



Changes to Medical and Resident Education: Flexner to Future

Len Levin, MS LIS, MA, AHIP

Lamar Soutter Library

Objectives

- By the end of this hour, attendees will be able to describe the history and trends in undergraduate and graduate medical education.

Disclosures

- No conflicts of interest – that is, after seeing how long and hard medical students and residents work, I have NO DESIRE to follow in their footsteps!



<https://www.flickr.com/photos/ahayward/2322577484>



University of Pennsylvania - 1765



https://commons.wikimedia.org/wiki/File:PSM_V49_D477_Biological_hall_university_of_pennsylvania_philadelphia.jpg

19th Century – Typical Medical Education?



<https://pixabay.com/en/saloon-bar-old-saloon-207396/>

Long Branch Saloon
&
Medical School

8:00 – Anatomy (who
was found on the
street last night?)

10:00 – Gun shot
wound care

12:00 – Drinkin’

2:00 – Gamblin’

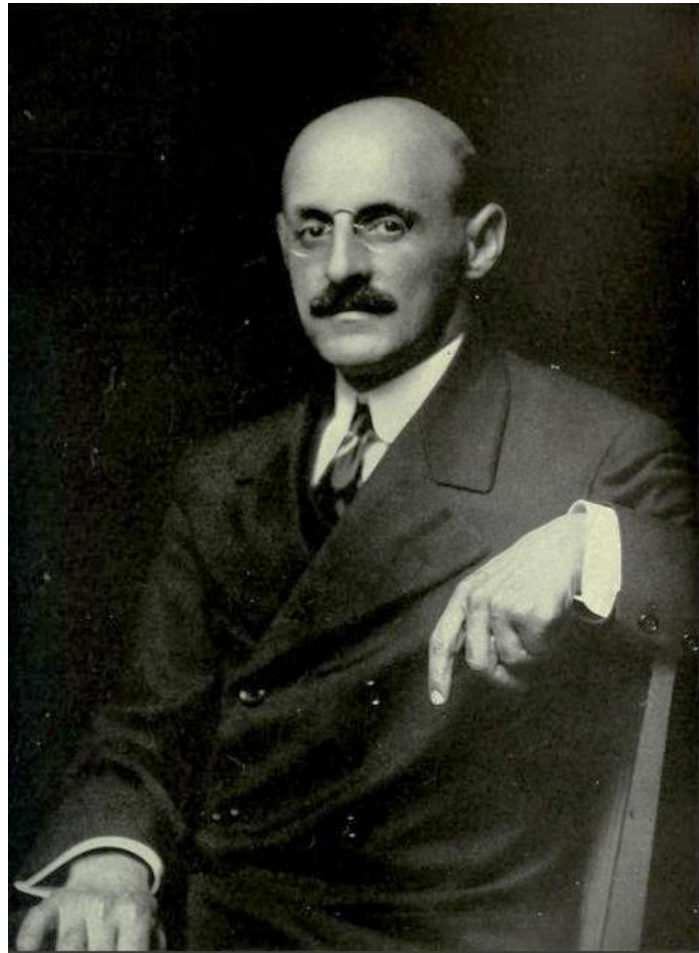
4:00 – Symposium on
addictive behavior

Johns Hopkins Medical School



1893

Abraham Flexner



https://commons.wikimedia.org/wiki/File:Picture_of_Abraham_Flexner.jpg

“2 X 2” curriculum

Year 1

Year 2

Year 3

Year 4

Basic Sciences

Clinical

1960's



https://www.flickr.com/photos/that_chrysler_guy/8142935761

Doctor PBL's Socially Disconnected Cardiac Organ Club Band



<https://www.flickr.com/photos/paille-fr/8903094536>

Progression of ME since Flexner

Where we started 20th century –
“Stand Alone”



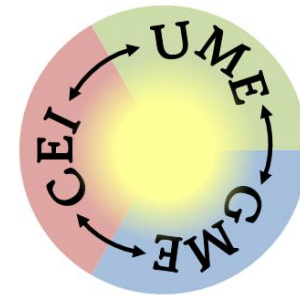
Start of 21st century – “Contiguous”



