


Screening for GBS colonization OLD & NEW TOOLS

Pierrette Melin
Belgian National Reference Centre for Group B Streptococci
Clinical Microbiology, University Hospital of Liege, University of Liege

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OBJECTIVES

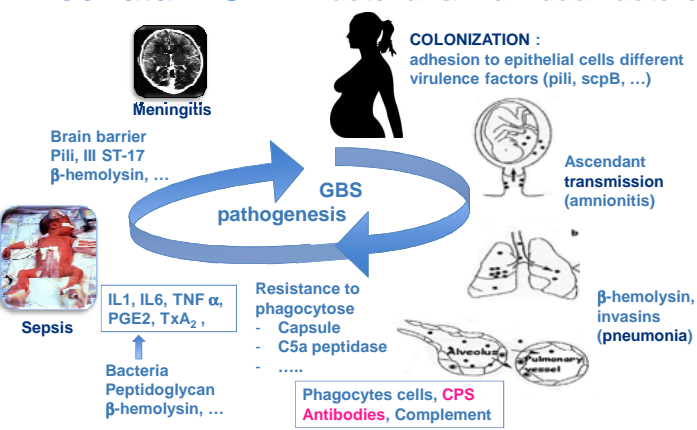
To provide a comprehensive picture of current and coming practices for GBS screening

Culture methods *versus* NAAT
Antenatal *versus* intrapartum

- ⊙ To emphasize critical criteria for success
- ⊙ To identify some possibilities for improvement
- ⊙ To point out advantages and drawbacks

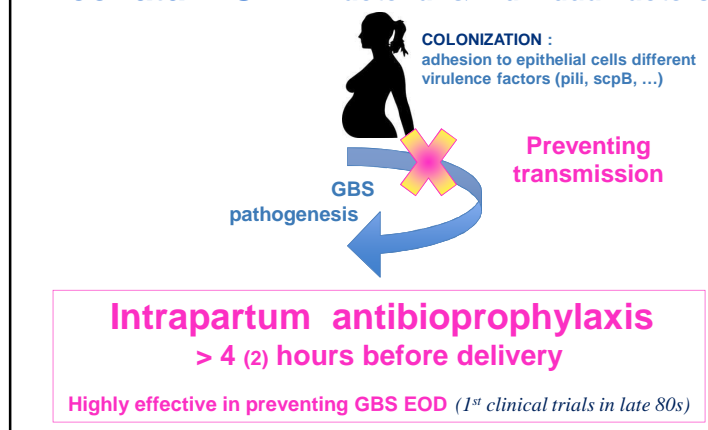
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Stages in the pathogenesis of GBS neonatal EOD : *Bacterial & individual factors*



