Theme 2: Intervention

UPDATE & INTRODUCTION TO BREAKOUT SESSION

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Classifying Health Interventions

Policy → Generic service process → Targeted service process → Clinical process → Patient Outcome

Comprehensive Interventions

- ‘Recipe’
- Thorough description of each component
- Fixed or modifiable components, or both
- Too rigid and prescriptive?
- Especially with varying context
Promoter Interventions

• Describe end result, NOT how to get there
• Standards, directives
• Allow significant autonomy in development and delivery
• But components likely very heterogeneous
• So an overall structure isn’t preserved
Somewhere in between?

- Probably need some direction, but planned tailoring to context
- Domains, e.g.:
  - Processes
  - Training/knowledge
  - Equipment
  - Medicines
  - Logistics
  - HR

Goldilocks and the Three Project Resource Libraries

- Too Much Information
- 2020 Resource Library
- Not enough Information

This one is just right
Local Context

All of this will vary by hospital:

• Challenges/gaps
• Likelihood of uptake
• Ease of implementation
• Cost: short and long term
• Likelihood of sustainability
Local Context

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• Likelihood of uptake
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• Cost: short and long term
• Likelihood of sustainability

Accordingly, the solutions will vary
Development Approaches (O’Cathain 2019)

1. Partnership
End users have at least equal decision-making powers as research team.

2. Target population-centred
Based on views and actions of end-users.

3. Theory and evidence-based
Combination of published evidence and formal/specific theories.

4. Implementation-based
Attention to ensuring intervention can work in the real world.

5. Efficiency-based
A series of optimisation mini-studies precede main rollout and evaluation.

6. Stepped/phased
Emphasis on systematic overview of processes involved.

7. Intervention-specific
Approach constructed for the intervention.

8. Combination
Combination of approaches – mostly centred on behaviour.
Stepped Approach - 6SQuID (Wight 2015)

Step 1: Define and understand the problem and its causes
Step 2: Identify which causal or contextual factors are modifiable:
   A. Which have the greatest scope for change and
   B. Who would benefit most
Step 3: Decide on the mechanisms of change
Step 4: Clarify how these will be delivered
Step 5: Test and adapt the intervention
Step 6: Collect sufficient evidence of effectiveness to proceed to rigorous evaluation
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WE’RE AT THIS POINT...
Co-design Structure for Intervention

PATIENT & PUBLIC INVOLVEMENT PANEL

CORE WORKING GROUP

CENTRE INVESTIGATORS

HOSPITAL STAFF & POLICYMAKERS
Core Intervention Working Group

Purpose:
To ensure some consistency of components and approach is retained across centres

Membership:
Tom Solomon; Richard Lilford; V Ravi; Priscilla Rupali; Rafael França; Jen Cornick; Nic Desmond; Mike Griffiths; Benedict Michael; Chris Parry; Lance Turtle; Fiona McGill
Intervention Domains & Components

Each component tailored to hospitals’ needs & capacity

HUMAN RESOURCES
- Clinical training
- Lab training
- HR management

ACCESS & PROCUREMENT
- Diagnostic kits
- Consumables
- Equipment
- Medicines

PROCESSES
- Clinical algorithms
- Lab algorithms
- Lumbar puncture pack
- Logistics
Process: Theme 1

**JOURNEY RESULTS**

**QUANTITATIVE OUTCOMES RESULTS**

**LAB CAPACITY ASSESSMENT RESULTS**

1. **IDENTIFY CHALLENGES IN EACH HOSPITAL, & ACROSS EACH CENTRE**
   - PRIORITISE: CONSIDER IMPACT & EASE/COST OF INTERVENTION

2. **INTEGRATION AT EACH CENTRE BY SOCIAL SCIENTIST, CLINICIAN & MICROBIOLOGIST**

3. **CROSS-CENTRE DISCUSSION WITHIN WHOLE THEME 1 TEAM**
   - COMPARE CHALLENGES & PRIORITIES IN EACH CENTRE:
     1: COMMON & DIVERGENT THEMES
     2: INFORM LOCAL CONCLUSIONS

4. **FOLLOW-UP DISCUSSION AT EACH CENTRE BY LOCAL TEAM**
   - DECIDE:
     1: WHOM TO INTERVIEW
     2: WHAT TO ASK (TOPIC GUIDE)
     3: WHO CONDUCTS INTERVIEW

5. **INTERVIEWS & ANALYSIS**
   - EXPLORE:
     1: ARE THE FINDINGS ACCURATE?
     2: WHY (WHAT IS RESPONSIBLE FOR THE CHALLENGES)?
     3: WHAT CAN BE DONE TO HELP?

