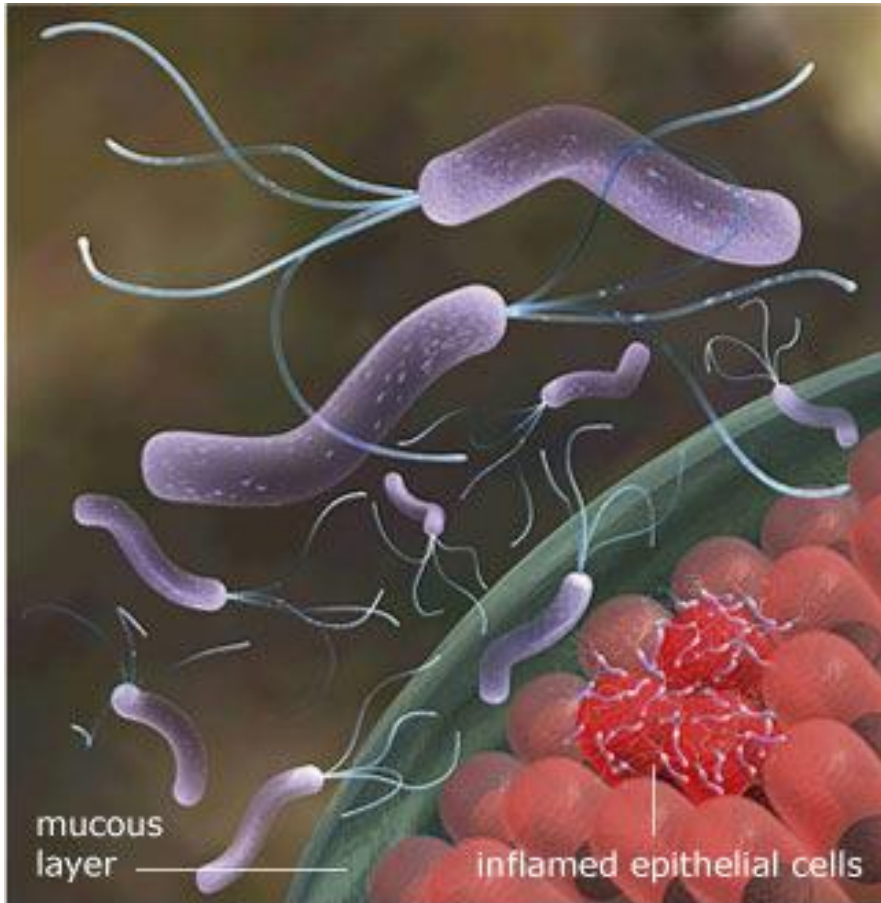




NanoBreath:

