

VITAMIN & MINERAL DEFICIENCY

Vitamin and mineral deficiencies affect a third of the world's people – debilitating minds, bodies, energies, and the economic prospects of nations.

But for once the world is confronted by a problem which could be brought under control in a relatively short time and at a relatively low cost.

A global damage assessment report

“It is no longer a question of treating severe deficiency in individuals. It is a question of reaching out to whole populations to protect them against the devastating consequences of even moderate forms of vitamin and mineral deficiency.”

Carol Bellamy, Executive Director, UNICEF

“We now have the knowledge and the solutions that can protect the muscles, brains, and blood of whole populations at an extraordinarily low cost.”

Venkatesh Mannar, President, The Micronutrient Initiative

“For nearly 40 years, food fortification has protected the populations of the United States, Canada, and many other countries. It is long past the time when the same protection was available to the peoples of the developing world.”

Nevin Scrimshaw, President, International Nutrition Foundation

“Fortifying foods with basic vitamins and minerals is both essential and affordable.”

Bill Gates, co-founder, Bill and Melinda Gates Foundation

“The case for the elimination of vitamin and mineral deficiency is compelling beyond description. The return on investment is without equal.”

Rolf Carriere, Executive Director, Global Alliance for Improved Nutrition

“Probably no other technology available today offers as large an opportunity to improve lives and accelerate development at such low cost and in such a short time.”

The World Bank

“This is a vital economic and humanitarian cause and we in the food industry are uniquely positioned to help progress.”

Brendan Stewart, Chairman, Australian Wheat Board

“The cost is minuscule. The benefit enormous. We have acted on this issue both because it is right – and because it presents our business in a positive light.”

Philip Punarma, Chief Commercial Officer, Bogosari Flour Mills, Indonesia

“The road to regional health and life-long productivity cannot be passed without removing the obstacle of vitamin and mineral deficiency.”

Joseph Hunt, Health and Nutrition Adviser, Asian Development Bank

VITAMIN & MINERAL DEFICIENCY

Few outside specialist circles are aware of the scale and severity of vitamin and mineral deficiency, or of what it means for individuals and for nations.

It means the impairment of hundreds of millions of growing minds and the lowering of national IQs.

It means wholesale damage to immune systems, and the deaths of more than a million children a year.

It means 200,000 serious birth defects annually, and the deaths of approximately 50,000 young women a year during pregnancy and childbirth.

And it means the large-scale loss of national energies, intellects, productivity, and growth.

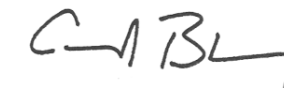
This problem was largely controlled decades ago in the industrialised nations. It could now be controlled world-wide by means that are tried and tested, available and affordable. That is why the World Bank says that “The control of vitamin and mineral deficiencies is one of the most extraordinary development-related scientific advances of recent years. Probably no other technology available today offers as large an opportunity to improve lives and accelerate development at such low cost and in such a short time”.

The Micronutrient Initiative and UNICEF will shortly be issuing a Global Progress Report on vitamin and mineral deficiency – along with Damage Assessment Reports for 80 individual countries.

This summary is being submitted to political leaders and major media in the belief that controlling vitamin and mineral deficiency is an affordable opportunity to improve the lives of two billion people and to strengthen the pulse of economic development.



Venkatesh Mannar
President
Micronutrient Initiative
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Carol Bellamy
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VITAMIN & MINERAL DEFICIENCY

A Global Progress Report

The Micronutrient Initiative and UNICEF will shortly be issuing a Global Progress Report on vitamin and mineral deficiency (VMD).

At the same time, VMD Damage Assessment Reports for 80 individual countries are being distributed to national political leaders and major media. These nation-by-nation audits draw on latest information to present the most comprehensive picture to date of the toll being taken by VMD on developing nations.

The findings, for countries that are home to approximately 80% of the world's population, are set out on pages 6 to 9.

