



ADAPTIVE WSPS: THE KEY TO RESILIENT SAFE WATER SUPPLIES

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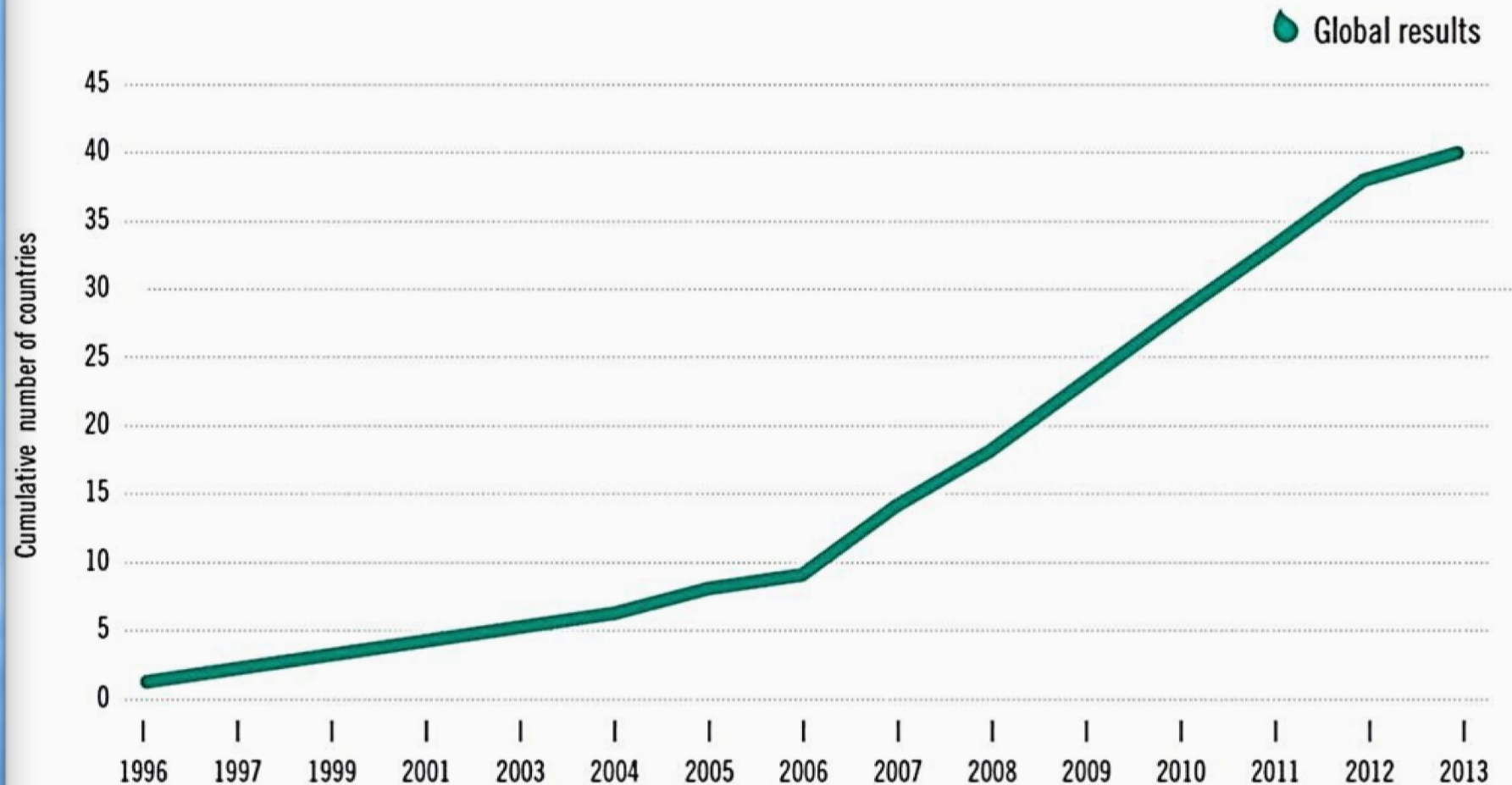
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WSPs

