



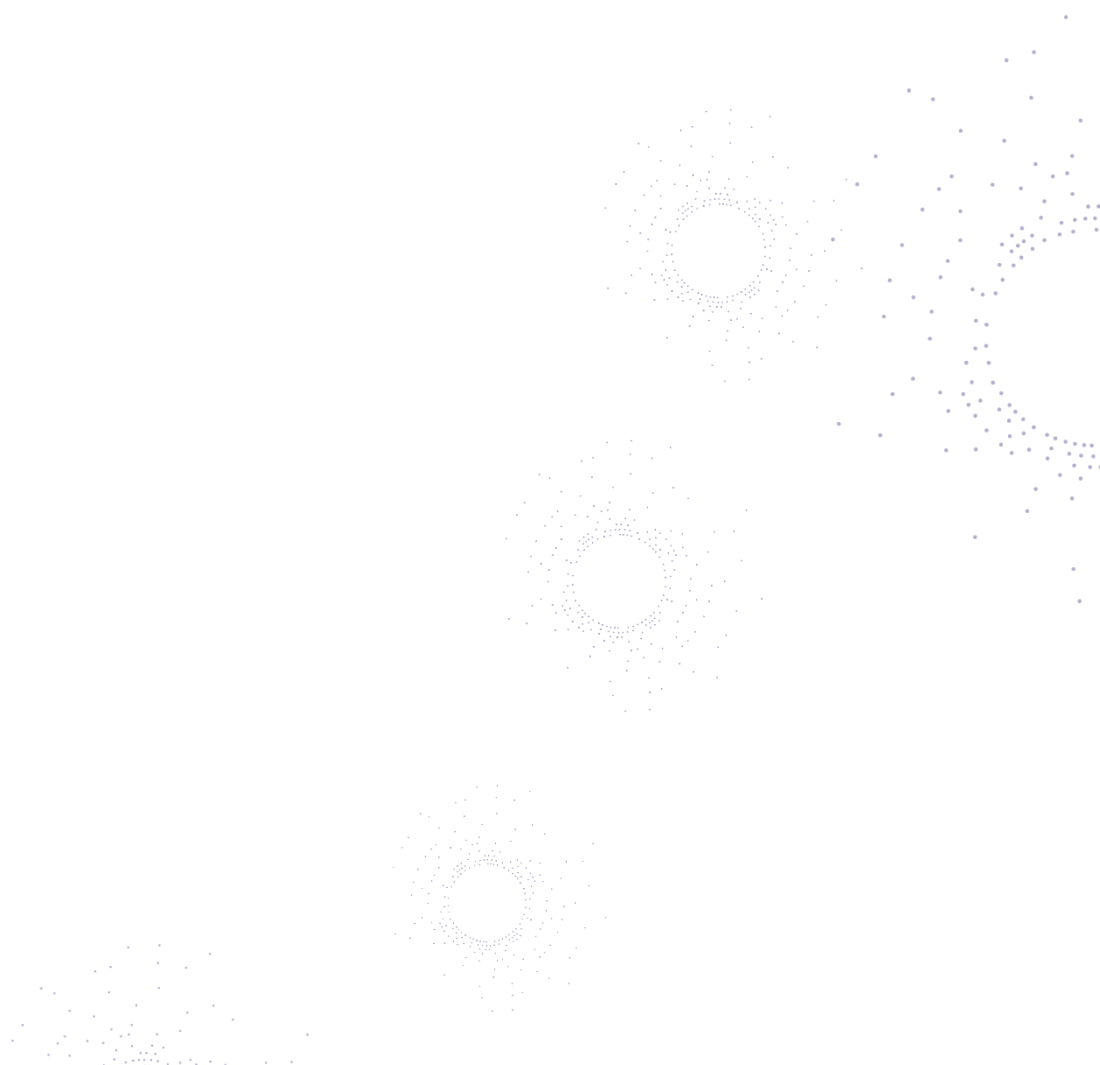
NORCE Norwegian Research Centre AS  
www.norceresearch.no

# Developing a method for economic evaluation of FACT teams in Norway

**Authors:**

Renira Corinne Angeles, Admassu Lamu

**Report** no. 25-2024, NORCE Health and Social Science division – Health Economics and Health Services research group



## FORORD

På oppdrag for Anne Signe Landheim (professor og forskningsleder ved Nasjonal kompetansetjeneste for samtidig rusmisbruk og psykisk lidelse, Sykehuset Innlandet og Fakultet for helse- og sosialvitenskap, Høgskolen i Innlandet) og Trond Hatling (sosiolog ved Nasjonalt kompetansesenter for psykisk helsearbeid ved NTNU Samfunnsforskning AS) har NORCE Norwegian Research Centre AS utført oppdraget økonomiske analyser av FACT-teamene. Oppdraget er en del av et større NFR prosjekt som evaluerte de sju første FACT teamene i Norge. Vårt oppdrag bestod i å først undersøke om innsamlet data på ressursbruk av FACT teamene, samt bruk av helsetjenester, var nyttig for en økonomisk analyse, og deretter skrive en rapport om mulighetene. Det er gjort lite vitenskapelige og empiriske analyser av den samfunnsøkonomiske effekten av FACT-teams, både nasjonalt og internasjonalt. Det er dermed svært begrenset hva vi kan lære fra tidligere studier og analyser, og erfaringer. Denne rapporten drøfter hvilket databehov vi har i dag som er nødvendig for å gjennomføre kost-nytte-analyser av FACT. I helseregisteret i dag finnes det ikke informasjon på om pasienten har benyttet FACT teams. Rapporten drøfter også mangelen i dataene som er tilgjengelige i Helsedirektoratet og SSB i dag, og at det er nødvendig med en fremtidig innsamling av data på pasienter som bruker FACT. Et viktig aspekt her er innsamling av informasjon om ressursbruken av FACT-teamene. Videre har vi også anbefalinger på metoder for å identifisere kostnader i FACT, og et analyserammeverk som kan brukes til å analysere de økonomiske konsekvensene av implementeringen av FACT teamene. Denne tilnærmingen kan svare på spørsmål som er politisk relevant da det er stadig press på helsebudsjettet og et større fokus på prioriteringer og bærekraftigheten på morgendagens helsetjenester.

