Community-based training for antibiotic stewardship: A Canadian-Ecuadorian collaboration to sustainably control infectious diseases using an ecosystem approach

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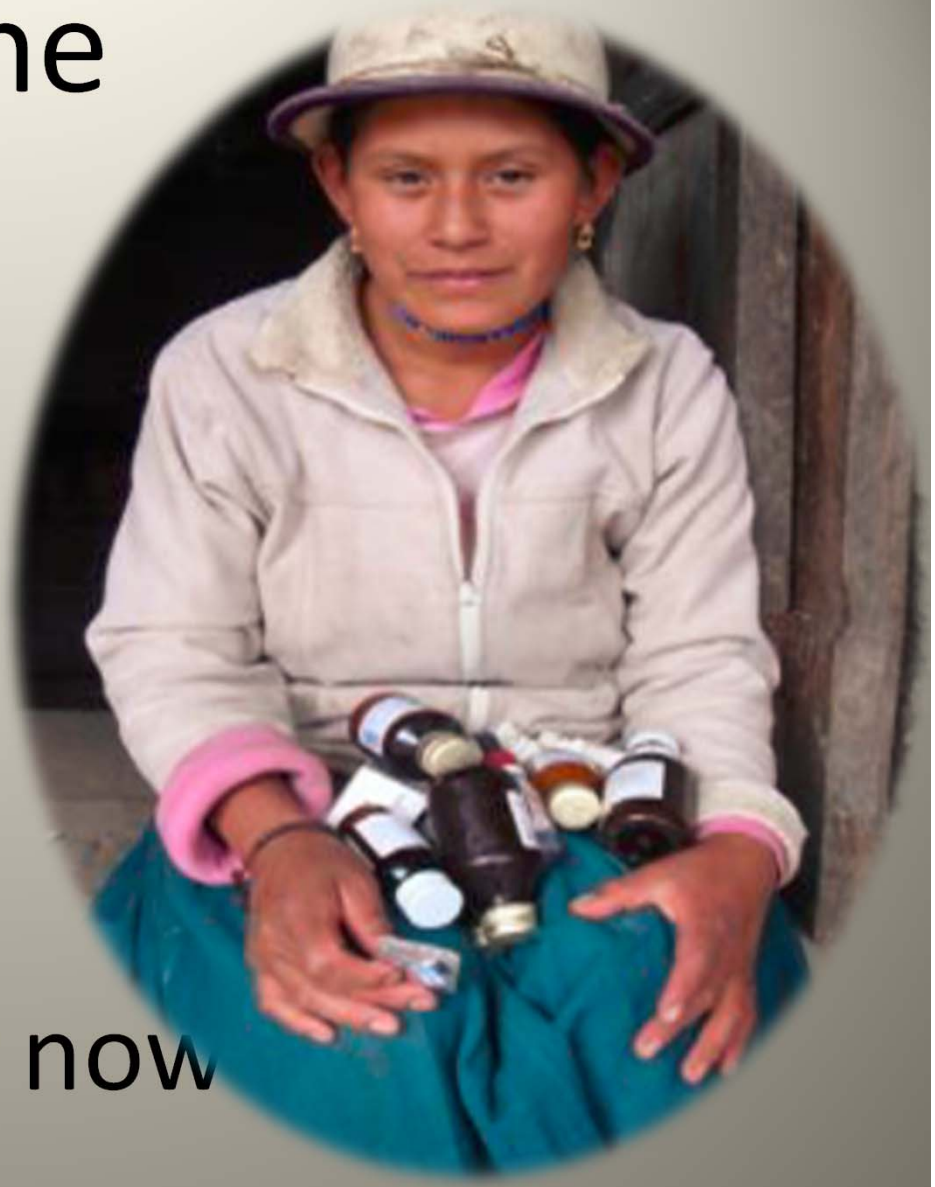
Outline

- The problem
- The context
- What we did
- What we found
- What we learned
- What we are doing now



1. The Problem

- LMICs: brunt of infectious disease morbidity and mortality
- LMICs: **increasingly severe problems due to antibiotic resistance**.
- Misuse of antimicrobial agents in LMICs include:
  - lack of knowledge by healthcare professionals,
  - deficient laboratory facilities,
  - inadequate access to healthcare,
  - lack of funds for the appropriate antibiotic doses,
  - dispensation of drugs by untrained people,
  - availability of substandard and counterfeit drugs, and
  - public misconceptions about antimicrobial drugs.