Today – “Integrated”



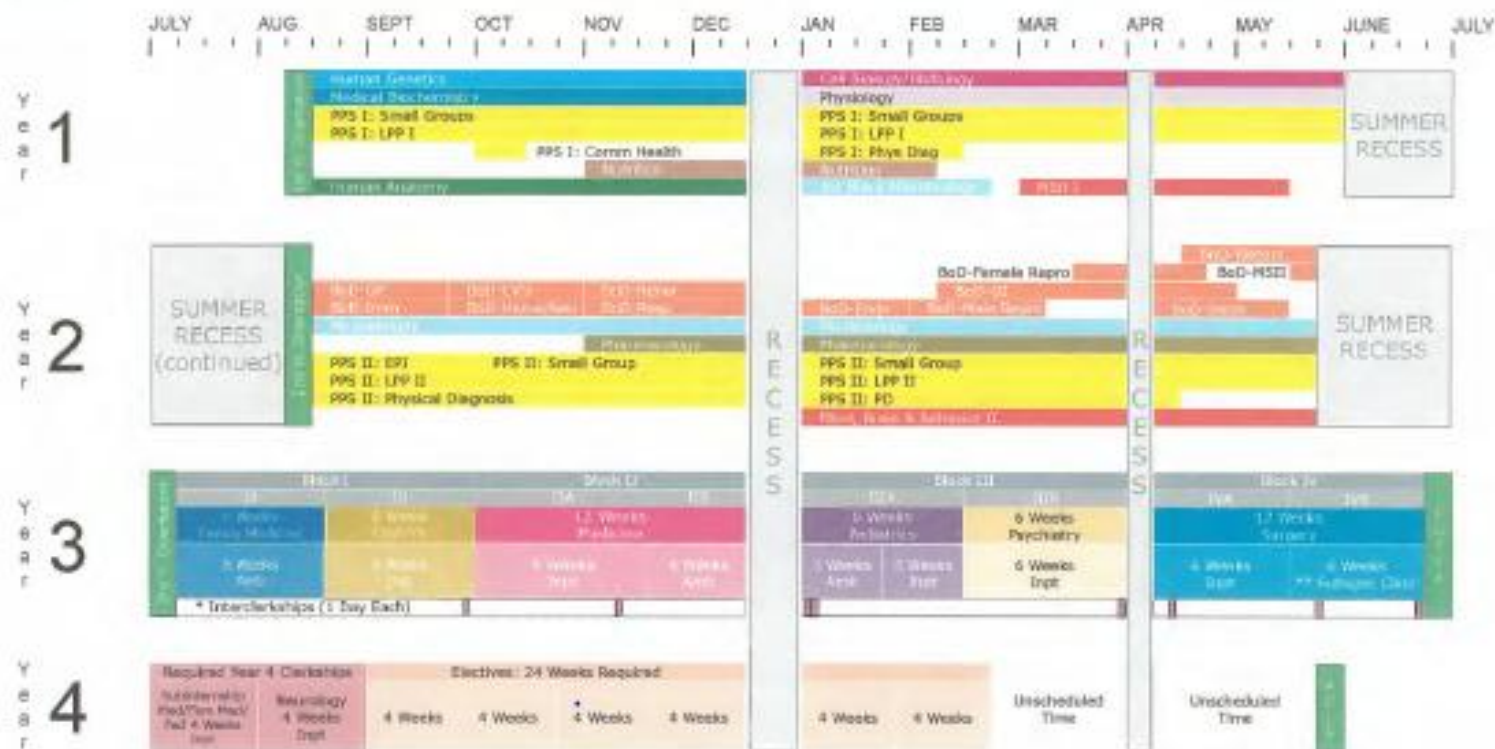
In ten years – “Systemized”



