

Immunization: Implications for Vaccine Uptake and Development

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Objectives

At the conclusion of this presentation, pharmacists will be able to:	At the conclusion of this presentation, pharmacy technicians will be able to:
<ol style="list-style-type: none"> 1) Explain issues regarding patients missing routine vaccinations 2) Identify ways to assess for missed vaccines 3) List key vaccines for catchup 4) Discuss safe practices to provide immunizations 	<ol style="list-style-type: none"> 1) Identify issues regarding patients missing routine vaccinations 2) Identify ways to assess for missed vaccines 3) List key vaccines for catchup

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Disclosures

•Jeannette Wick has no real or potential conflicts of interest or financial disclosures related to the subject matter in this presentation.

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Herd Immunity



Hazel, Maddy, Gracie, Eloise, and Charlotte

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Hazel, Maddy, Gracie, Eloise, and Charlotte

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Metcalf CJL, et al. Trends Immunol. 2015;36(12):753-755.

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Herd Immunity

- Successful pathogen spread depends on access to susceptible individuals
- If the proportion of the population that is immune exceeds a threshold, disease incidence declines
- Thresholds are pathogen specific

Disease	Threshold	R ₀
Diphtheria	85%	1.7 – 4.3
Measles	83 – 94%	12 - 18
Mumps	75 – 86%	10 - 12
Pertussis	92 – 94%	5.5
Polio	80 – 86%	5-7
Rubella	83 – 85%	5-7
COVID-19	82%	5.7

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The Center Center. Available at <http://www.cdc.gov/health/it/index.html>. Accessed December 10, 2020.

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Herd Immunity

Vaccine efficacy	Vaccination uptake	Effect on Community
Low	Low	No herd immunity
Low	High	No herd immunity
High	Low	No herd immunity
High	High	HERD IMMUNITY

UConn | SCHOOL OF PHARMACY Fine P, et al. Clin Infect Dis. 2011;52(7):911-6. doi: 10.1093/cid/cir007. 8

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COVID-19 pandemic and disruptions to routine childhood vaccination

All non-influenza vaccines

UConn | SCHOOL OF PHARMACY Whalley CM, et al. JAMA Netw Open. 2020;3(11):e2024894. 9

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COVID-19 pandemic and disruptions to routine childhood vaccination

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UConn | SCHOOL OF PHARMACY Wharton M (ACIP). June 22, 2020. Leask J. Nature. 2013;473:443-5. 10

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Disruptions to Healthcare

- Between mid-March and June 2020, in-person outpatient visits fell by nearly 70%
- Pediatrics was among the hardest hit specialties, neck-and-neck with ophthalmology, otolaryngology, pulmonary, and dermatology
- Primary care reported 31% fewer visits

Wharton M. Oral presentation at: ACIP Meeting; June 22, 2020.
 Ateneu M, et al. ID: RWJ Briefing; July, 2020.
<https://doi.org/10.1186/s12916-020-01608-1>

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Focus on MEASLES

- In 2019, 31 states reported measles in 1,282 people.
- Greatest number of cases reported since 1992
- Most cases among the unvaccinated

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UConn | SCHOOL OF PHARMACY Singh T, et al. Pharmacy. 2020;8(1):7. 13

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Assessment



Hazel, Maddy, Gracie, Eloise, and Charlotte are representative of their herd. Gracie is an anti-vaxxer and has not been vaccinated for bovillis coronavirus (a coronavirus that causes bovine diarrhea). Which of the following is TRUE?

- Since Hazel, Maddy, Eloise, and Charlotte (meaning 80% of the herd) have been vaccinated, there is herd immunity.
- Although Hazel, Maddy, Gracie, and Charlotte (meaning 80% of the herd) have been vaccinated, herd immunity is threatened.
- Since Charlotte (meaning 20% of the herd) refuses to be vaccinated, she will develop immunity eventually if infected.

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Measles Isn't "Just Measles..."

