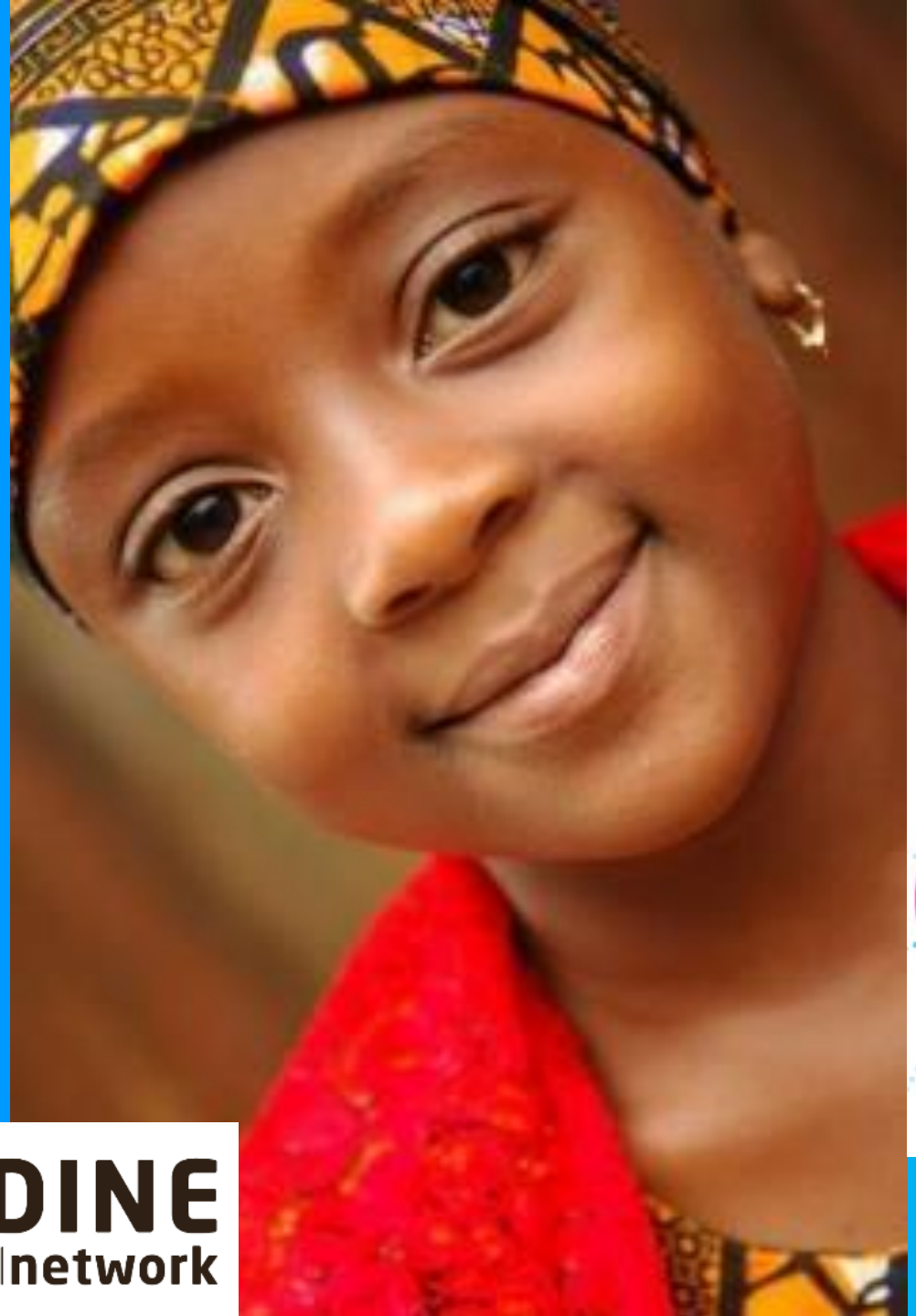

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Guidance on the Monitoring of Salt Iodization Programmes and Determination of Population Iodine Status

IODINE global network

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INTRODUCTION

Welcome to this webinar!

What can you expect?

Presentation – 40 minutes
Questions and comments – 20 minutes

In the next hour you will hear about …

→ Salt iodization programs
→ What has changed over time in iodine nutrition programs
→ Its implications for what and how we monitor performance and impact
→ What the key recommendations are from Guidance document
→ How you can use them in your work as program manager

BACKGROUND

Although a program guidance[1] exists, programs have evolved and there was a need for an update.

A technical working group was hosted by UNICEF to discuss research priorities for the monitoring of salt iodization programs and determination of population iodine status.

Objectives of the working group:

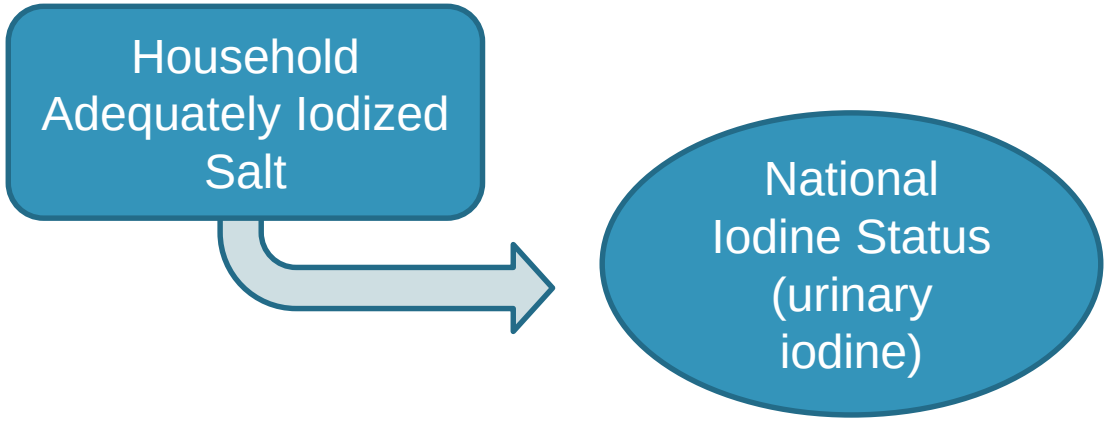
1) To **identify knowledge gaps** related to the monitoring of salt iodization and iodine nutrition programs
2) To **reach consensus on selected issues** related to the monitoring of salt iodization and iodine nutrition programs

Why was this review necessary?

