A New framework for Integrated Care:

*Use of the new paradigm of healthcare ecosystem research in mental health planning*

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Healthcare Ecosystem Research

- Part of Implementation Sciences that incorporates systems dynamics, context analysis, health economics & knowledge discovery from data.

- Facilitates analysis of environment and context, and its knowledge translation to policy, for decreasing research waste and to guide decision making in complex questions in health care.

CONTEXT
In health care it includes all sources of evidence of the local system: geography, social and demographic factors, other environmental factors, service availability, capacity, use and costs. It also includes legislation and expertise on the milieu (e.g., the historical account current state of the art)
Context: totality of circumstances that comprise the milieu of a given phenomenon: geography, social and demographic factors, other environmental factors, service availability, capacity, use and costs.
## Analysis of Healthcare Ecosystems

### Modified Care Matrix of the Organizations

*Process of Care (A. Donabedian)*

<table>
<thead>
<tr>
<th>ORGANISATIONAL LEVELS</th>
<th>INPUT (UC)</th>
<th>THROUGHPUT (RUM)</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MACRO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large NGO/ Health corporation</td>
<td>1A</td>
<td>1B</td>
<td>1C</td>
</tr>
<tr>
<td><strong>MESO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>2A</td>
<td>2B</td>
<td>2C</td>
</tr>
<tr>
<td><strong>MICRO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service (e.g. BSIC)</td>
<td>3A*</td>
<td>3B</td>
<td>3C</td>
</tr>
<tr>
<td><strong>NANO</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual agents (e.g. Professional)</td>
<td>4A</td>
<td>4B</td>
<td>4C</td>
</tr>
</tbody>
</table>

BUILDING SCENARIOS AND MODELLING FOR HEALTHCARE ECOSYSTEM RESEARCH

Adapted from Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2016)
Individual W1

Preprocessing
Midprocessing
Postprocessing
Complex health systems: TOOLS & ANALYTICAL TECH.

Health ecosystems
- Systems, subsystems, nested systems
- Boundaries and Population determinants

Target Agents
- Consumers
- Professionals, Teams, Organisations

Frameworks
- Models & Drivers
- Taxonomies
- Logic models
- Conceptual maps

Connections
- Resource use
- Networks interactions

Connections
- Resource use
- Networks interactions

DSS
- Interventions
- Strategies
- Social Networks

LOCAL ATLAS OF CARE
- Jurisdictions
- Context analysis
- GIS

Epidemiology
- Provision
- Use

VIDEIA
Vesual & Dieusion Analytics Lab
Main Problems when Assessing Services

Commensurability: Diff. units of analysis, lack of comparison like with like. We cannot merge:
- Service Providers
- Clinical teams
- Interventions
- Activities

MH Atlas Solutions

1st We identify the minimal unit of production or care (Basic Stable inputs of Care-BSIC) or TEAMS

Transferability and terminological variability:
- Names of the services do not always reflect their main activity (Hospital – Outreach services- Crisis houses-medical homes)
- Names of same services vary across jurisdictions (Day care)

2nd We label them according to their Main Type of Care (MTC) they provide
A [F0-F99] - R4 j

Target Population
Adults

Crime and
Justice users

DESDE LTC CODE:
Non-Acute, 24 hours physician cover, hospital, time limited

ICD codes for Mental Health

STEP 3

STEP 4

Microsystem
Mesosystem
Macrosystem

STEP 1

STEP 2

Adult Outpatient Care
Risk of psychological distress
Age-gender adjusted
Below average
Average
Above average
Ref. in 151 scientific papers
71 studies using ESMS/DESDE
Since 2000
34 Countries
- Service mapping
(Standardised description of services)
- Costs
- Context analysis
- Models of care
- Analysis of interventions
- Analysis of MH care indicators
AUSTRALIAN ATLASES OF MENTAL HEALTH CARE


THEMES
- Mental Health
- AOD
- Homeless
- Chronic Care
- Social Care

URBAN

RURAL
A collaborative strategy based on systems research has been implemented to regional mental health planning

- Development of the conceptual model,
- Atlases of regional Mental Health Care,
- Integrated resource utilisation analysis
- Cost of illness of sentinel conditions,
- Financing of mental health care,
- Geospatial analysis
- Modelling of efficiency and organisational improvement.