A summary

- Iodine deficiency is estimated to have lowered the intellectual capacity of almost all of the nations reviewed by as much as 10 to 15 percentage points.
- Iron deficiency in the 6-to-24 month age group is impairing the mental development of 40% to 60% of the developing world's children.
- Vitamin A deficiency is compromising the immune systems of approximately 40% of the developing world's under-fives and leading to the early deaths of an estimated one million young children each year.
- Iodine deficiency in pregnancy is causing as many as 20 million babies a year to be born mentally impaired.
- Folate deficiency is causing approximately 200,000 severe birth defects every year and is associated with approximately 1 in every 10 adult deaths from heart disease.
- Severe iron deficiency anaemia is causing the deaths of an estimated 50,000 young women a year in pregnancy and childbirth.
- Iron deficiency in adults is so widespread that it is lowering the energies of nations and the productivity of workforces – with estimated losses of up to 2% of GDP in the worst affected countries. "Vitamin and mineral deficiencies," says the World Bank "impose high economic costs on virtually every developing nation."
- In practice, vitamin and mineral deficiencies overlap and interact. Half of children with VMD are suffering from multiple deficiencies – adding up an immeasurable burden on individuals, on health services, on education systems, and on millions of families caring for children who are disabled or mentally impaired.

A 'new' problem

This damage assessment exercise confirms that we are here dealing with a global problem of enormous importance that is as yet little recognised.

In large part this is because VMD is a 'new' problem.

For several decades it has been known that micronutrient deficiency – the lack of key vitamins and minerals – inflicts anaemia, cretinism and blindness on tens of millions of people. But the news of the last decade is

that this is but the tip of a very large iceberg. Levels of mineral and vitamin deficiency that have no clinical symptoms can and do impair intellectual development, compromise immune systems, provoke birth defects, and consign perhaps 2 billion people to lives lived below their physical and mental potential. VMD therefore debilitates in some significant degree the energies, intellects, and economic prospects of nations.

The implications of these findings are obviously far-reaching. Most fundamentally, as UNICEF Executive Director Carol Bellamy has said, "We have to leave behind the old thinking and act in the light of new knowledge: it is no longer a question of seeking out symptoms of severe deficiency in individuals and treating them. It is a question of reaching out to whole populations to protect them against the devastating consequences of even moderate forms of vitamin and mineral deficiency."

Solutions

But if it is clear that VMD represents a much greater problem than was imagined even a decade ago, it is also clear that for once the world is confronted by a problem for which there are available and affordable solutions.

In summary those solutions are:-

FORTIFICATION: Adding essential vitamins and minerals to foods that are regularly consumed by a significant proportion of the population (such as flour, salt, sugar, cooking oil and margarine). The cost can be as little as a few cents per person per year.

SUPPLEMENTATION: Reaching out to vulnerable groups (particularly children and women of childbearing age) with vitamin and mineral supplements in the form of tablets, capsules and syrups costing only a few cents per person per year.

EDUCATION: Informing communities about the kinds of foods that can increase the intake and absorption of vitamins and minerals.

DISEASE CONTROL: Controlling diseases like malaria, measles, diarrhoea, and parasitic infections can also help the body to absorb and retain essential vitamins and minerals.

These are the methods that have brought VMD under control in the industrialised nations and that could now be deployed to control the problem world-wide in a relatively short time and at a relatively low cost.

As the forthcoming Global Progress Report on vitamin and mineral deficiency will show, each of the available solutions contains its own difficulties; none is a complete solution in itself; and all need to be pursued simultaneously and according to the particular contours of need and opportunity in each country.

Targets

In May 2002, the General Assembly of the United Nations agreed that the elimination or reduction of vitamin and mineral deficiencies should be one of the principal development goals to be achieved in the early years of the new millennium. Specifically, the UN has called for the elimination of iodine deficiency by 2005; the elimination of vitamin A deficiency by 2010; and a reduction of at least 30% in the global prevalence of iron deficiency anaemia by 2010.

The struggle to achieve these goals is already underway. Throughout the 1990s, international agencies have been working with governments, national institutions, and the private sector to fortify foods and extend the outreach of vitamin and mineral supplements. In that time, some remarkable advances have been made. These achievements, and the main lessons to be drawn from them, are also summarised in the forthcoming VMD Global Progress Report.

The main burden of the report, however, is that the goals will not be achieved, and the impact of VMD will not be significantly reduced, without a more ambitious, visionary, and systematic commitment to deploy known solutions on the same scale as the known problems.

