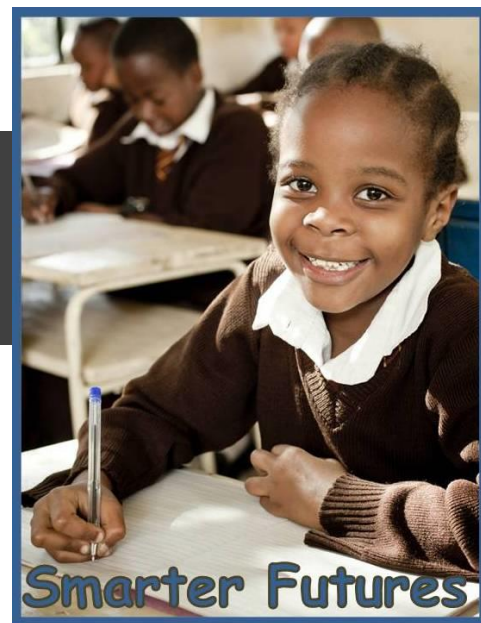


Folic Acid and Neural Tube Defects

What do millers actually prevent?



Anna Verster, Project Coordinator

Smarter Futures

With thanks to Graham Fieggen (Red Cross War Memorial Children's Hospital), Lieven Bauwens (IF) and Sarah Zimmerman (FFI)



Ministerie van Buitenlandse Zaken

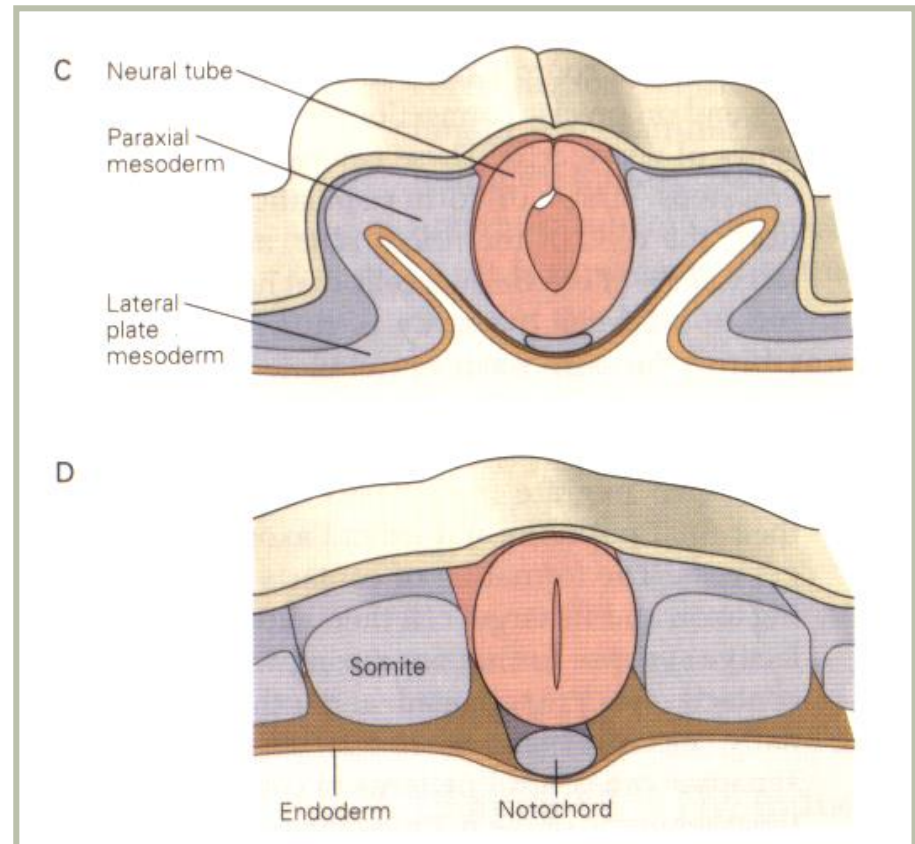
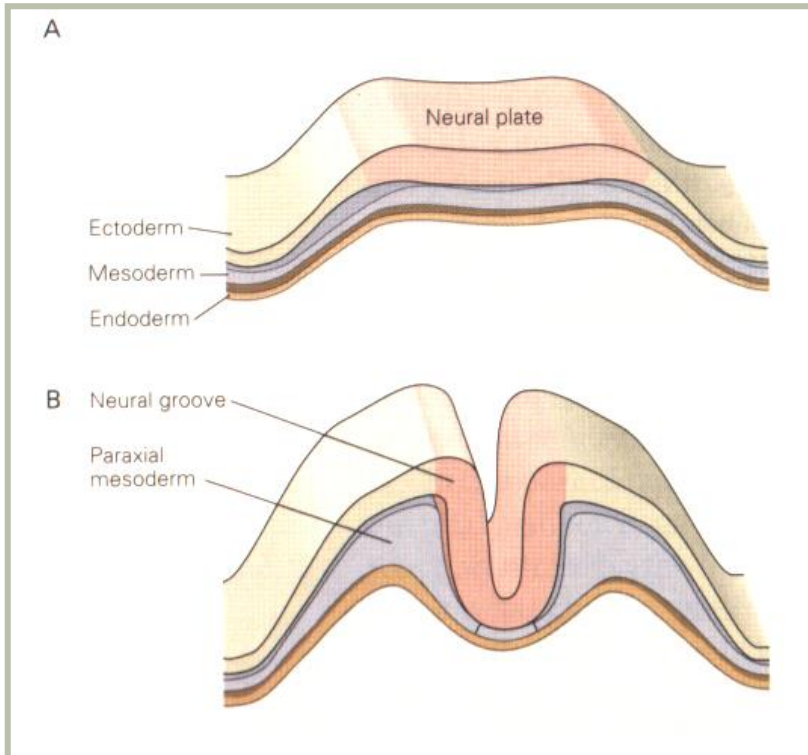
Very early in pregnancy, the Neural Tube is supposed to close