Vi vil takke Anne Signe Landheim og Trond Hatling for verdifulle innspill underveis i arbeidet.

Report title	Developing an economic evaluation method of FACT teams in Norway
Project No	107064
Institution	NORCE Health and Social Science division
Client(s)	Anne Signe Landheim & Trond Hatling, in connection to the project "Flexible Assertive Community Treatment How is the model adapted and implemented in different Norwegian contexts?"
Classification:	Open
Report No.	25-2024, NORCE Health and social sciences
ISBN	978-82-8408-369-8
No. of pages	23
Date of publ.:	October
CC-licence	CC BY 4.0
Citation	Angeles, R.C. & Lamu, A. (2024) Developing a method for economic evaluation of FACT teams in Norway
Geographical area	Bergen, Oslo
Keywords	Mental health service, FACT, cost-effectiveness, cost-utility, economic evaluation

#### Summary

Studies show that FACT teams in Norway significantly reduced involuntary admissions and the number of admission days (both regular and involuntary). Currently, there is limited knowledge on the health-economic consequences of the implementation of FACT teams. More specifically, there are no empirical studies that can be used as guidelines when establishing methods for identifying direct and indirect costs in FACT teams and methods for analyzing cost-effectiveness (CEA) or cost-utility (CUA). In this report, we discuss the need for health economic evaluation of FACT, the necessary individual-level data that is not currently available in Norwegian health administrative data, and suggestions for an analysis plan.

## Revisions

Rev.	Date	Author	Checked by	Approved by	Reason for rev.
1	10.04.2024	Angeles, Lamu	Hatling, Landheim	Hatling, Landheim	
2	10.05.2024	Angeles, Lamu,	Hatling, Landheim	Hatling, Landheim	
3	11.06.2024	Angeles, Lamu,	Hatling, Landheim	Hatling, Landheim	
4	28.06.2024	Angeles, Lamu	Hatling, Landheim	Hatling, Landheim	

## Table of contents

1.	The challenges of health economic evaluation of FACT and why it is important .....	4
1.1.	The need for economic evaluation .....	4
1.2.	FACT teams and information gap for economic evaluation .....	5
1.3.	Control group problem.....	6
1.4.	Lack of existing costing method .....	7
2.	Review of economic evaluations of community mental health care .....	8
3.	Proposal of an optimized design for economic evaluation of FACT in Norway .....	9
3.1.	Development of costing method for an economic evaluation of FACT teams ..	11
3.2.	Outcome measurement .....	17
3.3.	Suggestion of control group.....	18
3.4.	Modelling .....	19
4.	Impact.....	20
5.	References .....	21

# 1. The challenges of health economic evaluation of FACT and why it is important

Evaluation of the FACT team implementation in Norway during 2013–2016 shows a significant reduction in coerced hospitalization (42%), the length of stay of regular inpatient days (33%) and coerced inpatient days (40%) compared to the two-years period before FACT implementation (Landheim and Odden 2020). Despite the significant changes in clinical outcomes, health policy decision making requires considerations of the broader costs and benefits of the implementation of FACT teams. This type of analysis provides insights into the feasibility, scalability, and sustainability of FACT teams as mental health service.

We have evaluated the possibility of conducting a cost-effectiveness analysis of the FACT model in Norway with the existing data collected during the study from 2013 to 2016. The data collected through the semi-experimental trial, including the existing data in administrative health register, and aggregated data in national statistics are not adequate for conducting economic evaluation of the FACT teams. In this note, we will discuss these challenges in more detail, and propose a plan for a full economic evaluation study including a costing method specific for FACT. Methods and examples of evaluating costs prospectively of FACT teams and community based mental health care in general are limited. One of the main challenges is the lack of individual level data for FACT users. So far, the resource use for FACT teams is not included in the Norwegian health registry data. This infers the relevance of designing randomized controlled trials (RCT) aiming to collect the required resource use data at the micro level to provide a full economic analysis of FACT teams in Norway. The plan for an economic analysis must be involved from the starting point of the trial simultaneously with the planning and design of the intervention. Most of the existing economic evaluations of public health interventions, including FACT have economically evaluated programs retrospectively (Sohn et al. 2020), which limits ability to fully assess the costs of implementation, especially during the early stages of design and initiation. Implementation and intervention costs and assessment of its significance should be carefully assessed. Absence of this may have underestimated costs of public mental health service interventions. A framework for considering and prospectively collecting implementation costs at early stages could improve economic evaluations of FACT in the coming years.

## 1.1. The need for economic evaluation

Pressure on health care budgets has led to increased emphasis on cost-effectiveness analysis and priorities to guide health care policy decision making. The aim of cost-effectiveness analysis is to identify efficient use of scarce resources by identifying

treatments that provide maximum additional effect per additional unit of resource consumed (Drummond et al. 2015). There are limited resources to provide all services and treatments that potentially improve health and quality adjusted life-years. Thus, priority setting is crucial, emphasizing the value for money, i.e., scarce resources for health should be allocated to maximize the health benefits of the targeted population (Musgrove and Fox-Rushby 2006). Prioritizing involves choosing a treatment that is evidently cost-effective, over other equally effective treatments. This is distinct from limiting treatments with no effect (Ministry of Health and Care Services 2024). Evaluations of the costs and benefits provide evidence of the effects of alternative care programs compared to the FACT teams. In this way, evidence from economic evaluations leads to informed decision making in a way that available resources are most effectively used. It is important to emphasize that evaluating costs *throughout* the implementation process and thus propose a structured method for investigating these costs is crucial (Sohn et al. 2020). Existing analyses may not fully account for the costs required to implement because the transition in the mental health service across countries is an inherently complex process.