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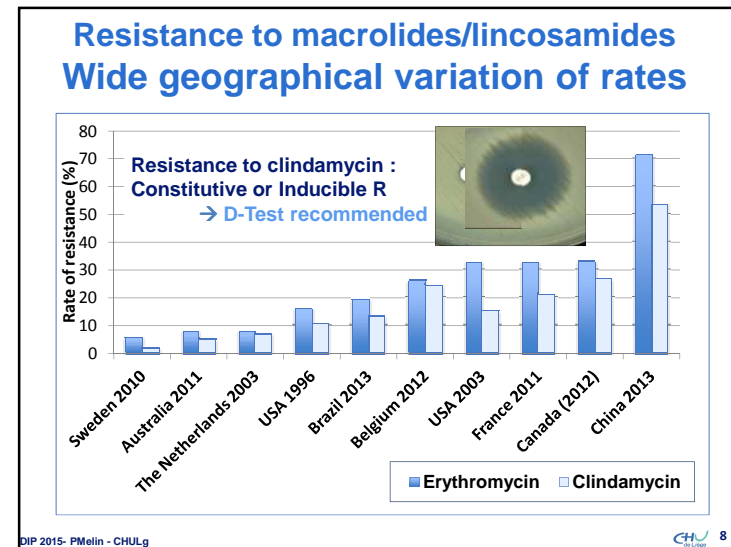
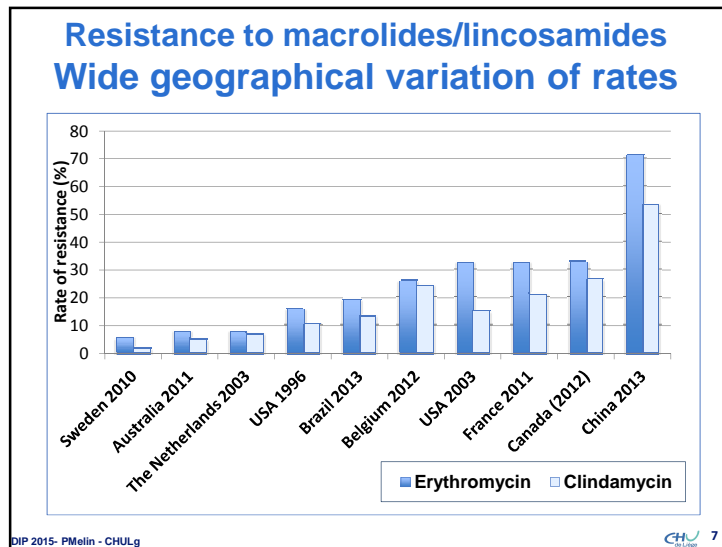
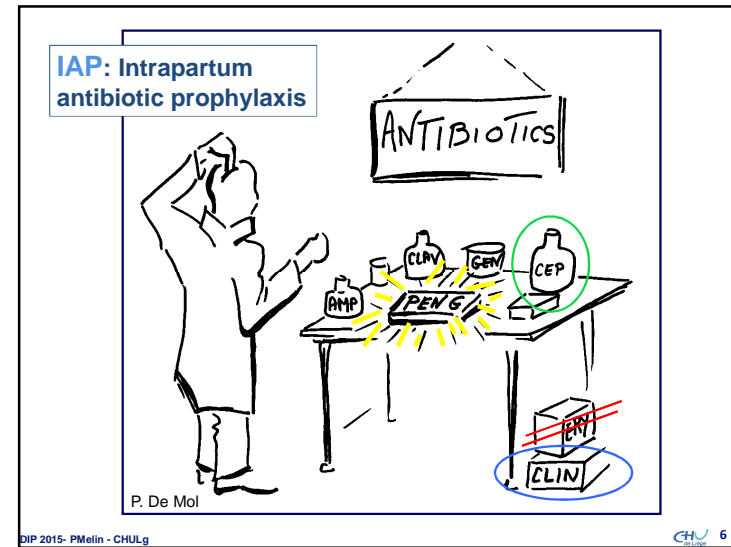
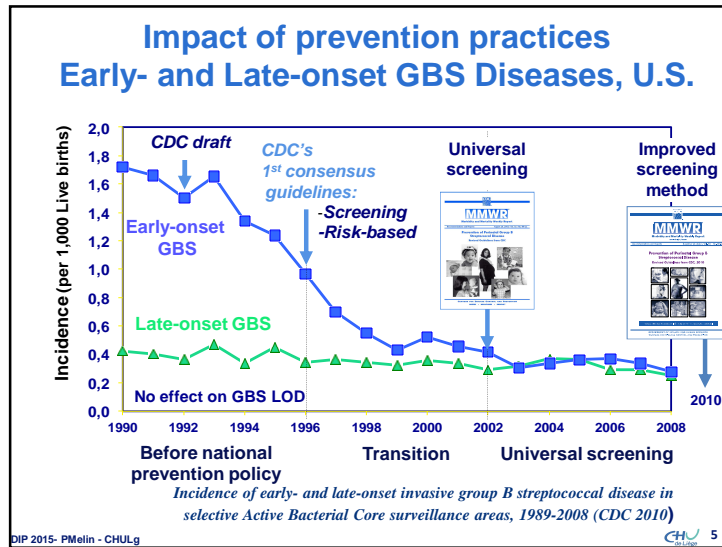
Stages in the pathogenesis of GBS neonatal EOD : *Bacterial & individual factors*