- Measles-infected patients lose 11-73% of total baseline antibodies after infection
 - Immunity only returns after re-exposure to pathogens
 - Similar loss NOT seen in MMR vaccinated children
- Data suggests this results in infection susceptibility in patients who had infection- or vaccine-induced immunity

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Mina MI, et al. Science. 2019;366(6465):599-606
Petrova VN, et al. 2019;4(41):eay6125.

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And What about Mumps?

- From January 1 to December 6, 2019, 48 states and the District of Columbia in the U.S. reported mumps infections in 3,252 people.
- Before the U.S. mumps vaccination program, clinicians reported about 186,000 cases each year (probably underestimated)
- Since the 2-MMR dose vaccination program started in 1989, cases decreased >99%, with only a few hundred cases reported most years.
- Since 2006, the CDC has tracked increases in cases and outbreaks about every five years.

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CDC: <https://www.cdc.gov/mumps/outbreaks.html>. Accessed December 14, 2020.

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What about Mumps?

- Recent outbreaks have occurred in tight-knit communities where vaccination rates were high.
- Two plausible theories these outbreaks: waning vaccine-induced immunity and immune escape.

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CDC: <https://www.cdc.gov/mumps/outbreaks.html>. Accessed December 14, 2020.
Altam, D, et al. Infect Genet Evol. 2019;75: 103965.

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What about Mumps?

- Waning vaccine-induced immunity suggests that vaccine-induced immunity is fading
- Waning vaccine immunity increases with time since vaccination, making adults more likely to become infected than children
- Immune escape suggests that the mumps virus genetically drifted from the vaccine strains and is no longer recognized.
- Implies that the current vaccine is compromised and a new vaccine must be designed to target the new mumps virus epitopes.

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CDC: <https://www.cdc.gov/mumps/outbreaks.html>. Accessed December 14, 2020.
Altam, D, et al. Infect Genet Evol. 2019;75: 103965.

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Will This Change How (or WHO) Pharmacies Immunize?

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What's the difference?

	Adults	Children >3	Adolescents 11 - 18
Route: IM	Deltoid	Deltoid Anterolateral thigh	Deltoid
Needle gauge	22-25	22-25	22-25
Needle length	1 to 1.5 inch <130 lbs (<60 kg), ½-inch	¾ to 1 inch	1 to 1.5 inch
Aspiration	NO	NO	NO
Position	Seated	Safe Hold	Seated

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Safe Hold



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Please do not....

- Say, "This will not hurt a bit!"
 - People have different thresholds for pain
 - It may or may not hurt
- Say, "It may hurt a little, but just for a minute or two."

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Missed Opportunities for Vaccination Strategy

- Reducing missed opportunities for vaccination (MOV) is a strategy to increase immunization coverage simply by making better use of existing vaccination sites
- MOV refers to any contact with health services by an individual (child or person of any age) who is eligible for vaccination (e.g., unvaccinated, partially vaccinated, and free of contraindications to vaccination), which does not result in the person receiving one or more of the vaccine doses for which he or she is eligible.

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Missed Opportunities for Vaccination Strategy

- How many opportunities do you miss?
- Why do you miss opportunities?
- What can you adjust or do differently?

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Table 2. Catch-up immunization schedule for persons aged 4 months-18 years who start late or who are more than 1 month behind, United States, 2020

Always make recommendations by determining needed vaccines based on age (Table 1), determining appropriate intervals for catch-up, if needed (Table 2), assessing for medical indications (Table 3), and reviewing special situations (Table 4).

The tables below provide catch-up schedules and minimal intervals between doses for children based on age whose vaccinations have been delayed.