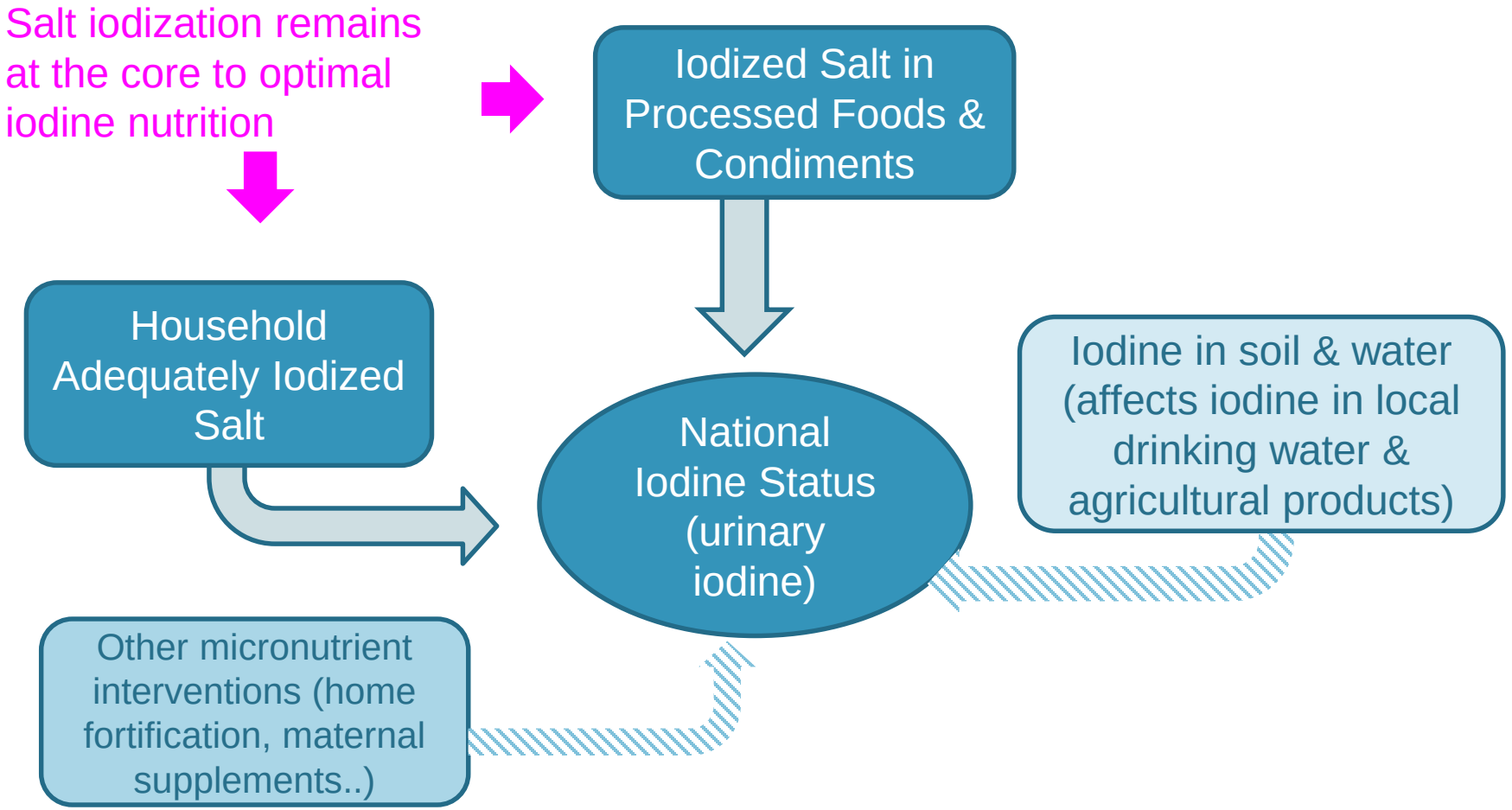
[1] Assessment of IDD and monitoring their elimination, a guide for programme managers, 2007 WHO/UNICEF/ICCIDD

SALT IODIZATION- ORIGINAL MODEL

- Original goal of Universal Salt Iodization: >90% coverage of households using adequately iodized salt (HHIS)
- Implication: Eliminate Iodine Deficiency Disorders (IDD)
- Household adequately iodized salt set at 15 ppm to meet daily requirement of 150 µg

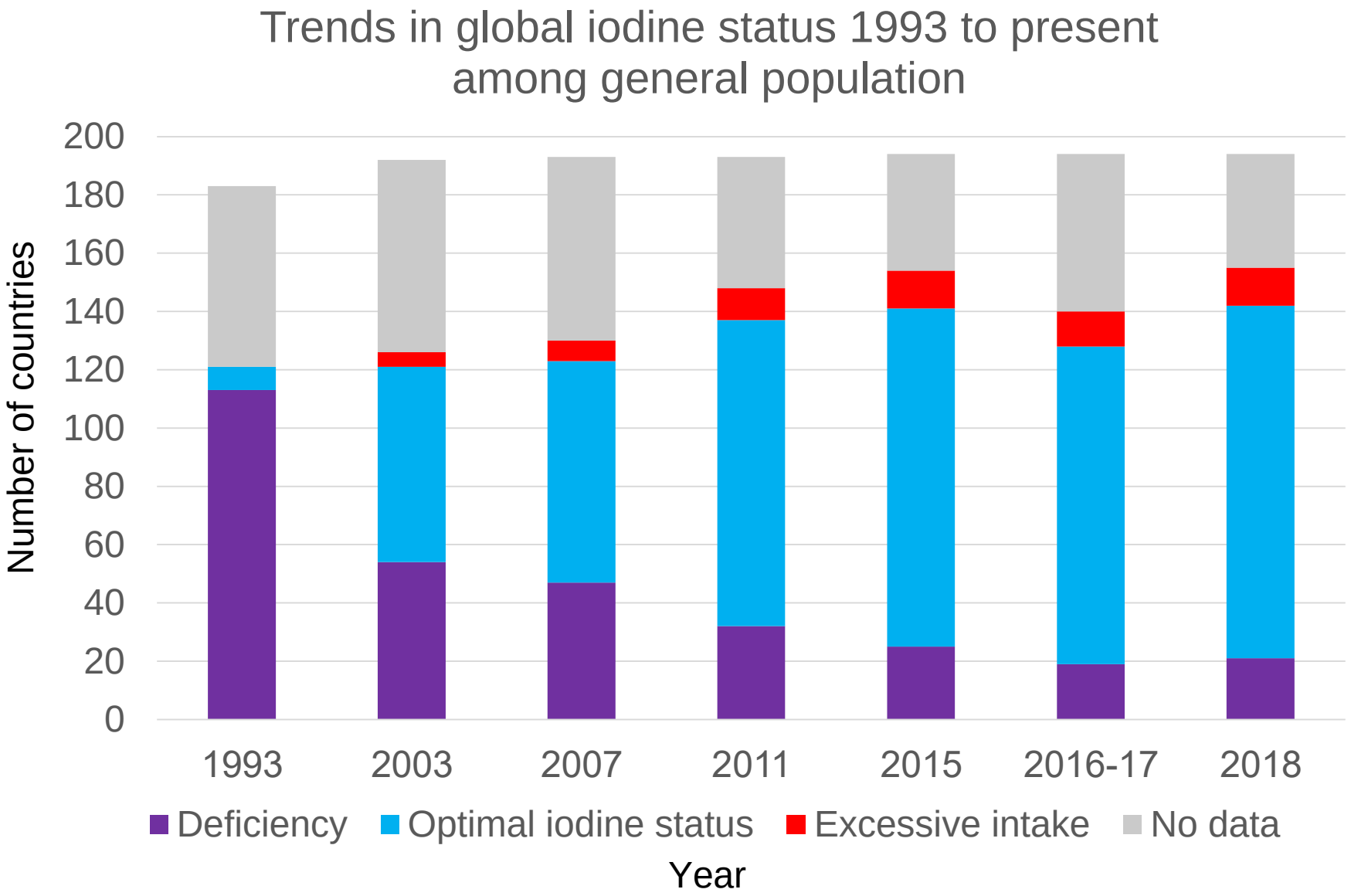


NEW MODEL: OPTIMIZE IODINE NUTRITION THROUGH DIFFERENT DIETARY SOURCES OF IODINE



But we can no longer rely just on coverage of households using adequately iodized salt (HHIS) to assess and track program success. We also need to find out about iodized salt in processed foods and condiments

SALT IODIZATION HAS BEEN MAIN STRATEGY TO ACHIEVE OPTIMUM IODINE NUTRITION



Countries with optimal iodine nutrition from 8 to 121

OPTIMAL IODINE NUTRITION, NOT JUST IODINE DEFICIENCY DISORDERS

- When USI programs began, the focus was to prevent iodine deficiency disorders IDD (clinical signs like goiter)
- Studies in 80s' have shown that iodine deficiency irreversibly affects brain development during pregnancy.
  → Focus shifted to include visible and invisible signs
  → Focus shifted to adequate iodine for all

- Increase in program data have shown decrease in iodine deficiency but also an increase of more than adequate iodine intake.
  → Focus now on optimal iodine nutrition, not too little and not too much.