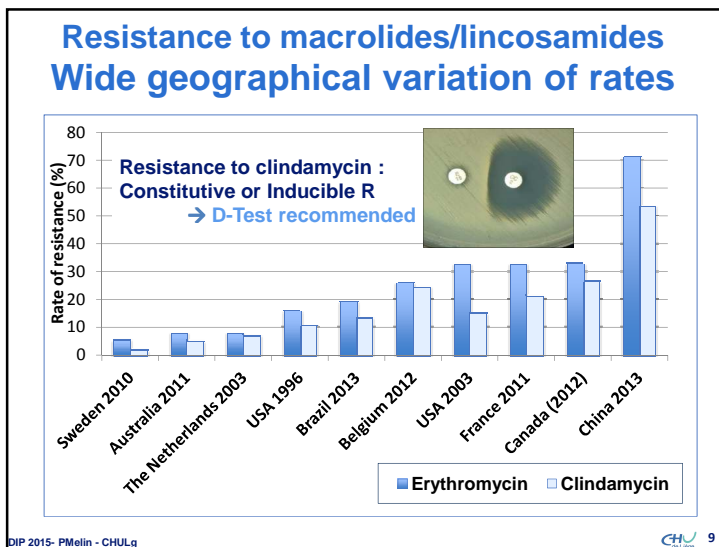


Intrapartum antibioprophyllaxis
> 4 (2) hours before delivery

Highly effective in preventing GBS EOD (*1st clinical trials in late 80s*)

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Screening for GBS colonization

Goal of GBS screening
To predict GBS vaginal (rectal) colonization at the time of delivery

Expected high predictive values

- **False negative**
→ Missed IAP
- **“False” positive**
→ Unnecessary IAP

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Screening for GBS colonization

Goal of GBS screening
To predict GBS vaginal (rectal) colonization at the time of delivery

▪ Critical factors influencing accuracy

- **Swabbed anatomic sites** (*distal vagina ± rectum*)
- **Timing of sampling**
- **Screening methods**
 - **Culture**
 - *Procedure*
 - *Media*
 - **Nucleic Acid Amplification Test (NAAT)**

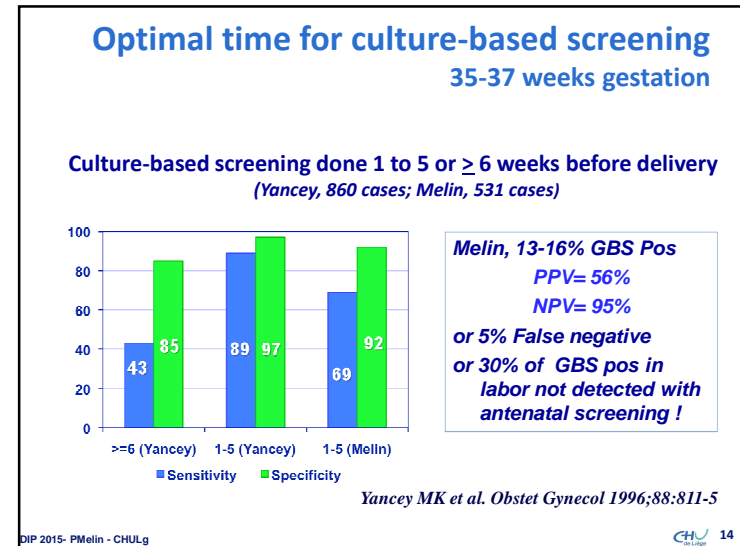
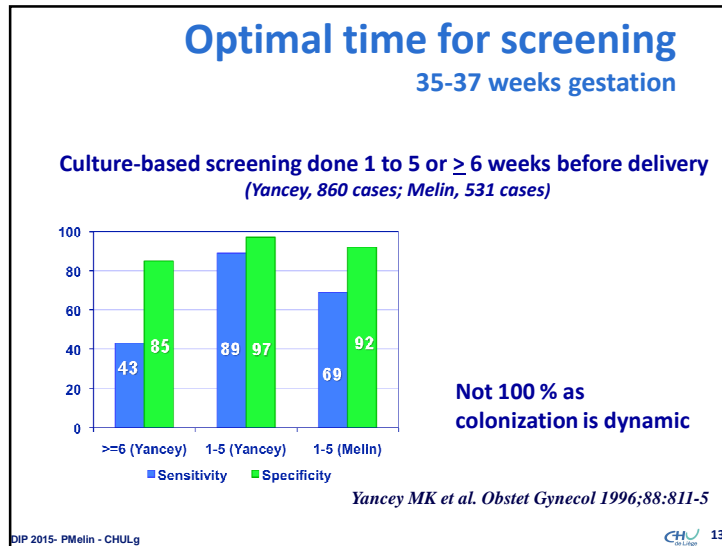
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Crucial conditions to optimize universal antenatal SCREENING