Table 1. By age
 • 5, 12, 15, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114, 120, 126, 132, 138, 144, 150, 156, 162, 168, 174, 180, 186, 192, 198, 204, 210, 216, 222, 228, 234, 240, 246, 252, 258, 264, 270, 276, 282, 288, 294, 300, 306, 312, 318, 324, 330, 336, 342, 348, 354, 360, 366, 372, 378, 384, 390, 396, 402, 408, 414, 420, 426, 432, 438, 444, 450, 456, 462, 468, 474, 480, 486, 492, 498, 504, 510, 516, 522, 528, 534, 540, 546, 552, 558, 564, 570, 576, 582, 588, 594, 600, 606, 612, 618, 624, 630, 636, 642, 648, 654, 660, 666, 672, 678, 684, 690, 696, 702, 708, 714, 720, 726, 732, 738, 744, 750, 756, 762, 768, 774, 780, 786, 792, 798, 804, 810, 816, 822, 828, 834, 840, 846, 852, 858, 864, 870, 876, 882, 888, 894, 900, 906, 912, 918, 924, 930, 936, 942, 948, 954, 960, 966, 972, 978, 984, 990, 996, 1002, 1008, 1014, 1020, 1026, 1032, 1038, 1044, 1050, 1056, 1062, 1068, 1074, 1080, 1086, 1092, 1098, 1104, 1110, 1116, 1122, 1128, 1134, 1140, 1146, 1152, 1158, 1164, 1170, 1176, 1182, 1188, 1194, 1200, 1206, 1212, 1218, 1224, 1230, 1236, 1242, 1248, 1254, 1260, 1266, 1272, 1278, 1284, 1290, 1296, 1302, 1308, 1314, 1320, 1326, 1332, 1338, 1344, 1350, 1356, 1362, 1368, 1374, 1380, 1386, 1392, 1398, 1404, 1410, 1416, 1422, 1428, 1434, 1440, 1446, 1452, 1458, 1464, 1470, 1476, 1482, 1488, 1494, 1500, 1506, 1512, 1518, 1524, 1530, 1536, 1542, 1548, 1554, 1560, 1566, 1572, 1578, 1584, 1590, 1596, 1602, 1608, 1614, 1620, 1626, 1632, 1638, 1644, 1650, 1656, 1662, 1668, 1674, 1680, 1686, 1692, 1698, 1704, 1710, 1716, 1722, 1728, 1734, 1740, 1746, 1752, 1758, 1764, 1770, 1776, 1782, 1788, 1794, 1800, 1806, 1812, 1818, 1824, 1830, 1836, 1842, 1848, 1854, 1860, 1866, 1872, 1878, 1884, 1890, 1896, 1902, 1908, 1914, 1920, 1926, 1932, 1938, 1944, 1950, 1956, 1962, 1968, 1974, 1980, 1986, 1992, 1998, 2004, 2010, 2016, 2022, 2028, 2034, 2040, 2046, 2052, 2058, 2064, 2070, 2076, 2082, 2088, 2094, 2100, 2106, 2112, 2118, 2124, 2130, 2136, 2142, 2148, 2154, 2160, 2166, 2172, 2178, 2184, 2190, 2196, 2202, 2208, 2214, 2220, 2226, 2232, 2238, 2244, 2250, 2256, 2262, 2268, 2274, 2280, 2286, 2292, 2298, 2304, 2310, 2316, 2322, 2328, 2334, 2340, 2346, 2352, 2358, 2364, 2370, 2376, 2382, 2388, 2394, 2400, 2406, 2412, 2418, 2424, 2430, 2436, 2442, 2448, 2454, 2460, 2466, 2472, 2478, 2484, 2490, 2496, 2502, 2508, 2514, 2520, 2526, 2532, 2538, 2544, 2550, 2556, 2562, 2568, 2574, 2580, 2586, 2592, 2598, 