Achievement

Alongside the VMD Damage Assessment Reports for individual countries, the Micronutrient Initiative and UNICEF are also issuing National Protection Audits to begin tracking the progress being made in putting solutions into effect. Much has already been achieved:-

A summary

- The global prevalence of iodine deficiency has been halved from 30% to 15%. This has been brought about by a sustained effort to add iodine to two-thirds of the world's household salt. As a result, approximately 70 million new-borns a year are being protected, in some degree, against mental impairment.
- More than 40 developing countries are now reaching 70% or more of their young children with at least one vitamin A capsule every year. Two-dose coverage is significantly lower, but the effort to date is estimated to be saving the lives of more than 300,000 young children a year and preventing many hundreds of thousands of cases of irreversible blindness.
- An international movement to fortify all wheat flour with iron and folic acid (as in the United States and Canada) is beginning to gain momentum. Indonesia, Jordan, Nigeria and South Africa have recently acted, bringing to 49 the total number of countries adding iron to flour.
- Many more developing countries have begun the process of fortifying other staple foods and condiments – from salt, sugar and margarine to noodles, cooking oil, and soy sauce – with essential vitamins and minerals
- In addition to these advances, there are signs that the seriousness and urgency of the VMD issue is beginning to be more widely realised. The last year, for example, has seen the launch of the \$70 million Global Alliance for Improved Nutrition (GAIN) – supported by the Bill and Melinda Gates Foundation, the Micronutrient Initiative, and the aid programmes of Canada, Germany, the Netherlands, and the United States.

Many of these achievements stem from the resolutions made at the 1990 World Summit for Children. And they emphatically contradict the idea that that nothing ever comes of international conferences, resolutions, goals and targets.

Nonetheless, with almost a third of the planet affected in some degree by a problem for which a clear solution beckons, anything less than rapid progress would be unconscionable. Indeed so serious is the VMD problem, and so affordable the solution, that not to act decisively against it would make a mockery of other, more difficult, development targets.

The challenge for 2004-10

Despite the achievements, the fact remains that few nations have moved decisively against VMD by deploying the full range of known solutions on a systematic, nation-wide scale.

If the goals set by the United Nations are to be achieved, action against VMD will therefore have to move onto a new level. Specifically, the major challenges are:-

SUSTAINING RECENT ACHIEVEMENTS: The first priority is to maintain what has been achieved. There is nothing automatic about sustainability; salt iodisation levels, for example, have recently slipped back in Bolivia, India, Indonesia, Vietnam, Central Asia, and the Balkans.

BUILDING A NEW AWARENESS: The next twelve months must be used to create a new public and political awareness of the scale and consequence of the problem. Action on the necessary scale will not happen

unless VMD is seen for what it is – not as an obscure nutritional issue but an assault on the mental and physical development of nations.

MEETING THE IRON CHALLENGE: 'Much achieved, job less than half done' might sum up recent progress against vitamin A and iodine deficiencies. But against iron deficiency there has been virtually no progress at all. With new knowledge about the consequences of the problem must come a new determination to move against it. To repeat, iron deficiency brings losses in productivity and cognitive development that no nation can afford. New solutions are becoming available, but will count for little without a new political determination to tackle the world's most stubborn public health problem.

FORMING NATIONAL ALLIANCES: The best hope of sustained progress against VMD resides in the idea of national alliances to press for, plan, implement and monitor specific national solutions. Such alliances are most effective when they represent the full range of those who have the expertise, the authority, and the means to put particular solutions into effect on a national scale. National alliances need to embrace, for example, not only government departments but food companies, scientists and researchers, health and education professionals, print and broadcast media, consumer associations and non-governmental organisations.

PARTNERING THE FOOD INDUSTRY: When it comes to deploying the powerful weapon of food fortification, it is the food companies, not governments, who own the solution. Only the food industry can develop, market, and distribute fortified food products for daily consumption by a significant proportion of the population. But if food fortification is to benefit the majority, then it will require public-private partnerships and government initiatives to create the legal and financial conditions and incentives that will allow the private sector to play its central role in defeating VMD.

GETTING THE SCIENCE RIGHT: Controlling VMD also presents a challenge to the scientific and research community. Specifically, progress could be accelerated by: multi-vitamin and mineral tablets that can be administered less often and with higher acceptability; massively cheap and well-marketed 'home-mixes' to add key vitamins and minerals to daily diets; improved pre-mixes and the identification of the most suitable staples for fortification in each nation; techniques to cheaply fortify rice with granulated vitamin and mineral pre-mixes; and progress in the bio-fortification of staple foods.