▪ WHEN	35-37 weeks
▪ WHO	ALL the pregnant women
▪ Specimen	Vaginal + rectal swab(s)
▪ Collection	WITHOUT speculum
▪ Transport	Transport/collection device/condition (non nutritive medium: Amies/Stuart or Granada like tube) (type of swab)(Length and T°)
▪ Request form	To specify prenatal « GBS » screening
▪ Laboratory procedure	

(CDC 2010 - Belgian SCH 2003)

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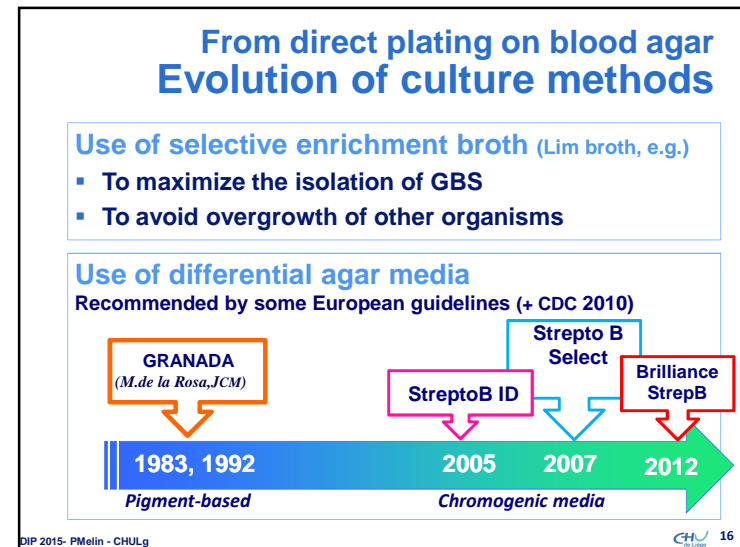
Remaining burden of GBS EOD Missed opportunities

In spite of universal screening prevention strategy
In spite the great progress
Cases still occur

- Among remaining cases of EOD
 - Some may be preventable cases
 - Missed opportunities for (appropriate) IAP
 - False negative screening


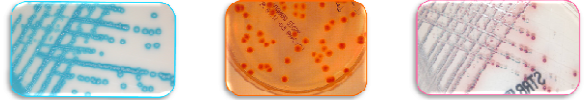
Van Dyke MK, Phares CR, Lynfield R et al. *N Engl J Med* 2009
CDC revised guidelines 2010
Poyart C, Reglier-Poupet H, Tazi et al. *Emerg Infect Dis* 2008
DEVANI project, unpublished data 2011

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Which agar or which combination?

+/- Blood agar

Workload - costs - extra-testing - non β-hemolytic GBS detection to be considered

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Crucial conditions to optimize SCREENING

- WHEN 35-37 weeks
- WHO ALL the pregnant women
- Specimen Vaginal + rectal swab(s)
- Collection WITHOUT speculum
- Transport **Transport/collection device/condition**
(non nutritive medium: Amies/Stuart or Granada like tube) (type of swab)(Length and T°)
- Request form To specify prenatal « GBS » screening
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(CDC 2010 - Belgian SCH 2003)

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Crucial conditions to optimize SCREENING

Transport-collection system & transport-storage condition


- Type of swab: Nylon flocked >> regular fiber swab

Nylon Flocked Swab

Superior sample collection and release

Collected sample

> 80% of the sample analyte released*



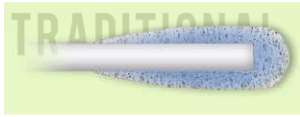
eSwab®

Regular Fiber Swab

Sample stays trapped in fiber matrix


Trapped sample

Sample dispersion, dilution and entrapment in the fiber matrix.



TRADITIONAL

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From direct plating on blood agar

Evolution of culture methods#


Use of selective enrichment broth (Lim broth, e.g.)