We need tools and guidance to better track USI programs and ensure optimal iodine nutrition

WHAT IS SUCCESS? QUALITY, SCALE AND IMPACT

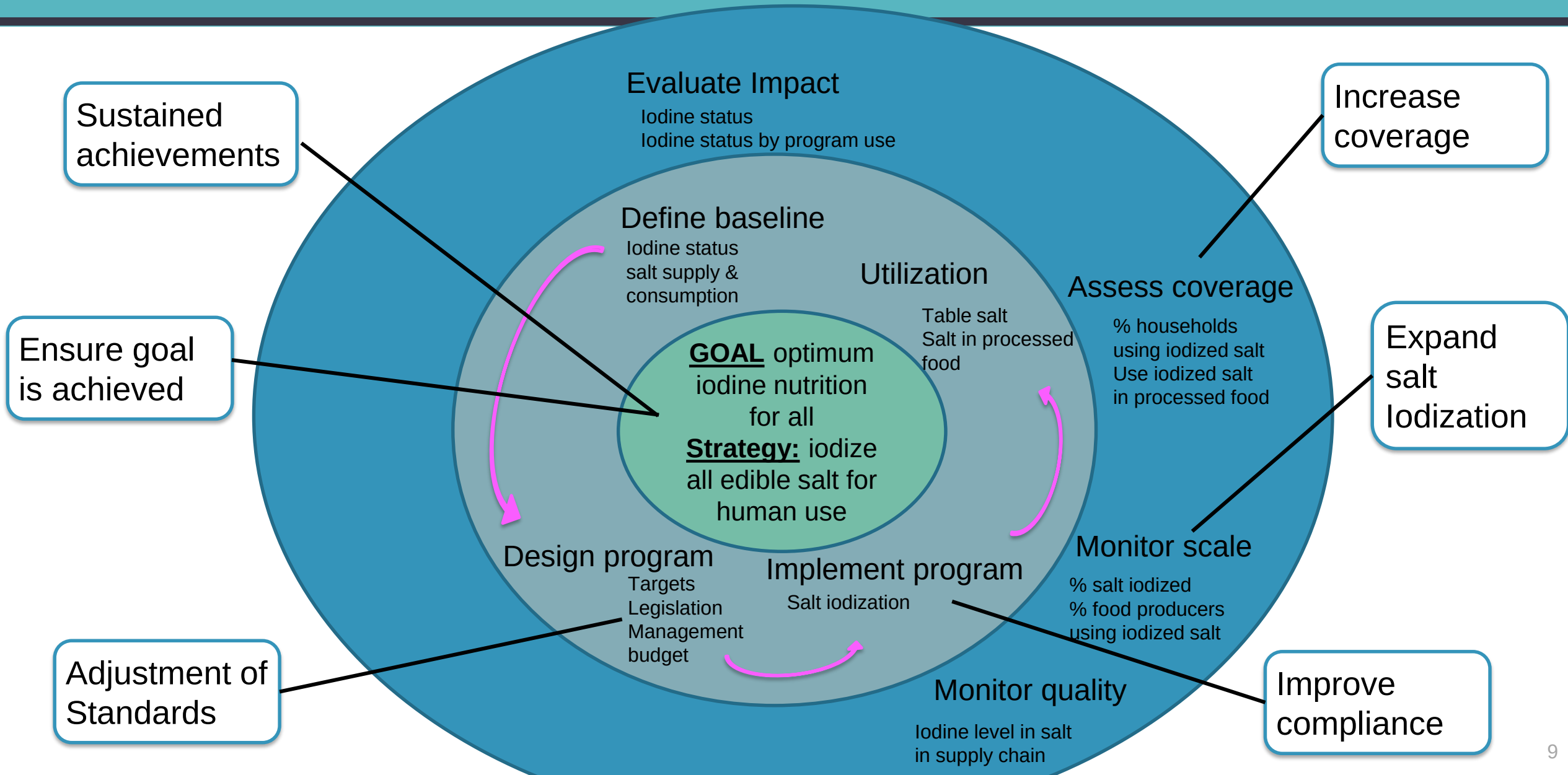
The salt iodization program is successful if it delivers iodized salt that is of the right quality (iodization level), has reached scale so everyone's iodine needs are met and makes an impact (achieves optimum iodine nutrition):

→ minimizes the population that is deficient
→ minimizes the population that has more than adequate iodine intake

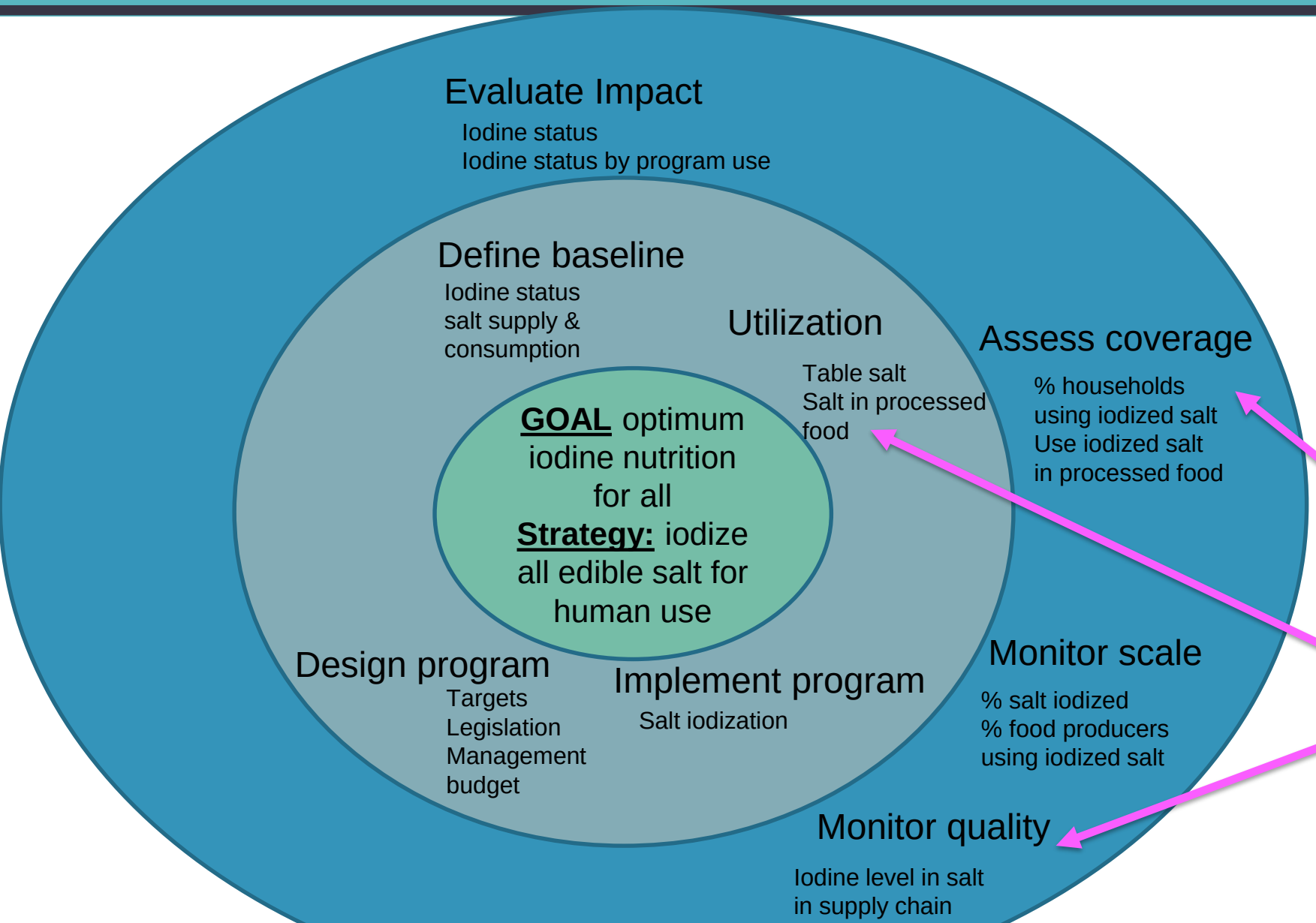
We need to have a program that is designed correctly AND implemented correctly in order to have the right impact