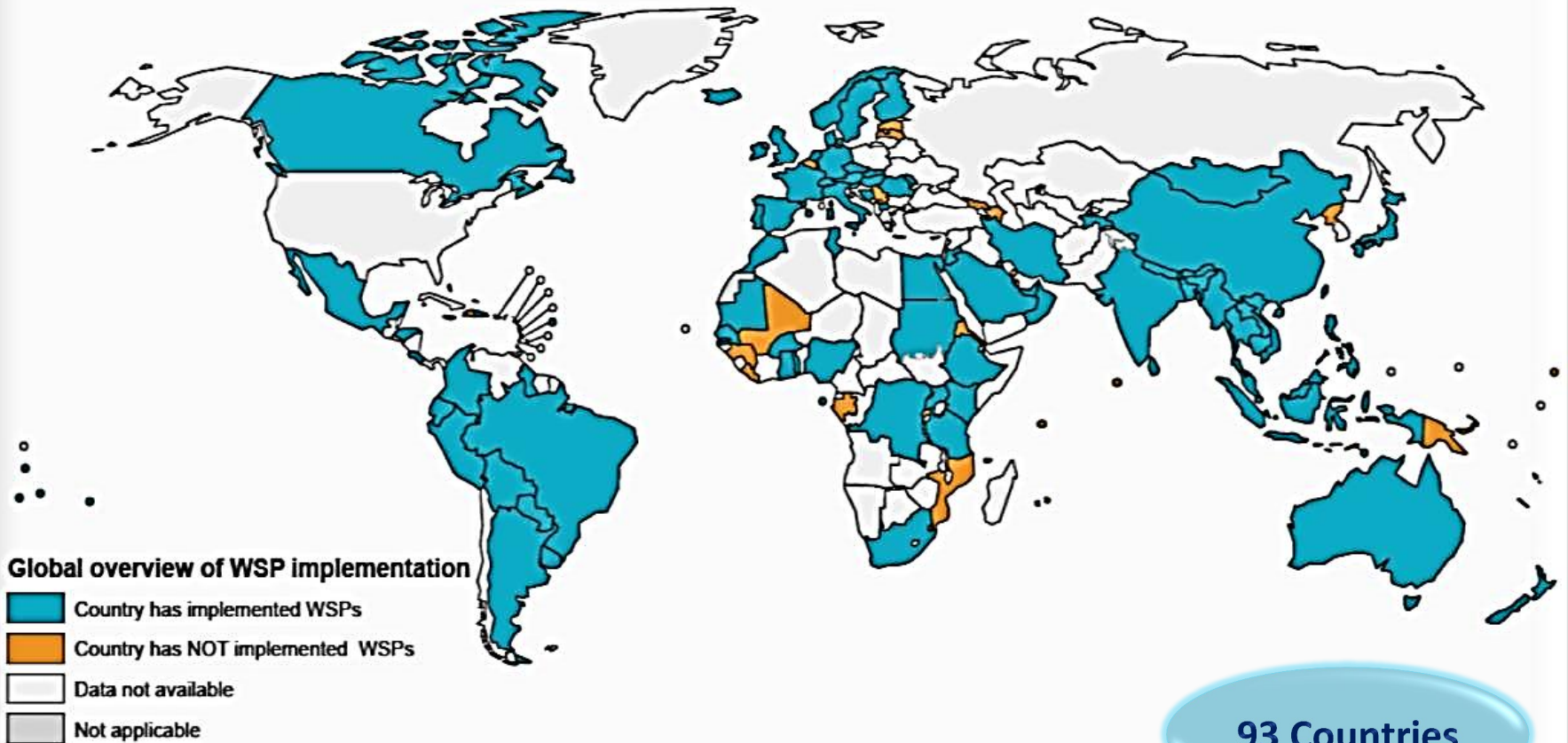
- ◆ WSPs are the cornerstone of the WHO Guidelines for Drinking-water Quality and the focus for ensuring safe drinking water
- ◆ Steady increase since introduction in the 3rd Edition of the GDWQ (2004). By 2017:
 - ◆ 93 countries had implemented WSPs
 - ◆ 46 countries have policies or regulations supporting/promoting WSPs
 - ◆ 23 countries working on policies/regulations
- ◆ Applications of WSPs expanding to include buildings

