**Appendix**

Table A1: Keywords and Mesh Terms for PRISMA Protocol search strategy

|  |  |  |
| --- | --- | --- |
|  | Key Word | MeSH Term |
| 1 | Financial Literacy | none |
| 2 | Financial Management | “economics”[Subheading] OR “financial management”[MeSH Terms] OR Financial Management[Text Word] |
| 3 | Physician | “physicians”[MeSH Terms] OR Physician[Text Word] |
| 4 | Doctor | “physicians”[MeSH Terms] OR Doctor[Text Word] |
| 5 | Medical staff | “medical staff”[MeSH Terms] OR Medical staff[Text Word] |
| 6 | Personal finance | none |
| 7 | Graduate medical education | “education, medical, graduate” [MeSH Terms] OR Graduate medical education [Text Word] |
| 8 | Undergraduate medical education | “education, medical, undergraduate”[MeSH Terms] OR Undergraduate medical education[Text Word] |
| 9 | Financial planning | none |
| 10 | Financial decision making | none |
| 11 | Investing | Investing[All Fields] |
| 12 | Investments | “investments”[MeSH Terms] OR Investments[Text Word] |
| 13 | Debt | Debt[All Fields] |
| 14 | Debt management | none |

Table A2: Characteristics of survey studies and opinion articles

|  |  |  |
| --- | --- | --- |
| Article | Sample Size | Participants or Target audience |
| Panel A: Survey-based studies | | |
| Teichman 2001 (7) | 151 | Urology residents (in 20 programs) |
| Burg 2001 (26) | Not provided | Primary care and cardiology physicians |
| Teichman 2005 (10) | 612 | Internal medicine, general surgery, pediatrics, obstetrics and gynecology, family medicine, psychiatry, urology, and ophthalmology residents |
| Glaspy 2005 (11) | 1707 | Emergency medicine residents at all 123 US programs |
| Brown 2010 (54) | 297 | Medicine, optometry, and dental medicine students |
| Witek 2014 (25) | 60 residents;  15 program directors | Radiation oncology residents; residency program directors |
| Ahmad 2017 (18) | 422 | Residents and fellows at two institutions |
| Jayakumar 2017 (1) | 1052 | Medical students |
| Yoo 2017 (55) | 166 | General surgery residents |
| Shappell 2018 (8) | 12 | Internal medicine, emergency medicine, and pediatric residents |
| McKillip 2018 (12) | 144 | Internal medicine, pediatrics, emergency medicine, psychiatry, orthopedics, obstetrics and gynecology, neurology, and otolaryngology residents |
| Tevis 2018 (6) | 105 | General surgery, neurosurgery, orthopedic surgery, otolaryngology, plastic surgery, urology, and vascular surgery residents |
| Wong 2018 (5) | 184 | Internal medicine and pediatric residents |
| Connelly 2018 (15) | 17 | Physical medicine and rehabilitation residents |
| Mizell 2019 (48) | 411 | Senior medical students at one institution |
| Jennings 2019 (27) | 85 | Orthopedic surgery residents |
| Adetayo 2019 (20) | 521 alumni; 84 residents | Residency alumni in multiple specialties from one institution; Plastic surgery residents nationwide |
| Panel B: Commentary/Opinion articles | | |
| Greene 2002 (24) | NA | Residents |
| Prabhakaran 2011(56) | NA | Residents |
| Thacker 2014 (17) | NA | Radiology residents |
| Bar-Or 2015 (29) | NA | Medical students, residents, fellows |
| Johnson 2016 (47) | NA | Women plastic surgeons |
| Borrelli 2017 (3) | NA | Medical students and trainees |
| Daily 2017 (16) | NA | Pediatric trainees and early career pediatric physicians |
| Mills 2018 (57) | NA | Pathology trainees |
| Lundgren 2018 (4) | NA | Medical residents |
| Daily 2018 (58) | NA | Medical residents |
| Poppler 2019 (59) | NA | Plastic surgery residents |
| Daily 2019 (19) | NA | Medical students |
| Ivy 2020 (60) | NA | Physicians |
| Heilman 2020 (61) | NA | Medical residents |
| Moriarity 2020 (21) | NA | Radiology residents |