An economic evaluation requires a structured collection of individual level costs and resources used as well as benefits generated from alternative interventions. In an economic evaluation, sources, and methods of valuations of costs and consequences should be clearly stated early in the study. Types of economic evaluation includes cost-effectiveness, cost-benefit, cost-utility, and cost-consequence analysis. Cost-effectiveness and cost-utility analyses are the most commonly used in health economic evaluation (Drummond et al. 2015).

## **1.2. FACT teams and information gap for economic evaluation**

There were no sufficient data available for an economic evaluation of FACT teams in Norway, particularly on resources used both in the primary and specialist health care services. Despite substantial implementation of FACT in Norway, the Norwegian health register data does not include individual level information of the use of FACT. The State transfer FACT team dedicated money to regional hospitals, DPS and the municipalities, but the value of this financial transfer including how it is distributed have not been assessed.

Current cost and resource use data of the primary and specialist mental health care services and substance use treatment is provided by Statistics Norway (KOSTRA) and the Norwegian Directory of Health (SAMDATA). These are municipality level (KOSTRA), and regional level data (SAMDATA). The aggregated nature of the data does not allow to retrieve individual level information on resource use nor costs for the FACT and non-FACT participants.

Since the FACT study lacks detailed information on individual level resource use and a well-defined comparator (control group), conducting a proper full economic evaluation

has not been possible. Although the study of the FACT implementation during 2013-2016 included some individual level information of health care service use directly related to the FACT team activities, time units were not provided for most of the FACT teams. Under such circumstances, it is not possible to quantify services used and calculate costs. Thus, without a well-designed prior resource use questionnaire, the economic estimation of the FACT teams cannot be properly conducted. Another core element in a well-designed economic evaluation is the availability of alternative treatments (control groups) to evaluate and estimate the best courses of action (which is detailed below).

### **1.3. Control group problem**

As a gold standard, economic evaluations require RCT design due to the ability to randomly select treatment and control groups – and thus be able to calculate the alternative costs and consequences. The choice of the comparator against which costs and consequences/effects will be measured is vital to ensure that the economic evaluation accurately informs the decision problem facing the decision-maker. A comparator that may not reflect the decision problem could lead to an inaccurate determination of cost-effectiveness and facilitate wrong decisions.

Our attempt to analyze the cost-effectiveness of the FACT teams in Norway have posed challenges when it comes to finding a suitable control (e.g., i.e., a municipality that has not implemented FACT that is similar to a FACT municipality). First, mental health care within primary care differs across municipalities. Secondly, almost half of the municipalities in Norway have implemented FACT teams, and the implementation is not randomly distributed. Municipalities establishing FACT teams have a relatively higher proportion of patients with severe mental illness. Third, it has been difficult to process and trace costs since the FACT implementation in Norway during 2013-2016 revealed that the majority of the FACT teams had shared employer responsibility between the specialist health care (hospitals) and primary care provided by the municipalities and districts (Landheim and Odden 2020).

In the absence of well-defined comparison groups/options, the challenges are even exacerbated. Heterogeneity of services poses challenges when defining “care as usual” or alternative treatments. Information from control group is necessary to assess the counterfactuals. The design and organization of the mental healthcare services, including the content of treatment across municipalities differs substantially, making comparison complex, especially when information on resource use lacks.

In sum, during our attempt to evaluate the cost-effectiveness of the FACT teams in Norway, we learned that the FACT study lacks important and detailed reporting of costs and resource use needed at microlevel for both FACT users and “care as usual”. There is no properly defined control group for the FACT study in Norway.

## 1.4. Lack of existing costing method

The costing method of FACT teams remains underdeveloped. The problem with shared resources (specialist and primary care) poses challenges in collecting cost inputs and develop a possible benchmark costing method for FACT teams. Further, it was reported that the teams had most frequent contact with the home help care as part of the local primary health care. This development during the FACT implementation is crucial information when evaluating the economic consequences. However, it is a challenging task as the collection of resource use measurements are not fully adequate as basis for an analysis – constituting an evidence gap. Existing costing method of this type of service is scarce, and thus the process of costing of FACT teams lacks guidelines. This is also one of the core reasons it was not feasible to assess economic consequences of the FACT teams implementation during the period 2013–2016.

In this note, we also provide a conceptual framework that details the types of economic resources utilized during the design, initiation, and maintenance phases of implementation and the implications of neglecting implementation costs in evaluating the cost-effectiveness of interventions. Such a framework provides better insight into the need for implementation costing practices for more accurate economic evaluation and budget impact analysis as well as insights into program feasibility, scale up and sustainability.

Thus, this section highlighted the importance of evidence from an economic evaluation of FACT teams and provided an overview of the data needed and presented the “data gap”. In the remaining of this report, we will describe alternative research design to conduct the health economic evaluations of implementing FACT in Norway. Section 2 portrays the mixed results of the health economic literature of community-based care in general, and ACT and FACT models in particular. Section 3 describes an optimal economic evaluation design of FACT in Norway, including a suggestion for costing method. That is, we will describe and suggest proper study design for future full economic evaluation, including a costing method and relevant checklists. Section 3 will also address the issue of selecting the appropriate comparison group and will suggest a concrete plan for data collection both for the control and intervention groups. Finally, we will provide an assessment of potential impact of the proposed design in section 4.



## 2. Review of economic evaluations of community mental health care

Recently, studies on the health economic evaluation of community-based mental health interventions are increasing. A systematic review of literature on economic evaluations of mental health prevention and promotion generally showed good value for money (Le et al. 2021). Literature indicated that residential crises programs could be a cost-effective approach to providing acute care to patients who have serious mental illness (Fenton et al. 2002). Findings from a pragmatic RCT study in England suggested that collaborative care would be a potentially cost-effective long-term treatment for depression in patients with comorbid physical and mental health compared to usual care (Camacho et al. 2016). Further, a study in the Netherlands showed that guideline-congruent stepped care for major depressive disorder is cost effective relative to usual care (Meeuwissen et al. 2019).