To maximize the isolation of GBS

To avoid overgrowth of other organisms

Use of differential agar media

Recommended by some European guidelines (e.g. CDC 2010)



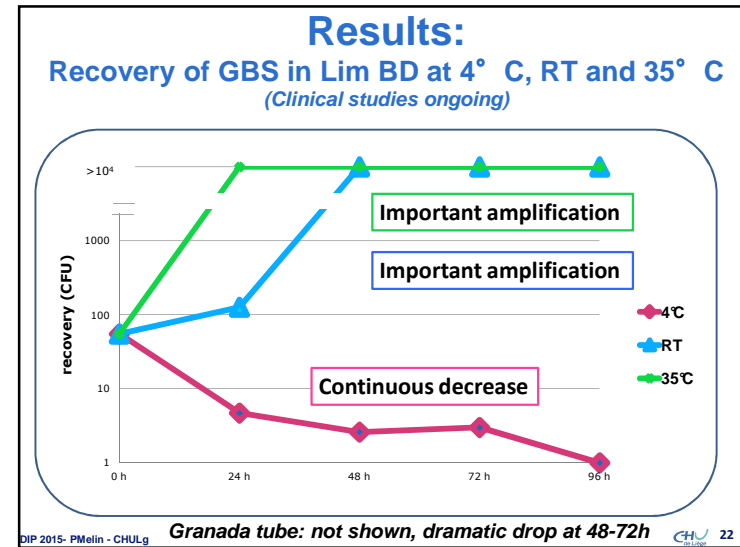
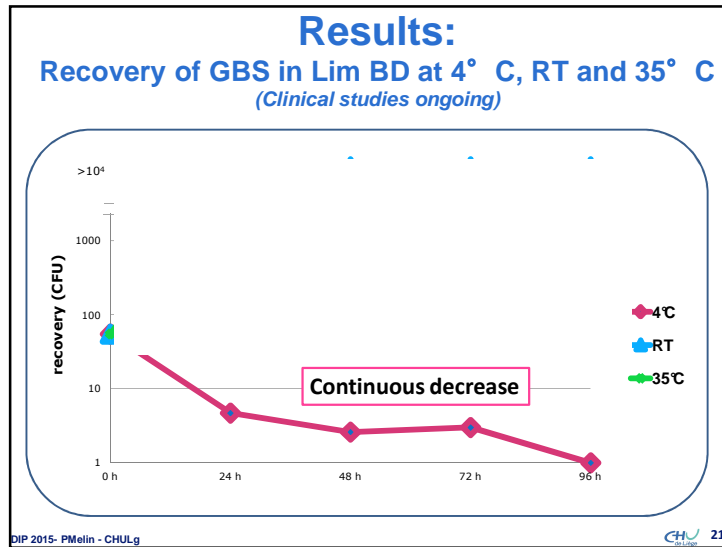
IMPROVEMENT OF TRANSPORT CONDITION OF SWABS FOR GROUP B STREPTOCOCCAL (GBS) SCREENING

P. Melin, M. Dodémont, G. Sarlet, R. Sacheli, et al.
National Reference Centre for GBS, University Hospital of Liège, Liège, Belgium

To sustain viability
Whatever is storage T° for a few days

Use of a selective enrichment Lim broth as transport media

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Antenatal culture-based screening combined with amplification molecular test

NAAT performed from Lim enrichment broth

- The Xpert GBS LB assay
- The LAMP Illumigene GBS Assay

Clinical evaluations

- Speed: time to result minus one day
- Accuracy: good comparison to reference culture
- Cost, logistic, training: very important to consider

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Antenatal culture-based screening: Limiting factors

- Positive and negative predictive values
 - False-negative results
 - Failure of GBS culture (*reduced viability during transport, oral ATB, feminine hygiene*) or new acquisition
 - Up to 1/3 of GBS positive women at time of delivery

Eagerly expected, a more accurate predictor
For intrapartum GBS vaginal colonization

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Alternative to GBS antenatal screening: intrapartum screening Theranostic approach

€€€ Cost-effective

Optimal management of patient

Turnaround time
collect specimen at admission

Results
30-45 minutes, 24 hrs/7 d, robust

Benütz et al. 1999, Pediatrics, Vol 183 (6)

- Full automation
- With internal QC
- Easy to perform, to interpret

TRAINING!