Table A3: Modified Côté-Turgeon assessment scores for the six studies offering curricula

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | Dhaliwal (22) | Liebzeit (45) | Mizell (23) | Meleca (46) | Boehnke (2) | Bar-Or (28) |
| **Introduction** | | | | | | |
| 1. The issue is described clearly and corresponds to the current state of knowledge | 5.0 | 4.7 | 5.0 | 5.0 | 4.7 | 5.0 |
| 2. The research question and objectives are clearly stated and relevant to qualitative research (e.g., the process of clinical or pedagogical decision-making) | 4.7 | 3.3 | 5.0 | 4.7 | 5.0 | 5.0 |
| **Methods** | | | | | | |
| 3. The context of the study and the researchers’ roles are clearly described (e.g. setting, bias) | 3.7 | 2.3 | 3.0 | 3.3 | 2.7 | 5.0 |
| 4. The method is appropriate for the research question | 5.0 | 2.7 | 2.0 | 3.0 | 3.7 | 4.7 |
| 5. The selection of participants is appropriate to the research question and to selected method | 5.0 | 5.0 | 4.7 | 5.0 | 4.7 | 5.0 |
| 6. The process for collecting data is clear and relevant | 4.7 | 3.3 | 4.7 | 4.3 | 4.7 | 4.7 |
| 7. Data analysis is credible |  |  |  |  |  |  |
| 7a) General credibility (triangulation) | 3.3 | 2.0 | 3.7 | 3.3 | 2.3 | 2.7 |
| 7b) Internal Validity | 3.7 | 2.7 | 3.0 | 2.7 | 3.0 | 3.7 |
| 7c) External validity | 3.0 | 2.7 | 2.0 | 2.7 | 2.0 | 2.7 |
| **Results** | | | | | | |
| 8. The main results are presented clearly | 5.0 | 3.0 | 5.0 | 3.0 | 4.3 | 5.0 |
| 9. The quotations make it easier to understand the results | 2.0 | 3.3 | 2.0 | 1.0 | 2.3 | 3.0 |
| **Discussion** | | | | | | |
| 10. The results are interpreted in credible and innovative ways | 4.7 | 2.3 | 3.0 | 3.0 | 3.7 | 4.3 |
| 11. The limitations of the study are presented | 5.0 | 1.0 | 4.3 | 2.7 | 4.7 | 5.0 |
| **Conclusion** | | | | | | |
| 12. The conclusion presents a synthesis of the study and proposes further research | 3.3 | 1.3 | 3.0 | 3.7 | 5.0 | 5.0 |
| **Curriculum Content** | | | | | | |
| 13. Breadth of curriculum | 4.3 | 2.3 | 4.0 | 2.7 | 2.7 | 5.0 |
| 14. Depth of curriculum | 2.3 | 2.3 | 4.7 | 3.3 | 2.0 | 3.7 |
| **Total** | 64.7 | 44.2 | 59.1 | 53.4 | 57.5 | 69.5 |

Entries are the three reviewers’ average scores on a scale of one to five, with one being “poor”, three being “neutral,” and 5 being “excellent”.

Table A4: Recommended personal finance curriculum for physicians

This recommended curriculum contains 14 modules. The content combines core and optional elements and may be customized depending on audience and time constraints. As a starting point, allocate one hour per module, which can be altered depending on circumstances, time constraints, audience backgrounds and interests, and anticipated volume of questions.