Previous studies of community care models such as Assertive Community Treatment (ACT), from which FACT was developed, demonstrate that the evidence of cost-effectiveness of the ACT model is rather mixed. Studies in the US show that ACT is cost-effective due to reduction in hospital stays (Weisbrod, Test, and Stein 1980). In the UK, studies show less evidence of cost-saving (McCrone et al. 2009), suggesting complexity when transferring interventions across different settings. McCrone et al. (2009) found, however, by using a satisfaction measurement as an effect measurement that a one-unit improvement in satisfaction was associated with cost-increase in the ACT group. FACT study from the Netherlands used FACT patients matched with patients from the non-FACT control region (through propensity score matching), and found difficulty to assess cost-effectiveness (Drukker et al. 2011). Another study in England found that including FACT teams in a multidisciplinary community mental health team (CMHT) was cost-effective h

Programs that are based on the ACT approach have been found to be more efficient than inpatient care (Kilian 2012). Compared to the current practice of mental health care in most western European countries, an intensification of community mental health interventions could increase the efficiency of psychiatric treatment especially for heavy users and first episode patients (Kilian 2012). However, methodological flaws and a lack of national studies limit the validity of current health economic evaluations, particularly for a Norwegian setting. The literature also provides poor guidance from previous methods in analysing the cost-effectiveness of community care models using FACT teams.

### 3. Proposal of an optimized design for economic evaluation of FACT in Norway

A proper economic evaluation involves methodological choices and a research strategy. Further, the perspective is also important. From which viewpoint is the analysis intended? If FACT is unattractive from one viewpoint, it may be attractive when other perspectives are considered. Analytic perspective may include the individual patient, health care providers, the target group for specific services, the government budget, and the wider economy (societal perspective) (Drummond et al. 2015).

The importance of information, as the real cost of any treatments such as FACT is not the amount of NOK appearing in the budget, but rather the value of the benefits achievable in the alternative treatment plan that has been forgone by committing the resources to FACT. A full economic evaluation compares the costs and the health outcomes of at least two treatment approaches: intervention and control arms. Full economic evaluations can be thought of just like a randomized clinical trial (RCT) that estimate the incremental effects of choosing one intervention or treatment over another. The best quality cost-effectiveness evidence comes from economic evaluations conducted within an RCT, which we call *trial-based evaluations*. An alternative is *model-based evaluations*, in which decision-analytic simulation models are used to evaluate broader and more complex settings. In the absence of randomization, quasi-experimental designs are also suitable to estimate the effect of an intervention, which include pre-post designs, stepped wedges, and alike (Miller, Smith, and Pugatch 2020). In general, the *PICOT framework* (Population, Intervention, Comparison, Outcome, and Timeframe) is an important aid to understanding the results of an economic evaluation (Drummond 2021). Accordingly, a typical economic evaluation involves the following key steps related to the PICOT framework:

**Step-1:** The decision context – settings, population and their socioeconomic characteristics, perspectives to be adopted.

**Step-2:** Correct specification of the question – e.g., which of the two or more options achieves a given objective at least cost? Note that questions such as “what does FACT cost?” is not an economic question, because there is no comparison in this instance and no consideration of outcomes.

**Step-3:** Identify and describe the options. If there is no alternative program against which we compare the intervention/treatment, then there would be no economic evaluation. There should be choices between two or more options – it can be new intervention/treatment vs the existing portfolio of programs (i.e., current practices or treatment as usual). Interventions in different communities are challenging because the contexts are different resulting in different results.

**Step-4:** Identify, measure and value the costs – evaluation of costs involve three vital steps to properly capture all costs; (i) identifying all the resources required for each option, (ii) measuring the resources required for each option, and (iii) valuing the quantities of resources. Here, cost is related to resource-use (economic or opportunity cost) and not necessarily spending. Thus, all resources required for each option should be listed, including voluntary community participation. After listing all ingredients required, the next step is to quantify how much of each resource is needed – e.g., how many more hours of staff time required, and what level of expertise do each option need, etc. Finally, assign value or price to the resources required for each option.

**Step-5:** Identify, measure and value the effects – as with costs, the aim should be identifying all relevant outcomes, then measuring it, and finally value the outcome if possible. Valuation of outcome is the feature of cost-utility analysis and cost-benefit analysis. In the former, we assign value to health outcomes (e.g., QALY or DALY), and in the latter monetary value is assigned to intervention outcomes.

Other important steps in economic evaluation includes 1) adjusting for differential timing of costs and effects/benefits (time preference), 2) dealing with uncertainty (sensitivity/scenario analyses) and 3), formulating decision rules. The decision rule in **cost-benefit analysis**: the intervention is good if benefits exceed costs; in **cost-effectiveness** or **cost-utility analysis**: the intervention is dominant if it is both more effective and less costly otherwise incremental cost-effectiveness ratio need to be calculated to reflect the unit price that must be paid per unit of health outcome. This price is usually known as cost-effectiveness threshold, the amount we are willing to pay for additional QALY gain or DALY averted. For instance, the officially recommended cost-effectiveness threshold by the National Institute for Health and Care excellence (NICE) is £20 000 to £30 000 (Paulden et al. 2014). So far, Norway neither has any official QALY valuation, nor threshold value to determine what shall be classified as cost-effective. However, an informal value between 250 000 and 750 000 NOK per QALY is commonly used in Norway based on stair-case model of health-loss class criteria (NOU 2014).

