

Flour Fortification Program Monitoring and Surveillance

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Minimum Conditions for a Successful Flour Fortification Program

- Industrial flour is a staple food regularly consumed by the vast majority of the population in the target geographic area.
- Fortification standards are based on estimated per capita consumption of fortifiable flour (i.e. flour produced by roller mills with >20 MT/day capacity) - not just total flour.
- Regular intake of flour containing bioavailable fortificant based on the estimated per capita consumption will improve nutrient intake and status of the target population, especially women of childbearing age.
 - Bio-available form of iron fortificant is used based on the extraction level of the flour; atomized, reduced, and hydrogen-reduced elemental iron powders are Not used.

Minimum Conditions for a Successful Flour Fortification Program (*cont.*)

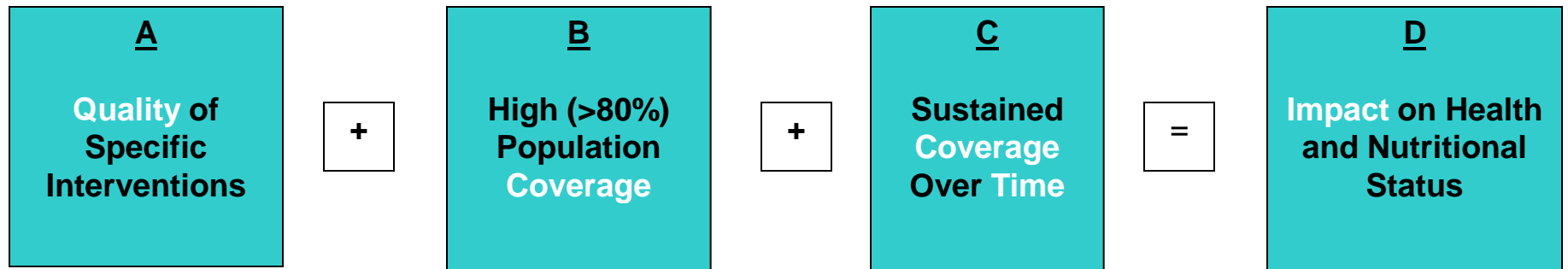
- Appropriate QA & QC procedures are in place to ensure that quality fortified flour is produced, imported and marketed.
- Sufficient and quality fortified flour and flour products (e.g. bread and noodles) are accessible to vast majority of target population across the country, or its large sub-geographic areas such as urban centers.
- Appropriate social marketing and behavior change communication implemented to encourage the population not to reject mandatory fortification of all industrially milled flour.

Average levels of nutrients to add to fortified wheat flour based on extraction, fortificant compound, and estimated per capita *fortifiable* flour consumption.

Nutrient	Flour Extraction	Compound	Level of nutrients to be added (ppm) by estimated per capita <i>fortifiable</i> wheat flour availability (g/day)			
			<75	75-149	150-300	>300
Iron	Low	NaFeEDTA	40	40	20	15
		Ferrous Sulfate	60	60	30	20
		Ferrous fumarate	60	60	30	20
		Electrolytic iron	NR	NR	60	40
	High	NaFeEDTA	40	40	20	15
Folic Acid	Low or High	Folic Acid	5.0	2.6	1.3	10\0.0
Vit. B12	Low or High	Cyanocobalamin	0.04	0.02	0.01	0.008
Vit. A	Low or High	Vit. A Palmitate	5.9	3.0	1.5	1.0
Zinc	Low	Zinc Oxide	95	55	40	30
	High	Zinc Oxide	100	100	80	70

Adapted from WHO Interim Consensus Statement, 2009.