|  |  |  |
| --- | --- | --- |
| **Module** | **Topic** | **Core/Optional** |
| **1** | **Formulate a Financial Plan with an Understanding of Money Basics (& Financial Markets)**   * The financial planning process and the importance of diversification, debt reduction, and fee minimization * Time value of money basics (interest rates, compounding, discounting, inflation) * The impact of advisor fees on nest egg accumulation * The importance of collaborating, and reaching consensus, with your spouse/partner * The financial system and its participants (savers, investors, corporations, governments, and financial intermediaries such as banks, financial advisors, and brokers) **(optional)**   Exercises:   * List the sections or tasks included in a financial plan * List as many different financial market participants as you can (e.g., retail banks, insurance agents, etc.). What functions does each serve? **(optional)**   Questions:   1. Why is it important to minimize fees paid to asset managers, advisors, agents, etc.? 2. What is diversification? Why does it matter to you? 3. How much would a sum of money grow if invested at X% over Y years? 4. Why is procrastination dangerous in the context of financial planning? 5. What factors influence interest rates? **(optional)** 6. What is the current inflation rate in the USA? **(optional)**   This module introduces the concept of financial planning and its components, along with several important axioms and imperatives. The portion on financial markets introduces the financial playing field and its players. This can be useful in providing context for financial decisions. | Financial Planning & Money Basics are core concepts which should be included in the curriculum.  The financial system discussion is optional. |
| **2** | **Assets, Liabilities & Net Worth**   * The balance sheet (statement of net worth) * Overview of assets and liabilities * Household net worth (aka net wealth or nest egg) * The trajectory of net worth over time   Exercises:   * Create a household statement of net worth (balance sheet), using the provided customizable template * Forecast your household net worth over the next five years   Sample Questions:   1. What is the relationship between assets, liabilities, and net worth? 2. What does a balance sheet tell you about your household financial position? 3. What does it mean if net worth is negative? | This core curriculum high-level overview of financial planning should be covered early in the course as the concept of net worth (nest egg) is pivotal to household financial planning.  Attainable wealth portion and its calculations may instead be offered *after* the budgeting module. |
| **3** | **Detailed Discussion of Liabilities – Debt Management**   * Good vs. bad debt * Student debt, deferment, forbearance, capitalization, consolidation, refinancing * Public Service Loan Forgiveness (PSLF) program * Buy vs. lease car * Purchase (mortgage debt) vs. rent home * Credit cards * Credit reports and scores   Exercises:   * List all your student loans * Obtain a recent copy of your credit report and credit score (available from your bank, credit bureaus, other online resources, or your lender) * Research available mortgage loan offers, including specialized low- or zero-down payment loans for physicians   Sample Questions:   * What’s the difference between good and bad debt? * Should you pay down debt or invest? * Which loans should you pay off first? * Can you rely on PSLF? | Debt management is one of the most crucial core curriculum elements, particularly for younger physicians. |
| **4** | **Detailed Discussion of Assets & Accumulation**   * Appreciating vs. depreciating assets * Stocks, bonds and cash * Rainy-day or emergency cash fund * Real estate – your primary home * 529 Children’s college savings plans **(optional)** * Real estate – as a rental business **(optional)** * Private practice ownership, insurance cash value, annuities **(optional)** * Alternative assets (hedge funds, private equity, venture capital, commodities, etc.) **(optional)**   Exercises:   * Choose a company with publicly listed stock and search online for a graph of its recent stock price history. Has its price increased or decreased over the last year? Has the company paid a dividend? If so, how much did it pay in dividends over the last twelve months? * Search zillow.com or realtor.com for information on your current residence and local area. Has your residence appreciated or depreciated in value over recent years?   Sample Questions:   1. What’s the difference between appreciating and depreciating assets? 2. Do you need a rainy-day cash fund? 3. What is a stock? What are the benefits of stock ownership? 4. What is a bond? What are the benefits of bond ownership? 5. Can you make do with just the basic assets or do you need to invest in hedge funds and commodities, etc.? 6. What makes annuities unappealing? 7. Is your home purchase an investment? 8. Should you rely on Social Security in retirement? 9. Is it important to discuss financial decisions with spouse/partner? | Investments in basics such as stocks, bonds, and real estate as a primary home are core curriculum elements. The same applies to cash holdings which serve as a rainy-day fund.  All other assets, including real estate as a rental business are optional.  529 plans are less relevant for medical students but increasingly important for trainees. 529 plans may be offered as a separate module (see module 8). |
