Improving the Diagnosis of Diarrhea

Introduction of a new testing algorithm combining a molecular multiplex panel (GPMP) with selective culture (SC)

Laina VandenBoomen BSc. RT(CG)

island health

BACKGROUND

- Infectious diarrhea affects millions of people each year and causes significant morbidity and mortality
- Rapid and accurate detection of gastrointestinal (GI) pathogens is vital so that appropriate therapy can be started and infection control measures taken to prevent spread of the disease

PROBLEMS

Method	Tests for	Turn-around time
Stool culture	Single bacterial pathogen per testing	2–3 days
Ova and parasite (O&P) exam	Parasitic pathogens	Several days–sample must be collected over multiple days
Rapid Tests (Rapid Immu-noassays -lateral-flow, immunochromatography, dot blot)	Single pathogen per test	20–30 minutes
Real-time PCR	1–3 pathogens per test	Under 5 hours
ELISA	Single antigen/antibody per test	6–24 hours

"Can a multiplex molecular test solve these problems?"

- Improve the diagnosis of diarrhea by having more accurate and timely results (and do it at a reduced cost)

xTAG® GPP	14 bacterial, viral, and parasitic pathogens in a single test

METHODOLOGY

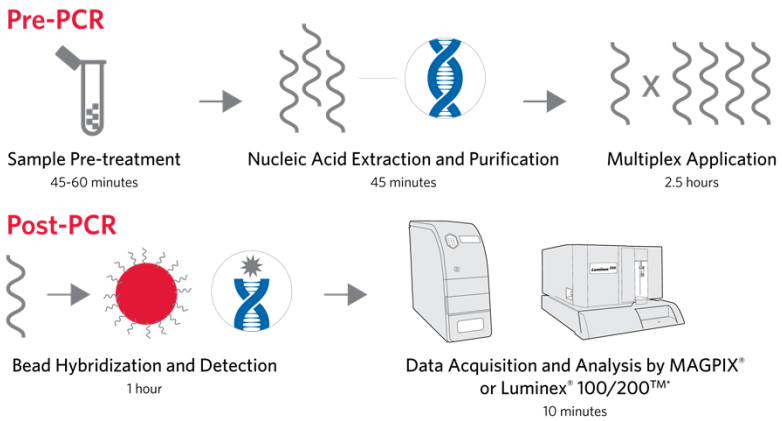
1.Validation of multiplex RT-PCR test panel (using **Luminex xTAG GPP**)

2.Application to BC's new Agency for Pathology and Laboratory Medicine **Test Review Committee (TRC)** and subsequent approval by the **Ministry of Health (MOH)** to perform GPMP and SC for a period of 24 months

3.Implementation of new testing algorithm in Island Health with education of laboratory staff and care providers.

4.Measurement of system performance

Gastrointestinal Pathogen Multiplex Panel (GPMP)



GPMP Targets:

Viruses	Parasites	Bacteria & Bacterial Toxins
• Adenovirus • Rotavirus A • Norovirus	• Giardia lamblia • Cryptosporidium • Entamoeba histolytica	• Clostridium difficile toxin A/B • Salmonella • Shigella • Campylobacter • E coli O157 • STEC • ETEC • Yersinia enterocolitica • Vibrio cholerae

Selective culture

Negative

- *Aeromonas*
- *Plesiomonas*
- *Yersina*
- *Vibrio*
- *Edwardsiella*

Positive

- *Campylobacter*
- *Yersinia enterocolitica*
- *Salmonella*
- *Shigella*
- *Vibrio cholerae*
- *E. coli 0157*
- *STEC stx1/stx2*

- Susceptibility testing
- Strain typing

Testing restrictions

- **GPMP testing limited to once every 7 days**
- **If inpatient >72 Hr C. diff only**
- **Restriction of microscopic O&P to high risk patients**
  - Children < 13 years old
  - Travelers
  - New Immigrants to Canada
  - Immunocompromised

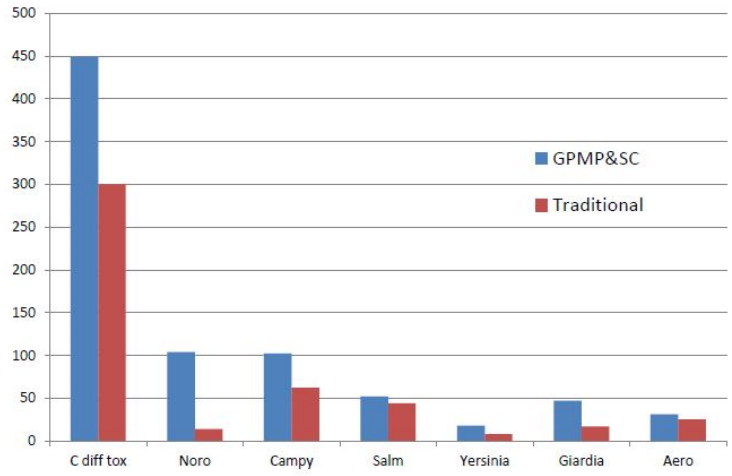
DATA ANALYSIS

- **After testing 3776 specimens in 6 months:**

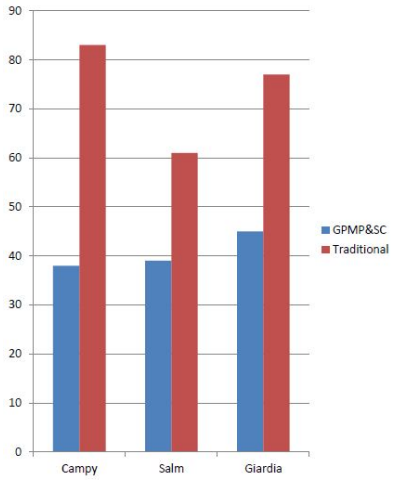
At least one pathogen detected by GPMP in 22.2%

- **Most common pathogens:**
  - C diff toxin 11.9% Noro 2.75%
  - Campy 2.7% Salm 1.37% Giardia 1.25%
  - Microscopic O&P testing reduced > 70%

Comparison of number of identifications with new testing algorithm Vs traditional methods



Comparison of test turn around times



SUMMARY

- **Easier for patients**
- **Easier for lab staff**
- **Better for care givers**

Syndromic testing using a panel of targets significantly improved the turn around time and sensitivity for the specific etiologic agents of infectious diarrhea.

FUTURE CONSIDERATIONS

- Report to TRC & MOH
- Applicability to other BC Laboratories
- Investigation of associated clinical outcomes
- Further research into “mixed” infections

island health

PROJECT TEAM

- Dr John Galbraith - Lead

- **Project Participants:**
- Dr Pamela Kibsey, Pan Sivananthan
- Lorraine Holfeld, Brian Isberg
- Molecular Diagnostics Laboratories Staff
- Luminex

island health

Questions ?

island health