- ▣ This occurs by **day 28** post conception, **before a woman even knows that she is pregnant.** This is critical for understanding strategies for prevention!



Normal situation: Closure of the neural tube

Principles of Neural Science
Kandel ER
2000

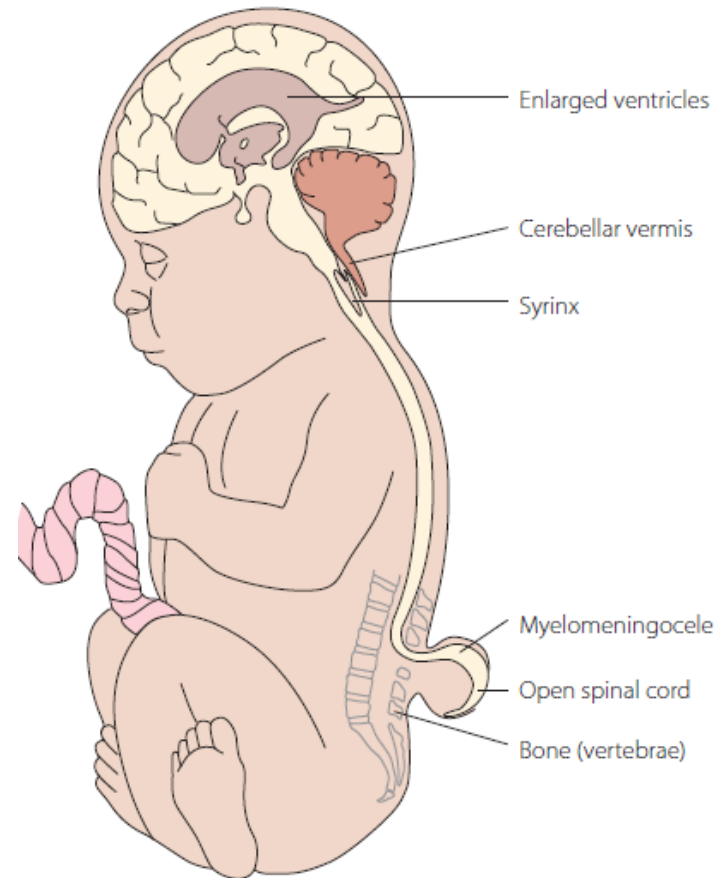


This process is complete within the first month post-conception;

This has clear implications for the concept of prevention

Neural Tube Defects: what are they?

- When the neural tube of a fetus fails to close properly the central nervous system is impaired. This we call: Spina bifida
- Spina Bifida is one of the most common birth defects.
- It is often **preventable**
- Initial management has a **profound** effect on survival and the disabilities that they may suffer