**THEME 1 RESULTS**

~6 WEEKS

~8 WEEKS

~10 WEEKS

10-14 WEEKS

~6 WEEKS

~8 WEEKS

~10 WEEKS

20 WEEKS

20 WEEKS
Stepped Approach - 6SQuID (Wight 2015)

Step 1: Define and understand the problem and its causes
Step 2: Identify which causal or contextual factors are modifiable:
   A. Which have the **greatest scope for change** and
   B. Who would benefit most
Step 3: Decide on the mechanisms of change
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THEME 1 COVERS THESE
Process: Theme 2

1. **Theme 1 Results**
2. **Quantitative Outcomes Results**
3. **Lab Capacity Assessment Results**

**Integration at Each Centre by Investigators & Hospital / District Staff**
- Identify potential intervention components at each hospital, & across the whole centre
- Prioritise impact vs. ease/cost

**Intervention Working Group Discussion**
- Compare challenges & priorities in each centre:
  1. Common & divergent components
  2. Inform local discussions

**Follow-up Discussion at Each Centre by Local Team**
- Decide:
  1. Draft local intervention
  2. Which policymakers / staff to approach

**Workshops with Hospital / District Staff & Higher-level Policymakers**
- Decide:
  1. Local intervention
  2. Centre-wide intervention

**2-3 Discussions with Intervention Working Group**

**2-3 Discussions with Public & Patient Involvement Panel**
Stepped Approach - 6SQuID (Wight 2015)

Step 1: Define and understand the problem and its causes

Step 2: Identify which causal or contextual factors are modifiable:
   A. Which have the greatest scope for change and
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Step 3: Decide on the mechanisms of change

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BREAKOUT SESSION: CONTEXT

• Zamunda; population 100 million
• Low-middle income
• Tropical: 3-month rainy season - mosquito-borne infections
• Political instability and reports of corruption, but stable otherwise
BREAKOUT SESSION: CONTEXT

• 70% of healthcare public
  • no fees for most care
  • some paid lab/imaging tests and high-cost drugs - unaffordable for much of the population.

• Responsibility shared between district, state & central government

• Staffing of hospitals poor
BREAKOUT SESSION: CONTEXT

• National immunisation programme includes *Haemophilus influenzae*, pneumococcal and polio
• Moderately high adult HIV prevalence: 2%.
• TB burden high: incidence 160 new cases/100,000/year
• Common brain infection pathogens:
  • without HIV infection pneumococcus, *Plasmodium falciparum* (malaria), *M. tuberculosis* (TB), enterovirus and *Herpes simplex virus* (HSV).
  • In patients with HIV infection, Cryptococcus is the main additional pathogen, though Varicella zoster virus and *Toxoplasma* become important too. *P. falciparum*, enterovirus and HSV are relatively less common in this group, while pneumococcus and TB become somewhat more likely.
• Common community-acquired febrile illness pathogens include dengue (and possibly other flavi-/arboviruses but this is unclear), *Leptospira*, salmonellae (*Typhi*/*Paratyphi*, and non-*Typhi*), and bacteraemia due to *E. coli* and *Staph. aureus*.
• Note: the above pathogens are mostly from well-funded trials and epidemiological studies obtained from central hospitals, which have focused on adults mostly.
BREAKOUT SESSION: CONTEXT

• Wadiya district in Wakanda - low-income state
• Poor general, sanitation and health-sector infrastructure
• Wadiya District Hospital - population served ~500,000
• General outpatients department: 200 patients/day
• Emergency department: unwell/out of hours
• 6 wards: 2 general medicine, 2 surgery, 1 paediatrics, 1 maternity/neonatal
BREAKOUT SESSION: CONTEXT

• X-ray machine; ultrasound machine but no trained sonographer; CT scanning is not available
• Short supply: oxygen, intravenous fluids, many medications
• Equipment in place for cell counts; various stains; bacterial culture; TB PCR (GeneXpert); and rapid tests for Cryptococcus (lateral flow assay), malaria, HIV, hepatitis B, syphilis
• Reagent/consumable supply chain and testing quotas due to funding restrictions
• Wakanda Central Hospital (BIGlobal study site): ~80km (1.5-2 hours by road)
Process: Theme 2

1. **Theme 1 Results**
   - Integration at each centre by investigators & hospital / district staff