| **5** | **Budgeting, Income and Expenses**   * The household budget (a measure of household “profitability”) * Income and expenses * Budget’s implications for net worth * Live within your means   Exercises:   * Create a budget for your household using the provided customizable template * Classify each expense in your budget as discretionary (optional) or non-discretionary (unavoidable)   Sample Questions:   1. Based on your budget, is your household living within its means or are you over-extended? 2. Can you curtail some discretionary spending and free up cash for more productive uses? | This module is core curriculum. It can be introduced even earlier in the course.  Content may be customized to the audience. For example, medical students’ income sources and expenses will differ from those of attending physicians.  Use this content to introduce the notion of household profit (as the excess of income over expenses), and in the subsequent investing section explain how to deploy those profits for longer-term gains. |
| **6** | **Investing Basics**   * Risk and expected return * Risk aversion and tolerance * Active vs. passive investing * The basic asset classes * Mutual funds and exchange traded funds (ETFs) * Low-fee indexed funds * Assembling an investment portfolio: asset allocation, asset selection, monitoring and rebalancing   Exercises:   * Take a risk-tolerance questionnaire (often available from asset management providers such as Vanguard, E\*trade, Schwab, etc.) * Create an asset allocation using the provided customizable templates or another online source   Sample Questions:   1. What are the limitations of risk tolerance questionnaires? 2. Do you consider yourself to be risk averse or a risk “lover”? 3. Do you see yourself as an active or passive investor? 4. What’s the difference between *ability* and *willingness* to take risk? 5. In which asset classes are you currently investing? | Basic investing concepts are core curriculum. They should precede discussion of retirement accounts.  Passive investing, in particular, should be emphasized. |
| **7** | **Retirement Planning**   * Asset accumulation vs. income generation * Assembling a sufficient nest egg for retirement * Social Security * 401(k), 403(b), 457(b) accounts * Traditional and Roth IRAs * Getting an early start on retirement planning   Exercise:   * If your employer offers a retirement plan:  1. Does it provide a match to your contributions? 2. How many funds are available within the plan? 3. Which funds have the lowest management fees? 4. What are the default investments and are fees low?  * Using budget and net worth forecasts, will you be able to live off your accumulated nest egg in retirement? How likely is it that you’ll outlive your assets?   Sample Questions:   1. Should you put money into the qualified account (e.g., 403(b)) provided by your employer or contribute to your own IRA? 2. Should you put money into the qualified account (e.g., 403(b)) provided by employer or pay down debt? 3. How much money do you need to retire? 4. How can you avoid outliving your nest egg? 5. What is a Backdoor Roth IRA? 6. What is asset *location* (as opposed to asset allocation)? | Retirement planning is core curriculum.  Ideally, deliver this content after presenting asset & accumulation basics and investing basics. |
| **8** | **Children’s 529 College Savings Plans**   * The two different account types (savings versus prepaid tuition) * State tax benefits * Eligible educational expenses   Exercises:   * Go to CollegeSavings.org and look up the details of your state’s program manager * Compare the features of your state plans with those offered in two other states * Are there any state tax exemptions? (Note your income level may affect qualification for tax benefits)   Sample Questions:   1. How much do you need to save for child(ren)’s college? 2. What if your child doesn’t go to college? 3. What if your child gets a scholarship? 4. Can funds in a 529 plan be used for educational expenses of someone other than the original named beneficiary? 5. Can the money in a 529 plan be used for non-educational expenses? What are the implications? | Children’s college savings plans may be omitted from the curriculum when teaching medical students as few have children. The topic is increasingly important for residents and fellows.  Ideally, deliver this content after presenting asset & accumulation basics and investing basics.  529 accounts can alternatively be covered within the Detailed Asset discussion, where the 529 account is viewed as another asset invested in basic stocks and bonds. |
| **9** | **Evaluating Needs and Selecting Insurance**   * Overview of insurance types (disability, life, health, legal, property and casualty, etc.) * Key insurance industry terminology * Disability insurance (own occupation, non-cancellable and guaranteed renewable, automatic coverage increases) * Life insurance (term vs. permanent) * Property and casualty insurance (umbrella coverage) * Group versus private insurance   Exercises:   * Obtain some disability insurance quotes * Estimate how much life insurance coverage you require according to the human life value and needs based methods * Obtain some term life insurance quotes * Use an online search or a conversation with a licensed insurance agent to estimate the cost of an umbrella or protection from catastrophic loss policy   Sample Questions:   1. How much life insurance do you need? 2. Are you better off with term or permanent life insurance? 3. Do you need all the bells and whistles associated with disability insurance? 4. How important is it to avoid medical testing for future insurance purchases? 5. Do you need long-term care insurance for yourself? Should your parent consider long-term care insurance? 6. Do you have sufficient liability insurance coverage? | This content is core curriculum. |