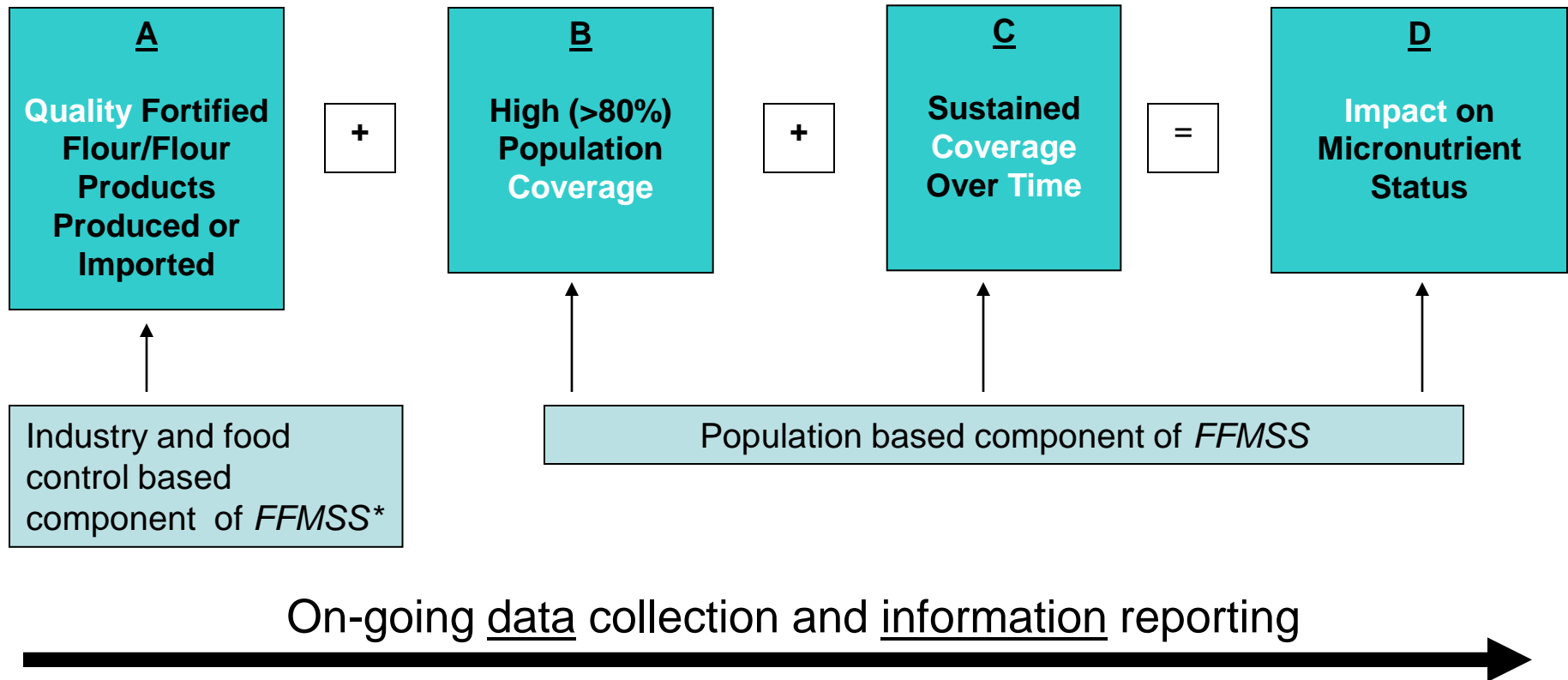
“Formula” to Describe Public Health Success of an Effective Nutrition Program



On-going data collection and information reporting



“Formula” to Describe Public Health Success of an Effective Flour Fortification Program



* FFMSS: Flour Fortification Monitoring and Surveillance System

Flour Fortification Program

Monitoring

- Is the ongoing collection and analysis of *data trends*, and interpretation and use of the resulting *information* on program *inputs* and *outputs* to assess how the flour fortification program is performing compared to predefined criteria.

Adapted from: Pena-Rosas JP, Parvanta I, Van der Haar F, Chapel T. Monitoring and evaluation in flour fortification programs: design and implementation considerations. Nutr Review 2008; 66 (148-162).

Flour Fortification Program

Monitoring (cont.)