Viewed in lieu of these key steps, the current implementation of FACT in Norway would not suit for proper economic evaluation. First and for most, FACT is a naturalistic prospective cohort study without alternative option to compare with. Furthermore, not all inputs/ingredients are properly identified in each FACT team. And those resources identified in some FACT teams are not accurately quantified: the quantity and quality of resource-use are unknown. Accordingly, it is hard to value costs. Key resource-use at municipality level is the best example, where several health services (mental health and substance use services, home nursing/help, day care centre etc.) are provided for known numbers of FACT teams patients with little or no information on the duration and frequency of services as well as level of expertise involved. Therefore, the current implementation of FACT teams so far in Norway does not fulfil at least three fundamental

steps for economic evaluations: Steps 3, 4 and 5. For a proper economic evaluation of FACT, it is required to collect detailed micro level information on resources at baseline, during the period of the intervention, and at follow-up for both the intervention and control groups. However, FACT intervention in Norway lacks a properly defined comparison group. Control group may be designed by matching the FACT municipalities with similar non-FACT municipalities in terms of factors such as population, cost of mental health care use, and distributions in socioeconomic status. Yet, these populations are in different context and involves different costing approach because it is impossible to identify the correct resource use without proper follow-up. Thus, due to heterogeneity in services across municipalities, it is challenging to construct appropriate control group. Furthermore, for such control group, it is unlikely to identify and measure health outcome that is similar to the intervention group (FACT). Comparison with something like this (mock control group) is very difficult for a health service decision-maker to interpret, in terms of what the effects would be of implementing the intervention in their own setting, because the results do not directly speak to any real-world alternative.

In a well-designed setting, for both the intervention and control municipalities, inputs must be defined throughout the whole intervention process and period (including volunteer services as this has market prices). If a resource is used without a pre-specification, the information of use (length of stay and use of service) must be collected and stored. The reason for the use must be documented. To properly assess the economic consequences, specific resources/inputs used need to be quantified in terms of both quantity and quality. Further, we must assign market or shadow prices to all ingredients/inputs based on alternative costs. The same is true for the consequences/effects. Most of these parameters are missing even in the intervention arm (FACT teams).

### **3.1. Development of costing method for an economic evaluation of FACT teams**

In general, costing of mental health interventions are complicated and depend on treatment settings (institutional, community), service providers (medical, non-medical) and treatment formats (individual, group, digital) (Shearer, McCrone, and Romeo 2016). There are no previous methods of costing in a setting of FACT teams. According to Drummond et al. (2015) all costs should be reported, and it should be as precise as possible. The most ideal situation is the availability of estimation of each component of resource use. However, this precision is not always available.

To provide decision-makers with an honest appraisal of the potential costs and benefits of any health intervention, it is critical to document the full range of costs required for programmatic implementation, including the costs of intervention design and local

adaptation, initiation and scale-up, and maintenance and sustainability. While consideration of implementation costs is universally relevant, these costs may be proportionally more important in settings where resources are relatively scarce. The heterogeneity of the organization of mental health service, and the heterogeneity of municipalities necessitates for collecting all direct costs at all phases of the intervention: development, implementation, operation, and maintenance. Findings from Landheim and Odden (2020) shows high model fidelity, but heterogeneity in organization of FACT teams and employer responsibility varies across the seven teams. Development cost and start-up cost may vary across municipality. There is a need to evaluate how the cost changes as the number of participants changes, and how these changes vary according to municipality characteristics.

Finally, as measures of the primary outcomes the main interest is to see development from baseline to a certain point, including a longer follow-up, and it is highly relevant to allow for differential timing of costs (techniques for discounting).

For purposes of costing, we suggest the following checklist as data collection on the use of resources for both arms at baseline, intervention, and follow-up periods (see table 1). During 2013–2016, FACT was implemented at district and municipality level, but lacks information on key resource used for most of the FACT teams.

Table 1 displays the resource use and costs that needs to be derived for both intervention and control group. The first column – “Cost category” – broadly lists relevant categories of costs. The next two columns – “Name of activity” and “Description of activity” – list and explain in more details several activities that belongs to each cost category. The column “Explanation of variables and units” explains the level of aggregation that allows quantification and thus analysis. As cost perspective is crucial to define in an economic evaluation. As such, the column “Cost perspective” highlights alternative perspectives. For instance, in societal perspective, all costs should be collected at a societal level given the research questions in an economic evaluation of FACT. Therefore, in addition to patient level (i.e., out-of-pocket) costs and health system costs, societal perspective includes lost income for patients and caregivers as well. In Norway, most health care is generally financed by the tax system, and a patient level economic analysis is not very common.

The column “Type of data” states if the data needed should be collected at individual (patient or staff), or team (equivalent to district) level. “Accessibility” column or source provides an overview if the data needed is available or needs to be collected in a future trial. It is also important to emphasize that since FACT teams are mixed from primary and

specialist care<sup>1</sup> during data collection, information on where the team member comes from (primary or specialist care) should be registered and stored. The same goes for service utilization in primary and specialist care. The data collection should state and detail carefully which service is visited. If it is a visit to the general practitioner, this cost is addressed to the municipality. If users of FACT team use outpatient service at the hospital, this should be costs for the specialist care.

---

<sup>1</sup>In Norway for instance, the transfer of responsibility to local community emerged with no increased or minimally transferred resources (The Norwegian Directorate of Health 2015, 39).

**Table 1 Potential required resources for both arms at baseline, during intervention and at follow-up**

Cost category	Name of activity	Description of activity	Explanation of variables and units	Cost perspective	Level of data	Accessibility	Importance of cost
Start-up and development cost	Organization of teams	Recruitment process, contacting team members, meetings regarding information about the FACT team, and hiring	Costs regarding advertisement, contacting, travel, meeting location	Societal, governmental and health care institution	Team	Not collected	Important
	Development of electronic "FACT tavle"	Purchase of finished product, or self-designed FACT tavle	Price of finished product, salary and resource use of developer	Societal, governmental and health care institution	Team, municipality	Not collected	Important
	Initial training	Profesionalization	Hours used for training, costs of meeting room (if relevant) and travelling costs	Societal, governmental and health care institution	Team	Not collected	Important
Operation costs	Labour	Resource use and salary of team members. Team members include: psychiatrist, psychologist, social worker, nurse, specialist nurse, and other health care worker	Full-time-equivalent (FTE), hourly salary, wages, fringe benefits, social cost	Societal, governmental and health care institution	Team, and user	Estimates can be collected at Statistics Norway microdata	Important