We depend on the right data to inform us

IODINE NUTRITION PROGRAMS – QUALITY, SCALE AND IMPACT



RECOMMENDATION 1 – USE OF RAPID TEST KITS



Rapid test kits (RTKs) are used for:

1) Monitoring quality
2) Assessing coverage
3) Education purposes to raise awareness

CORRECT USE OF RAPID TEST KITS

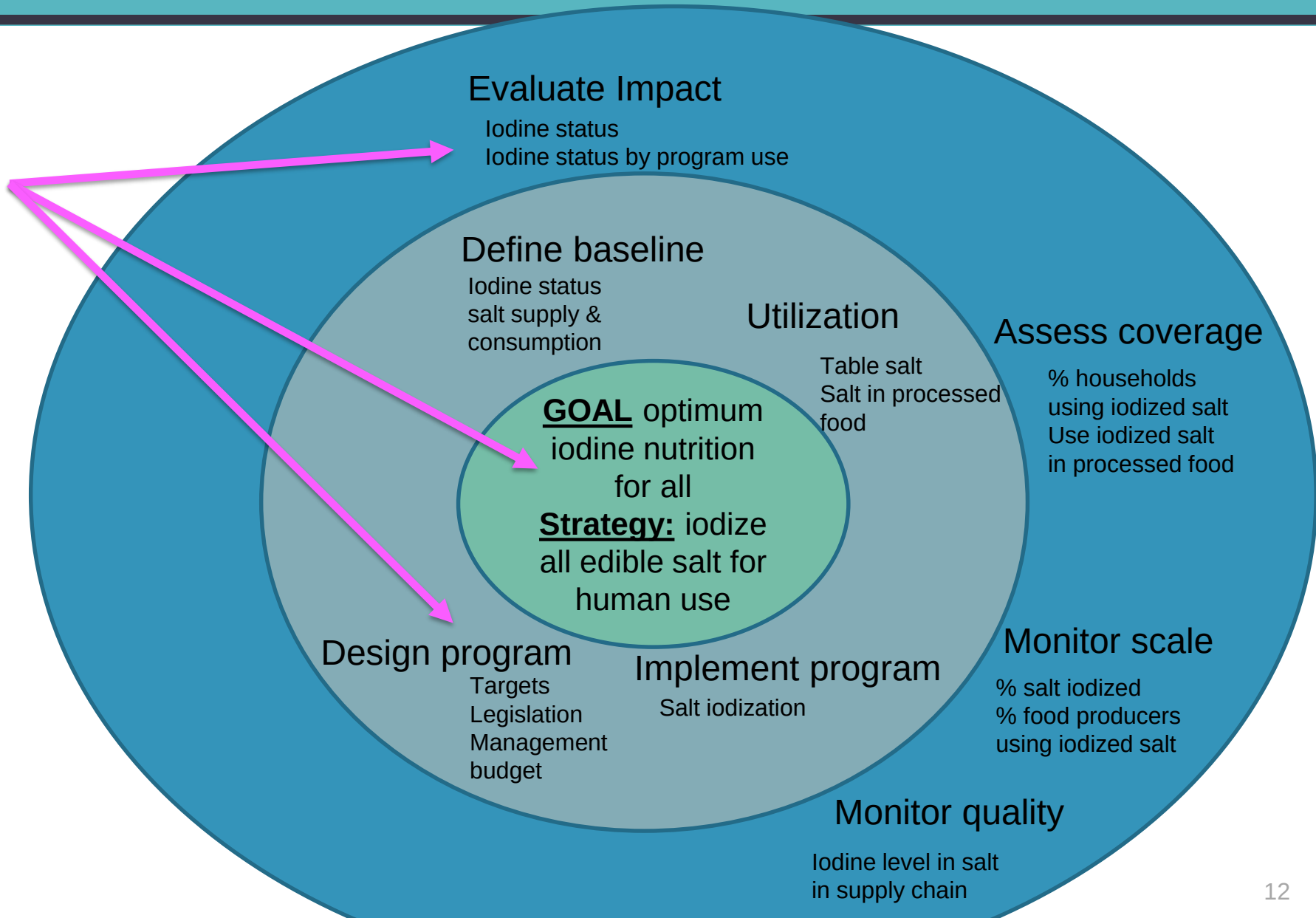
- Rapid test kit (RTK) is a chemical solution. A few drops on salt turns it blue when iodine is present. It is field friendly and easy to use
- BUT - It has been incorrectly used to distinguish inadequately from adequately iodized salt (confirmed by many studies[1])
- It is good to tell if there is iodine in the salt: yes or no, for example for education purposes

RTKs should only be used to differentiate between non-iodized and iodized salt - not to measure the actual iodine content!

[1] Performance of rapid test kits to assess household coverage of iodized salt. Gorstein et al, Public Health Nutrition 2016

RECOMMENDATION 2 – ACCEPTABLE RANGE FOR URINARY IODINE

The acceptable range of median UIC in monitoring iodine status of school aged children



SUMMARY OF A MULTI-COUNTRY STUDY

- Median urinary iodine concentration (MUIC) is a biomarker of iodine intake

- MUIC in school aged children, in the past:
  - mUIC of 100–199 µg/L indicates ‘adequate’ iodine intake
  - mUIC 200–299 µg/L indicates ‘more than adequate’ iodine intake (WHO)

- In a 12 country study[1], the association between UIC and markers of thyroid function was assessed among 2500 school aged children