2604, 2610, 2616, 2622, 2628, 2634, 2640, 2646, 2652, 2658, 2664, 2670, 2676, 2682, 2688, 2694, 2700, 2706, 2712, 2718, 2724, 2730, 2736, 2742, 2748, 2754, 2760, 2766, 2772, 2778, 2784, 2790, 2796, 2802, 2808, 2814, 2820, 2826, 2832, 2838, 2844, 2850, 2856, 2862, 2868, 2874, 2880, 2886, 2892, 2898, 2904, 2910, 2916, 2922, 2928, 2934, 2940, 2946, 2952, 2958, 2964, 2970, 2976, 2982, 2988, 2994, 3000, 3006, 3012, 3018, 3024, 3030, 3036, 3042, 3048, 3054, 3060, 3066, 3072, 3078, 3084, 3090, 3096, 3102, 3108, 3114, 3120, 3126, 3132, 3138, 3144, 3150, 3156, 3162, 3168, 3174, 3180, 3186, 3192, 3198, 3204, 3210, 3216, 3222, 3228, 3234, 3240, 3246, 3252, 3258, 3264, 3270, 3276, 3282, 3288, 3294, 3300, 3306, 3312, 3318, 3324, 3330, 3336, 3342, 3348, 3354, 3360, 3366, 3372, 3378, 3384, 3390, 3396, 3402, 3408, 3414, 3420, 3426, 3432, 3438, 3444, 3450, 3456, 3462, 3468, 3474, 3480, 3486, 3492, 3498, 3504, 3510, 3516, 3522, 3528, 3534, 3540, 3546, 3552, 3558, 3564, 3570, 3576, 3582, 3588, 3594, 3600, 3606, 3612, 3618, 3624, 3630, 3636, 3642, 3648, 3654, 3660, 3666, 3672, 3678, 3684, 3690, 3696, 3702, 3708, 3714, 3720, 3726, 3732, 3738, 3744, 3750, 3756, 3762, 3768, 3774, 3780, 3786, 3792, 3798, 3804, 3810, 3816, 3822, 3828, 3834, 3840, 3846, 3852, 3858, 3864, 3870, 3876, 3882, 3888, 3894, 3900, 3906, 3912, 3918, 3924, 3930, 3936, 3942, 3948, 3954, 3960, 3966, 3972, 3978, 3984, 3990, 3996, 4002, 4008, 4014, 4020, 4026, 4032, 4038, 4044, 4050, 4056, 4062, 4068, 4074, 4080, 4086, 4092, 4098, 4104, 4110, 4116, 4122, 4128, 4134, 4140, 4146, 4152, 4158, 4164, 4170, 4176, 4182, 4188, 4194, 4200, 4206, 4212, 4218, 4224, 4230, 4236, 4242, 4248, 4254, 4260, 4266, 4272, 4278, 4284, 4290, 4296, 4302, 4308, 4314, 4320, 4326, 4332, 4338, 4344, 4350, 4356, 4362, 4368, 4374, 4380, 4386, 4392, 4398, 4404, 4410, 4416, 4422, 4428, 4434, 4440, 4446, 4452, 4458, 4464, 4470, 4476, 4482, 4488, 4494, 4500, 4506, 4512, 4518, 4524, 4530, 4536, 4542, 4548, 4554, 4560, 4566, 4572, 4578, 4584, 4590, 4596, 4602, 4608, 4614, 4620, 4626, 4632, 4638, 4644, 4650, 4656, 4662, 4668, 4674, 4680, 4686, 4692, 4698, 4704, 4710, 4716, 4722, 4728, 4734, 4740, 4746, 4752, 4758, 4764, 4770, 4776, 4782, 4788, 4794, 4800, 4806, 4812, 4818, 4824, 4830, 4836, 4842, 4848, 4854, 4860, 4866, 4872, 4878, 4884, 4890, 4896, 4902, 4908, 4914, 4920, 4926, 4932, 4938, 4944, 4950, 4956, 4962, 4968, 4974, 4980, 4986, 4992, 4998, 5004, 5010, 5016, 5022, 