Does it work? - AAMC EPA

- EPA 1: Gather a history and perform a physical examination
- EPA 2: Prioritize a differential diagnosis following a clinical encounter
- EPA 3: Recommend and interpret common diagnostic and screening tests
- EPA 4: Enter and discuss orders and prescriptions
- EPA 5: Document a clinical encounter in the patient record
- EPA 6: Provide an oral presentation of a clinical encounter
- EPA 7: Form clinical questions and retrieve evidence to advance patient care
- EPA 8: Give or receive a patient handover to transition care responsibility
- EPA 9: Collaborate as a member of an interprofessional team
- EPA 10: Recognize a patient requiring urgent or emergent care and initiate evaluation and management
- EPA 11: Obtain informed consent for tests and/or procedures
- EPA 12: Perform general procedures of a physician
- EPA 13: Identify system failures and contribute to a culture of safety and improvement

School of Medicine Curriculum at a Glance



Keywords

ACLS Advanced Cardiac Life Support Certification

SoD Biopsy of Oncomice

EOTYA End of Third Year Assessment

^a Dystrophic vegetation.

Complementary & Alternative Medicine

Qualitative

Domestic Violence

****Surgery Subspecialty Options**

8122 • J. Neurosci., July 26, 2006 • 26(30):8115–8122

Center

Measures of PMT

EPI Epidemiology and Biostatistics

GP General Pathology

LPP Longitudinal Partnership Programs

State of Life

Medical Error and Patient Safety

Multiculturalism

Catherine,

Pharmaceuticals

1992-1993

John, Mimi Kagan, and Belovoy

MS Multi-System

1995 Physician Patient and Society

Client address

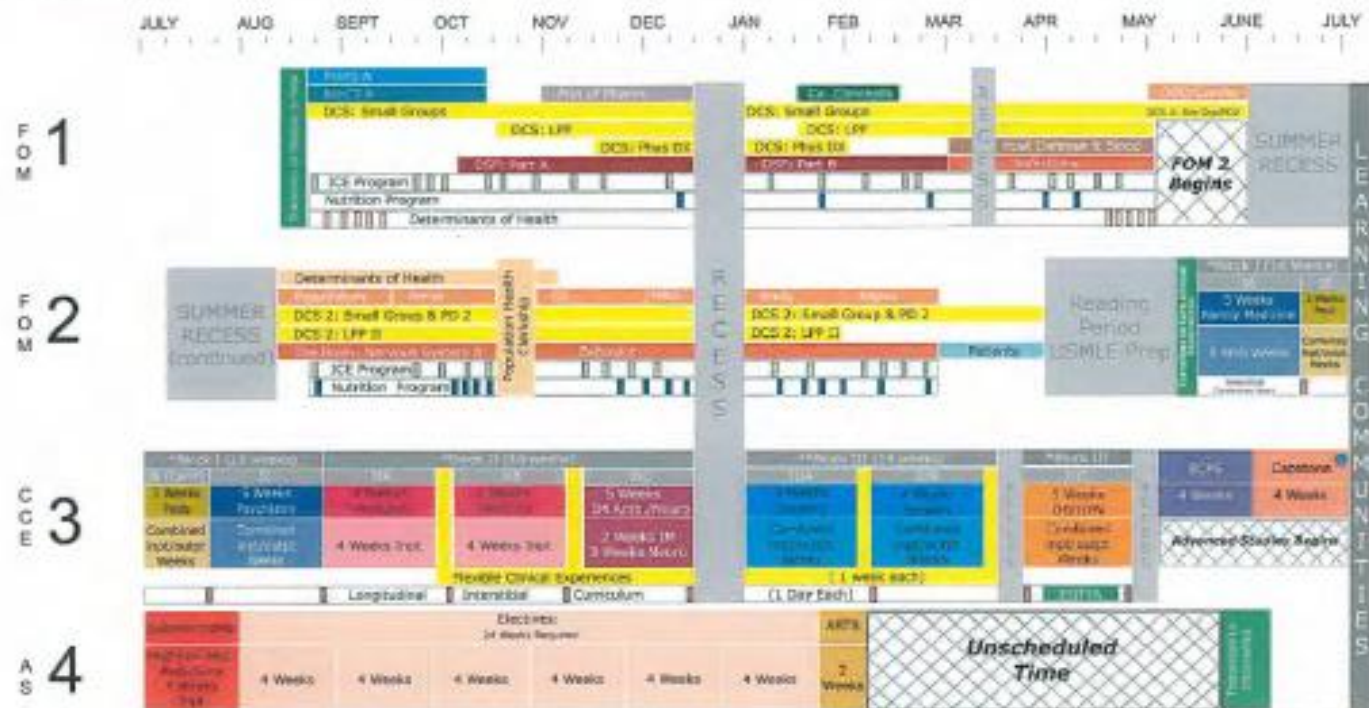
Health Policy and the Protection of Minors