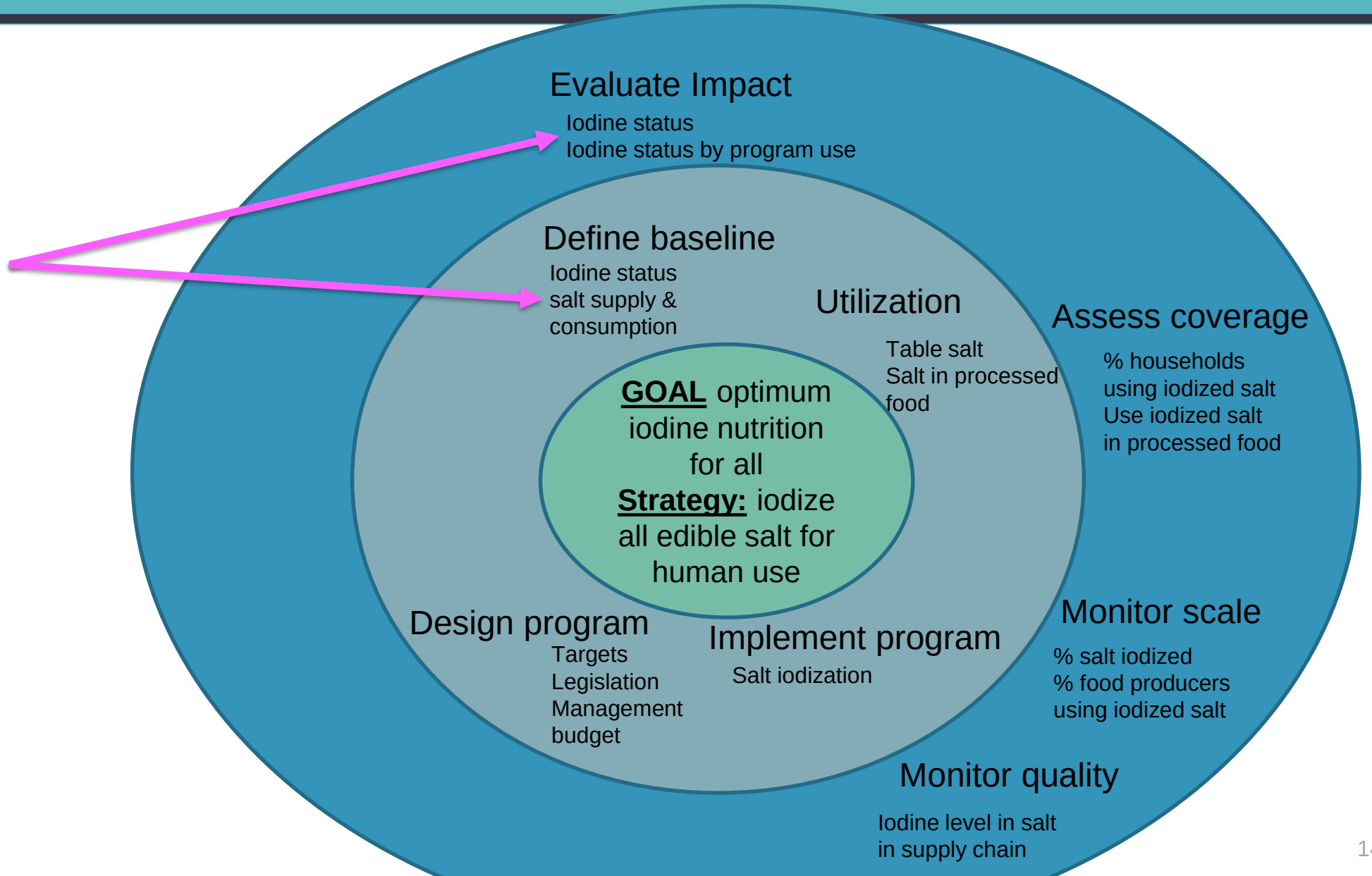
  - Risk of thyroid dysfunction increases with iodine deficiency (UIC <100 µg/L) and iodine excess (UIC >300 µg/L)
  - Between 100 and 299 µg/L thyroid function is normal

The acceptable range of median UIC in monitoring iodine status of school aged children can be safely widened to 100 to 299 µg/L!

[1] Zimmermann et al. Thyroglobulin is a sensitive measure of both deficient and excess iodine intakes in children and indicates no adverse effects on thyroid function in the UIC range of 100-299 µg/L: a UNICEF/ICCIDD study group report. J Clin Endocrinol Metab. 2013 Mar;98(3):1271-80

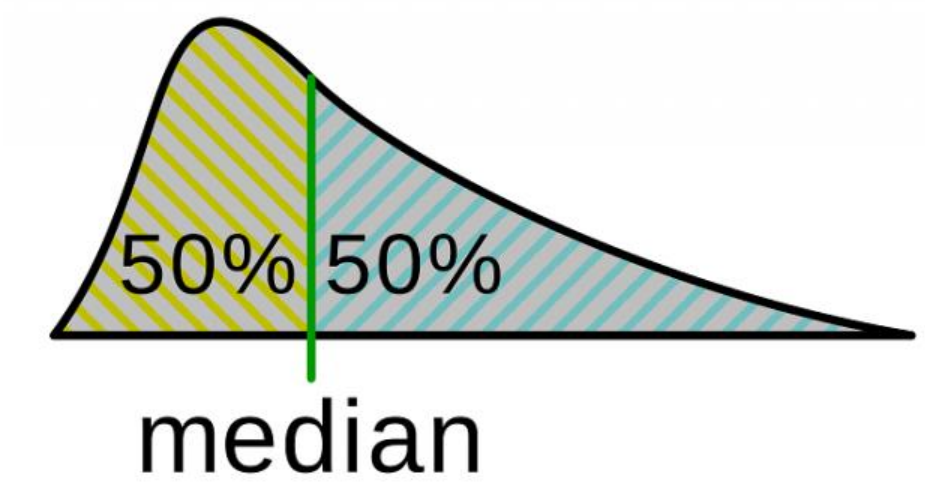
RECOMMENDATION 3 – POPULATION STATUS

The median urinary iodine concentration (MUIC) to define population iodine status



URINARY IODINE – USED FOR POPULATIONS, NOT FOR INDIVIDUALS

- The concentration of iodine excreted in urine (UIC) is an indicator of iodine intake
- The assessment of UIC is typically assessed in spot urine samples
- Because of the variation in individual iodine intake, UIC data can only be presented for the entire population (presented as the median UIC) and cannot be used to classify individuals



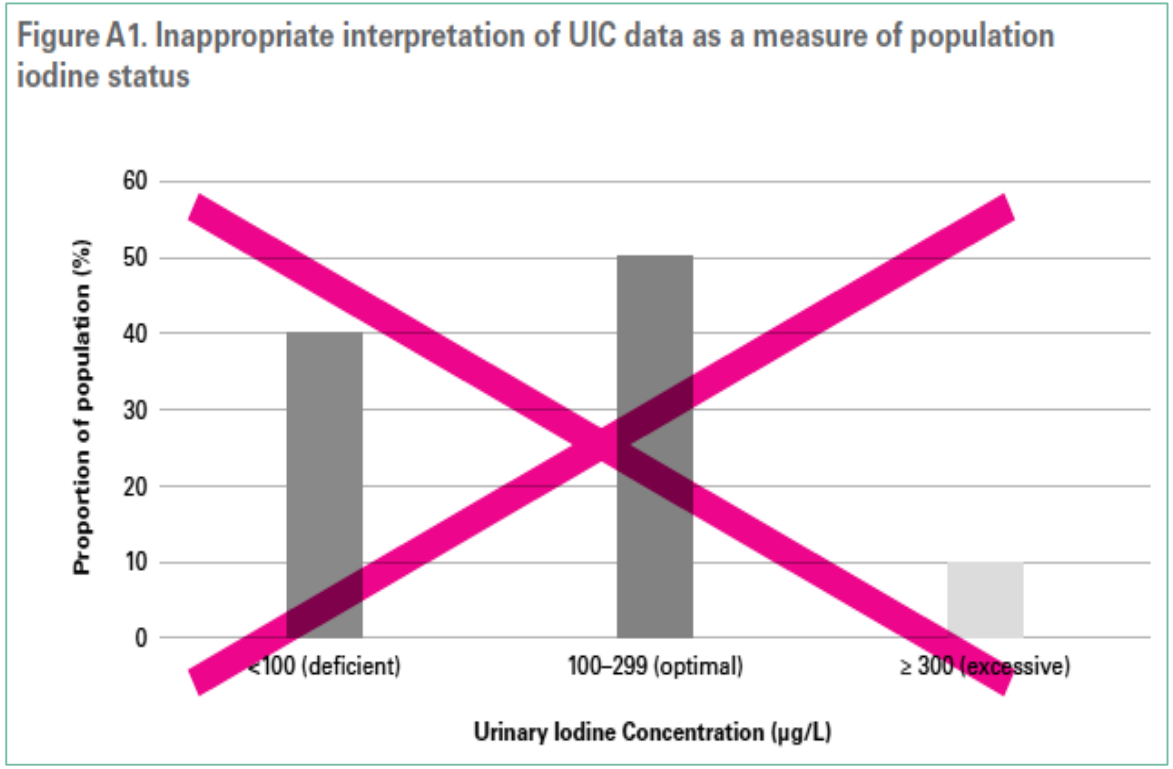
The median value provides a reflection of the status of the entire population

USE OF MEDIAN URINARY IODINE

- The use of percentages of low and excessive iodine intake has been problematic and provide a misleading impression of population status.