Furthermore, LMICs:
transmission of resistant bacteria high from:

- person-to-person contact
- contaminated food
- lack of sanitation
- unsafe water
- aggravated by malnutrition

i.e. a complex array of social and environmental factors.

2. The Context

- Ecuador, one of the poorest countries in South America, has serious health needs.
- Vector-borne diseases e.g. malaria, dengue, Chagas
- Tuberculosis
- Acute respiratory and intestinal infections
- Also health impact of the social disruption and cultural challenges accompanying globalization.

The situation on the ground

Plus strong culture of resistance

Ecuador’s constitution:

The new constitution gives **nature** the "**right to exist, persist, maintain and regenerate its vital cycles, structure, functions and its processes in evolution**" and mandates that the government take "**precaution and restriction measures in all the activities that can lead to the extinction of species, the destruction of the ecosystems or the permanent alteration of the natural cycles**."

Context continued

- several methods for promoting antimicrobial stewardship - focusing on prescribers, the public, or both - but the most effective approach is unknown.

An "ecosystem approach to human health" understands health as the culmination of various social, cultural, economic and biophysical factors, and recognizes the interconnectivity of all life-forms…..but had (to our knowledge) never been applied to the AMR issue

Context…. continued
Masters Program in *an Ecosystem Approach to Health*

- 6 year project funded by the Canadian International Development Agency (CIDA)
- to train personnel for reducing health impacts/environmental health risks.

One Masters Thesis*…

Objective: To collect baseline data on infectious diseases and antibiotic use in two Andean indigenous communities in Ecuador - to determine the feasibility and acceptability of applying an ecosystem approach

Methods:

- **visited 65 households** with children under age 5 years,
- **environmental risk factors** evaluated;
- caregivers' **knowledge, attitudes, and practices** related to antibiotic use were determined;
- antibiotic use - from inspection of medicine chests; and
- overall **health of the 91 children** (including nutritional status) was assessed.

A workshop was held to share results and to craft a multicomponent intervention using an ecohealth framework.

Results of that thesis*

- **numerous environmental risks,** especially related to water and sanitation.
- knowledge, attitudes, and practices revealed use of traditional **and** Western medicines……but **serious knowledge gaps**.
- **antibiotics** were present in 60.9% of households in one community; 46.8% in the other;
- malnutrition rates were 22.2% in one; 26.1% in the other;
- **diarrheic episodes** were experienced in the previous month by 26.7% of children in one and 47.8% in the other, with antibiotics prescribed in 50.0% and 47.1% of cases, respectively; and
- **acute respiratory infections** in 28.9% of children one and 47.8% in the other, with antibiotics prescribed in 53.8% and 50.0% of cases, respectively.

* **Muñoz G, Mota L, Bowie WR, Quizhpe A, Orrego E, Spiegel JM, et al. Ecosystem approach to promot- ing appropriate antibiotic use for children in indigenous communities in Ecuador.** ***Rev Panam Salud Publica*****. 2011;30(6):566–73.**

3. What we did:

Develop a **Certificate Program in an Ecosystem Approach to AMR (University of Cuenca, Oct-Nov 2011)**:

- A four-day workshop,
- Followed by six weeks of community-based work,
- Then a final workshop with findings presented to decision-makers.
- The 34 participants consisted of 7 academic health professionals, 13 community-based physicians, 4 nurses, 3 dentists, 3 lawyers; and 4 **community leaders** (from communities where the Munoz thesis was conducted).