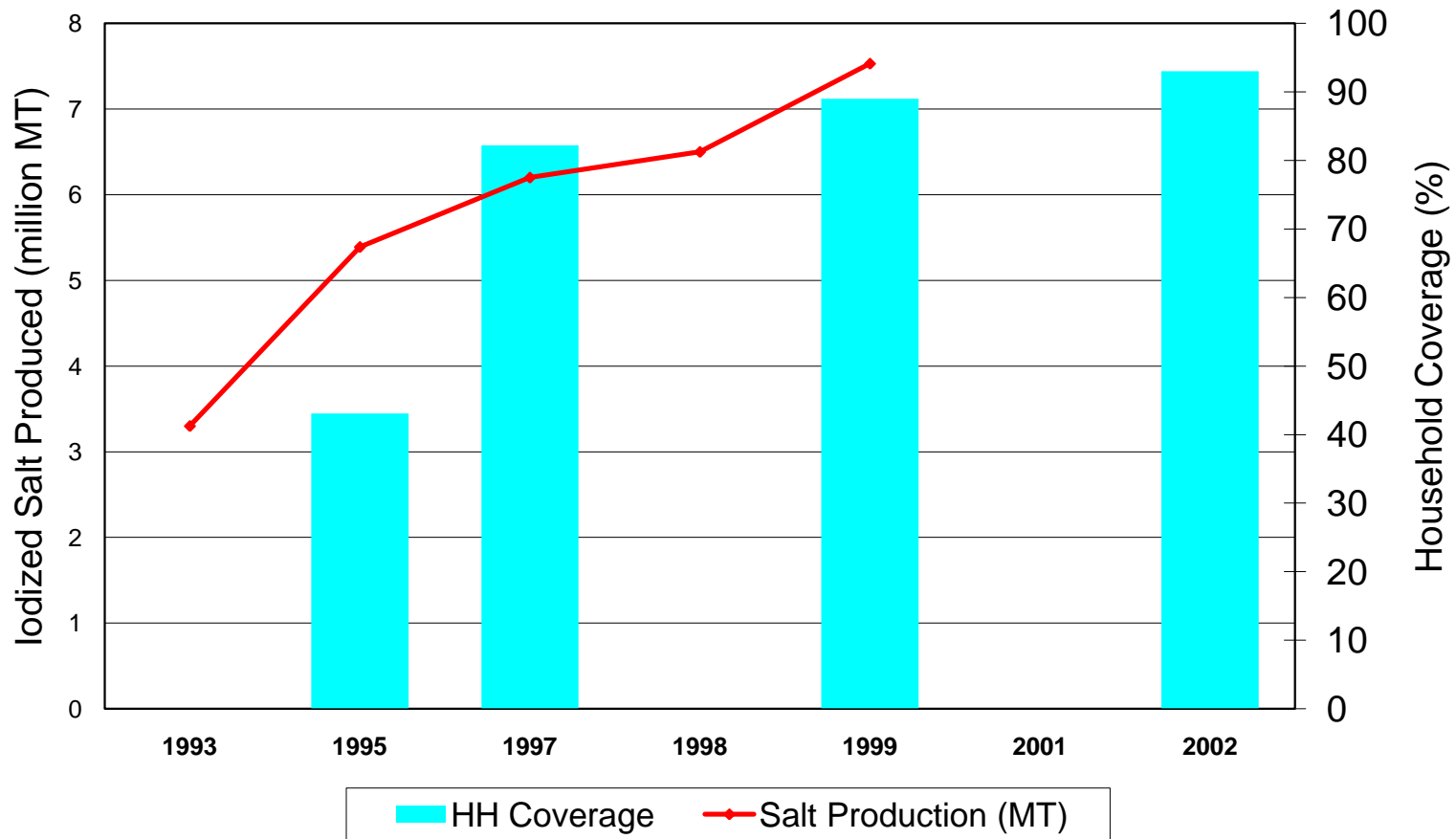
- At industry level:
 - Track quantities of premix (fortificant) used compared to total quantity of flour produced over time.
 - Track quantity of fortified flour that meets national standards over time (based on quality assurance by producers and quality control by regulatory agency).
 - Track quantity of imported fortified flour that meets national standards over time (certificate of conformity by importers; quality control monitoring by regulatory agency).
- At population level:
 - Track household/population coverage of fortified flour or fortified flour products over time.

Examples of Flour Fortification Program *Monitoring* Indicators

- Annual trends in total quantity of fortified flour produced and/or imported (provided by the flour industry and food control agency).
- Annual trends in proportion of flour which meets national fortification standards (provided by food control agency).
- Annual trends in quantity of fortified flour ordered or sold by commercial wholesalers in selected areas who supply local markets (may be more practical because there are far fewer wholesalers compared to retailers in given geographic areas).
- Annual trends in prevalence of households reporting purchasing fortified flour/flour products.
- Annual trends the prevalence of households having fortified flour/flour products in the home at the time of data collection.