Example

- In a population the median UIC = 120 ug/L, but 40% of values are < 100 ug/L and 10% are > 300 ug/L
- The median UIC in this example is classified as optimal since it falls in the range of 100-299 ug/L
- We cannot say that 40% is deficient or 10% has excess



With currently available methods, the analysis and interpretation of mUIC cannot be used to quantify the proportion of the population with iodine deficiency or iodine excess.

CURRENT IODINE STATUS CRITERIA

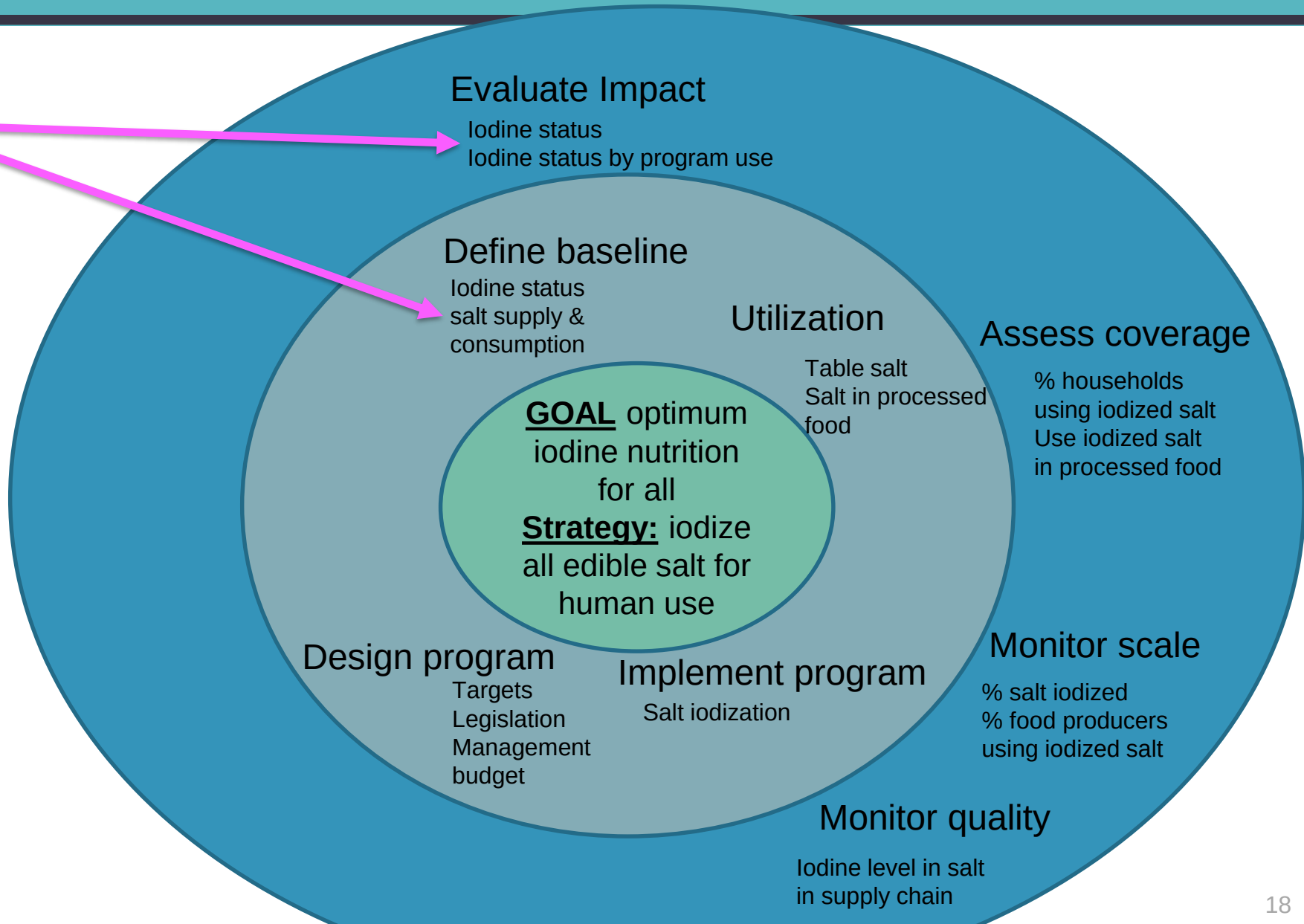
Epidemiologic criteria for assessing iodine nutrition based on median urinary iodine concentrations in different target groups			
	MUIC (ug/L)		
Population group	**Insufficient**	**Adequate**	**Above requirement and excessive**
School aged children	<100	100-299[a]	≥ 300[a]
Adults (women reproductive age)	<100	100-299[a]	≥ 300[a]
Pregnant women	<150	150-249	≥ 250
Lactating women	<100	≥ 100	
Children < 2 years	<100	≥ 100	

[a] adjusted based on best available scientific evidence to date

Source: WHO. Urinary iodine concentrations for determining iodine status deficiency in populations. Vitamin and Mineral Nutrition Information System. Geneva: World Health Organization; 2013 (http://www.who.int/nutrition/vmnis/indicators/urinaryiodine, accessed 3 October 2019).

RECOMMENDATION 4 – IODINE STATUS BY POPULATION GROUPS

Assess Iodine intakes among different population groups



IODINE STATUS AMONG DIFFERENT POPULATION GROUPS

Example 1 of national MUICs among different population groups				
	MUIC (ug/L)			
Population group	**Insufficient**	**Adequate**	**Above requirement and excessive**	**Classification of status**
School aged children		163		Adequate

- If you only collect information on school aged children you will conclude that the ‘iodine status is categorized as adequate’