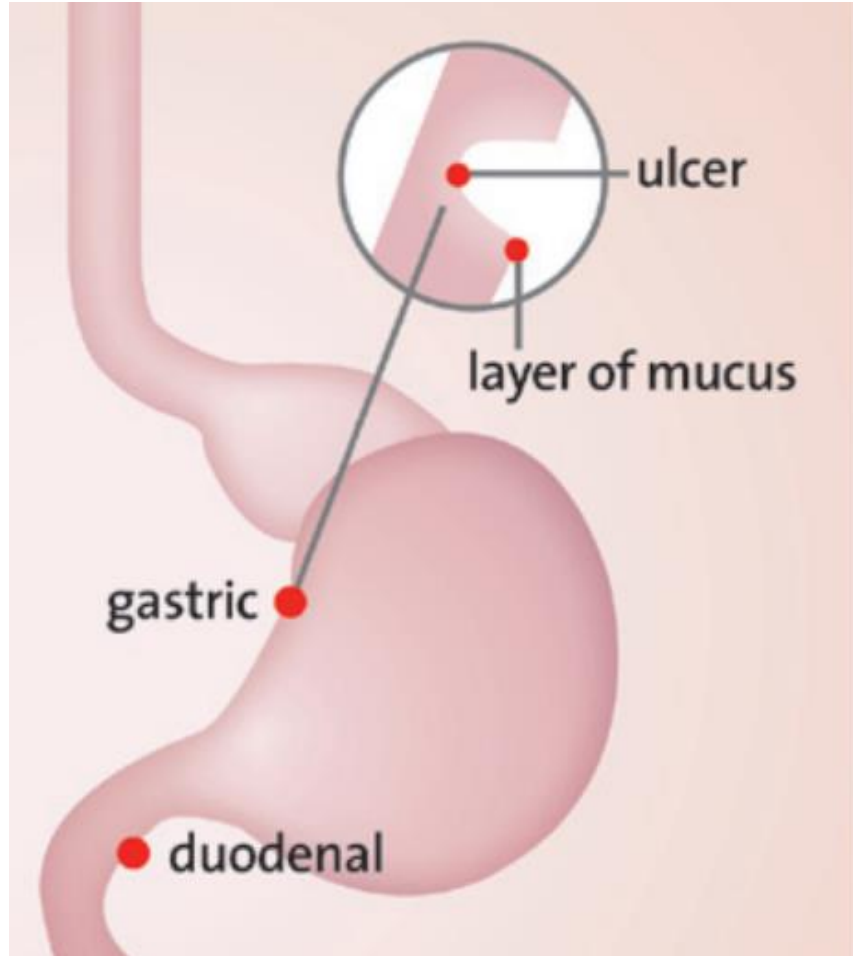
Affordable detection of *Helicobacter pylori* in the developing world

What?



- *Helicobacter pylori* is one of the most common bacterial infections
- Spiral-shaped bacterium that infects well over 30% of world's population
- About 40% of people in the UK have the bacteria in their stomach
- Higher infection rates correlate with: crowded living conditions, poor sanitation/personal hygiene/water supply (~ 80% in developing world).
- Most infections occur in childhood.

Why?



<http://www.nhs.uk/ipgmedia/national/core%20charity/assets/helicobacterpylori.pdf>

- It invades the mucosal lining of the stomach and is the cause of up to 95% of duodenal and up to 75% gastric ulcers and has also been associated with gastric cancer and lymphoma
- About 15% of people with *H. pylori* infection get ulcers either in the stomach or in the duodenum
- Ulcers tend to cause indigestion, they can bleed or even burst (perforate) which happens if the ulcer burrows deep enough to make a hole
- World Health Organisation has declared the bacteria to be a Class 1 carcinogen (1 to 3% of those infected will develop distal gastric adenocarcinoma)