Program *Monitoring* Example

Annual Production and Household Coverage of Iodized Salt: China



Sources: ICCIDD – Nov. 2002

Zhao and van der Haar – FNB, Dec., 2004

UNICEF Global Database on Iodized Salt Consumption

Flour Fortification Impact *Surveillance*

- Is the ongoing and systematic collection, analysis, and interpretation of *data* and dissemination of the trend information on *micronutrient* and *health status* of the target population *in order to strengthen and sustain a flour fortification program.*

Adapted from : CDC. Updated guidelines for evaluating public health surveillance systems: recommendations from the guidelines working group. MMWR 2001;50 (No. RR-13)

Examples of Flour Fortification

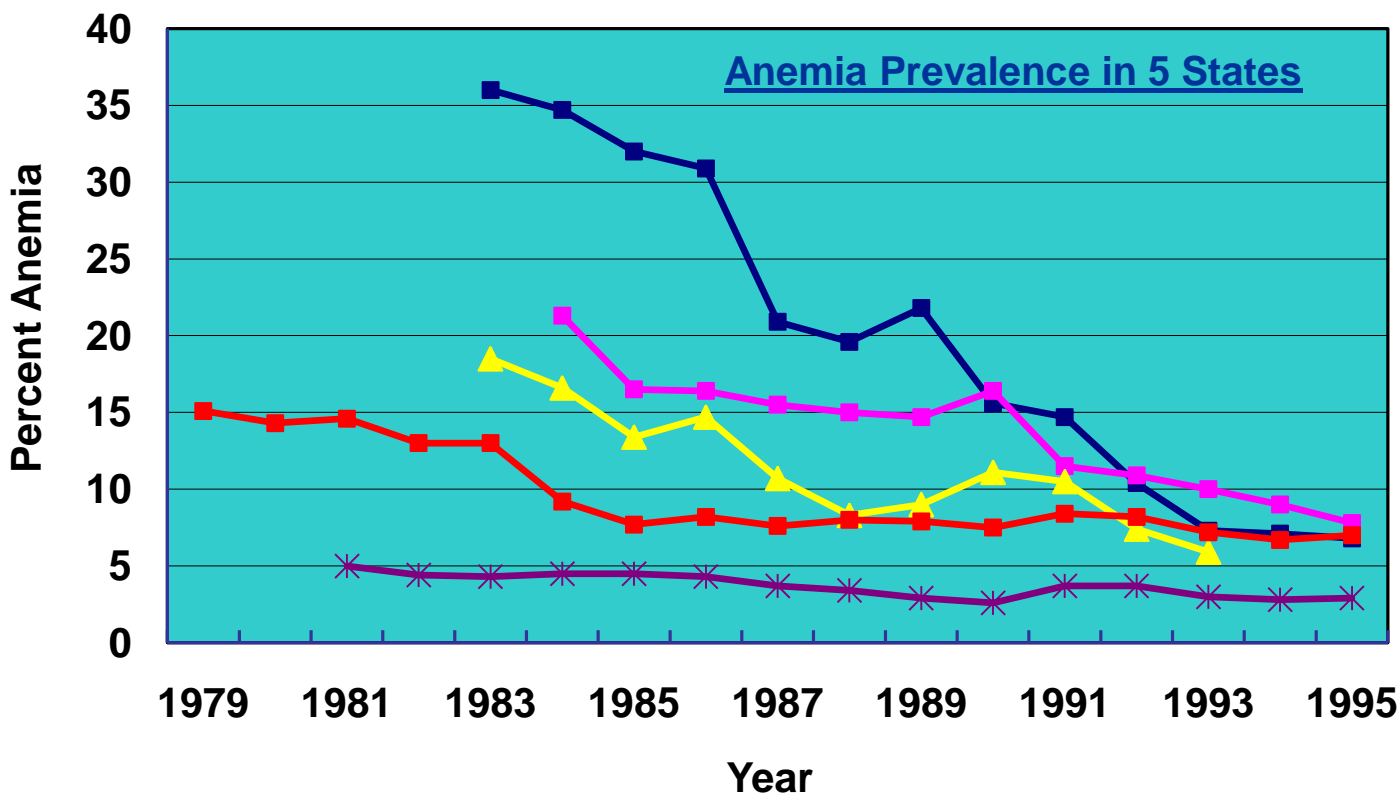
Impact *Surveillance*

- Examples of impact surveillance indicators include:
 - Trends in prevalence (%) of anemia among non-pregnant women of childbearing age.
 - Trends in prevalence (%) of iron deficiency among non-pregnant women of childbearing age.
 - Trends in prevalence of folate sufficiency (%) among non-pregnant women of childbearing age.
 - Trends in incidence (per 10,000 births) of babies born with neural tube defects (NTDs).