IODINE STATUS AMONG DIFFERENT POPULATION GROUPS

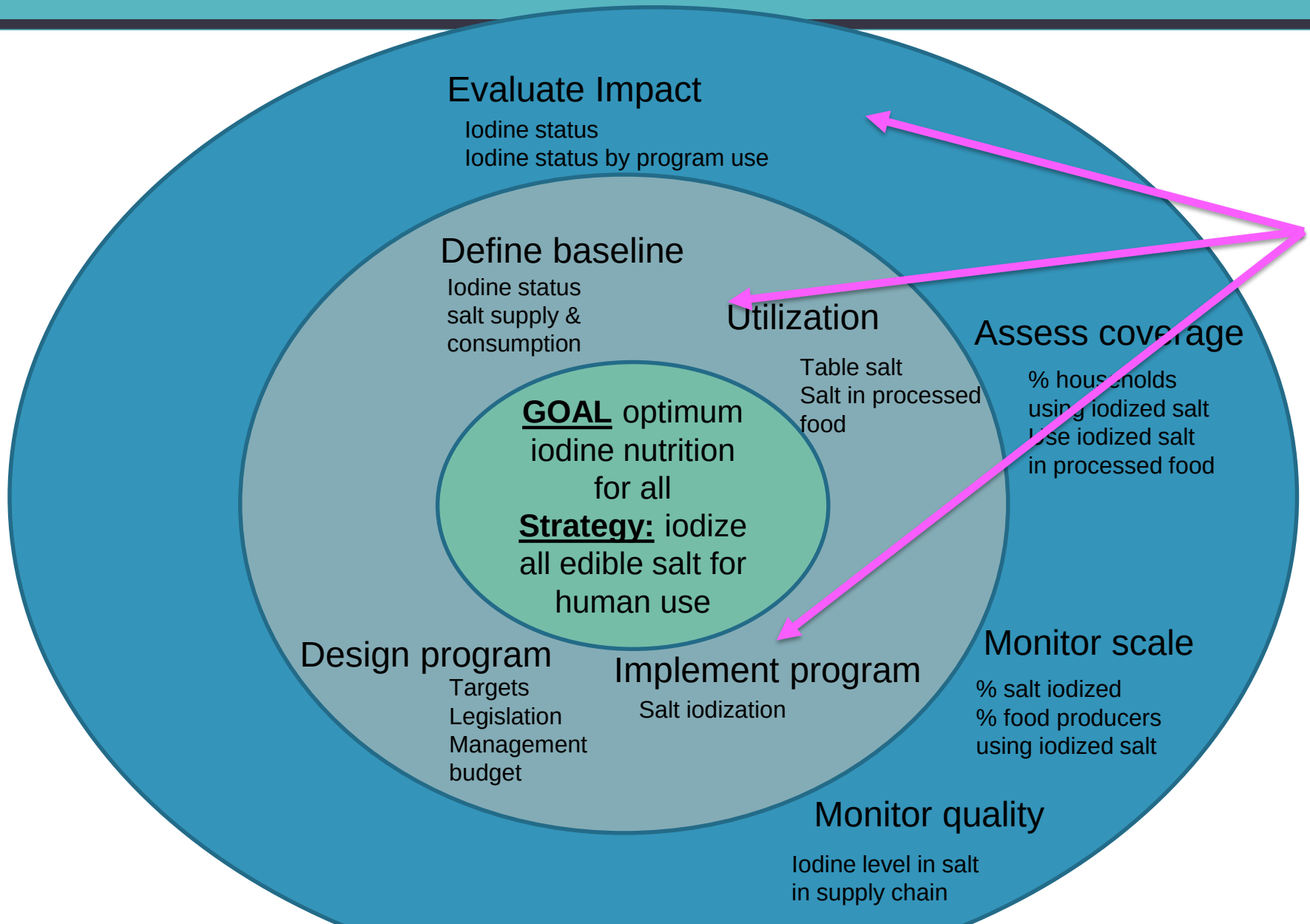
Example 1 of national MUICs among different population groups				
	MUIC (ug/L)			
Population group	**Insufficient**	**Adequate**	**Above requirement and excessive**	**Classification of status**
School aged children		163		Adequate
Pregnant women	113			Insufficient

But now we also have data on pregnant women:

- Iodine status is categorized as adequate for school aged children
- Iodine status is insufficient for pregnant women → this needs attention

As resources allow, the adequacy of iodine intakes should be examined among different subsets of the population, especially among groups vulnerable to deficiency

RECOMMENDATION 5 – IODINE STATUS BY SUB-GROUPS



Examine the median urinary iodine concentration (MUIC) by subgroups

INTERPRETATION OF NATIONAL SURVEY DATA

- National level data are useful to track overall progress, but may hide disparities, and sub-national variations
- Many countries have adequate iodine status, but there are sub-populations with inadequate status – unprotected
- Other sources of iodine may be contributing to iodine status, in particular the use of iodized salt in processed foods and condiments
- Such data help identify disparities and guide where program enhancements are needed and will become increasingly important following industry reform

INTERPRETATION OF NATIONAL SURVEY DATA – COUNTRY A

Household iodine content	Coverage (%)	Median UIC (ug/L)
No iodine (0 ppm)	17%	
Inadequate iodine (1-14 ppm)	33%	
Adequate iodine (≥ 15 ppm)	50%	
All	100%	130

In case you only look at the MUIC of the entire population without taking into account whether they had iodized salt at home or not, the conclusion would be:

- MUIC is “optimal” and the country qualified as iodine sufficient

INTERPRETATION OF NATIONAL SURVEY DATA – COUNTRY A

Household iodine content	Coverage (%)	Median UIC (ug/L)
No iodine (0 ppm)	17%	78
Inadequate iodine (1-14 ppm)	33%	136
Adequate iodine (≥ 15 ppm)	50%	155
All	100%	130

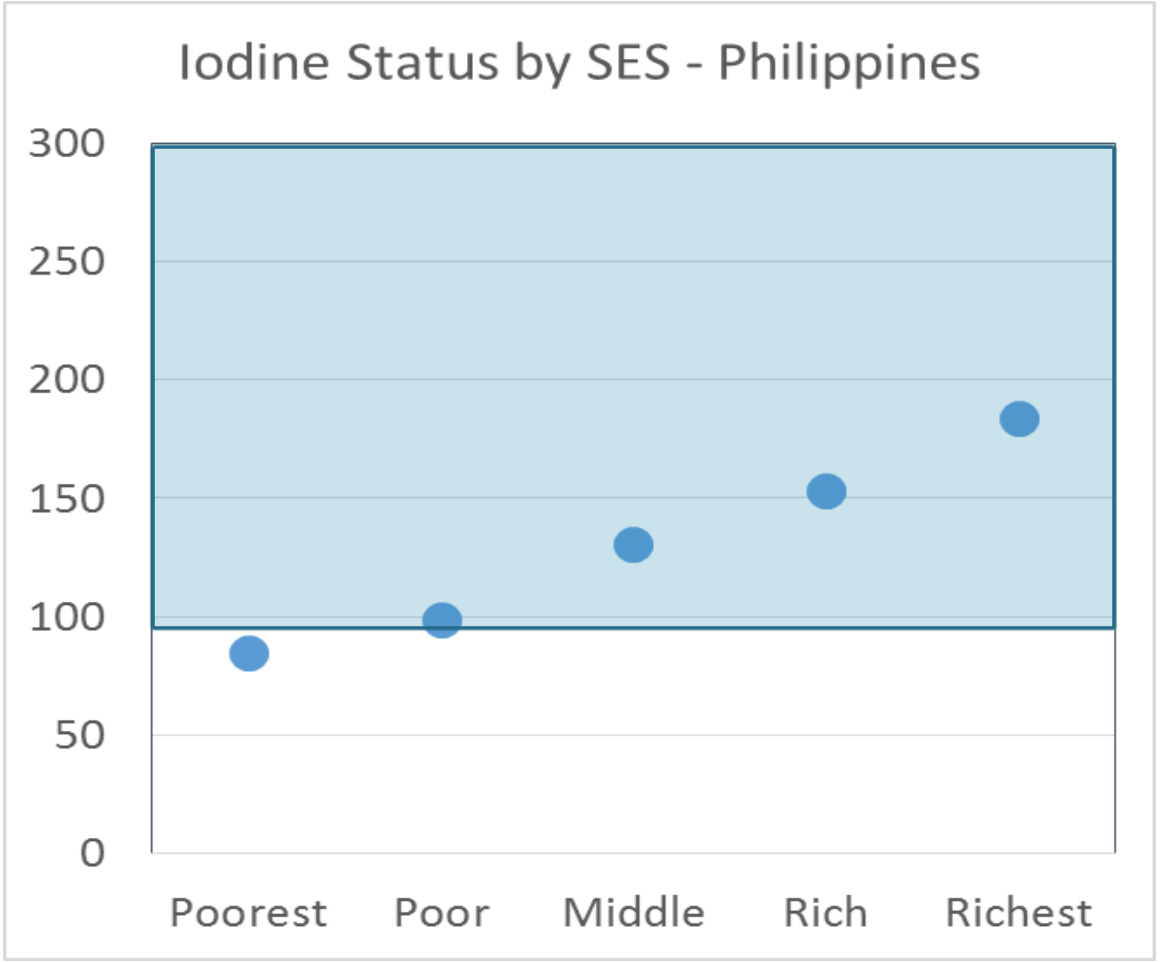
Now, when you also know the MUIC for the the level of iodine in their salt: the MUIC can be found in the right column.