- Sensitivity > 90%
- Specificity > 95%

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Intrapartum screening theranostic approach Expected advantages: pro & con

- Inclusion of women without prenatal screening/care
- Identification of women with change of GBS status after 35-37 wks gestation (*new acquisition, false negative*)
- Increased accuracy of vaginal GBS colonization status at time of labor & delivery
- Drawback: no antimicrobial susceptibility result

IAP addressed to right target

- Reduction of inappropriate/unnecessary IAP
- Broader coverage of « at GBS risk women »

Improvement of prevention

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Real Time PCR for intrapartum screening

- Advance in PCR techniques & development of platforms & to be used as a POCT
 - Xpert® GBS, Cepheid (35-45 min)

Already recommended by CDC for women with no prenatal care, ...

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Xpert® GBS for intrapartum screening (selected paper amongst many others)

Diagnostic Accuracy of a Rapid Real-Time Polymerase Chain Reaction Assay for Universal Intrapartum Group B Streptococcus Screening

Najoua El Helali, Jean-Claude Nguyen, Aicha Ly, Yves Giovgrandi and Ludovic Trinquart

Clinical Infectious Diseases 2009;49:417-23

- 968 Pregnant women
- Intrapartum Xpert GBS, Cepheid (performed in lab)
 - vs intrapartum culture
 - antenatal culture (French recom.) (vaginal swab/CNA-BA)

▪ Sensitivity	98.5%	PPV	58.3%
▪ Specificity	99.6%	NPV	92.1%
▪ PPV	97.8%		
▪ NPV	99.7%		

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Xpert® GBS for intrapartum screening

(selected paper amongst many others)

Cost and effectiveness of intrapartum group B streptococcus polymerase chain reaction screening for term deliveries.
 El Helali N, Giovangrandi Y, Guyot K, Chevet K, Gutmann L, Durand-Zaleski I
Obstet Gynecol 2012 Apr;119 (4):822-9

2009	2010
Antenatal screening	Xpert GBS intrapartum screening
11.7% GBS POS	Performed by midwives as a POCT !!
	16.7% GBS POS
	Less GBS EOD & less severe
Cost neutral per delivery	

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Xpert® GBS for intrapartum screening

(main papers)


Authors	Year Journal	Nb patients	Site	S %	Sp %	PPV %	NPV %
Mueller et al	2014, Eur J Obstet Gynecol Reprod Biol	150 & 150	Lab Obst	85.7 85.7	96 95.6	82.7 85.7	96.7 95.6
Poncelet et al	2013, BJOG	225	Lab	66.7	94.9	64.3	95.4
Abdelazim	2013, Aust NZ Obstet Gynaecol	445	Lab	98.3	99	97.4	99.4
Park et al	2013 Ann Lab Med	175	Lab	86.6	95.6	65	98.7
Church et al	2011 Diag Microbiol Infect Dis	231	Lab	100	100	100	100
De Tejada et al	2011 Clin Microbiol Infect	695	Obst	85	96.6	85.7	96.3
Young et al	2011, Am J Obstet Gynecol	559	Lab	90.8	97.6	92.2	97.1
El Helali et al	2009, Clin Inf Dis	968	Lab	98.6	99.6	97.8	99.7

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Real Time PCR for intrapartum screening

- Advance in PCR techniques & development of platforms & to be used as a POCT
 - Xpert® GBS, Cepheid (35-45 min)

Already recommended by CDC for women with no prenatal care, ...
- Easy BUT ...
- Midwives teams: numbers, turn-over
- TRAINING is essential
 - Sample preparation
 - Proper breaking the swab into the cartridge
 - Loading the instrument
- To be used under lab control



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TAKE-HOME MESSAGES

GBS screening

Acknowledged need for improvement of predictive values & logistics

Antenatal screening

- ⊙ Identified possibilities for improvement of culture method
- ⊙ NAAT on enrichment broth as an alternative approach

Intrapartum screening or « the desirable approach »

- ⊙ NAAT available (but no clindamycin susceptibility result)
- ⊙ Some evidence of cost-effectiveness
- ⊙ Additional studies needed for validation as a POCT

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