Program Impact *Surveillance* Example

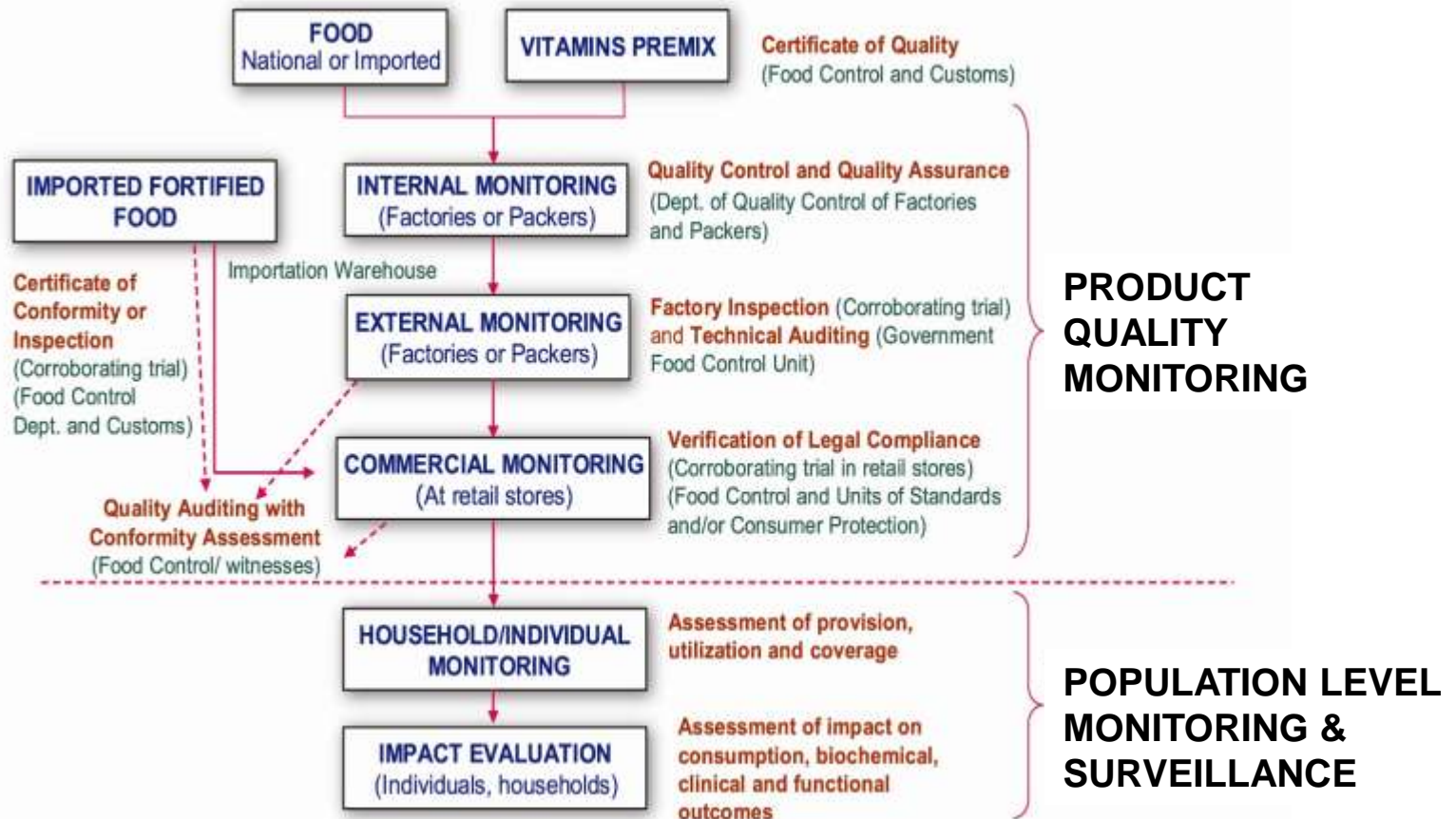
Declining Trend in Anemia

in Low-Income U.S. Children <5 Years Old



Source: Sherry, B. et al. Pediatrics 107:677, 2001

Framework for monitoring, surveillance and evaluation of a food fortification program.