- Hope and support make this a manageable condition, which culminates in a productive and meaningful life for many...



Spina Bifida

- ❑ In mild cases of spina bifida, permanent loss of some sensation or movement occurs.
- ❑ Severe cases include paralysis and varying degrees of loss of bowel and bladder control.
- ❑ Children born with spina bifida will undergo a lifetime of surgeries and face many health issues.
- ❑ Spina bifida cannot be cured.



NTD's are only the ears of the hippo....

Other adverse health outcomes:

Certainly: Folic Acid deficiency and related anemia

Probably: stroke, heart disease

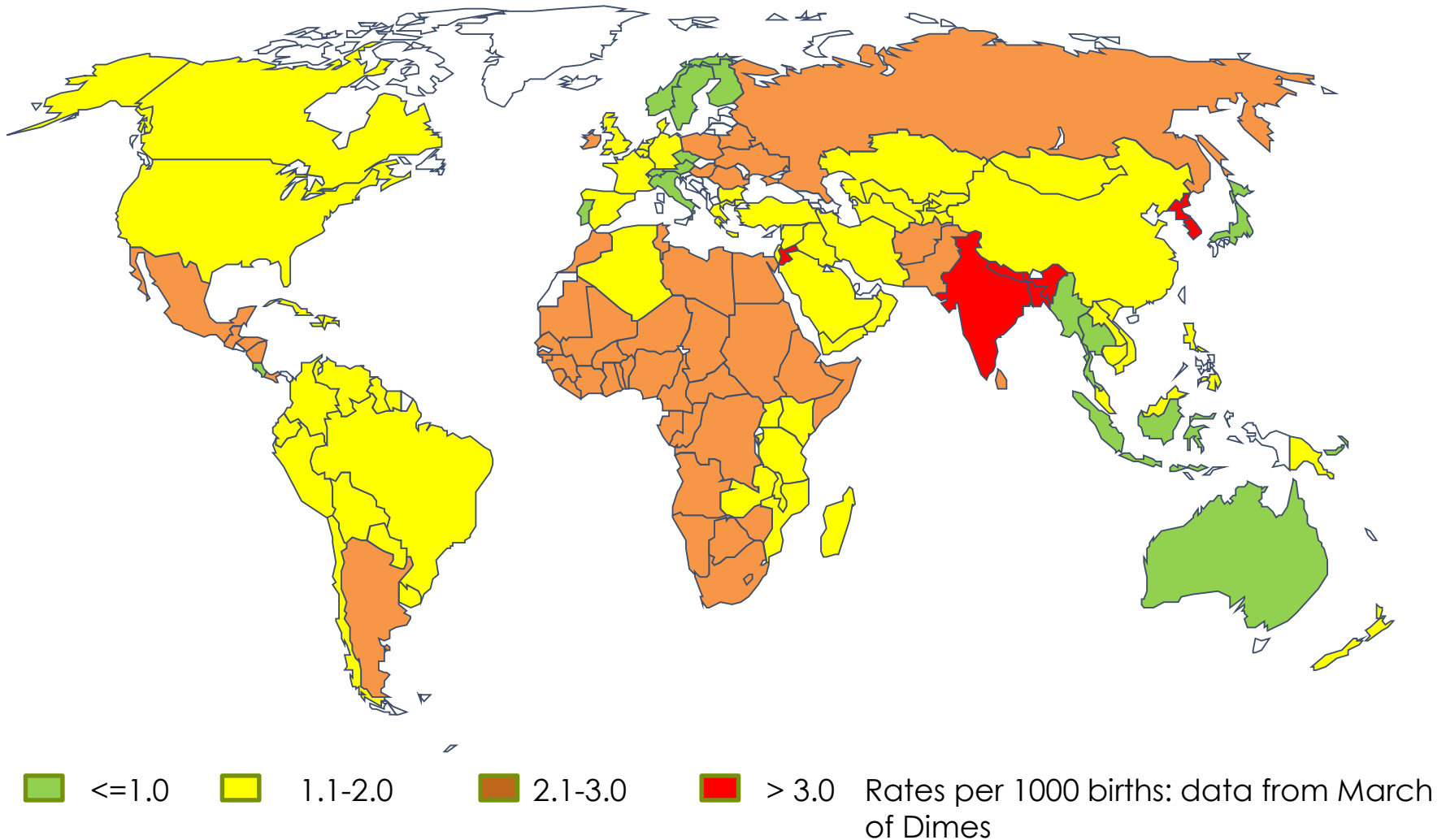
Possibly: Low birth weight, pre-term birth, cancer, other birth defects, cleft palate ...