Test method

History

University of Maryland

School of Medicine Curriculum at a Glance



Say

ABTS: Advanced Biomedical and Translational Sciences

ACLS Advanced Cardiac Life Support Certification

400 *Journal of Management Education* 36(4)

© 2000 Blackwell Science Ltd *Journal of Internal Medicine* 247: 105–112

Source: *Journal of the American Statistical Association*, 1997, Vol. 92, No. 439, pp. 1023-1032.

Cordia alliodora

Can Cancer Concepts

^aCCE blocks are each 16 weeks and include dedicated time for clerkships, assessments, and interstitial curriculum.

● Required starting with Class of 2016

**Includes Surgical Subspecialties

TICR Determinants of Health

DBF Development Structure & Definition

SCS Consulting & Clinical, Inc.

—

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

Adult Emergence Clinical Practice Objectives

ECNY, End of Third Year Assignment

FCM: Foundation of Medicine

EU Consolidation

[illegible]

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

Abstract

III Integrated Case Exercises

LTP Longitudinal Preceptorship Program

M. A. S. Murtaza, M. A. S. Murtaza and S. Khan

Pharm. J. Pharm. Technol. Pharmaceut.

© 2000 Blackwell Science Ltd

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 103–110

Who are today's students?

- Number of applicants per year = 43,919
- Number to matriculate = 19,230
- Number of women = 47%
- Number of African American, Native American, Hispanic = 15.7%

MD – Says who?



LIAISON COMMITTEE ON
MEDICAL EDUCATION



Tomorrow's Doctors, Tomorrow's Cures®



Testing - Boards

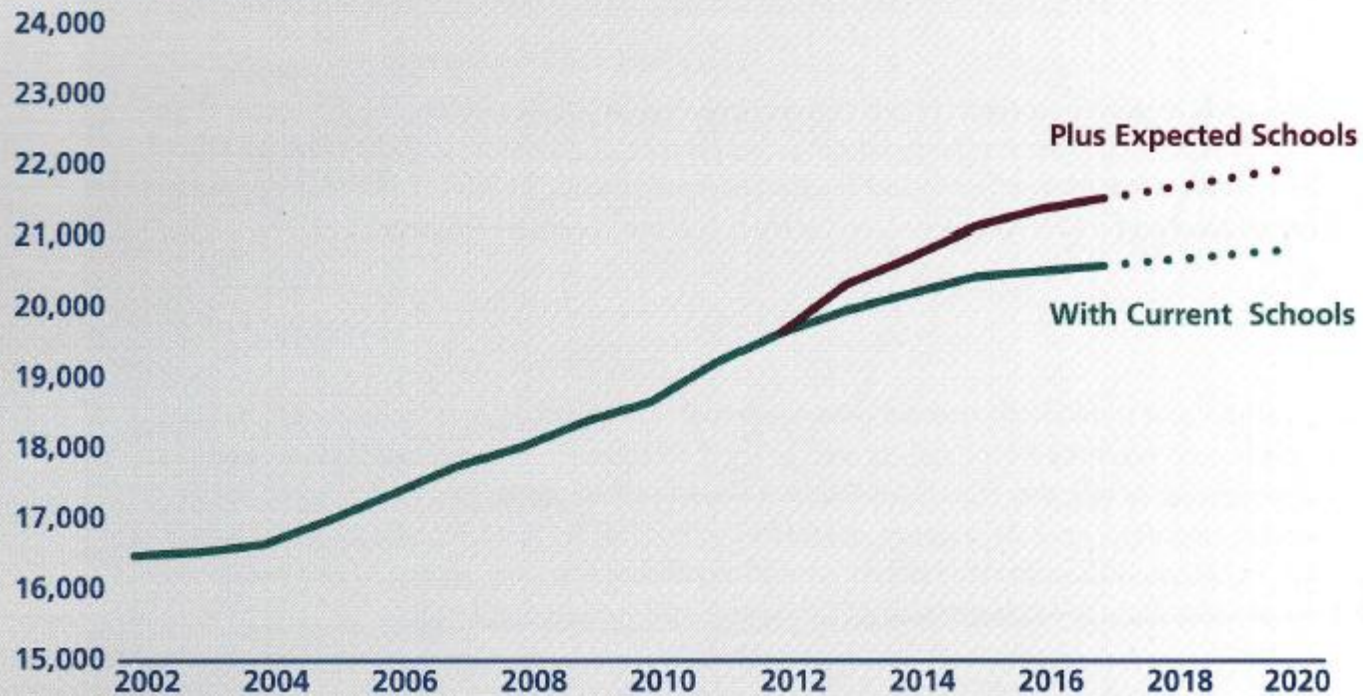
- MCAT
- USMLE Step 1
- USMLE Step 2
- USMLE Step 3
- ABMS – 24 specialties

