policy Alliance*. Published June, 2021 [CCPA-Maine-State-of-Chronic-Disease \(chroniccarealliance.org\)](#)
7. Crossfit Movements: Push Up, Air Squat, DB Press www.crossfit.com/essentials/movements
8. The Dumbbell Row [The Dumbbell Row is a Classic Muscle-Building Exercise | BarBend](https://barbend.com/dumbbell-row/)
<https://barbend.com/dumbbell-row/>
9. The TRX Row [TRX Row Exercise: Strengthen Your Back - PopWorkouts](#)

Interview Consent Form

Interview Consent Form
Family Medicine Clerkship
Larner College of Medicine at the University of Vermont

Thank you for agreeing to be interviewed. This project is a requirement for the Family Medicine clerkship. It will be stored on the Dana Library Scholar Works website. Your name will be attached to your interview, and you may be cited directly or indirectly in subsequent unpublished or published work. The interviewer affirms that he/she has explained the nature and purpose of this project. The interviewee affirms that he/she has consented to this interview.

Consented

Name: _____

Name: _____

Did NOT Consent

Name: _____

Name: _____