5028, 5034, 5040, 5046, 5052, 5058, 5064, 5070, 5076, 5082, 5088, 5094, 5100, 5106, 5112, 5118, 5124, 5130, 5136, 5142, 5148, 5154, 5160, 5166, 5172, 5178, 5184, 5190, 5196, 5202, 5208, 5214, 5220, 5226, 5232, 5238, 5244, 5250, 5256, 5262, 5268, 5274, 5280, 5286, 5292, 5298, 5304, 5310, 5316, 5322, 5328, 5334, 5340, 5346, 5352, 5358, 5364, 5370, 5376, 5382, 5388, 5394, 5400, 5406, 5412, 5418, 5424, 5430, 5436, 5442, 5448, 5454, 5460, 5466, 5472, 5478, 5484, 5490, 5496, 5502, 5508, 5514, 5520, 5526, 5532, 5538, 5544, 5550, 5556, 5562, 5568, 5574, 5580, 5586, 5592, 5598, 5604, 5610, 5616, 5622, 5628, 5634, 5640, 5646, 5652, 5658, 5664, 5670, 5676, 5682, 5688, 5694, 5700, 5706, 5712, 5718, 5724, 5730, 5736, 5742, 5748, 5754, 5760, 5766, 5772, 5778, 5784, 5790, 5796, 5802, 5808, 5814, 5820, 5826, 5832, 5838, 5844, 5850, 5856, 5862, 5868, 5874, 5880, 5886, 5892, 5898, 5904, 5910, 5916, 5922, 5928, 5934, 5940, 5946, 5952, 5958, 5964, 5970, 5976, 5982, 5988, 5994, 6000, 6006, 6012, 6018, 6024, 6030, 6036, 6042, 6048, 6054, 6060, 6066, 6072, 6078, 6084, 6090, 6096, 6102, 6108, 6114, 6120, 6126, 6132, 6138, 6144, 6150, 6156, 6162, 6168, 6174, 6180, 6186, 6192, 6198, 6204, 6210, 6216, 6222, 6228, 6234, 6240, 6246, 6252, 6258, 6264, 6270, 6276, 6282, 6288, 6294, 6300, 6306, 6312, 6318, 6324, 6330, 6336, 6342, 6348, 6354, 6360, 6366, 6372, 6378, 6384, 6390, 6396, 6402, 6408, 6414, 6420, 6426, 6432, 6438, 6444, 6450, 6456, 6462, 6468, 6474, 6480, 6486, 6492, 6498, 6504, 6510, 6516, 6522, 6528, 6534, 6540, 6546, 6552, 6558, 6564, 6570, 6576, 6582, 6588, 6594, 6600, 6606, 6612, 6618, 6624, 6630, 6636, 6642, 6648, 6654, 6660, 6666, 6672, 6678, 6684, 6690, 6696, 6702, 6708, 6714, 6720, 6726, 6732, 6738, 6744, 6750, 6756, 6762, 6768, 6774, 6780, 6786, 6792, 6798, 6804, 6810, 6816, 6822, 6828, 6834, 6840, 6846, 6852, 6858, 6864, 6870, 6876, 6882, 6888, 6894, 6900, 6906, 6912, 6918, 6924, 6930, 6936, 6942, 6948, 6954, 6960, 6966, 6972, 6978, 6984, 6990, 6996, 7002, 7008, 7014, 7020, 7026, 7032, 7038, 7044, 7050, 7056, 7062, 7068, 7074, 7080, 7086, 7092, 7098, 7104, 7110, 7116, 7122, 7128, 7134, 7140, 7146, 7152, 7158, 7164, 7170, 7176, 7182, 7188, 7194, 7200, 7206, 7212, 7218, 7224, 7230, 7236, 7242, 7248, 7254, 7260, 7266, 7272, 7278, 7284, 7290, 7296, 7302, 7308, 7314, 7320, 7326, 7332, 7338, 7344, 7350, 7356, 7362, 7368, 7374, 7380, 7386, 7392, 7398, 7404, 7410, 7416, 7422, 7428, 7434, 7440, 