2. **Quantitative Outcomes Results**
   - Lab capacity assessment results

3. **Identify potential intervention components at each hospital, & across the whole centre**

4. **Prioritise impact vs. ease/cost**

5. **Compare challenges & priorities in each centre:**
   - 1: common & divergent components
   - 2: inform local discussions

6. **Discuss at each centre by local team**

7. **Decide:**
   - 1: Draft local intervention
   - 2: Which policymakers / staff to approach

8. **Workshops with hospital / district staff & higher-level policymakers**

9. **2-3 discussions with intervention working group**

10. **2-3 discussions with public & patient involvement panel**

11. **Compare challenges & priorities in each centre:**
   - 1: Common & divergent components
   - 2: Inform local discussions

12. **Decide:**
   - 1: Local intervention
   - 2: Centre-wide intervention

Brain Infections Global
BREAKOUT SESSION: QUANTITATIVE OUTCOMES RESULTS

• 61 patients recruited in 4 months
• Results similar to other BIGlobal district hospitals in Zamunda

• 46% receive a syndromic diagnosis:
  • 21% meningitis
  • 13% encephalitis
  • 8% meningoencephalitis
  • 4% other

• 21% receive a microbiological diagnosis
  • Mostly cerebral malaria and cryptococcal meningitis
BREAKOUT SESSION: QUANTITATIVE OUTCOMES RESULTS

• 39% have a lumbar puncture; median 29h from presentation
• Proportion having (of those who have a lumbar puncture):
  • CSF cell count, total and differential: 91%
  • CSF protein: 92%
  • CSF glucose: 0
  • Paired CSF & blood glucose: 0
  • CSF bacterial microscopy and culture: 0
• 81% have appropriate empirical therapy; median 0 days after presentation
• 13% have appropriate definitive therapy; median 2 days after presentation
• Mortality: 29%; 40% if not malaria or Cryptococcus / adult / HIV co-infection
BREAKOUT SESSION: THEME 1 RESULTS

- Lumbar punctures not done/delayed due to lack of equipment in the hospital stores, and perception of limited value
- Only cell count, malaria tests, cryptococcal antigen and Xpert (TB PCR) work reliably, due to consumables/reagent unavailability
- Significant delays in being seen by a health professional day and night blamed on staffing shortages – especially doctors; allocation to districts is from central government; often not achieved due to on-call/outpatients/training commitments
- Delays in receiving treatment (additional to delay in clinical assessment) appear due to uncertainty over diagnosis and some lack of knowledge
- No-one has brain imaging due to the private scanner nearby being unaffordable, and many patients refusing to go to the central hospital (indirect costs)
- No sample transport to central lab due to unreliable logistics: have to send samples in a patient ambulance, or in buses
- No CSF sample testing done between 17:00 and 08:00
BREAKOUT SESSION: LAB CAPACITY RESULTS

• General:
  • Standard operating procedures in place
  • Internal quality assurance system not documented for 14 months
  • No external quality assurance system
  • 3 technicians (diploma) and 1 manager (degree); all do all tests
  • Power cuts frequent; only blood fridge is gas-powered
  • Equipment is from outside of Zamunda: servicing is expensive and so doesn’t happen

• Specific:
  • Non-availability of key reagents for Gram and Giemsa stains for >1 year
  • One broken microscope slows everything down
  • Automated chemistry analyser can do glucose, but only used for blood
  • No latex antigen testing available
  • Incubator in working order, but culture plates in short supply
  • Proficiency testing of technicians: 2 can’t differentiate between white blood cells
BREAKOUT SESSION: TASK

• What interventions would you put in place?
• Consider:
  • Impact vs. cost and feasibility
  • What is needed to deliver the intervention? – Resources, processes
  • Who needs to be involved in decision/approval and delivery
• Start with:
  • Simple
  • Obvious
  • Well-evidenced
  • Targeting a key step
• CHOOSE ONE INTERVENTION COMPONENT
Intervention Components: LABORATORY

HUMAN RESOURCES
Lab training

ACCESS & PROCUREMENT
Diagnostic kits
Consumables
Equipment

PROCESSES
Lab algorithms
Logistics
Intervention Components: ADMIN/POLICY

- HUMAN RESOURCES
  - HR management

- ACCESS & PROCUREMENT
  - Diagnostic kits
  - Consumables
  - Equipment
  - Medicines

- PROCESSES
  - Logistics
Questions/Discussion