Recurrence?



Photo from Animal Planet

Prevalence of NTDs, 2001



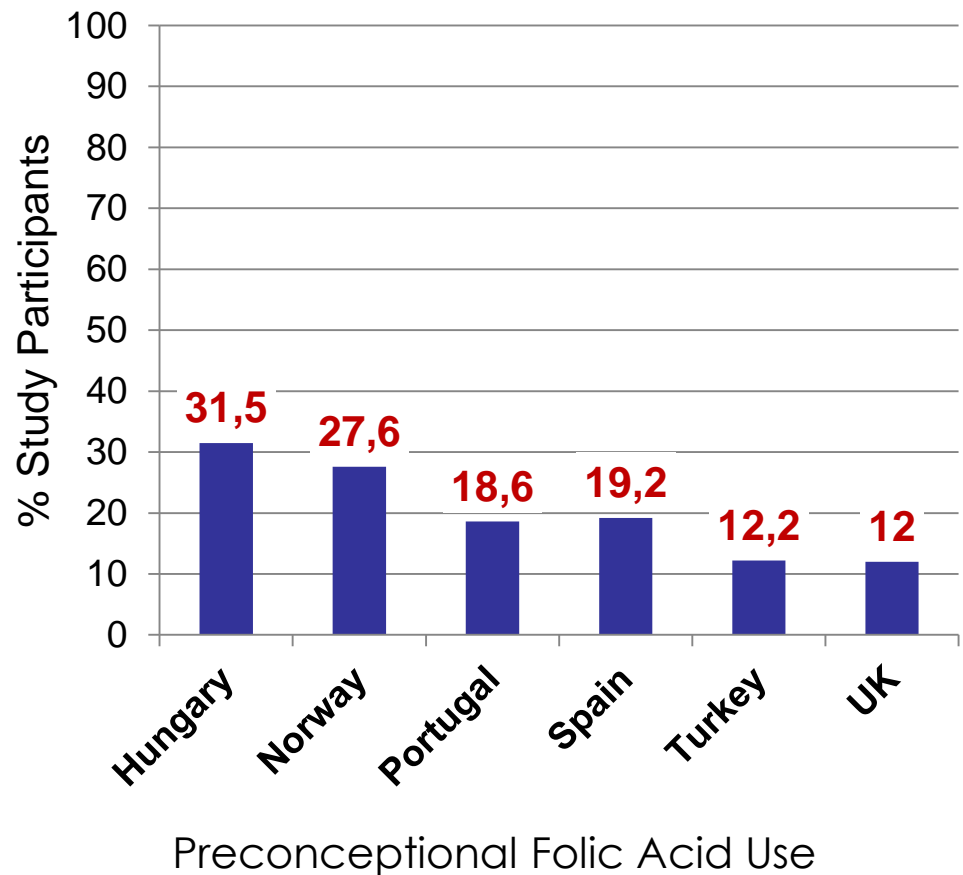
Until 25 years ago we did not know that NTD's can be prevented...