- CATALONIA (Spain)
- BASQUE COUNTRY (Spain)
- FINLAND
- FRANCE
- ENGLAND (Support Accommodation)
- ACT (Australia)
HEALTH ECOSYSTEM ANALYSIS for Regional MH Planning


3.- Cost of Illness  - Salvador-Carulla et al, 2011

4. Financing (Financing of Illness)  - Salvador -Carulla et al, 2010

5.- Spatial analysis (hot and cold-spots)  - Rodero-Cosano ML et al, 2016

6- Smart and relational indicators  - Salinas-Pérez JA, et al, 2010

7.- Technical efficiency analysis of small health areas  - Torres-Jimenez et al, 2016

8.- Analysis of management interventions  - Garcia-Alonso et al, 2019

DESDE-LTC (Tool for Coding and Mapping): http://www.edesdeproject.eu/
MAPPING OF SERVICES IN EUROPE: http://www.refinementproject.eu/
ATLASES OF MH Care in Catalonia and Bizkaia
Adult mental health care in three remote areas
Rates of groups of care for adults per 100,000 adult population

- **Nunavik**: 188.1 beds per 100,000 pop.
- **Kimberley**: 137.5 beds per 100,000 pop.
- **Lapland**: 25.1 beds per 100,000 pop.
- **Other**: 57.3 beds per 100,000 pop.
- **Community**: 14.5 beds per 100,000 pop.

*) Preliminary data *
Access to Allied Psychological Services (ATAPS) program

Spatial clustering analysis

Method: spatial autocorrelation indexes

Spatial units: postcode areas in Western Sydney health district

Study variables:
- Rates of referrals to a primary mental Health program (ATAPS) per 1,000 inhabitants (2012-2015)
- Neighbourhood between pairs of units.

Distribution of the referral rates

Cold spot: statistically significant cluster of low values

Hot spot: statistically significant cluster of high values
Comparative Effectiveness Analysis of Mental Health Care Areas
Health System Engineering in the Basque Country

Evaluation of system efficiency using the Monte Carlo DEA: The case of small health areas
Mercedes Torres-Jiménez, Carlos R. García-Alonso, Luis Salvador-Carulla, Vicente Fernández-Rodríguez

<table>
<thead>
<tr>
<th>Small health areas (mental health centres)</th>
<th>Input management (Input oriented DEA)</th>
<th>Output management (Output oriented DEA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajuriaquerra</td>
<td>Inefficient</td>
<td>Likely efficient</td>
</tr>
<tr>
<td>Barakaldo</td>
<td>Efficient</td>
<td>Efficient</td>
</tr>
<tr>
<td>Basauri</td>
<td>Likely efficient</td>
<td>Efficient</td>
</tr>
<tr>
<td>Bermeo</td>
<td>Likely efficient</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Derio</td>
<td>Efficient/Likely eff.</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Durango</td>
<td>Likely inefficient</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Erandio</td>
<td>Efficient</td>
<td>Efficient</td>
</tr>
<tr>
<td>Ercilla</td>
<td>Efficient/Likely eff.</td>
<td>Efficient</td>
</tr>
<tr>
<td>Etxaniz</td>
<td>Likely inefficient</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Galdakao</td>
<td>Likely efficient</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Gernika</td>
<td>Efficient/Likely eff.</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Ortueña</td>
<td>Likely efficient</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Otzarreta</td>
<td>Likely eff./Likely ineff.</td>
<td>Likely efficient</td>
</tr>
<tr>
<td>Portugalete</td>
<td>Efficient</td>
<td>Efficient</td>
</tr>
<tr>
<td>Santurtzi</td>
<td>Likely efficient</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Sestao</td>
<td>Efficient</td>
<td>Efficient</td>
</tr>
<tr>
<td>Uribe</td>
<td>Efficient/Likely eff.</td>
<td>Efficient</td>
</tr>
<tr>
<td>Zalla</td>
<td>Likely eff./Likely ineff.</td>
<td>Efficient/Likely eff.</td>
</tr>
<tr>
<td>Recalde</td>
<td>Likely eff./Likely ineff.</td>
<td>Inefficient</td>
</tr>
</tbody>
</table>

Do you know where variation exists? SOMNet – Machine Learning

Do you know where you stand relative to the best? Benchmarking RTE-CEA
Major challenges for implementation of the ecosystems research approach

- Need to accommodate the global strategy to specific short-time policy demands
- Lack of continuity of research funding and research teams
- Difficulty of information generated for practical use by decision makers and stakeholders without expert guidance
- Political cycles
- Structural and administrative constraints in the Spanish public and research systems.
Thanks!

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