| **10** | **Dealing with Financial Advisors**   * Generic advisor’s perspective and sales agenda * Do-it-yourself versus using an advisor * Obtaining advice from peers * Advisor functions – what they do * Advisor alignment – fiduciary standard, suitability standard, conflicts of interest, independent advisors * Advisor compensation – assets under management, broker commissions, fee-only, fee-based * Advisor expertise – education, licensing, experience * Finding and evaluating an advisor   Exercises:   * Identify several advisor candidates (who function as fiduciaries) * Look up each candidate’s regulatory record using FINRA’s BrokerCheck and the SEC Investment Adviser Public Disclosure database * Use the Advisor Evaluation Template to interview and assess three financial advisors from three different companies   Sample Questions:   1. What is the difference between “fee-only” and “fee-based” advisors? 2. How important is fiduciary duty? 3. What are some of the common conflicts of interest impacting advisors? 4. Do all advisors provide the same services? 5. Where can you check whether an advisor/agent has been sanctioned by a government agency or industry group? 6. What guidance is there for finding good advisor candidates and which questions should you ask them? | This content is core curriculum. |
| **11** | **Reviewing & Negotiating Employment Contracts**   * The “Standard Contract” * Description of duties (on-call responsibilities) * Compensation (base salary, bonus, RVUs, “eat-what-you-kill” model) * Employee vs. contractor status * Benefits (health/life/disability/property and casualty insurance, vacation, retirement accounts) * Research support * Medical malpractice insurance * Non-compete clauses * Paths to private practice ownership   Exercises:   * Draft your professional wish list. What will you want/need at your new place of employment? * Together with your spouse/partner, draft your household wish list. Where do you prefer to live? What resources are most important to you (daycare, school quality, etc.) * Pair-up and conduct mock interviews * Choose one prospective employer and research the institution and prospective colleagues. Your objective is to gain sufficient familiarity to come across as knowledgeable/proactive during an interview * Read a good book on negotiating   Sample Questions:   1. Should you accept interviews even with employers you won’t seriously consider? 2. Does negotiating make you seem like a troublemaker to a prospective employer? 3. What can be negotiated? 4. Should you find out in advance who will be interviewing you? 5. Should you pay an attorney to review your employment contract? | This is core curriculum for trainees in their final year. It is optional for other populations. |
| **12** | **Estate Planning and Asset Protection**   * Wills * Trusts * Powers of attorney * Asset protection * Your parents’ estate planning   Exercises:   * Search online for a basic Will document and read it. Consider which of the clauses are relevant for your family’s needs * Think about what you would like to happen to your assets after your passing. Do you have an interest in donating to charity or scientific research? How important is it to you to leave a professional or other legacy?   Sample Questions:   1. Do you need a Will? 2. How often do you need to redraft estate planning documents? 3. To whom should you consider granting powers of attorney? 4. Can you control how/when your assets are distributed to your children, before or after they reach the age of majority? | This content may be omitted from curricula aimed at younger populations, but it becomes more important over time, as assets and families grow. |
| **13** | **Psychological Barriers to Decision Making**   * Rational vs. behavioral decision-making models * Role of intuition in financial decision making * Psychological biases in financial decision making (overconfidence, loss aversion, herding behavior, confirmation bias, etc.)   Exercise:   * Consider an instance in which you may have made an impulsive financial decision and later regretted it. Assess the forces/factors that led you to making the impulsive decision * (As relevant) agree on a disciplined bilateral financial decision-making mechanism with your spouse/partner. This helps ensure decisions are made with consensus rather than unilaterally, and provides each of you with a sounding-board   Sample Questions:   1. How can you avoid making impulsive decisions? 2. Are finance industry professionals aware of the various psychological decision-making biases? | This material is useful but may be omitted from the curriculum.  If included, cover this content after discussing risk and return, as psychological biases impact our perception of these two concepts. |
| **14** | **Calculating Risk and Return**   * Formal definitions of risk and return in financial markets * Measures of risk/variability (standard deviation, beta) * Calculating expected and realized return   Exercises:   * Identify a publicly traded stock and using daily or monthly prices calculate its average historical return, standard deviation, and beta * Calculate the expected return for a stock given its beta   Sample Questions:   1. How reliable is the standard deviation of returns as a measure of risk? 2. Is beta a reliable input for assessing the expected return of a stock? | This module involves mathematical calculations. It is optional and may be omitted. |

