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FebriDx – A Rapid Point-of-Care Test to optimise patient flow for respiratory infections

May 19th 2022

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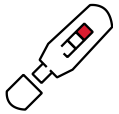
The Problem:

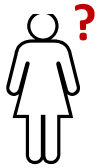
High volume of respiratory patients presenting to Primary Care, Urgent Care, ED

Difficulty differentiating **viral** from **bacterial** infection due to overlapping clinical symptoms

Time to assess each patient/make isolation decisions is short



Limitations in **rapid tests** to diagnose acute respiratory infections



Decisions to isolate, admit or discharge patients and patient **expectations** to receive an antibiotic

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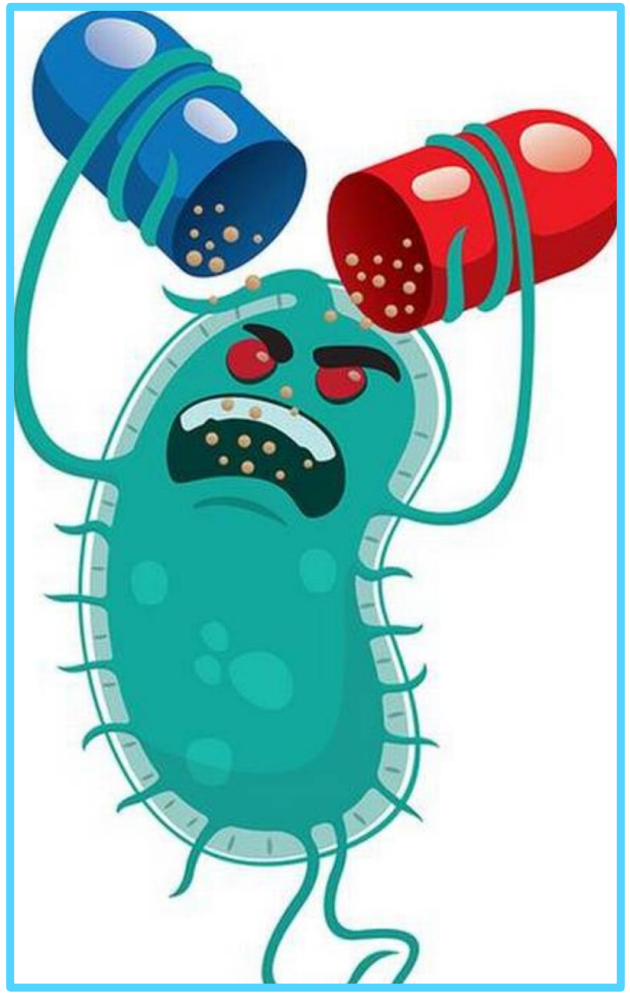
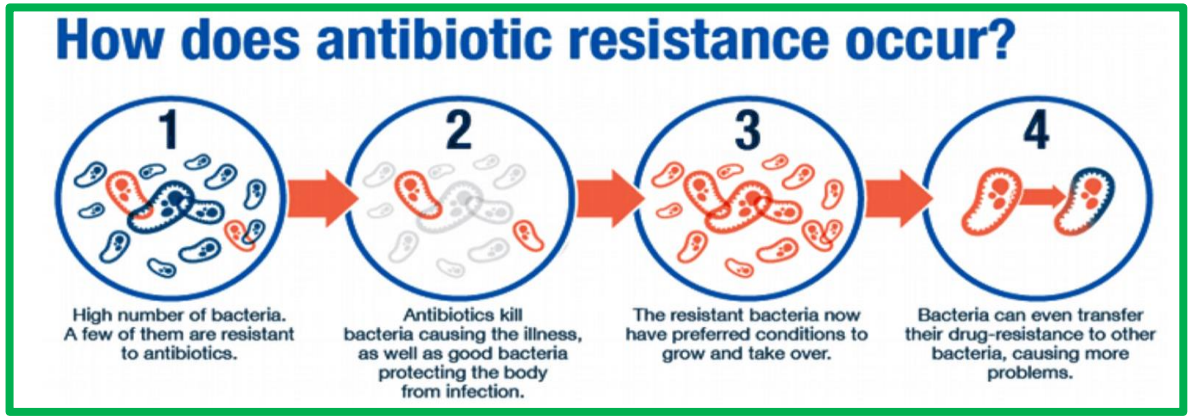
AMR: A threat to the human race





"Antimicrobial resistance poses a catastrophic threat."