- Folic acid is a B vitamin that our bodies need to make new cells.
- In 1991, a study done in the United Kingdom showed that **400 microgram of folic acid daily taken from 8 weeks before conception** till 12 weeks into the pregnancy can help reduce the risk of NTD's by up to 70%
- This important discovery made it possible to **prevent** these debilitating birth defects
- Pregnant women all over the world are given iron and folic acid tablets during pregnancy, mostly in the 3d trimester
- That is **too late** for preventing NTD's

Folic acid from supplements, from the diet or from fortified foods?

Supplements have limitations:

- Cost and inconsistent use
- Minority of women use folic acid supplements at the correct time for preventing NTDs (even when the pregnancy is a planned one) – important relation with socio-economic background



Folic acid supplement use is low

- Assessed in 49 studies from 22 countries
- Peri-conceptual use ranged from 0.5% (Italy) - 52% (Netherlands)
- Almost half of all pregnancies worldwide, estimated to be over 100 million annually, are unintended or mistimed
- If women are not planning pregnancy, they may not take supplements



Folic acid from from supplements, from the diet or from fortified foods?

Dietary Diversification:

- ❑ it is virtually impossible to obtain enough folic acid through natural foods, even in high-earning and educated populations.
- ❑ Women who plan to become pregnant need 400ug of folic acid daily.
- ❑ To obtain this naturally they would need to eat 44 ripe tomatoes, 14 cups of broccoli or four slices of fried beef liver every day.



Photo Ella ten Have

Flour Fortification with folic acid is the best solution

- Effective, simple and inexpensive
- Requires no change in dietary patterns or individual decision
- Non-discriminating
- The discovery that folic acid can prevent NTD's led Oman to start fortification of flour with folic acid in 1996, soon followed by the US and Canada.



- The impact was immediate!