1. A O B ● C O D O E O
2. A O B O C O D ● E O
3. A ● B O C O D O E O
4. A O B O C ● D O E O
5. A O B ● C O D O E O
6. A O B O C O D O E ●
7. A O B O C O D ● E O
8. A ● B O C O D O E O
9. A O B O C O D ● E O

Growth in Med School Enrollment

Figure 10: Projected Growth in U.S. Medical School First-year Enrollment (2001–2020)

First-Year Enrollment

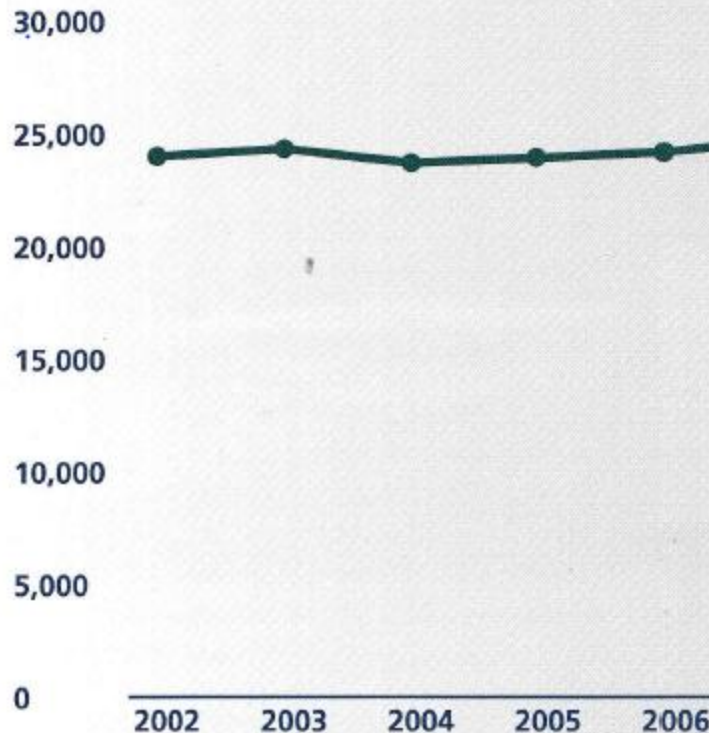


Source: AAMC Medical School Enrollment Survey

“Growth” in Residency Enrollment

Figure 11: Number of Residents Entering the ACGME Pipeline (2002–2011)

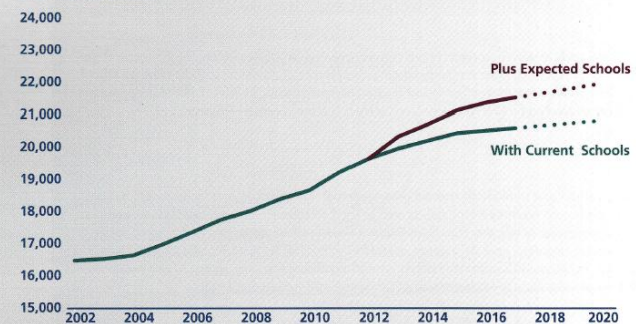
Residents Entering the ACGME Pipeline



Source: ACGME

Figure 10: Projected Growth in U.S. Medical School First-year Enrollment (2001–2020)