What we did cont'd

- Presentations by interdisciplinary international "experts", including indigenous leaders:

– focusing on an ecosystems approach

Reviewed Canadian "*Do bugs need drugs*" and critiqued it…

12 group projects conducted:
Results include:

- poor level of knowledge regarding antibiotic use amongst 56 Ministry dentists (*Álvarez JL, Alvarado J, and Cazar M. Conocimientos, Actitudes Y Prácticas En La Utilización De Antibioticos En Odontólogos Del MSP*.)
- hand-washing compliance in a neonatal intensive care unit with high rates of Extended Spectrum Beta Lactamase (ESBL) infection was problematic (*Calle M, Naula M, Ruiz A. Técnica del lavado de manos del personal de salud en la Unidad de Cuidados Intensivos Pediátricos del Hospital Vicente Corral Moscoso.*)
- obtaining anti-infectives through pharmacies and informal routes (auto-medication) was very common (*many presentations …*)
- healthcare providers overprescribed - thus a program primarily focusing on restriction of antibiotics to those prescribed by physicians (or dentists or veterinarians) would not itself lead to better antimicrobial utilization.

Projects continued

- A project reviewing legal structures around drug prescribing including a public forum on the subject at the law school revealed that enforcement of laws regulating access to and prescribing of drugs was inadequate, and revealed the tension in Ecuador related to restricting prescribing of antimicrobials to healthcare providers..as many people don't have prompt access..

Projects continued

- One examined contamination of a “potable” water distribution system in a rural indigenous community (*Guamán C, Guamán N. Sensibilización a la comunidad de La Posta y Correuco y creación de Plan de Acción Comunitario frente a Agua NO Segura).*

Projects continued

Many projects used arts-based methods – e.g. using educational material supplemented by a puppet theatre to illustrate that not all bacteria are harmful

Projects continued

- This one was evaluated in a pre-versus-post intervention controlled trial, in which a questionnaire was administered to two classes of 9-10 year old girls, one of which then received education about bacteria and the other on a completely different topic.

Project cont'd

- Prior to the intervention, the girls did drawings illustrating a concept of bacteria as always harmful to health.
- After the intervention, a more holistic view was embraced
- and a marked statistically significant improvement in questionnaire responses was also found.

Table 2 - Proportion Correct in Pre and Post Intervention Questions about Bacteria in School Classes of Girls age 9-10 Receiving Educational Programs about Bacteria and on Different Topic Respectively

Question	Intervention			Comparison		
	Pre	Post	P value	Pre	Post	P value
1. Where do bacteria live?	78.4	97.3	**.013**	78.4	73.0	.588
2. Do you believe that millions of bacteria exist in your mouth, nose, skin and intestines of people?	81.1	100	**.005**	89.2	83.8	.496
3. How do bacteria help people?	18.9	97.3	**.000**	18.9	18.91	1.00
4. How do bacteria help the ecosystem?	37.8	89.2	**.000**	27.0	18.9	.407
5. People, animals and plants live thanks to bacteria?	16.2	97.3	**.000**	18.9	18.9	1.00