Professor Dame Sally Davies, Chief Medical Officer

Introducing FebriDx as a solution

- 10-minute POCT for acute respiratory infections (ARI)
- For use in children and adults
- Simple test for doctors, nurses, pharmacists
- Highly accurate viral v bacterial test from fingerstick blood
- High Negative Predictive value
- Highly sensitive to enable triaging and cohorting in urgent care
- Cost effective, lab accurate and instrument free

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MxA in combination with CRP

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A single biomarker cannot differentiate viral from bacterial infections

CRP [1-3]

- General Marker for acute inflammation and infection
- At 20mg/L, CRP does not miss a bacterial infection
- Approx. 40% of viral infections will elevate CRP > 20mg/L
- At a 100mg/l cut off, 2/3 of bacterial pneumonias can be missed

+

MxA [4-6]

- Sensitive and specific biomarker for acute viral infection
- MxA levels remain low with bacterial infection
- Intracellular protein derivative of interferon-α and -β
- Cell defense mechanism to inhibit replication of viral nucleid acids

Dual biomarker technology allows accurate differentiation of viral from bacterial

Studies have shown FebriDx can accurately differentiate bacterial infection from COVID-19

1. Simon L, Gauvin F, Amre DK, Saint-Louis P, Lacroix J. Serum procalcitonin and C-reactive protein levels as markers of bacterial infection: a systematic review and meta-analysis. Clinical infectious diseases: an official publication of IDSA 2004;39:206-17.2. Chew, Keng Sheng. "What's new in Emergencies Trauma and Shock? C-reactive protein as a potential clinical biomarker for influenza infection: More questions than answers." Journal of emergencies, trauma, and shock 5.2 (2012):115.3. Lagerström F, Engfeldt P, Holmberg H. C-reactive protein in diagnosis of community-acquired pneumonia in adult patients in primary care. Scand J Infect Dis. 2006;38(11-12):964-9.4. Nakabayashi M, Adachi Y, Itazawa T, et al. MxA-based recognition of viral illness in febrile children by a whole blood assay. Pediatric research 2006;60:770-4.
5. Engelmann I, Dubos F, Lobert P-E, et al. Diagnosis of viral infections using myxovirus resistance protein A (MxA). Pediatrics 2015;135:e985-e93.6. Halminen M, Ilonen J, Julkunen I, Ruuskanen O, Simell O, Makela MJ. Expression of MxA protein in blood lymphocytes discriminates between viral and bacterial infections in febrile children. Pediatric research 1997;41:647-50.

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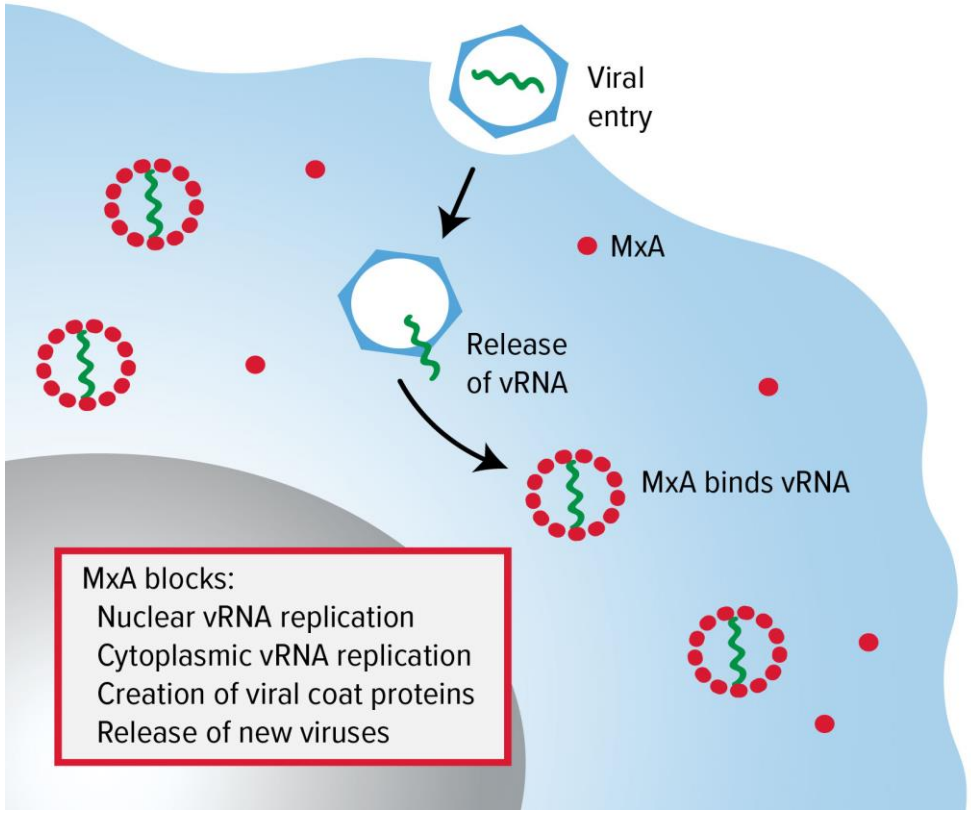
MxA: An Anti-Viral Protein to inhibit viral replication