MONITORING PROGRESS: The national VMD Damage Reports and Protection Audits about to be issued have brought together the best of currently available data for each individual country. But those data are not nearly good enough. In some countries, they are based on partial surveys, extrapolations, and statistical modelling techniques which are at present the only way of estimating the extent and consequences of VMD. To monitor progress and allocate resources, more accurate and up-to-date monitoring is needed.

Conclusion

VMD touches the lives of perhaps a third of the world's people. The effects on adults, and particularly on women, are subtle and insidious. The effects on nations, and on economic development, are only just beginning to be measured. But at the heart of the VMD problem is the fact that it is in the vital, vulnerable, earliest months of life that the lack of essential vitamins and minerals has its most devastating and durable effects. It is children who sustain the severest damage.

One of the causes of poverty, and of its perpetuation from one generation to the next, is the fact that so many of the world's children do not have the kind of start in life that allows them to fulfil the potential with which they were born. It is in this sense that achieving UN goals for reducing vitamin and mineral deficiency would be a significant strike not only against one of poverty's most devastating effects but against one of its most insidious causes.

After a decade of dramatic developments, the facts are known, the solutions are available, and the cause is one in which many individuals and organisations – governments, the private sector, the medical and scientific community, civil society – can all become involved. The challenge is therefore clear. And when so much could be achieved for so many and for so little, it would be a matter of global disgrace if vitamin and mineral deficiency were not brought under control in the years immediately ahead. ■