Adapted from WHO/FAO. Guidelines on food fortification with micronutrients. Geneva, Switzerland 2006

Flour Fortification Program

Evaluation

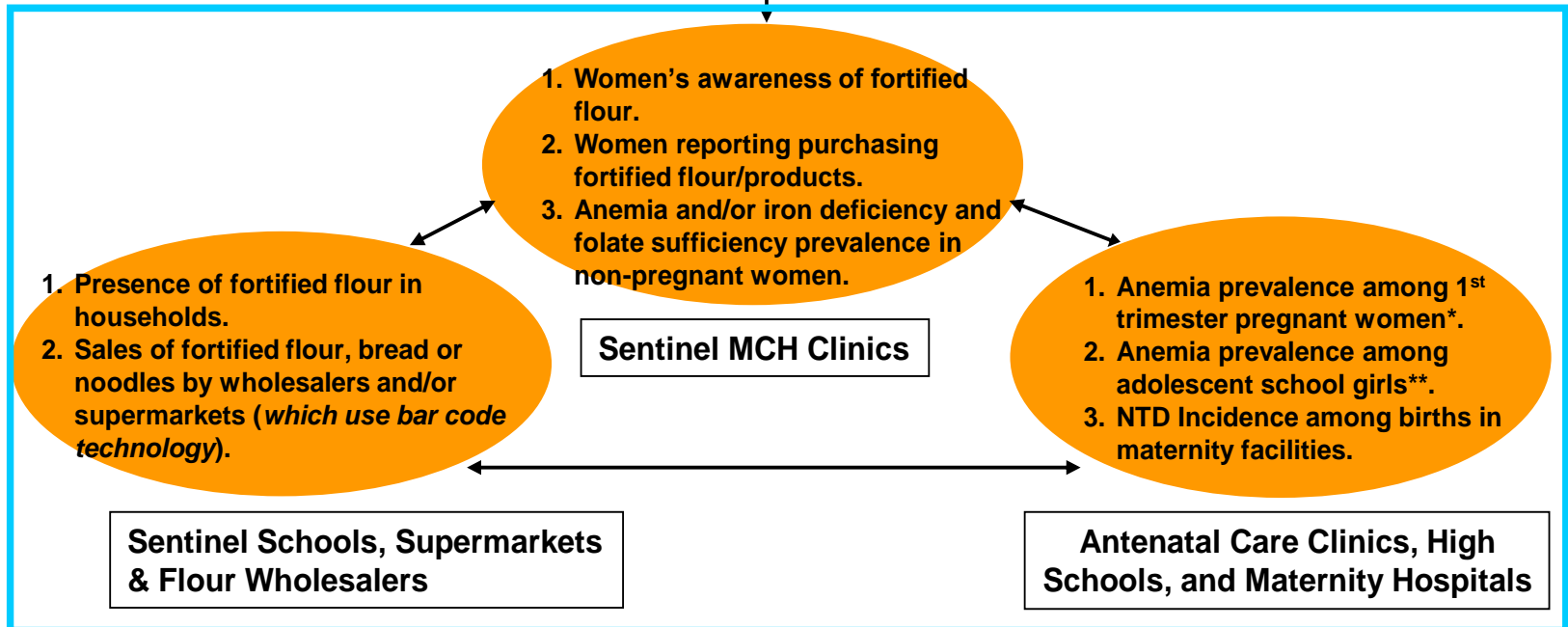
- Is the systematic collection and analysis of detailed data and information about the activities, characteristics, and impact of the flour fortification program to assess (and improve) its effectiveness and/or inform decisions about its continuation or expansion.
 - *FFMSS* data and information informs program evaluation.
 - Additional data (quantitative and/or qualitative) may need to be collected; e.g. a population-based statistical survey.
 - May be conducted every 5 – 10 years.
- Most public nutrition programs are evaluated at adequacy level – i.e. the preponderance of evidence indicates that the program has (or has not) helped improve nutritional status of the population.

Use Complementary Data Sources

Flour Industry & Food Control Agency data

1. Millers and importers - amount of fortified flour produced or imported.
2. Food Control Agency - quantity and percent of fortified flour which meets quality standards.

Population-based data



* Hemoglobin levels of 1st trimester pregnant women are usually very similar to those of non-pregnant women; thus, trends in anemia prevalence among 1st trimester pregnant women could be a proxy for trends among non-pregnant women.

** Adolescent girls may be considered as "women of childbearing age".

A hypothetical population-based flour fortification monitoring & surveillance system