Conclusions

- For households that don't get iodized salt: improve quality of iodization
- For those that get the right level of iodized salt: iodine status is adequate → the iodization level of salt is correct
- Iodized table salt is likely the main source of iodine: if processed food salt was an important source, we would see higher MUIC for households with table salt with no iodine

Examine the MUIC in relevant subgroups, National-level MUIC may mask subnational disparities

INTERPRETATION OF NATIONAL SURVEY DATA



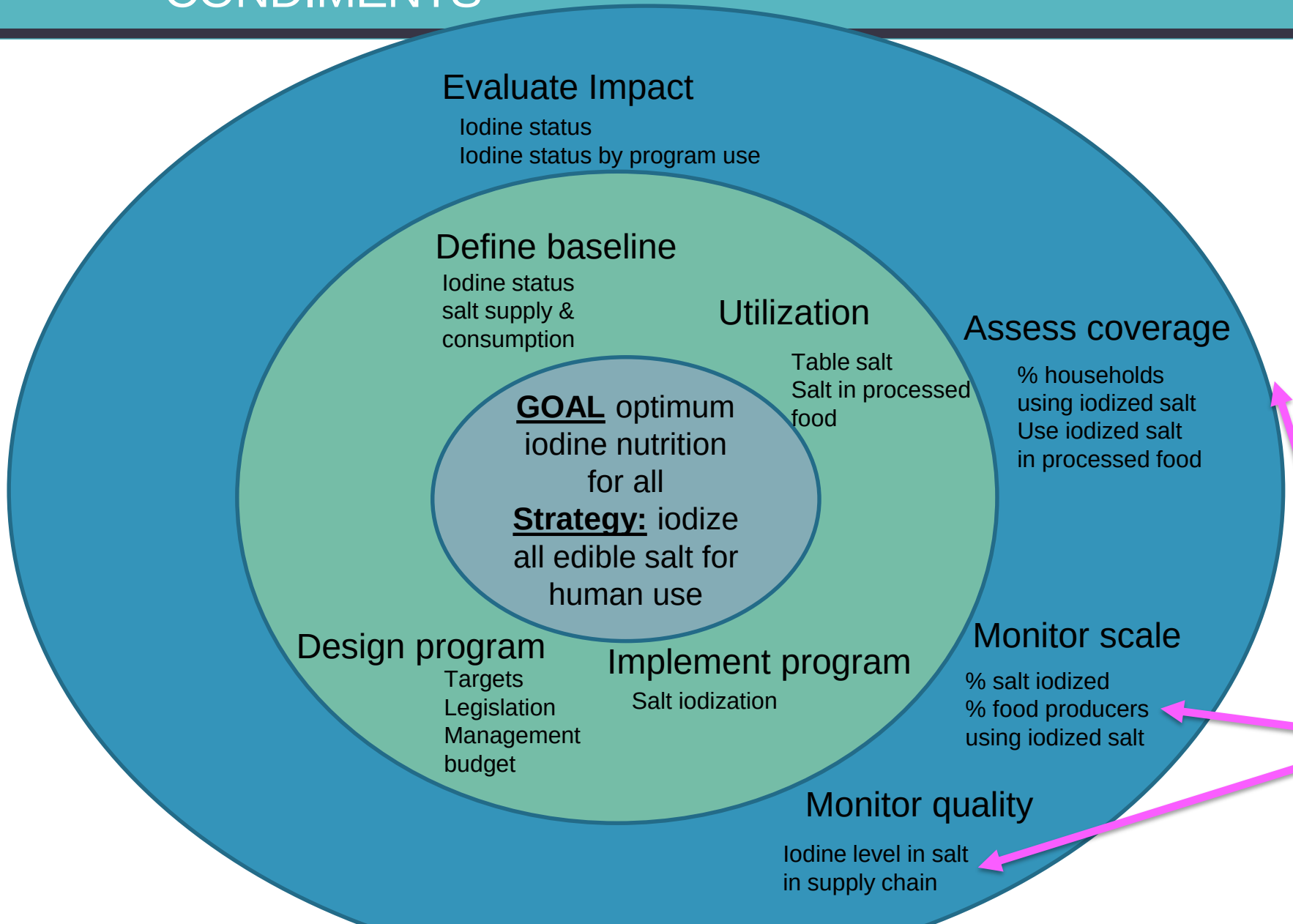
Blue box represents range of optimal status

In this example: poorer household likely use salt that is non-iodized or poorly iodized

IODINE STATUS FOR SUB-GROUPS

Geographic area/ Demographic characteristic	Number of samples	Median Urinary Iodine Concentration
National		
Location		
Urban		
Rural		
Region/Province		
Region/Province 1		
Region/Province 2		
Region/Province 3		
Economic status		
Quintile 1 (poorest)		
Quintile 2		
Quintile 3		
Quintile 4		
Quintile 5 (richest)		
Salt iodine content (HHIS)		
Non iodized (< 5 ppm)		
Inadequately iodized (5-14.9 ppm)		
Adequately iodized (15-40 ppm)		
Over iodized (> 40 ppm)		

RECOMMENDATION 6 – MONITOR PROCESSED FOODS AND CONDIMENTS



Monitor the use of iodized salt in processed foods and condiments.

ASSESSMENT OF SOURCES OF SALT IN THE DIET

Monitoring approach

- Monitor iodine status
- Monitor the main sources of iodine in the diet: household salt and food salt
- Monitor food salt quality – possible → supply side
- Monitor scale of processed foods with iodized salt – possible → supply information

Ultimate goal: population intake sufficient, all segments of population reached and see whether standard change is required.

IODINE INTAKE FROM PROCESSED FOODS

Country	Food	% of iodine requirement provided by processed food in previous column
Egypt	Baladi bread	50%
Indonesia	Instant noodles	6%
	Stock	4%
Ghana[1]	Bouillon cubes	68%
Haiti[2]	Bouillon cubes	79%
Philippines	Bread	8-10%
	Instant noodles	7-9%
	Canned fish	8-18%
	Soy sauce	8%
Russian Federation	Bread	37%

[1] Abizari: contribution of bouillon cubes to dietary iodine intake among children in northern Ghana; [2] Gorstein: modelling potential iodine intake from bouillon cubes in Haiti;
All other data: Knowles et al. Iodine intake through processed food: case studies from Egypt, Indonesia, the Philippines, the Russian Federation and Ukraine, 2010-2015. Nutrients 2017

CONCLUSION

- The Guidance provides you with programmatic tools to better monitor your programs and interpret the findings
- We shared 6 key recommendations today. There are more recommendations and practical tools for your use in the Guidance

- Please use this Guidance. It is available in English, French, Spanish and Russian

- Please know that support for your programs is available:
  - By peers in other countries
  - By international organizations (UNICEF, IGN, Nutrition International, GAIN, etc)

Now is your chance to ask questions

Thank you!