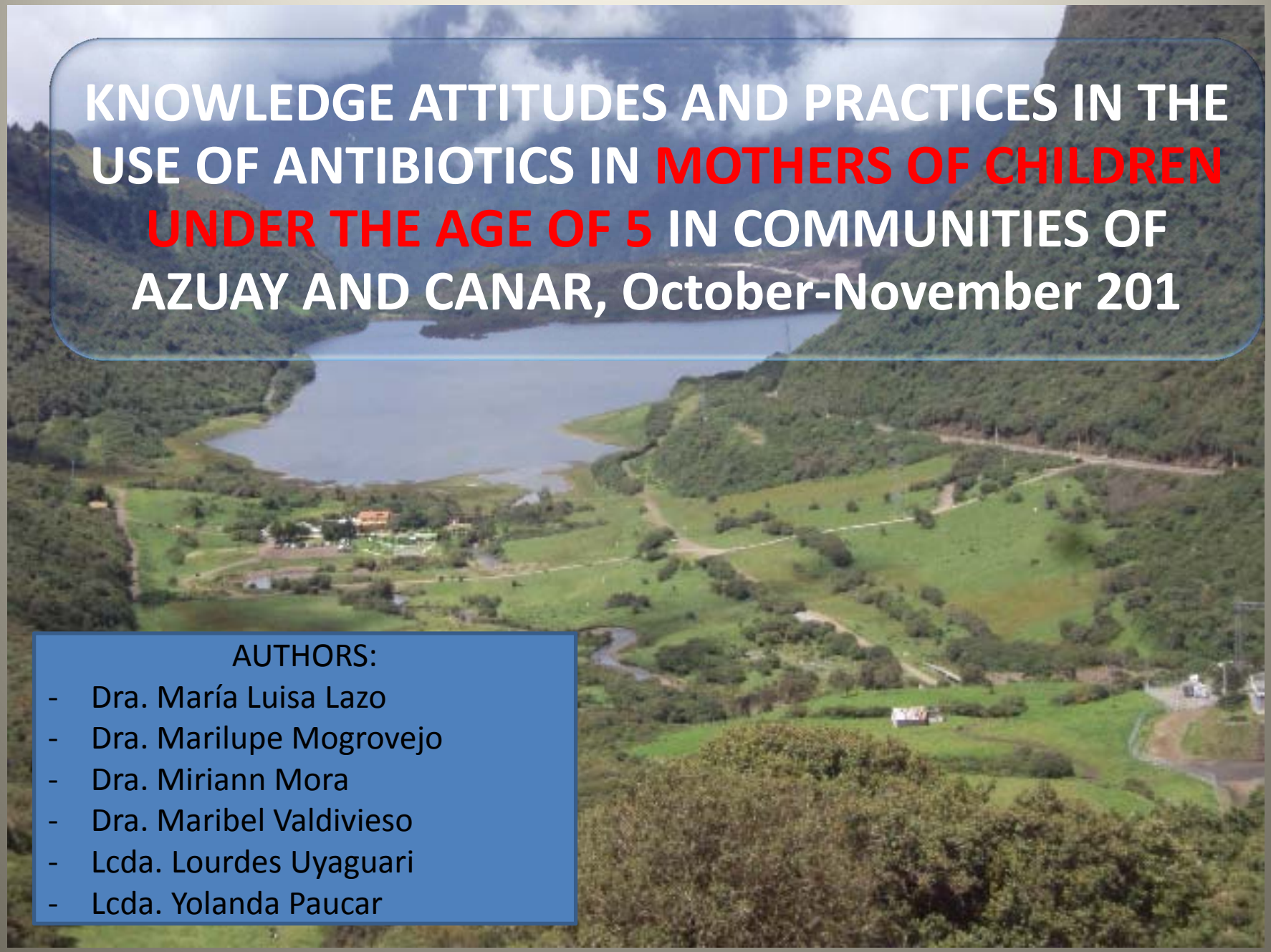
Projects continued

- Many of the projects involved Knowledge, Attitudes and Practices surveys – e.g.

KNOWLEDGE, ATTITUDES AND PRACTICES IN THE USE OF ANTIBIOTICS: Mothers and fathers of newborn children. Escuela Abelardo Tamariz, October-November 2011.

