



Co-Producing Public Health Insights: An Evaluation of SEIR Modelling and Enhanced Stakeholder Engagement during the COVID-19 Pandemic

Introduction Our COVID-19 pandemic response required rapid adaptation of public health intelligence functions to support decision-making. This study evaluated two key changes we implemented within the Dorset Integrated Care System (ICS): The use of SEIR (Susceptible-Exposed-Infected-Recovered) modelling and the establishment of an intelligence forum “EpiCell” for enhanced stakeholder engagement.

The SEIR Model:

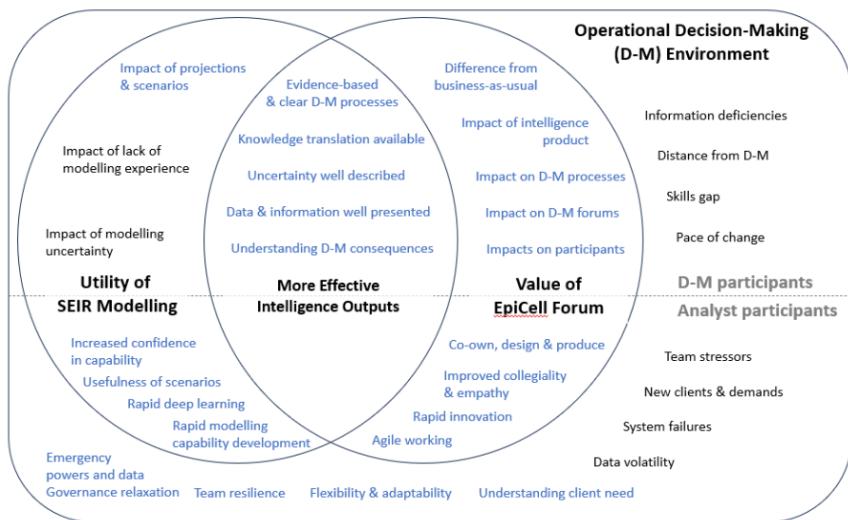
We used a system dynamics approach to develop a local SEIR model to simulate COVID-19 spread. The model enabled rapid development of local scenarios, which we tested collaboratively through the EpiCell forum. Continuous feedback from stakeholders allowed the model to evolve throughout the response.

The ‘EpiCell’ forum:

EpiCell was created to strengthen stakeholder engagement and rapid sharing of intelligence. It had analysts and decision-makers from multiple organisations. An EpiCell briefing was regularly produced, up to daily at some points, to inform the Local Resilience Forum.

Method A post-hoc qualitative evaluation was conducted using semi-structured interviews with a purposeful sample of 15 participants, including both analysts and decision-makers connected to “EpiCell” and involved in the pandemic response. Interviews explored roles pre- and during the pandemic, decision-making processes, the EpiCell forum, and SEIR modelling. Data were analysed using a grounded theory approach, with open and axial coding to identify emerging themes.

Findings Emergent themes from interviews with EpiCell participants are visualised in the figure. Blue text represents views we saw as enabling, but black text represents views that were barriers to intelligence development and decision-making. The Venn diagram captures the two changes to public health intelligence that are being evaluated, and their overlap represents, in our view, the emergence of a supportive intelligence environment.



Discussion The SEIR model was seen as a valuable tool and boosted decision-maker confidence with two provisos: Decision-makers were concerned about model uncertainty and their previous lack of experience in utilising modelling. The EpiCell forum was valued and there was a unanimous view that outputs were effective. The combined SEIR model and EpiCell approach positively impacted decision-making processes during the pandemic response. This approach facilitated rapid learning, improved collaboration, and more responsive intelligence production.