7446, 7452, 7458, 7464, 7470, 7476, 7482, 7488, 7494, 7500, 7506, 7512, 7518, 7524, 7530, 7536, 7542, 7548, 7554, 7560, 7566, 7572, 7578, 7584, 7590, 7596, 7602, 7608, 7614, 7620, 7626, 7632, 7638, 7644, 7650, 7656, 7662, 7668, 7674, 7680, 7686, 7692, 7698, 7704, 7710, 7716, 7722, 7728, 7734, 7740, 7746, 7752, 7758, 7764, 7770, 7776, 7782, 7788, 7794, 7800, 7806, 7812, 7818, 7824, 7830, 7836, 7842, 7848, 7854, 7860, 7866, 7872, 7878, 7884, 7890, 7896, 7902, 7908, 7914, 7920, 7926, 7932, 7938, 7944, 7950, 7956, 7962, 7968, 7974, 7980, 7986, 7992, 7998, 8004, 8010, 8016, 8022, 8028, 8034, 8040, 8046, 8052, 8058, 8064, 8070, 8076, 8082, 8088, 8094, 8100, 8106, 8112, 8118, 8124, 8130, 8136, 8142, 8148, 8154, 8160, 8166, 8172, 8178, 8184, 8190, 8196, 8202, 8208, 8214, 8220, 8226, 8232, 8238, 8244, 8250, 8256, 8262, 8268, 8274, 8280, 8286, 8292, 8298, 8304, 8310, 8316, 8322, 8328, 8334, 8340, 8346, 8352, 8358, 8364, 8370, 8376, 8382, 8388, 8394, 8400, 8406, 8412, 8418, 8424, 8430, 8436, 8442, 8448, 8454, 8460, 8466, 8472, 8478, 8484, 8490, 8496, 8502, 8508, 8514, 8520, 8526, 8532, 8538, 8544, 8550, 8556, 8562, 8568, 8574, 8580, 8586, 8592, 8598, 8604, 8610, 8616, 8622, 8628, 8634, 8640, 8646, 8652, 8658, 8664, 8670, 8676, 8682, 8688, 8694, 8700, 8706, 8712, 8718, 8724, 8730, 8736, 8742, 8748, 8754, 8760, 8766, 8772, 8778, 8784, 8790, 8796, 8802, 8808, 8814, 8820, 8826, 8832, 8838, 8844, 8850, 8856, 8862, 8868, 8874, 8880, 8886, 8892, 8898, 8904, 8910, 8916, 8922, 8928, 8934, 8940, 8946, 8952, 8958, 8964, 8970, 8976, 8982, 8988, 8994, 9000, 9006, 9012, 9018, 9024, 9030, 9036, 9042, 9048, 9054, 9060, 9066, 9072, 9078, 9084, 9090, 9096, 9102, 9108, 9114, 9120, 9126, 9132, 9138, 9144, 9150, 9156, 9162, 9168, 9174, 9180, 9186, 9192, 9198, 9204, 9210, 9216, 9222, 9228, 9234, 9240, 9246, 9252, 9258, 9264, 9270, 9276, 9282, 9288, 9294, 9300, 9306, 9312, 9318, 9324, 9330, 9336, 9342, 9348, 9354, 9360, 9366, 9372, 9378, 9384, 9390, 9396, 9402, 9408, 9414, 9420, 9426, 9432, 9438, 9444, 9450, 9456, 9462, 9468, 9474, 9480, 9486, 9492, 9498, 9504, 9510, 9516, 9522, 9528, 9534, 9540, 9546, 9552, 9558, 9564, 9570, 9576, 9582, 9588, 9594, 9600, 9606, 9612, 9618, 9624, 9630, 9636, 9642, 9648, 9654, 9660, 9666, 9672, 9678, 9684, 9690, 9696, 9702, 9708, 9714, 9720, 9726, 9732, 9738, 9744, 9750, 9756, 9762, 9768, 9774, 9780, 9786, 9792, 9798, 9804, 9810, 9816, 9822, 9828, 9834, 9840, 9846, 9852, 9858, 9864, 