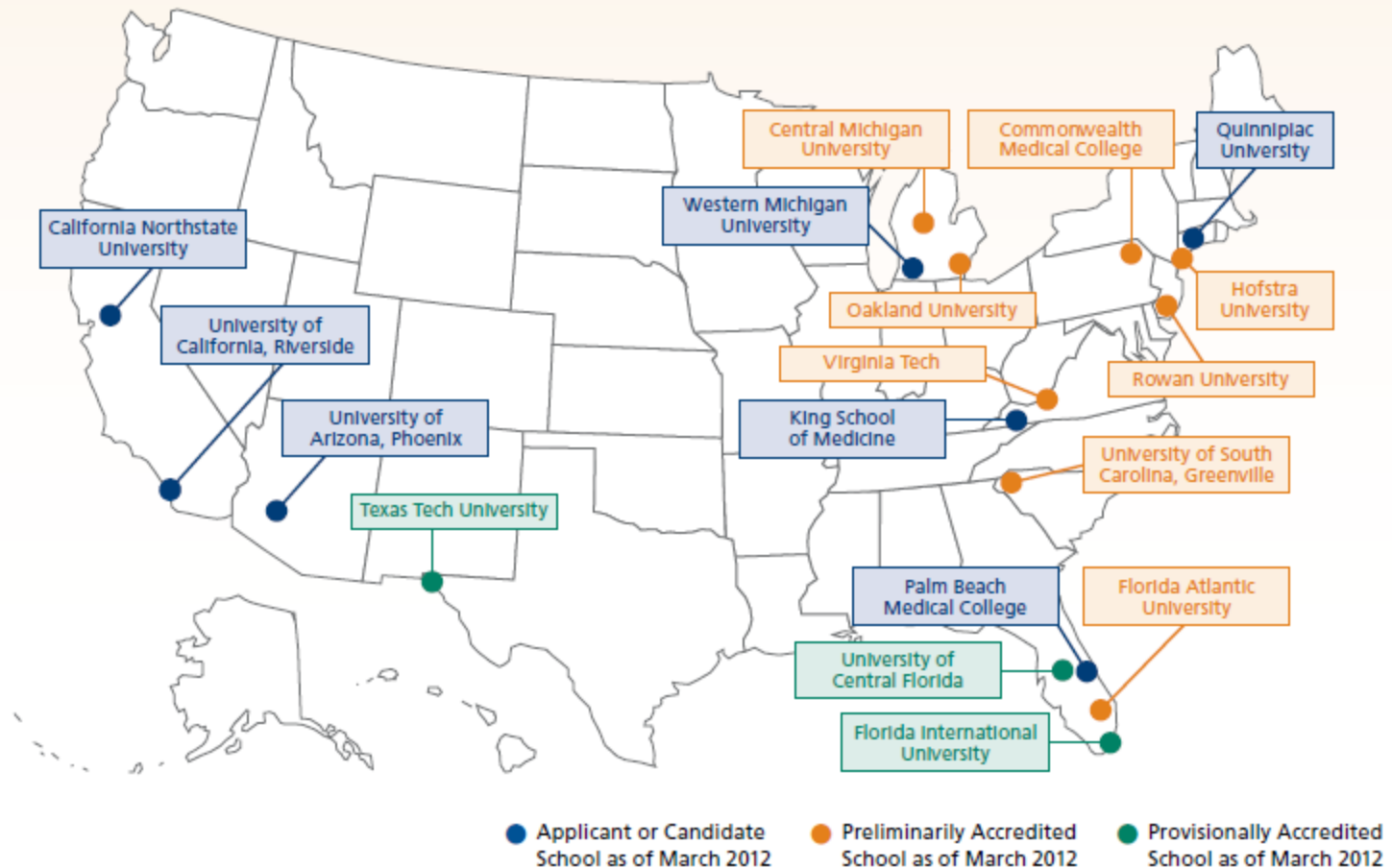
First-Year Enrollment



Source: AAMC Medical School Enrollment Survey

New Medical Schools (as of 2012)