	Primary health care utilization	General practitioner	Cost from a health care institution perspective, i.e. the value of the service performed and not what the patient or user paid	Societal, governmental and health care institution	Team, user	Provided by the FACT study, but not duration of health care utilization	Important
	Specialist health care utilization	Visits and stays at DPS and regional hospitals	Cost per diem (cost from a hospital perspective)	Societal, governmental and health care institution	Team, user		Important
	Travel costs	When team members and users have to travel to the home of the user, and also if users travel to for instance the general practitioner	Mileage, gas	Societal, governmental and health care institution	User, employee	Not collected	Important
	Materials and supplies	materials related to operation of FACT teams		Societal, governmental and health care institution	Team	Not collected	Important
	Volunteer time	Unreported work hours by	Full-time-equivalent (FTE), hourly salary	Societal, governmental and health care institution	Employee	Not collected	Important
Adverse events	Adverse events such as a reduction in function level, or other bad events		Emergency room use, or the value of FACT team work related to the specific event	Societal, governmental and health care institution	Team	Not collected	Less important
Productivity loss	Absenteeism, leave		Lost workdays and hours	Societal, governmental and health care institution	Employee	Not collected	Less important

Note: Team level is equivalent to district level (bydel). It is difficult to pre-specify which of the cost categories belong to specialist or primary mental health care institution. The data collection will try to separate which costs belong to the primary or specialist mental health care. This is especially true for costs such as development and start-up costs. For operation costs, the staff will be able to report if they are hired at the regional and district hospitals, or primary health care in the municipalities. \*The Norwegian guidelines on cost-effectiveness analysis in health care discourage the inclusion of loss of production due to ill health. Note that rankings of different cost components are not conventional, as their total sum of score is used in cost-effectiveness analysis.



*Development costs* of FACT teams implementation includes all costs directly related to development and start-up of team members. This involves meetings and consultation with selected FACT teams, and preparation of FACT materials (i.e., documents and presentation of the content of the FACT model, experiences, and evidence of the FACT care model). *Start-up costs* involves facilities and equipment, hiring and recruitment costs, and initial training of the FACT teams. Today, FACT municipalities and regional hospitals receive a lump-sum dedicated to development of FACT teams.

FACT teams developed from 2013 to 2016 in Norway were all primarily located within hospitals (regional and DPS). Three of seven teams had shared employee responsibility between regional hospitals/DPS and municipalities (Landheim and Odden 2020, 34–35). The collaboration agreement between regional hospitals, DPS and municipalities varied across the teams and contained division of labour between primary and specialist care institutions. The agreement included salary, and responsibility of information flow. The primary employer varied greatly. Most teams were organized at the regional hospitals and DPS, while some were organized at both primary and specialist institution (regional or DPS). The FACT teams activity levels vary according to population size, level of mental illness, severity of users, and population density. Accordingly, the organization, structure and thus use of resources could also vary.

*Operation costs* involves all costs directly related to core activities of the FACT teams. FACT teams are interdisciplinary and mainly includes psychiatrist, psychologist, social worker, nurse, specialist nurse, and other health care worker (for instance those specializing in drug abuse). In this way, FACT teams are based on a cooperation between primary care and regional hospitals. In the context of FACT teams, it is essential to be able to distinguish between costs of specialist mental health services (regional hospitals and DPS), and the primary health care. From early on, these costs and resource use needs to be carefully listed and stored separately.

Core activities of the teams is logged on the “FACT board” (an electronic scoreboard) and reported in patient journals (but not all teams reported in journals). The development of the “FACT board” varies across teams as some teams purchase a finished product while others developed or modified their own electronic scoreboard (Landheim and Odden 2020).

It is also important to list and be transparent about the health care service use during FACT teams that primarily does not involve the core activity. This is for instance home nursing services and medication. It is specifically visits to the GP, physiotherapy, the psychologist and inpatient/outpatient visits to hospitals that is part of the FACT team service. It is crucial to collect details in terms of number of visits, length of stay (or number of hours or minutes) for both FACT and control groups. Thus, the costs related to home nursing visits and medication are not included. The evaluation of FACT implementation during 2013–2016 revealed that the majority of the activities of the teams involved

supporting dialogues, health care service use, practical help with accommodation or housing, finances and self-care (Landheim and Odden 2020, 61–67).

Thus, operation costs contain labour costs measured as full-time-equivalent (FTE): hourly salary, wages, fringe benefits, and social costs. Operation costs also include volunteer time and materials and supplies that is involved when the FACT team is in operation. Travel costs of the teams, i.e., travelling from office/home to meet the team/patient, or the patient, transportation of the patients to health care services needed such as the general practitioner for instance. To estimate the travel costs details on mileage and price is needed.

If possible, it is also helpful to include all unit costs related to adverse events caused by FACT teams, and productivity loss (lost workdays or hours due to absenteeism, as well as inefficiency while at work/job owing to sickness).

When all required measurement of resource use and cost is collected for all periods and cases, cost-effectiveness analysis will be used to evaluate the value of money for implementing FACT in Norway. Results of the comparison will be stated as the incremental cost per unit of effect.

### **3.2. Outcome measurement**

Effect studies that measure benefits beyond a reduction in hospitalization is also needed. While decision making requires that the total benefits of a program exceed the total costs, it is also necessary to discuss what would count as a benefit, and cost, and how to do the comparison. In the case of mental health service, a discussion of a measurement of benefits beyond a reduction in hospitalization is needed (Reitan and Lien 2023). This is especially relevant in a setting of FACT teams as there is heterogeneity in primary outcomes across the teams. Some teams for instance emphasize more psychosis with substance abuse more than others. The difference of the emphasis on target outcomes also requires different pattern of the health service utilization due to different symptoms, and thus resource use. One possible approach is to use hospitalization as well as other measurement such as functioning.