- MxA is part of the innate Immune response against a viral infection
- MxA is stimulated by Interferon α & β and produced in large quantities in response to a viral infection
- MxA binds viral RNA or DNA forming an immune complex and blocking viral replication
- MxA has fast onset (1-2 hrs after infection) and long half life making it an ideal marker for a viral infection
- Area Under the ROC curve (AUC) is 0.98, for differentiating uninfected from virus-infected patients

MxA Defense Mechanism in Viral Infections



[1] 964-9.4. Nakabayashi M, Adachi Y, Itazawa T, et al. MxA-based recognition of viral illness in febrile children by a whole blood assay. Pediatric research 2006;60:770-4. 5. Engelmann I, Dubos F, Lobert P-E, et al. Diagnosis of viral infections using myxovirus resistance protein A (MxA). Pediatrics 2015;135:e985-e93.6. Halminen M, Ilonen J, Julkunen I, Ruuskanen O, Simell O, Makela MJ. Expression of MxA protein in blood lymphocytes discriminates between viral and bacterial infections in febrile children. Pediatric research 1997;41:647-50

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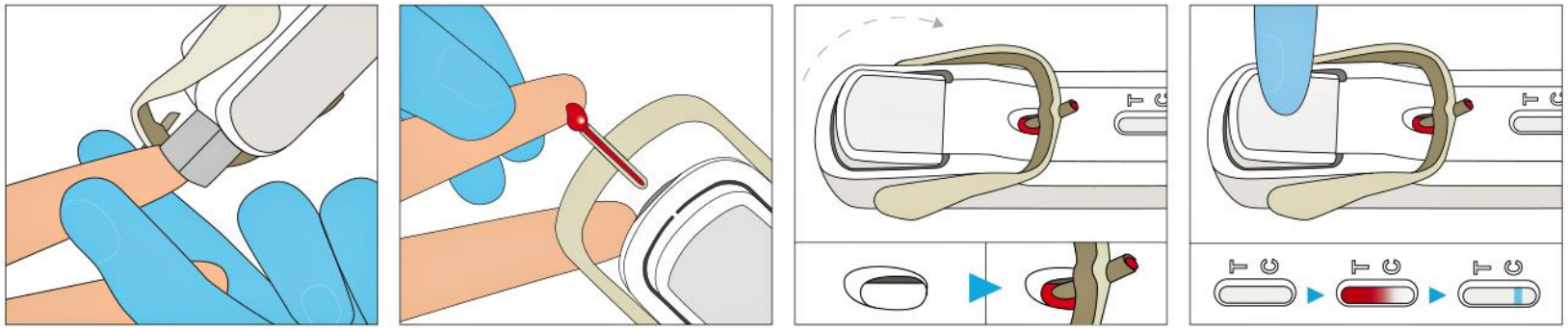
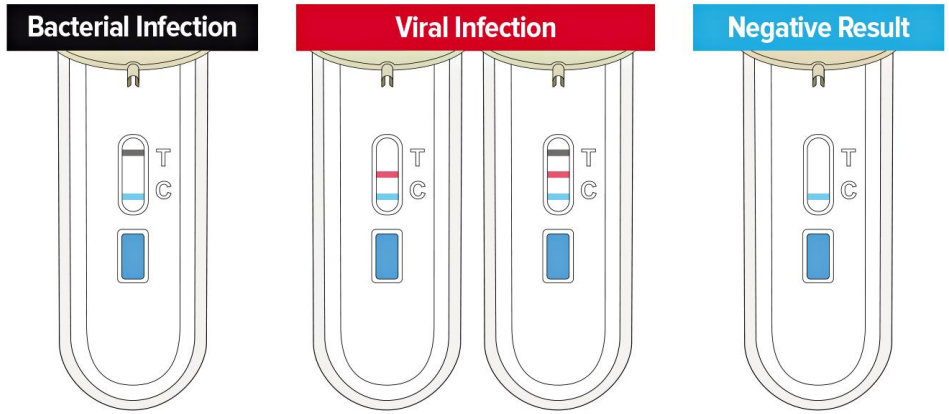
Simple to use and to interpret