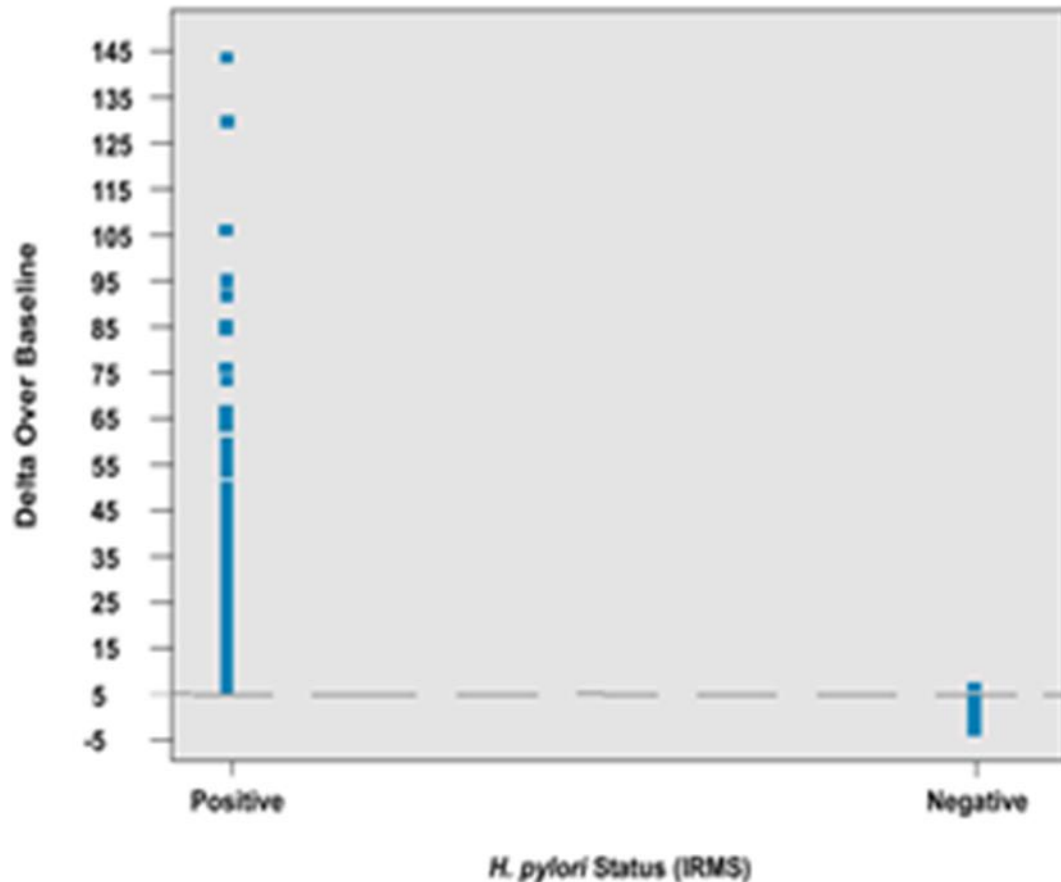
How big an issue?



Estimated size of the patient populations presenting in our principal territories

Country/ Region	Population	<i>H. pylori</i> Prevalence	Infected population	Number of patients (1% annual presentation with symptoms)
India	1,211 million	80%	967 million	9.7 million
China	1,344 million	80%	1,075 million	10.8 million
Brazil	201 million	80% estimate	161 million	1.6 million
<i>Total</i>				<i>22.1 million</i>

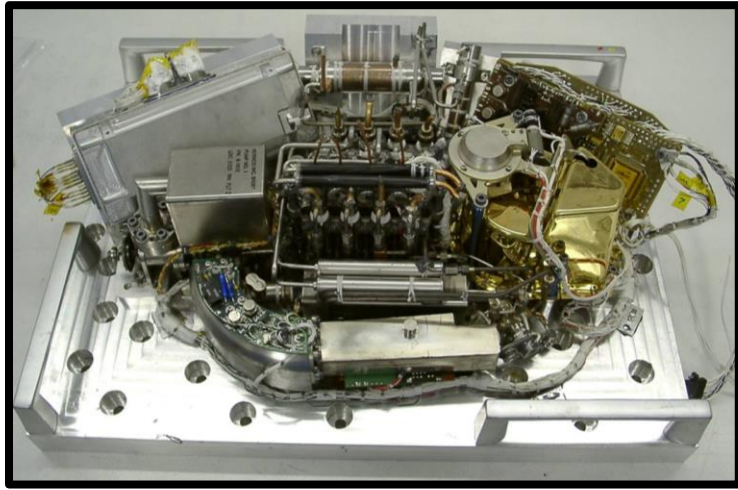
Solution: An affordable Urea Breath Test (UBT)