In the economic evaluation, we thus propose to also use secondary outcomes such as functional level (the Health of the Nation Outcomes Scales – HoNOS) and quality of life such as MANSA (Manchester Short Assessment of Quality of Life). When measuring MANSA, patients rate their subjective feeling of the quality of life. These are instruments that are internationally validated and substantially used in the FACT study 2013–2016 (see Landheim and Odden 2020). In this way, we can also measure the cost of a one-unit increase in quality of life as well as functional level of FACT users.

Both MANSA and HoNOS are condition-specific non-preference measure of health, and thus they are able to more sensitive for a given condition (e.g., mental illness) by covering important dimensions of mental illness. However, they have important limitations as well: they may miss the impact of possible co-morbidities and side effects, as well as they cannot be comparable across programs. An alternative is to use *generic* preference-based measures of health in economic evaluation because they permit comparisons between health care programs, even under different medical conditions and treatments. One such instrument is EQ-5D, where the Norwegian Medicines Agency recommends it in a single technology assessment.

### 3.3. Suggestion of control group

As mentioned in section 1.3., a proper control group is hard to establish in a FACT team setting because FACT teams are not randomly distributed. The first districts using FACT teams were districts with high frequency of the most severe mental health illnesses. The remaining municipalities today that do not practice FACT teams have rather lower density of FACT target users.

We propose a pragmatic RCT as a gold standard, which seek to examine whether an intervention/treatment works in the clinical setting, preferably on all types of relevant population (Lyngbakken et al. 2021). It tries to answer how treatment works in a *real-world scenario* of a heterogeneous *real-world population*. In short, the settings of pragmatic RCT should be similar to the settings in which patients are treated in the real world, i.e., it should be representative. There are well developed statistical guidelines for such trials, and key design elements include: 'Real-world population', 'Real-world setting', 'Appropriate comparison arm', 'Relevant outcome' (treatment benefits and costs).

In the absence of pragmatic/traditional RCT, we propose two alternative methods to construct a control group. The first involves comparison of before and after the FACT implementation. In this method, we utilize the sequential implementation of FACT in Norway. This means that there are continuous implementations of FACT teams. This allows us to choose a region or municipality that has recently or will prospectively implement FACT teams. We can thus collect similar information/data before the implementation of FACT teams (baseline data). There are different data collection methods employed: standardized templates (which can be administered via interview or survey), targeted questionnaires (survey of participants or staffs about resource unit quantity and unit cost data), other existing records (electronic or hard copy) that are routinely collected related to an intervention.

The second method includes a construction of a control group (municipality with no FACT teams) that matches a FACT municipality in terms of municipality characteristics and

distribution of mental health illnesses. In contrast to the first method, we will perform the data collection of intervention and control group simultaneously. In addition to the above methods highlighted, there are several other data collection approaches as well. For instance, activity logs, and direct observations. That is, FACT team staff can complete logs prospectively to track time or materials used for control and intervention activities; this can also be used by participants (cost diaries). Further, FACT teams or trained staff can observe intervention processes and record time, or materials used during intervention activities for both arms.

### **3.4. Modelling**

We also review a method for how long the benefits last without cost increases. Several literatures examined the benefits and costs of mental treatment/intervention focusing on a single treatment episode. One can model the progression of patients over time with respect to health care use and treatment benefits. Yet, the benefits generated, and costs incurred varies depending on the severity of mental illness, the nature and relevance of the treatment involved, and hence difficult to speculate the outcomes. However, it is always preferable to evaluate effectiveness and cost-effectiveness of a trial over a relatively longer period. A two-year follow-up of the FACT teams in Norway is reasonably sufficient time to assess trends in the costs and benefits of FACT implementation had all necessary data been available. Since trial-based effectiveness and cost-effectiveness are usually involve shorter time horizon, the most common approach is using dynamic simulation models to evaluate chronic mental illness over a longer time horizon. This enables us to explore the pattern of change in costs in relation to treatment benefit over time.

## 4. Impact

The methodology for assessing the cost-effectiveness of FACT is not well established in Norway and internationally. Without a systematic analysis and costing methods it is difficult to clearly identify the relevant alternatives to FACT. Different stakeholders such as decision-makers, practitioners, evaluation team should involve in defining the questions being addressed and clearly specify the options/comparators. The main aim of health economic evaluation is to provide useful information that equip policy-makers in their proper decision-making process.

For the research community, the proposed design will be the first economic evaluation of the FACT implementation, and thus it will establish an empirically tested framework for an economic analysis of FACT. Further, this can be used as a checklist for future economic evaluation of FACT and other community-based mental health care services, which can be reassessed and reviewed by peers frequently.

Results from the economic evaluation speaks directly to the municipality and district level primary health care providers, DPS, regional hospitals, and at higher level decision-makers such as the Directorate of Health and the Ministry of Health and Care Services. At a lower level, results from the proposed design can potentially affect the everyday lives of FACT and non-FACT users.