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Case Study: The challenges faced by Urgent Care/ED

- ED's are often overcrowded representing a high-risk clinical area for transmission of infection.
- 14-24% of COVID-19 patients in UK hospitals have acquired the infection nosocomially.
- Lack of single occupancy rooms and delays in test results from lab
- Critical to maintain patient flow and minimise spread of infection
- Decisions to isolate patients must be rapid and accurate
- Rapid POC solutions can help

Mansbridge et al. FebriDx host response point-of-care testing improves patient triage for coronavirus disease 2019 (COVID-19) in the emergency department. Infect Control Hosp Epidemiol 2022 Jan 31;1-8. doi: 10.1017/ice.2021.531

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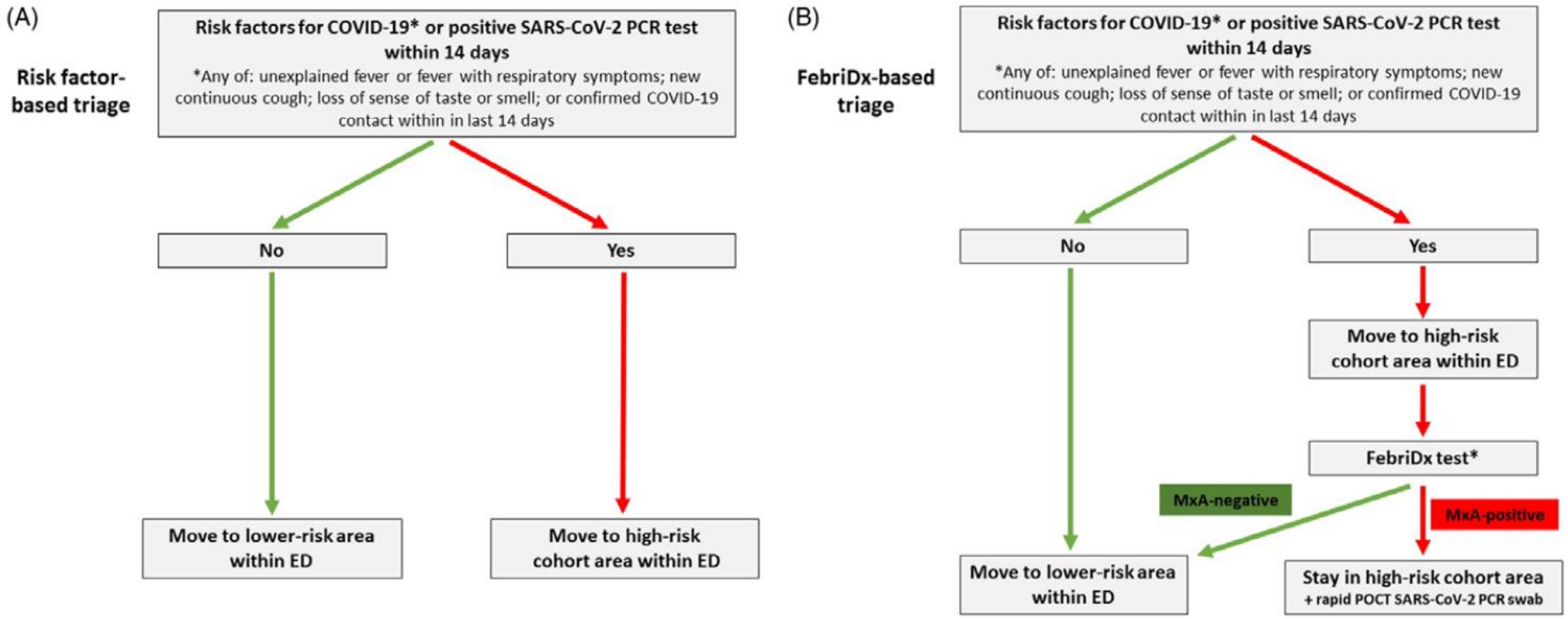
Case Study: Implementation of a FebriDx triage algorithm