KNOWLEDGE ATTITUDES AND PRACTICES IN USE OF ANTIBIOTICS IN ACUTE RESPIRATORY DISEASES IN MOTHERS OF CHILDREN UNDER THE AGE OF 5 YEARS IN THE COMMUNITY OF CORRALEJA

KNOWLEDGE ATTITUDES AND PRACTICES IN THE USE OF ANTIBIOTICS IN MOTHERS OF CHILDREN UNDER THE AGE OF 5 IN COMMUNITIES OF AZUAY AND CANAR, October-November 201



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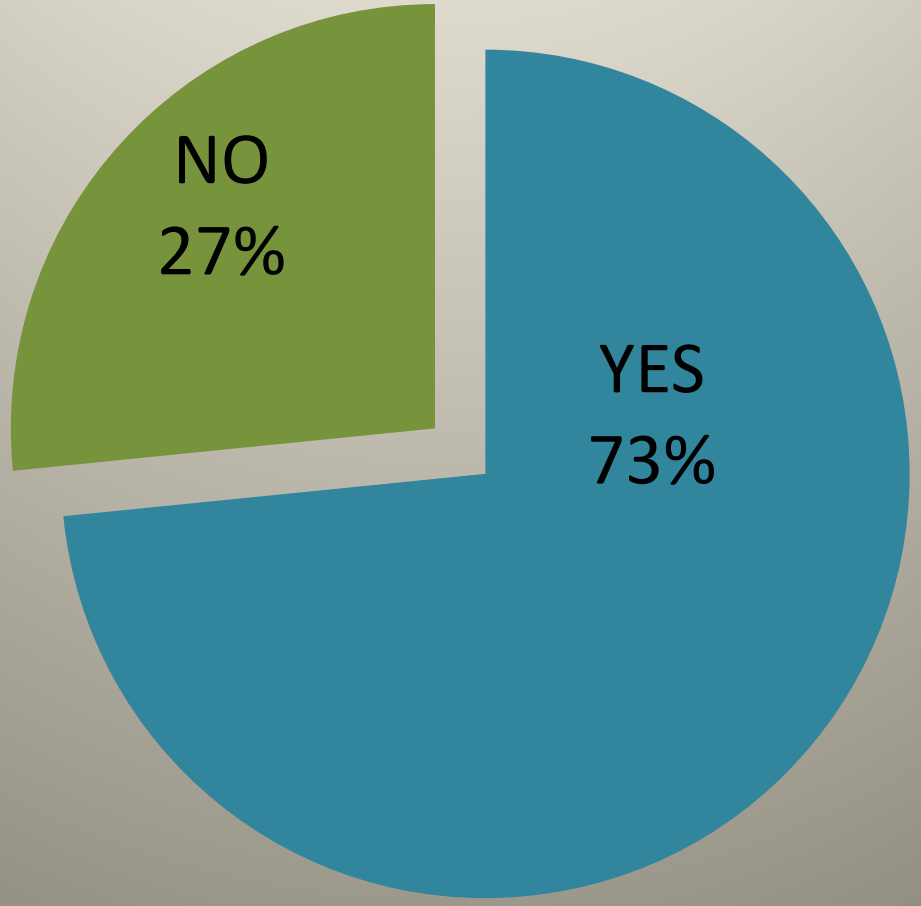
Typically: Convenience sample: (e.g. 94 mothers of children under 5)

Grupo N° 1
Con los medicamentos no se juega

Typical Workplan

Activities	Ist week post Module	2nd	3rd	4th	5th
Developing the research instrument and intervention content					
Validating the tool and organizing the logistic					
Administering the pre-survey					
Conducting the training workshop					
Administering the post-survey					
Analyzing the results and preparing the final report					

Do you complete perscribed courses of antibiotics?



Fuente: Encuestas PRECAP

Community Capacity-Building as part of the projects

- ALL of the projects included capacity-building

4. What we found

- 12 project-teams formed- only one group failed to complete.
- Most KAP projects employed pre-versus-post project surveys, one with a comparison group; (or other acceptable methodology) and showed that participants were able to design, implement and evaluate AMR projects in a very short time.
- In all, more than 570 individuals (in schools, community centers, daycares, a hospital ward and a senior citizen care center), were trained by the program participants, with markedly positive results and/or strong positive reception.