FIGURE 1: Medical Schools in the LCME Accreditation Process



Graduate Medical Education



<http://collider.com/finale-recap-review-greys-anatomy-community-parks-and-recreation-the-office-30-rock/>. © ShondaLand, Mark Gordon Co., ABC Television

Match Day



GME Structure

- Intern – Year 1
- Junior Resident – Year 2
- Senior Resident – Year 3-5
- Fellow – Year 6-11
- *Some residencies, e.g., Family Medicine, Peds = 3 years*
- *Some specialties, e.g., advanced neurosurgery, can last up to 11 years.*

GME Structure cont.

- “Home base” with multiple rotations throughout other disciplines of medicine
- All rotations include educational objectives, e.g., didactics, lectures, journal club, peer-to-peer learning
- Always includes faculty supervision, lessening as residency advances

The Demographics

- >1,000 teaching hospitals in U.S. – majority are non-profit
- 8,887 ACGME accredited programs comprising 133 specialties and 113,142 residents



Fully licensed MD – Says who?



Accreditation competencies

- Patient care
- Medical knowledge
- Practice-based learning
- Interprofessionalism and communication skills
- Professionalization
- Systems-based practice

Duty Hours

- ACGME Mandates – 2003 & 2008
- 80 hours/week “reasonable upper limit”
- 16 consecutive hours for Interns, 24 for PGY2 and above



Duty Hours – Issues?

- Adaption of “shift mentality” vs. “moral & professional responsibility”
- Other components of original recommendation not implemented
- Still issue of “sleep deprivation” vs. leaving sick patient because “shift has ended”
- Concerns of appropriate handoff, follow-up
- Studies show *no correlation* with improved quality of patient care or decrease in errors.

Show Me the Money!



Jerry Maguire. ©1996, TriStar Pictures

The Costs

- Undergraduate (Medical School)
 - 37% - Patient care via clinical faculty
 - ~20% - Federal non-Medicare (e.g., residency support, CME)
 - Other – govt. support, grants and contracts, etc.
 - Lowest - Tuition

The Costs

- Graduate Medical Education
 - Much via federal “Prospective Payment System” of direct and indirect costs
 - Based on number of Medicare factors such as DRG codes all set by Congress. These funds cut by aggregate 50% since inception
 - “Medicare Direct Graduate Education” payments. Covers $\frac{1}{4}$ of cost per each resident. Half of this for fellows.

M&M Brownies



<http://omnommy.tumblr.com/post/29012152719/mm-brownies>

Ingredients

- 1 cup butter, melted
- 1 cup unsweetened cocoa powder
- 1 1/4 cup packed brown sugar
- 1 cup granulated sugar
- 1/2 tsp salt
- 4 eggs
- 1 1/4 cup flour
- 2/3 cup M&Ms

The recipe changes, the mission does not

Ingredients - 1996

- 1 cup butter, melted
- 1 cup unsweetened cocoa powder
- 1 1/4 cup packed brown sugar
- 1 cup granulated sugar
- **1 lb salt**
- 4 eggs
- 1 1/4 cup flour
- 2/3 cup M&Ms

Ingredients - 2004

- 1 cup butter, melted
- **1/16 tsp unsweetened cocoa powder**
- 1 1/4 cup packed brown sugar
- 1 cup granulated sugar
- **1 lb salt**
- 4 eggs
- **1 pinch flour**
- 2/3 cup M&Ms

So...

- Growing population → Aging population → ACA insuring more individuals → Looming physician shortage → Demand/need for more medical schools → Need for more residency positions → Funding being cut → Academic Medical Centers carrying more of cost → Costs higher at AMC's → Private insurers now “tiering” coverage/excluding AMC sites and physicians → Lower volume of AMC's...

Or...

- Primary Medical Home
- Accountable Care Organizations
- Motivated learners with more interprofessional experience, greater ability at critical thinking, more skills in behavioral/social medicine



https://commons.wikimedia.org/wiki/File:Z_The_End_Notorious.png

Thank you. Let's eat!
Right after questions, of course...