Reduction in NTD's in Oman

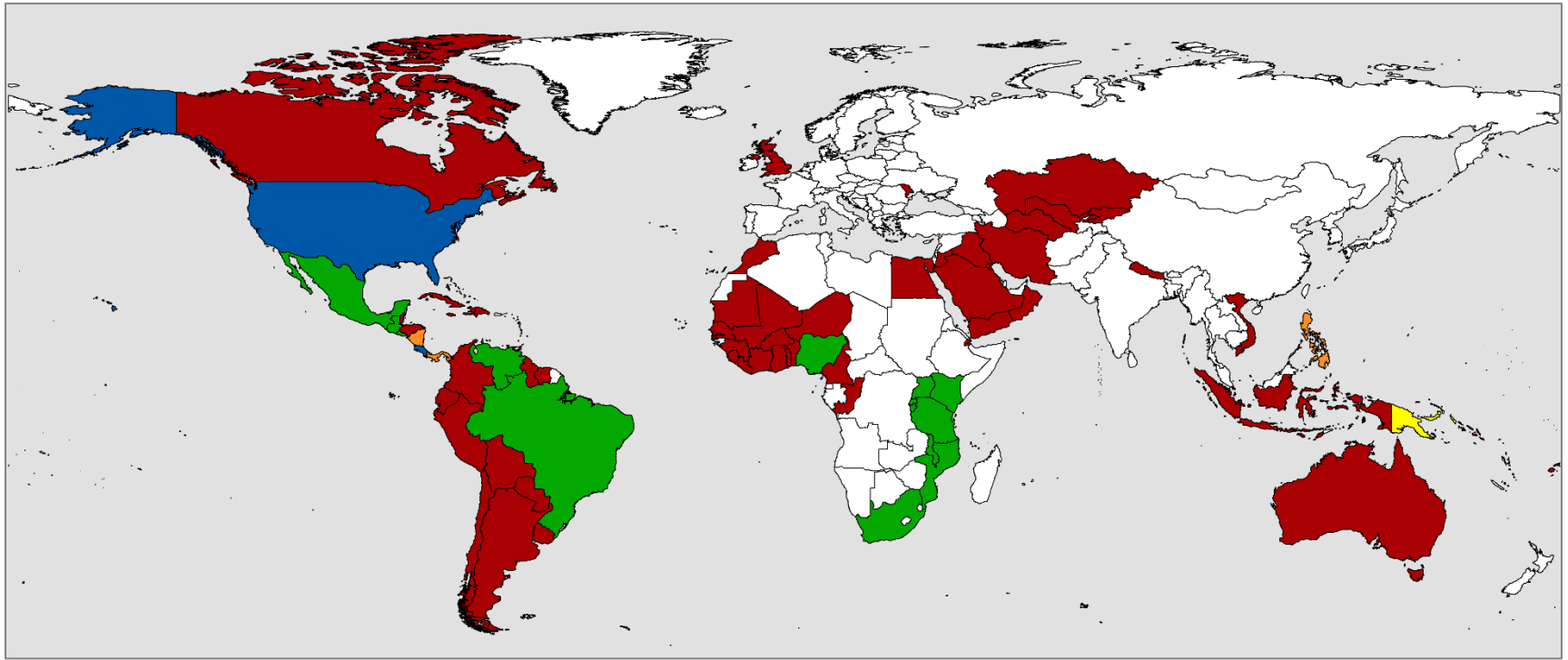
Flour fortification reduces Neural Tube Defects by about half!




Eight studies from Argentina, Canada, Chile, South Africa, and the United States showed a:




- **31% to 78% reduced risk** of neural tube defects after fortifying flour with folic acid
- **Overall reduction of 46%**



Industrially Milled Flour and Rice Fortification Legislation



	Wheat flour – 66 countries
	Rice – 1 country (Papua New Guinea)
	Wheat flour and maize flour –14 countries

	Wheat flour and rice – 3 countries (Nicaragua, Panama, Philippines)
	Wheat flour, maize flour, and rice – 2 countries (Costa Rica and the United States)
	No grain fortification legislation

* Legislation has effect of mandating grain fortification with at least iron or folic acid.

Legislation status from the Food Fortification Initiative (www.FFInetwork.org) May 2016

Summary

- An estimated **300,000 neural tube defects** (NTDs) occur every year globally
- Fortifying flour with folic acid is an effective way to prevent NTDs
- Countries that made fortification mandatory have experienced between 31 and 78% reductions in NTD prevalence
- Globally an estimated **38,417** birth defects were prevented in 2012 where flour was fortified with folic acid. That is an average of **105 a day**
- Countries can avert millions of dollars in healthcare expenditures when spina bifida is prevented
- Millers are **key partners** in preventing Neural Tube Defects

Global Report Cards

- **The PUSH! Global Alliance**, a platform for organisations to advance the greatest benefit to those affected by spina bifida and hydrocephalus has developed Global Report Cards that provide country and regional snapshots of indicators grouped by World Health Organization (WHO) regions.
- These snapshots provide meaningful, tangible information in areas deemed to be “actionable.”
- To see how your Region and country is doing, please visit <http://www.pu-sh.org/global-report-cards>

Thank you!