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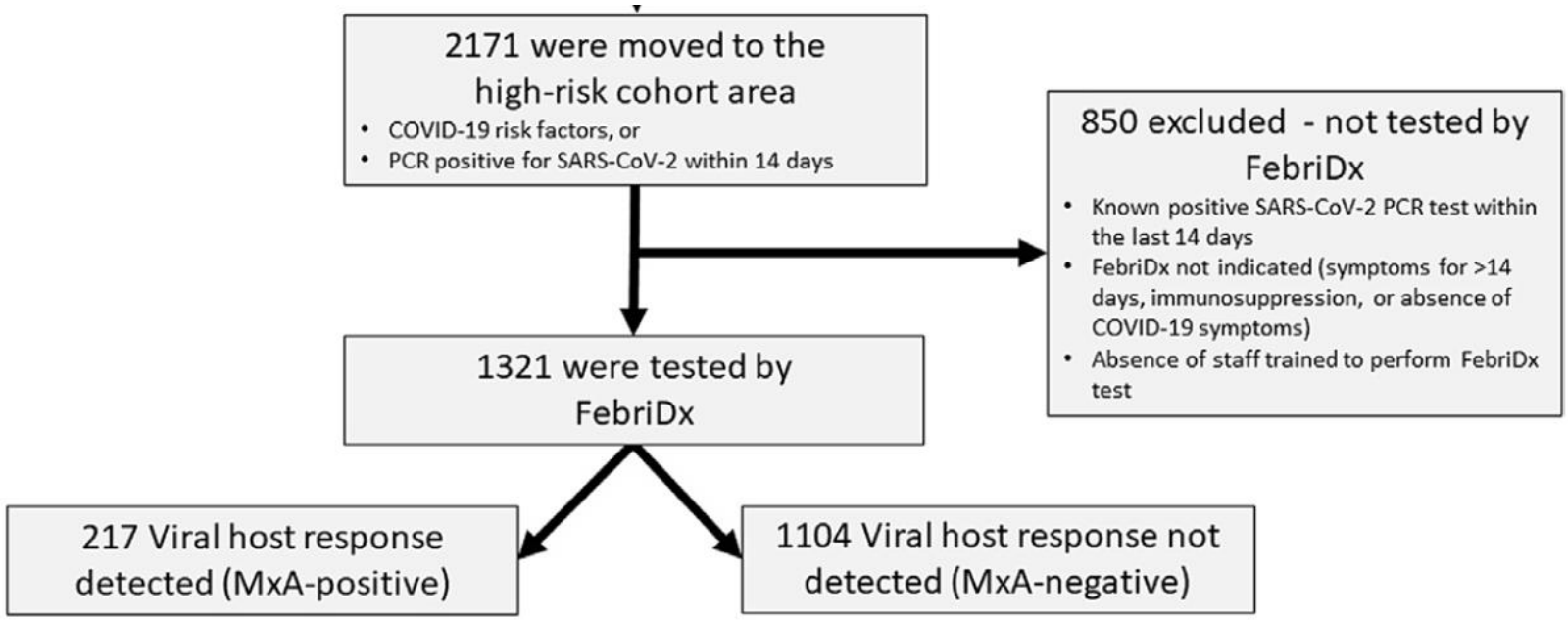
Case Study: Clinical Impact of the FebriDx triage algorithm



- FebriDx algorithm significantly improved departmental flow and allowed high-risk beds to be used more appropriately

Mansbridge et al. FebriDx host response point-of-care testing improves patient triage for coronavirus disease 2019 (COVID-19) in the emergency department. Infect Control Hosp Epidemiol 2022 Jan 31;1-8. doi: 10.1017/ice.2021.531

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Benefits of a FebriDx guided workflow

- Enables optimal management of acute respiratory infections (ARI)
- Improves patient streaming in Primary and Secondary Care
- Rapid antimicrobial stewardship solution
- Optimises triaging and cohorting
- Guides confirmatory molecular testing
- Helps prevent Spread of Infection

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