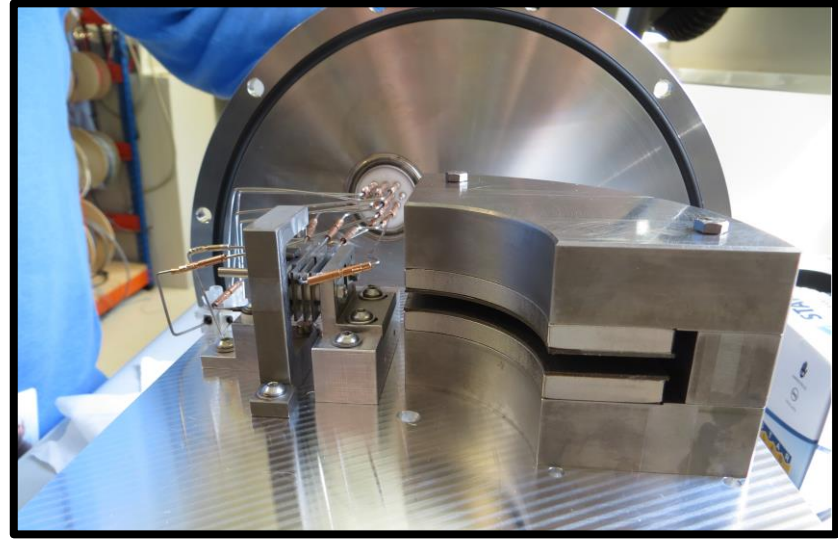
Source: Oridion Medical 1987 Ltd Clinical Study(NDA 21-314)

1. A baseline patient breath sample is collected and the $\delta^{13}\text{C}$ (‰) of their CO_2 determined
2. The patient then swallows a $\delta^{13}\text{C}$ labelled urea pill
3. If present then *H. pylori* will metabolise the urea resulting in a positive shift in $\delta^{13}\text{C}$ (‰) of the CO_2
4. Patient's breath is re-collected ~ 20 minutes after the labelled urea pill is taken
5. A delta-over-baseline (DOB) shift in the $\delta^{13}\text{C}$ of > 10 ‰, between the two patient samples, is considered a positive sample

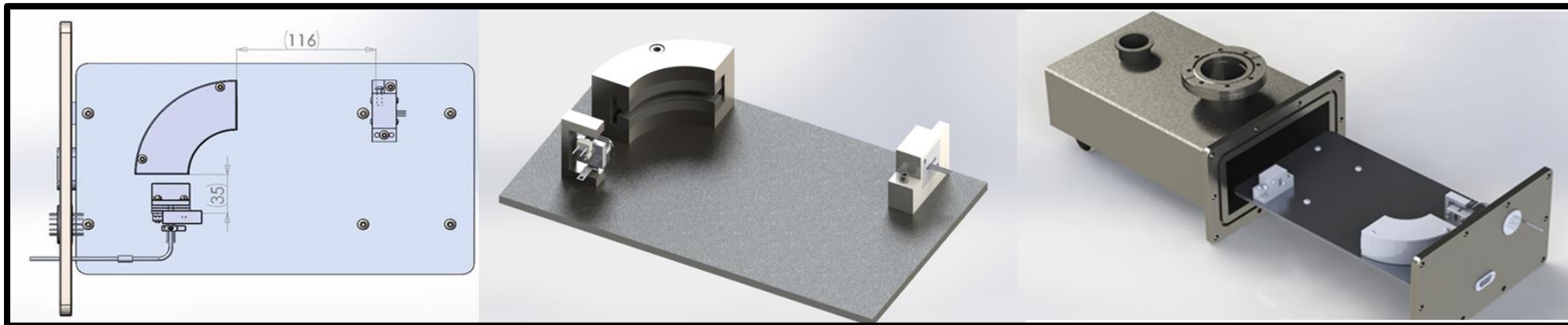
Link to Space?



Gas Analysis Package on Beagle2

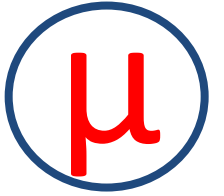


NanoBreath Prototype



NanoBreath Final Product Philosophy

The Road to Market



1. Regulatory Compliance Support

- Access to Regulatory Body appropriate for the target region
- Medical Classification
- CE Marking
- Technical File Support

2. Design for Manufacture

- Electronic PCBs and harnessing
- Enclosure and internal architecture
- Packaging

3. Manufacture, Assembly and Integration of Production Product

4. Design for Test

- Test solution for production product - minimising time, cost and skill set yet accurate and reproducible acceptance testing

5. Accessory Management

6. Warehousing / Logistics / Shipping & Distribution

7. Post Product Support

- Servicing
- Warranties
- Repair/maintenance
- Rental Support