## 5. References

- Camacho, E. M., D. Ntais, P. Coventry, P. Bower, K. Lovell, C. Chew-Graham, C. Baguley, L. Gask, C. Dickens, and L. M. Davies. 2016. "Long-term cost-effectiveness of collaborative care (vs usual care) for people with depression and comorbid diabetes or cardiovascular disease: a Markov model informed by the COINCIDE randomised controlled trial." *BMJ Open* 6 (10): e012514. <https://doi.org/10.1136/bmjopen-2016-012514>.
- Drukker, M., J. van Os, S. Sytema, G. Driessen, E. Visser, and P. Delespaul. 2011. "Function assertive community treatment (FACT) and psychiatric service use in patients diagnosed with severe mental illness." *Epidemiol Psychiatr Sci* 20 (3): 273–8. <https://doi.org/10.1017/s2045796011000369>.
- Drummond, Michael F. 2021. "Medical decision making: The increasing role of evidence." *Medical Writing* 30 (3).
- Drummond, Michael F., Mark J. Sculpher, Karl Claxton, Greg L. Stoddart, and George W. Torrance. 2015. *Methods for the Economic Evaluation of Health Care Programmes*. Oxford, United Kingdom: Oxford University Press.
- Fenton, W. S., J. S. Hoch, J. M. Herrell, L. Mosher, and L. Dixon. 2002. "Cost and cost-effectiveness of hospital vs residential crisis care for patients who have serious mental illness." *Arch Gen Psychiatry* 59 (4): 357–64. <https://doi.org/10.1001/archpsyc.59.4.357>.
- Firn, M., K. Hindhaugh, D. Hubbeling, G. Davies, B. Jones, and S. J. White. 2013. "A dismantling study of assertive outreach services: comparing activity and outcomes following replacement with the FACT model." *Soc Psychiatry Psychiatr Epidemiol* 48 (6): 997–1003. <https://doi.org/10.1007/s00127-012-0602-x>.
- Kilian, R. 2012. "[Health economic evaluation of community-based psychiatric interventions]." *Nervenarzt* 83 (7): 832–9. <https://doi.org/10.1007/s00115-011-3469-2>.
- Landheim, Anne, and Sigrun Odden. 2020. *Evaluering av FACT-team i Norge. Sluttrapport*. (Hamar: Sykehuset Innlandet HF Nasjonal kompetanse for samtidig rusmisbruk og psykisk lidelse (NKROP)).
- Le, Long Khanh-Dao, Adrian Cuevas Esturas, Cathrine Mihalopoulos, Oxana Chiotelis, Jessica Bucholc, Mary Lou Chatterton, and Lidia Engel. 2021. "Cost-effectiveness evidence of mental health prevention and promotion interventions: A systematic review of economic evaluations." *PLOS Medicine* 18 (5): e1003606. <https://doi.org/10.1371/journal.pmed.1003606>.
- Lyngbakken, M. N., A. Paulsen, A. Sethupathy, Ø. Hesselberg, S. Grimsgaard, and K. Hagen. 2021. "Pragmatic Trials – what are they?" *Tidsskrift for den norske legeförening* 141. <https://doi.org/10.4045/tidsskr.21.0490>.
- McCrone, Paul, Helen Killaspy, Paul Bebbington, Sonia Johnson, Fiona Nolan, Stephen Pilling, and Michael King. 2009. "The REACT Study: Cost-Effectiveness Analysis of Assertive Community Treatment in North London." *Psychiatric Services* 60 (7): 908–913. <https://doi.org/10.1176/ps.2009.60.7.908>. <https://doi.org/10.1176/ps.2009.60.7.908>.
- Meeuwissen, J. A. C., T. L. Feenstra, F. Smit, M. Blankers, J. Spijker, C. L. H. Bockting, Ajlm van Balkom, and E. Buskens. 2019. "The cost-utility of stepped-care algorithms according to depression guideline recommendations – Results of a state-transition model analysis." *J Affect Disord* 242: 244–254. <https://doi.org/10.1016/j.jad.2018.08.024>.
- Miller, Christopher J., Shawna N. Smith, and Marianne Pugatch. 2020. "Experimental and quasi-experimental designs in implementation research." *Psychiatry Research* 283: 112452.

<https://doi.org/https://doi.org/10.1016/j.psychres.2019.06.027>.  
<https://www.sciencedirect.com/science/article/pii/S0165178119306833>.

Ministry of Health and Care Services. 2024. *Rapport fra ekspertgruppen om tilgang og prioritering*. (Oslo: Ministry of Health and Care Services).

Musgrove, P., and J. Fox-Rushby. 2006. "Cost-Effectiveness Analysis for Priority Setting." In *Disease Control Priorities in Developing Countries*, edited by D. T. Jamison, J. G. Breman, A. R. Measham, G. Alleyne, M. Claeson, D. B. Evans, P. Jha, A. Mills and P. Musgrove. Washington (DC) New York: The International Bank for Reconstruction and Development. The World Bank.Oxford University Press.

NOU. 2014. *Åpent og rettferdig – prioriteringer i helsetjenesten*. Departementenes sikkerhets- og serviceorganisasjon. Informasjonsforvaltning (Oslo).

Paulden, Mike, James F. O'Mahony, Anthony J. Culyer, and Christopher McCabe. 2014. "Some Inconsistencies in NICE's Consideration of Social Values." *PharmacoEconomics* 32 (11): 1043–1053. <https://doi.org/10.1007/s40273-014-0204-4>.

Reitan, Solveig Klæbo, and Lars Lien. 2023. "Mental health services in Norway, 2023." *BJPsych International* 20 (4): 95–99. <https://doi.org/10.1192/bji.2023.25>.  
<https://www.cambridge.org/core/product/0A5C0BFF3619C1BF569FF1894800ED1A>.

Shearer, James, Paul McCrone, and Renee Romeo. 2016. "Economic Evaluation of Mental Health Interventions: A Guide to Costing Approaches." *PharmacoEconomics* 34 (7): 651–664. <https://doi.org/10.1007/s40273-016-0390-3>.

Sohn, H., A. Tucker, O. Ferguson, I. Gomes, and D. Dowdy. 2020. "Costing the implementation of public health interventions in resource-limited settings: a conceptual framework." *Implement Sci* 15 (1): 86. <https://doi.org/10.1186/s13012-020-01047-2>.

The Norwegian Directorate of Health. 2015. [\*Internasjonalt perspektiv på psykisk helse og helsetjenester til mennesker med psykiske lidelser\*](#). The Norwegian Directorate of Health (Oslo: The Norwegian Directorate of Health).

Weisbrod, B. A., M. A. Test, and L. I. Stein. 1980. "Alternative to mental hospital treatment. II. Economic benefit-cost analysis." *Arch Gen Psychiatry* 37 (4): 400–5. <https://doi.org/10.1001/archpsyc.1980.01780170042004>.