9870, 9876, 9882, 9888, 9894, 9900, 9906, 9912, 9918, 9924, 9930, 9936, 9942, 9948, 9954, 9960, 9966, 9972, 9978, 9984, 9990, 9996, 10002, 10008, 10014, 10020, 10026, 10032, 10038, 10044, 10050, 10056, 10062, 10068, 10074, 10080, 10086, 10092, 10098, 10104, 10110, 10116, 10122, 10128, 10134, 10140, 10146, 10152, 10158, 10164, 10170, 10176, 10182, 10188, 10194, 10200, 10206, 10212, 10218, 10224, 10230, 10236, 10242, 10248, 10254, 10260, 10266, 10272, 10278, 10284, 10290, 10296, 10302, 10308, 10314, 10320, 10326, 10332, 10338, 10344, 10350, 10356, 10362, 10368, 10374, 10380, 10386, 10392, 10398, 10404, 10410, 10416, 10422, 10428, 10434, 10440, 10446, 10452, 10458, 10464, 10470, 10476, 10482, 10488, 10494, 10500, 10506, 10512, 10518, 10524, 10530, 10536, 10542, 10548, 10554, 10560, 10566, 10572, 10578, 10584, 10590, 10596, 10602, 10608, 10614, 10620, 10626, 10632, 10638, 10644, 10650, 10656, 10662, 10668, 10674, 10680, 10686, 10692, 10698, 10704, 10710, 10716, 10722, 10728, 10734, 10740, 10746, 10752, 10758, 10764, 10770, 10776, 10782, 10788, 10794, 10800, 10806, 10812, 10818, 10824, 10830, 10836, 10842, 10848, 10854, 10860, 10866, 10872, 10878, 10884, 10890, 10896, 10902, 10908, 10914, 10920, 10926, 10932, 10938, 10944, 10950, 10956, 10962, 10968, 10974, 10980, 10986, 10992, 10998, 11004, 11010, 11016, 11022, 11028, 11034, 11040, 11046, 11052, 11058, 11064, 11070, 11076, 11082, 11088, 11094, 11100, 11106, 11112, 11118, 11124, 11130, 11136, 11142, 11148, 11154, 11160, 11166, 11172, 11178, 11184, 11190, 11196, 11202, 11208, 11214, 11220, 11226, 11232, 11238, 11244, 11250, 11256, 11262, 11268, 11274, 11280, 11286, 11292, 11298, 11304, 11310, 11316, 11322, 11328, 11334, 11340, 11346, 11352, 11358, 11364, 11370, 11376, 11382, 11388, 11394, 11400, 11406, 11412, 11418, 11424, 11430, 11436, 11442, 11448, 11454, 11460, 11466, 11472, 11478, 11484, 11490, 11496, 11502, 11508, 11514, 11520, 11526, 11532, 11538, 11544, 11550, 11556, 11562, 11568, 11574, 11580, 11586, 11592, 11598, 11604, 11610, 11616, 11622, 11628, 11634, 11640, 11646, 11652, 11658, 11664, 11670, 11676, 11682, 11688, 11694, 11700, 11706, 11712, 11718, 11724, 11730, 11736, 11742, 11748, 11754, 11760, 11766, 11772, 11778, 11784, 11790, 11796, 11802, 11808, 11814, 11820, 11826, 11832, 11838, 11844, 11850, 11856, 11862, 11868, 11874, 11880, 11886, 11892, 11898, 11904, 11910, 11916, 11922, 11928, 11934, 11940, 11946, 11952, 11958, 1