What we found…… (3)

Table 1 - Degree of satisfaction with aspects of the certificate program, by occupational groups

	Program organization		Quality of presentations		Time for discussion		Satisfaction with fieldwork		Satisfaction with Expectations	
	Satisfactory	Highly Satisfactory	Satisfactory	Highly Satisfactory	Satisfactory	Highly Satisfactory	Satisfactory	Highly Satisfactory	Satisfactory	Highly Satisfactory
University professors (medicine and nursing) n=7	42.9	57.1	28.6	57.1	14.3	85.7	28.6	57.1	14.3	85.7
Health practitioners (in practice) n=20	20.0	80.0	55.0	45.0	15.0	70.0	20.0	80.0	30.0	70.0
Lawyers n=3	66.7	33.3	33.3	66.7	0	100.0	33.3	33.3	66.7	33.3
Indigenous Community leaders n=4	25.0	25.0	50.0	25.0	50.0	50.0	50.0	25.0	75.0	25.0
P value *	0.054		0.06		<0.01		0.18		0.08	

*P values comparing rankings by community leaders to rankings by the others (all of whom had university-level education).

5. What we learned

- Key to the success was the adoption of an ecosystem approach, in which **bacteria are not seen as "evil** and must be eliminated" but as playing an important role in the ecosystem.
- Interdisciplinarity and interculturality was challenging but found to be quite welcome.
- Community leaders, municipal and provincial officials, and leaders of the dental, medical and nursing schools, committed to addressing problems identified and continue capacity-building.
- Community-based learning is complicated, requiring navigation of complex political, cultural and environmental factors…. but
- Given the importance of antibiotic stewardship, our experience illustrates that "eco-health" initiatives such as ours are well worth pursing..

6. What are we doing now?

Obtained funds to develop, implement and evaluate a comprehensive ecosystem approach to AMR…..and now in the process of figuring out how to do that

Meanwhile developed an intercultural brochure to convey key messages – should be going to print November 2012.

¡No todos los gérmenes son iguales!

UN ENFOQUE SUSTENTABLE PARA PREVENIR Y TRATAR ENFERMEDADES INFECCIOSAS:

Cuando y como usar antibióticos y plantas medicinales de la Región Andina

l. ¿Cómo podemos organizar a la comunidad para prevenir enfermedades?

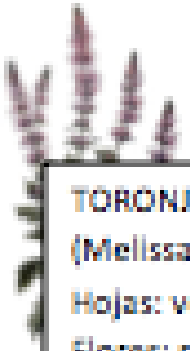
abemos que una alimentación nutritiva es muy importante para preveni
nfermedades. Para lograr esto es importante que la comunidad se organice par
segurar el acceso de todos a alimentos nutritivos, y, si es posible, producirlo
ocalmente.

Las promotoras de salud y las promotoras de seguridad del agua y de los alimentos pueden ayudar a la comunidad a mejorar la protección del agua.

¡YO TOMO TANTAS MEDICINAS PORQUE MI DOCTOR ME LAS RECETA!
¡YO RECETO TANTAS MEDICINAS PORQUE MIS PACIENTES CUENTAN CON ELLAS!

El te frío de cedrón (*Aloysia citrodora*), menta (*Mentha viridi*) y toronjil (*Melissa officinalis*) ayuda a bajar la fiebre como también a la digestión. Hierva una taza de agua con dos hojas de cedrón, menta y toronjil y endulce con miel o panela.

CEDRÓN
(*Aloysia citrodora*)
Hojas: verde pálido
Flores: blancas con tintes liláceos



TORONJIL
(Melissa *officinalis*)
Hojas: verdes
Flores: rosadas

MENTHA
(*Mentha viridi*)
Hojas: verdes

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