Table A5: Learning objectives for recommended curriculum

|  |  |
| --- | --- |
| Topic | Learning objectives |
| Introduction to Financial Planning, Money Basics & Financial Markets | * Define time value of money concepts including interest rates, compounding, discounting, and inflation * Recognize the insidious impact of advisor fees and debt on your financial wellbeing * Formulate household financial priorities or goals * Write a household financial plan * Recognize the basic workings of a financial system and your role within that system (optional) |
| Assets, Liabilities & Net Worth | * Define net worth as the net of what you own (assets) and what you owe (liabilities) * List assets and liabilities * Calculate your household’s net worth (net wealth) * Track your household’s net worth (net wealth) over time in a balance sheet and project its growth into the future * Forecast future nest egg value(s) |
| Detailed Discussion of Liabilities – Debt Management | * Distinguish good from bad debt * Explain implications of deferment, forbearance, and capitalization of interest on student loans * Recognize student loan consolidation and refinancing options * Compare your educational debt repayment options * Consider qualification for Public Service Loan Forgiveness Program (PSLF) * Describe implications of purchasing a home or car versus renting/leasing * Acknowledge importance of your credit score * Prioritize debt repayment |
| Detailed Discussion of Assets & Accumulation | * Contrast appreciating and depreciating assets * Identify the various asset types, especially the most common ones: cash, stocks, bonds, and real estate * Recognize the potential rewards and risks associated with each asset type * Assemble a rainy-day fund composed of cash and equivalent instruments |
| Budgeting, Income and Expenses | * List and quantify all income sources * List and quantify all household expenses * Create and maintain a household budget * Calculate annual net income (household profit) * Realistically assess household’s financial circumstances * Formulate household priorities for making ends meet |
| Investing Basics | * Explain the concepts of risk and expected return * Recognize your own level of risk tolerance * Choose between being a passive and active investor * Allocate money across asset classes * Identify and select favorable low-cost investment funds within asset classes * Monitor and rebalance investments |
| Retirement Planning | * Recognize that in retirement focus changes from asset accumulation to steady, reliable income generation * Compare characteristics of available retirement accounts * Utilize retirement accounts effectively to optimize tax advantages and build wealth * Forecast realistic wealth (nest egg) accumulation * Estimate nest egg required to support dignified retirement |
| Children’s 529 College Savings Plans | * Distinguish between savings and prepaid tuition plans * Identify eligible expenses * Compare 529 plans offered by different states * Open 529 account(s) for own child(ren) * Select specific investments |
| Evaluating Needs & Selecting Insurance | * Identify reputable insurers * Quantify/estimate coverage needs within the context of your household circumstances * List the important features of disability insurance * Distinguish between term and permanent life insurance * Avoid unnecessary riders * Explain the role of liability insurance and umbrella coverage |
| Dealing with Financial Advisors | * Recognize advisor/agent/broker perspectives and agendas * Recognize and avoid advisors with potential conflicts of interest * Compare doing-it-yourself vs. using an advisor * Critique implications of accepting advice from peers * Assess skills and credibility of service providers * Identify potential advisor candidates * Interview and evaluate prospective advisor candidates * Effectively communicate your financial circumstances to advisor(s) |
| Reviewing & Negotiating Employment Contracts | * Describe how you will be compensated * Recognize standard contract clauses including on-call duties * Prepare for interviews * Research prospective employers * Negotiate effectively * Explain requirements/conditions for ownership stake eligibility (as relevant) |
| Estate Planning & Asset Protection | * Describe the purpose of estate planning documents such as Wills, Trusts, and Powers of attorney * Understand when redrafting of estate planning documents is necessary * Recognize asset protection tools |
| Psychological Barriers to Decision Making | * Develop awareness of psychological biases that may negatively impact financial decision making * Avoid making decisions influenced by such biases |
| Calculating Risk & Return | * Measure risk and expected return using standard techniques * Recognize the limitations of risk measures |