Administer or Refer

- Properly store and handle vaccines
- Distribute Vaccine Information Statements (VIS) to patients
- Follow safety protocols
- Review the CDC Guide to Infection Prevention for Outpatient Care periodically
- Be aware of and prepared for potential adverse reactions
 - 15 minute waiting period?

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DOCUMENT

Vaccine Information Sheet?
Yes? No?

- Only 20%-28% of pharmacists reported all vaccinations to the appropriate state vaccination registries
 - Record vaccination in patients' medical records **1**
 - Provide documentation to patients for their personal records **2**
 - Document vaccinations in immunization information systems (IIS) **3**

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U.S. DHHS. 2013; 2013. p 3-5.
Wool JL, Kadaka NN, Reed JB, Ellingworth Flake KS. Vaccine. 2020;38(11):2456-2465.

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Assessment

You screen a patient at prescription intake and find that she has missed several recommended vaccines? You use the SHARE approach, and she decides to be vaccinated today. You vaccinate her using standard precautions. Once you send her on her way, you enter the vaccinations into the ISS. Which step did you miss?

- Reporting the immunizations to the patient's primary care provider
- Having the patient sit and wait for 15 minutes at least
- Giving the patient a record of the vaccinations she received

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Safe Immunization Practices

- Follow Standard Precautions
 - Hand hygiene and environmental cleaning between patients
 - Wear a medical facemask at all times
 - Use eye protection based on community transmission level
 - Moderate-substantial: Wear eye protection; likelihood of seeing asymptomatic COVID-19
 - Minimal to none: Universal eye protection is optional, unless otherwise indicated as a part of Standard Precautions.
- IM or subcutaneous vaccines
 - Wear gloves
 - Change gloves and sanitize hands between patients
- Intranasal or oral vaccines:
 - Wear gloves
 - Change gloves and and sanitize hands between patients
 - Use of an N95 or higher-level respirator is not necessary

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CDC. <https://www.cdc.gov/vaccines/pandemic-guidance/index.html>. Accessed December 11, 2020

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Those Darned Vaccine Metrics

- Vaccinated at a pharmacy
 - Often costs less than in a physician's office
 - Is more convenient and accessible
- The fiscal benefit of offering vaccines
 - The vaccine market may reach ~ \$49.27 billion by 2022, up from \$32.31 billion in 2016
 - A 20% vaccination rate can drive a 6% increase in front-end sales



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Winegarden W. [pacificresearch.org/new-study-patients-could-save-time-and-money-if-neighborhood-pharmacists-can-administer-more-vaccines](https://www.pacificresearch.org/new-study-patients-could-save-time-and-money-if-neighborhood-pharmacists-can-administer-more-vaccines). Accessed December 11, 2020. Quinlan K. <https://www.pharmacytimes.com/immunization-shot-in-the-arm-for-retail-pharmacy>. Accessed December 11, 2020.

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Vaccine Administration → Vaccine Development

- Vaccination could be an evolutionary pressure on seasonal influenza if vaccines reduce the transmission rates of some ("targeted") strains more than others
 - More vaccinated populations should have a lower prevalence of targeted strains compared to less vaccinated populations
- Strains are defined in 3 ways:
 - influenza types and subtypes
 - lineages of type B
 - clades of influenza A/H3N2
- Researchers have detected a significantly greater frequency of an H3N2 clade with known vaccine escape mutations in more vaccinated countries during the 2014-2015 season, which is consistent with vaccine-driven selection within the H3N2 subtype.
- Vaccine-driven selection is likely when vaccines are most effective.

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Vaccine Administration → Vaccine Development

- Pneumococcal disease: Elders and children at an increased risk
- Vaccines now cover many *Streptococcus pneumoniae* serotypes
 - Two vaccines possess subtle differences
- Pneumococcal serotypes identified as “pediatric” caused more than half of IPD in adults older than 85 years of age before PCV7 was introduced.
- Before the PCV7 vaccine, statisticians saw an annual post holiday IPD spike in January among elderly people—attributed to intergenerational holiday gatherings.

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CDC: <https://www.cdc.gov/pneumococcal/surveillance.html>, Accessed December 12, 2020.
Wick JV. Consult Pharm. 2013;28(4):220-227.

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Vaccine Administration → Vaccine Development

- Once children were routinely vaccinated with PCV7, incidence of IPD caused by the seven serotypes in the vaccine declined 92% in adults > 65
- Notwithstanding the positive impact from each vaccine type, the incidence of diseases caused by serotypes that are not included in specific vaccines tends to increase in children and certain adult populations with underlying illnesses.
 - Increases are usually small compared with the overall reduction in disease

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CDC: <https://www.cdc.gov/pneumococcal/surveillance.html>, Accessed December 12, 2020.
Wick JV. Consult Pharm. 2013;28(4):220-227.

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Trends in invasive pneumococcal disease among adults aged 19-64 years old, 1998-2016

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Centers for Disease Control and Prevention

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What does this mean?

As vaccination rates improve, researchers look for better vaccines

- Broader coverage
- Greater efficacy
- New administration approaches

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Mckee G, et al. Can Commun Dis Rep. 2018;44(12):317-322.

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Assessment

How do good immunization practices contribute to new vaccine development?

- The money paid for vaccines contributes to research and development
- They don't; this is one of those false statements that circulates on social media
- As vaccines become more effective, researchers can identify emerging strains

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That's it!

Go forth and VACCINATE!

Your “herd” will benefit.

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