Implementation timeline

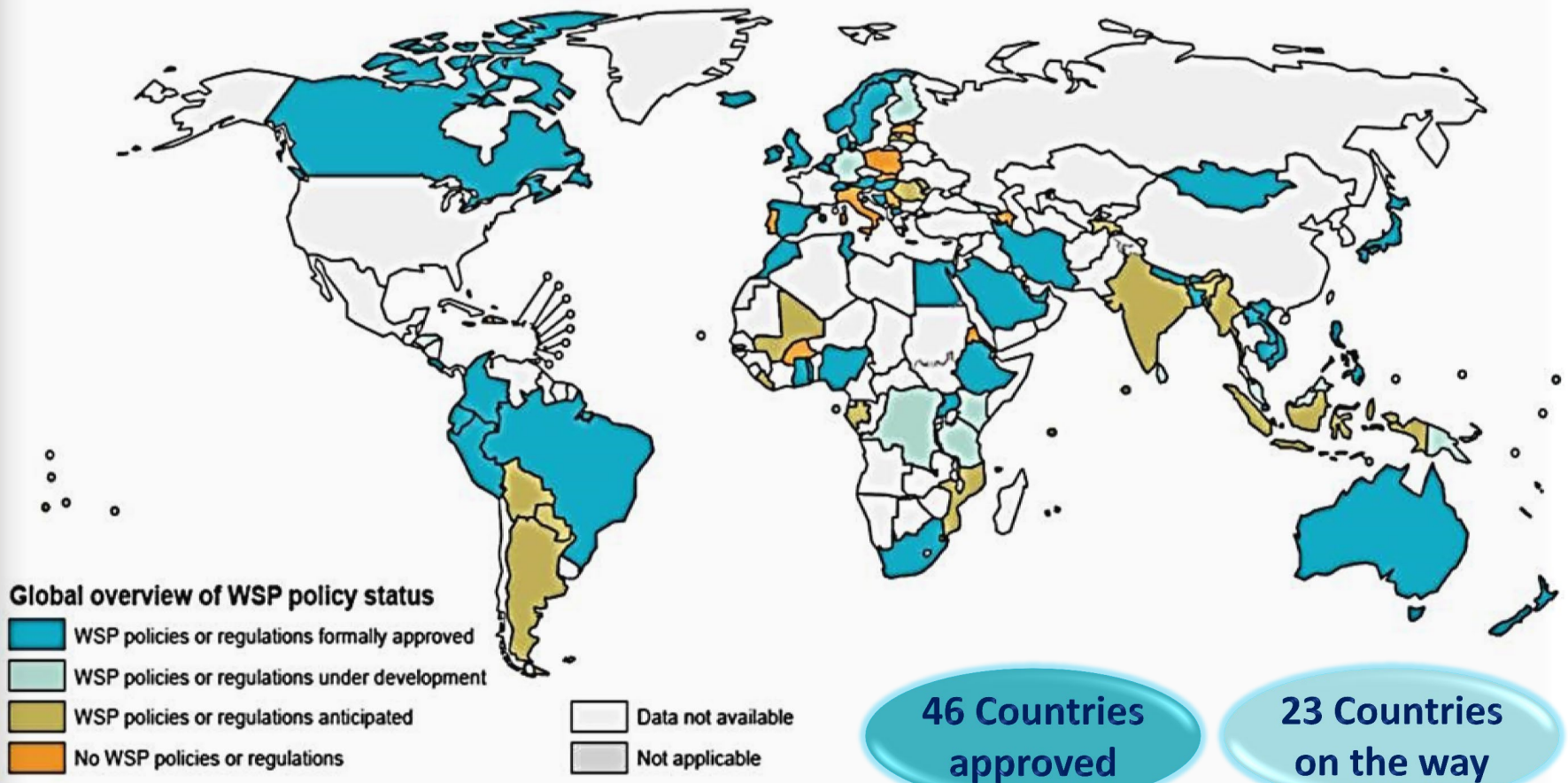
Total number of countries with WSPs implemented (n=40 respondent countries)