VMD: NATIONAL DAMAGE ASSESSMENTS

VMD: NATIONAL PROTECTION AUDITS

	IRON DEFICIENCY			IODINE DEFICIENCY		VITAMIN A DEFICIENCY		FOLATE DEFICIENCY	ECONOMIC IMPACT	FLOUR FORTIFICATION			SALT IODISATION	VITAMIN A SUPPLEMENTS	
	Estimated prevalence of iron deficiency anaemia in children under 5 years (%)	Estimated prevalence of iron deficiency anaemia in women age 15-49 (%)	Estimated annual no. of maternal deaths from severe anaemia	Estimated annual no. of children born mentally impaired	Total Goitre Rate (%)	Estimated annual no. of child deaths precipitated	Estimated % of children under 6 with sub-clinical vitamin A deficiency	Estimated annual no. of neural tube birth defects	Estimated % of GDP lost to all forms of VMD	Type of programme (M = Mandatory, V = Voluntary, P = proposed)	IRON (parts per million)	FOLIC ACID (parts per million)	Estimated % of household salt iodised	Estimated % of children receiving at least one dose of vitamin A per year	
Afghanistan	65	61	-	535,000	48	50000	53	2250	2.3	-	-	-	2	84	Afghanistan
Angola	72	59	-	235,000	33	34000	55	1400	2.1	-	-	-	35	75	Angola
Armenia	24	12	<100	3,500	12	<100	12	<100	0.3	-	-	-	83		Armenia
Azerbaijan	33	35	<100	22,000	15	1100	23	225	0.7	V	55	2	26		Azerbaijan
Bangladesh	55	36	2,800	750,000	18	28000	28	8400	0.9	P	66	1.5	70	87	Bangladesh
Benin	82	65	370	35,000	13	9000	70	550	1.4	-	-	-	72	95	Benin
Bhutan	81	55	<100	-	-	600	32	150	1.6	-	-	-	82		Bhutan
Bolivia	59	30	120	13,000	<5	1200	23	380	0.5	M	60	2	85	44	Bolivia
Botswana	37	31	<100	9,000	17	500	30	100	0.6	-	-	-	67	85	Botswana
Brazil	45	21	880	280,000	8	4000	15	5250	-	P, M	42	2			Brazil
Burkina Faso	83	48	490	180,000	29	20000	46	1230	2.0	-	-	-	22	97	Burkina Faso
Burundi	82	60	-	125,000	42	8500	44	600	2.5	-	-	-	96	95	Burundi
Cambodia	63	58	520	85,000	18	8000	42	950	1.4	-	-	-	14	57	Cambodia
Cameroon	58	32	360	65,000	12	10500	36	1100	0.8	-	-	-	84	99	Cameroon
Central African Rep.	74	49	250	16,000	11	5000	68	300	-	-	-	-	86	90	Central African Rep.
Chad	76	56	550	100,000	24	12500	45	800	1.2	-	-	-	58	91	Chad
China	8	21	820	1,880,000	10	30500	16	38000	0.3	-	-	-	93		China
Congo	55	48	-	59,000	36	1500	32	300	1.9	-	-	-		100	Congo
Congo, Dem. Rep.	79	54	-	-	-	76000	42	5250	0.8	-	-	-	72	98	Congo, Dem. Rep.
Dominican Rep.	25	31	<100	23,000	11	350	18	400	0.4	V	60	2	18	35	Dominican Rep.
Egypt	31	28	230	225,000	12	4400	27	3800	0.5	-	-	-	28		Egypt
El Salvador	28	34	<100	17,000	11	250	17	250	0.5	M	55	2	91		El Salvador
Eritrea	75	53	270	16,000	10	1750	30	300	1.1	-	-	-	97	67	Eritrea
Ethiopia	85	58	4,390	685,000	23	51000	30	6000	1.7	-	-	-	28	16	Ethiopia
Gabon	43	32	<100	11,500	27	450	41	<100	1.1	-	-	-	15	89	Gabon
Gambia	75	53	-	10,000	20	1000	64	100	1.3	-	-	-	8	91	Gambia
Georgia	33	31	<100	11,000	21	<100	11	100	0.5	-	-	-	8		Georgia
Ghana	65	40	230	120,000	18	12000	60	1300	1.1	-	-	-	50	100	Ghana
Guatemala	34	20	<100	67,000	16	1500	21	600	0.8	M	55	1.5	49	60.0	Guatemala
Guinea	73	43	360	83,000	23	9500	51	700	1.4	-	-	-	12	93	Guinea
Guinea-Bissau	83	53	100	12,500	17	1750	31	150	1.5	-	-	-	1	100	Guinea-Bissau
Haiti	66	54	310	29,000	12	3200	32	400	0.8	V	44	2	11		Haiti
Honduras	34	31	<100	24,500	12	300	15	300	0.7	M	55	1.5	80	62	Honduras
India	75	51	22,000	6,600,000	26	330000	57	50000	1.0	-	-	-	50	24	India
Indonesia	38	40	2,700	550,000	12	14000	26	6800	0.6	M	50	2	65	61	Indonesia
Iran	32	29	<100	125,000	9	3000	23	2100	0.3	P	30	2	94		Iran
Kazakhstan	36	36	<100	54,000	21	1000	19	400	0.6	V	55	1.5	75		Kazakhstan
Kenya	60	43	930	105,000	10	23500	70	2000	0.8	-	-	-	91	90	Kenya
Kyrgyzstan	42	31	<100	23,500	21	300	18	170	0.9	V	55	1.5	27		Kyrgyzstan
Lao PDR	54	48	200	27,000	14	2000	42	400	1.1	-	-	-	75	70	Lao PDR
Lebanon	21	24	<100	7,500	11	100	20	140	0.4	-	-	-	87		Lebanon
Lesotho	51	43	-	11,000	19	1100	54	100	0.8	-	-	-	69		Lesotho
Liberia	69	44	170	29,000	18	5000	38	330	1.2	-	-	-		100	Liberia
Madagascar	42	42	520	43,000	6	13000	42	1400	0.8	-	-	-	52	83	Madagascar

