Optimal Policy: Dosage by age group

Set up

- Dosage is between 0 (zero dose) and 1 (full dose) [0.5 would be a half-dose]
- We vary the dose supply constraint along each row where the constraint is total doses divided by the population
- We use infection fatality rates by age group as a measure of the harm
- The dosage function is 0.95x^0.25 [consistent with 95% efficacy at full dose, and 80% at half-dose]
- We require efficacy to be at least 50%.

Takeaways:

- Give full doses to those most at risk, because a small marginal gain in efficacy is more valuable (in averting harm) for the elderly than large gains in efficacy for the young.
- At all partial dose amounts, marginal returns to dosage in harm by group must be equal.
- Results are presented for low- and high-income countries separately

A. Optimal Dosage by age group: Low Income Countries

Age Group	Population Share	***Doses / Population***									
		1.0	**0.9**	**0.8**	**0.7**	**0.6**	**0.5**	**0.4**	**0.3**	**0.2**	**0.1**
0-10	28.99%	1.000	0.655	0.390	0.269	0.147	0.000	0.000	0.000	0.000	0.000
10-20	23.15%	1.000	1.000	0.900	0.620	0.340	0.191	0.102	0.000	0.000	0.000
20-30	17.28%	1.000	1.000	1.000	1.000	1.000	0.868	0.465	0.322	0.157	0.000
30-40	12.01%	1.000	1.000	1.000	1.000	1.000	1.000	0.918	0.635	0.309	0.109
40-50	8.06%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.784	0.382	0.135
50-60	5.32%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.456
60-70	3.20%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
70-80	1.55%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
90+	0.43%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

B. Optimal Dosage by age group: High Income Countries

Age Group	Population Share	***Doses / Population***									
		1.0	**0.9**	**0.8**	**0.7**	**0.6**	**0.5**	**0.4**	**0.3**	**0.2**	**0.1**
0-10	10.97%	1.000	0.206	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10-20	11.27%	1.000	0.886	0.198	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20-30	12.61%	1.000	1.000	1.000	0.384	0.136	0.000	0.000	0.000	0.000	0.000
30-40	13.73%	1.000	1.000	1.000	1.000	0.500	0.271	0.000	0.000	0.000	0.000
40-50	13.68%	1.000	1.000	1.000	1.000	1.000	0.624	0.159	0.000	0.000	0.000
50-60	13.34%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.420	0.090	0.000
60-70	11.39%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.508	0.143
70-80	8.01%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.437
90+	5.00%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.972