Implementation status 2017



WSP Policy Status



Refining WSPS

- Implementation is an important first step but maintenance, review and adaptation are essential to support resiliency and ongoing safety
- This includes assessing new challenges and where necessary including adaptive responses
- A well designed WSP will include flexibility to enable adaptation and include the tools to assess and determine the need for change (i.e. risk assessment)

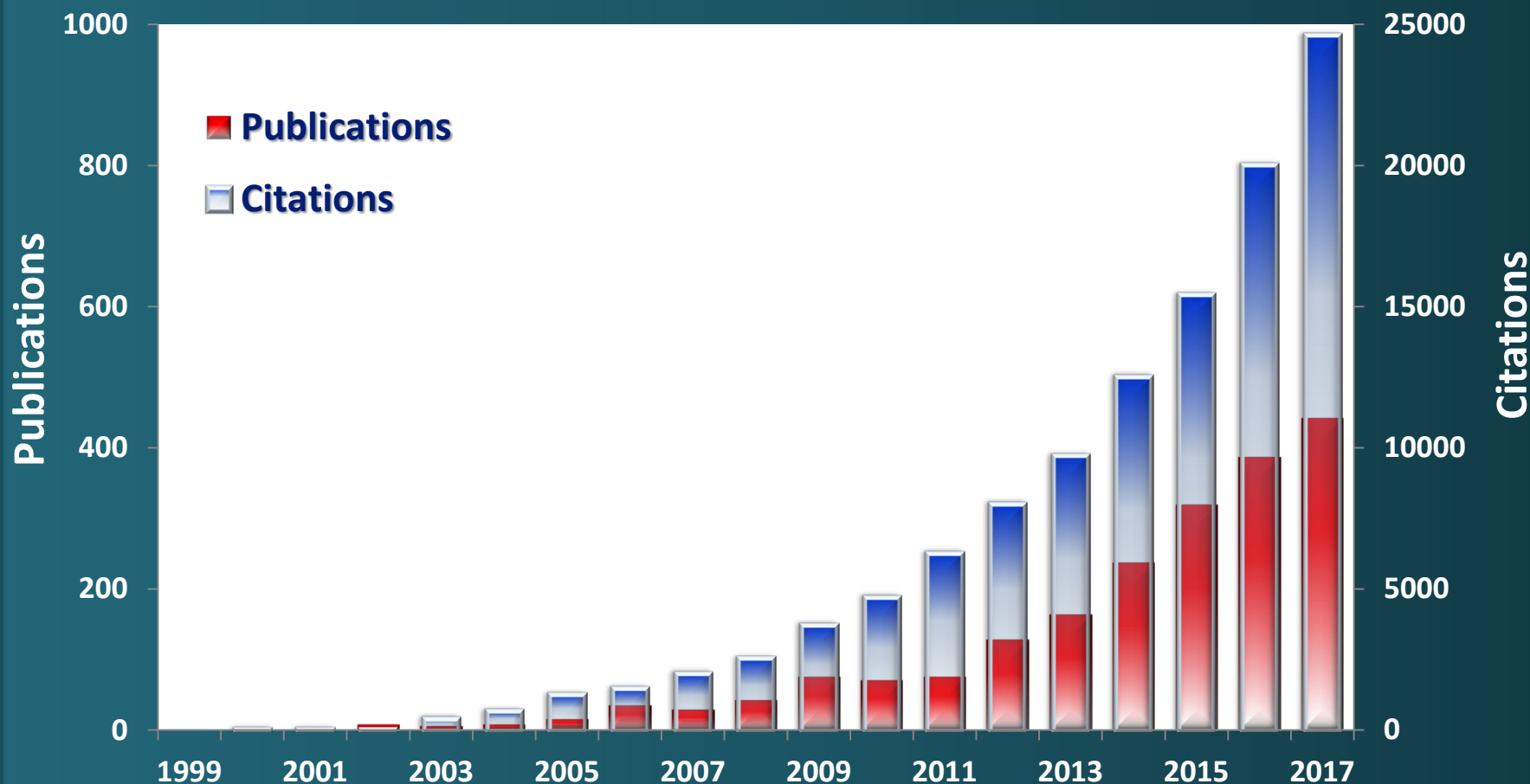
Changing Conditions

- ◆ Incidents and emergencies that signal the original WSP includes gaps that need filling e.g.
 - ◆ outbreaks, unexpected chemical contamination
- ◆ Unforeseen hazardous events
- ◆ Emerging contaminants representing hazards not previously considered e.g.
 - ◆ pharmaceuticals
 - ◆ microplastics
 - ◆ chlorate and NDMA

Justification for Changes

- Reasonably straightforward when incidents or unforeseen hazards lead to exceedances of guideline values/standards or when guidelines/standards change
- The speed of change influenced by expected frequency and magnitude of exceedance and the nature of the parameter
- Loss of microbial control or exceedances in chemicals with acute impacts need more rapid responses
- Dealing with emerging contaminants is more complicated

Focus on Emerging Contaminants



Risk Assessment

Only 91 contaminants are regulated in the USA but 60,000 chemicals are used (NY Times).

- ◆ Need to separate media reports, speculative claims and political influence from known facts
- ◆ Researchers tend to speculate about potential health risks and promote the need for further investigations. Increasingly this speculation is spread through media releases.
- ◆ Also see a conflation of ecological/environmental impacts with human health impacts (e.g. endocrine disruptors, microplastics)
- ◆ Important to apply the risk assessment process used in WSPs to assess risks and determine need for action

Case Study – Pharmaceuticals

- First came to prominence in the early 2000s following a USGS survey of US streams. Further studies followed