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Malawi	80	27	380	115,000	22	17500	59	1100	1.4	-	-	-	36	86	Malawi
Mali	77	47	590	270,000	42	24000	47	1300	2.7	-	-	-	74	80	Mali
Mauritania	74	42	140	24,000	21	1500	17	250	1.3	-	-	-	2	98	Mauritania
Mongolia	37	18	<100	8,500	15	300	29	<100	0.6	V	55	2	45	93	Mongolia
Morocco	45	34	210	-	-	1750	29	1000	0.2	P	45	1.5	41	-	Morocco
Mozambique	80	54	1,470	134,000	17	14000	26	1500	1.2	-	-	-	62	71	Mozambique
Myanmar	48	45	460	205,000	17	13000	35	2300	0.7	-	-	-	48	97	Myanmar
Namibia	42	35	<100	12,000	18	500	59	100	0.8	-	-	-	64	84	Namibia
Nepal	65	62	760	200,000	24	6900	33	1600	1.5	-	-	-	63	98	Nepal
Nicaragua	47	40	<100	19,000	11	1000	90	350	0.8	M	60	2	96	-	Nicaragua
Niger	87	47	650	185,000	28	26000	41	1300	2.2	M	40.7	-	15	89	Niger
Nigeria	69	47	-	370,000	8	82000	25	9500	0.7	-	-	-	98	77	Nigeria
Pakistan	56	59	-	2,100,000	38	56000	35	11000	1.7	-	-	-	17	100	Pakistan
Papua New Guinea	40	43	<100	-	-	1700	37	350	0.5	-	-	-	-	-	Papua New Guinea
Paraguay	52	25	<100	22,000	13	150	13	250	0.7	M	45	3	83	-	Paraguay
Peru	50	32	120	60,000	10	1100	17	1250	0.5	M	28	-	93	6	Peru
Philippines	29	35	500	300,000	15	4500	23	4000	0.7	-	-	-	24	84	Philippines
Rwanda	69	43	690	46,000	13	9500	39	700	1.1	-	-	-	90	94	Rwanda
Senegal	71	43	310	86,000	23	9500	61	750	1.3	-	-	-	16	85	Senegal
Sierra Leone	86	68	780	40,000	16	13250	47	500	1.4	-	-	-	23	91	Sierra Leone
South Africa	37	26	-	160,000	16	6000	33	1500	0.4	M	35	1.43	62	-	South Africa
Swaziland	47	32	<100	4,000	12	600	38	<100	0.6	-	-	-	59	-	Swaziland
Syria	40	30	<100	130,000	27	300	8	1000	1.1	-	-	-	80	-	Syria
Tajikistan	45	42	<100	43,000	28	600	18	300	1.2	V	55	2	20	-	Tajikistan
Tanzania	65	45	-	-	16	-	37	-	-	-	-	-	67	93	Tanzania
Thailand	22	27	<100	140,000	13	1400	22	2200	0.4	-	-	-	74	-	Thailand
Togo	72	45	150	25,000	14	3250	35	350	1.0	-	-	-	67	77	Togo
Turkey	23	33	100	335,000	23	2600	18	3000	0.7	-	-	-	64	-	Turkey
Turkmenistan	36	46	<100	11,000	11	550	18	200	0.7	-	-	-	75	-	Turkmenistan
Uganda	64	30	890	111,000	9	29000	66	2600	1.0	-	-	-	95	37	Uganda
Uzbekistan	33	63	<100	136,000	24	3700	40	800	1.2	V	55	1.5	19	-	Uzbekistan
Venezuela	41	24	<100	60,000	10	300	11	1200	0.5	-	-	-	90	-	Venezuela
Viet Nam	39	33	160	180,000	11	2000	12	3300	0.6	-	-	-	77	59	Viet Nam
Yemen	59	49	480	143,000	16	10000	40	1800	1.3	-	-	-	39	100	Yemen
Zambia	63	46	480	115,000	25	19000	66	900	1.3	V	28.9	-	68	83	Zambia
Zimbabwe	53	44	440	35,000	9	4900	28	800	0.7	-	-	-	93	-	Zimbabwe
Totals			50,000	19000000*		1150000		204,000							

Note: Data on vitamin and mineral deficiency are imperfect. The figures given in this table are drawn from the best information currently available. Prevalence data are based on a global review of existing surveys of vitamin and mineral deficiencies (VMD). Functional consequences of VMD are calculated using a specially-designed 'Profiles module'. Some figures for individual countries may be subject to revision before official publication of national Damage Assessment Reports in cases where UNICEF country offices indicate that more recent national data is available.

* This total may not yet reflect recent increases in the proportion of children receiving vitamin A supplements. Many nations have boosted vitamin A coverage by distributing capsules on National Polio Immunisation Days. Vitamin A supplementation is now estimated to be saving approximately 300,000 young lives each year, though there is a question mark over whether present levels of coverage can be maintained once polio is eradicated and National Immunisation Days are discontinued

**Controlling VMD
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