- Media interest followed led by a two part story from AP on “Drugs found in drinking-water”. The US Congress got involved and raised the need for more monitoring and assessment of health risks. Further debate continued
- Pressure was placed on drinking water operators to add treatment to remove pharmaceuticals (without a risk assessment)
- In response to the growing concern WHO undertook a review of the state of science

Findings of the WHO Review

- Trace quantities of pharmaceuticals in drinking-water are very unlikely to pose risks to human health
- Concerns over pharmaceuticals should not divert attention from waterborne pathogens and chemical priorities, such as lead and arsenic
- Treatment to reduce the very low concentrations of pharmaceuticals in drinking-water is not necessary
- The levels of exposure to pharmaceuticals in drinking-water suggest that formal guideline values are unwarranted

Dealing with Emerging Contaminants in WSPs

- ◆ The great majority of emerging contaminants will not represent a risk through drinking water but occasionally some do (e.g. *Cryptosporidium*, NDMA, perchlorate)
- ◆ Identify sources of truth as a basis for WSP risk assessments e.g. WHO Guidelines and other credible international guidelines and standards
- ◆ If these identify potential risks at concentrations credible in drinking water consider including them. Also consider where the level of risk fits within existing challenges (e.g. pathogens, lead, fluoride, nitrate etc)
- ◆ Some larger utilities may establish a watching brief including monitoring. This is OK providing it does not distract from maintenance and management of existing processes

Adaptive WSPs

- ◆ Adaptive WSPs are a key to resilient and sustainable drinking water supplies
- ◆ Need to be kept under regular review to ensure ongoing performance and in response to:
 - ◆ occurrence of incidents
 - ◆ unforeseen hazardous events
 - ◆ emerging contaminants/issues
- ◆ Changes to treatment and operating practices should be also be captured in WSPs
- ◆ This is good practice but some times it can be forgotten or overlooked