

Procomp Solutions

Founded in Finland, 1995

Specialise in Artificial Intelligence-based
solutions for

Schedule Optimisation

Workforce Management (WFM)



Procomp R2 Optimiser

Enterprise-class AI-based optimisation

Largest logistics customers optimise 400'000 shipments/day

Largest WFM customer manages 25'000 employees

75% of retail food distribution in Finland planned with R2

R2 originally developed for transport logistics

Started working with Domiciliary Care in 2011

Heavily adapted for Care (Delivering care is different to delivering a parcel)

Used for

Operational Planning and Optimisation

Strategic Planning and Optimisation



Logistics is about

Having the

Right Resource

In the Right Place

At the Right Time



In England there are
735'000 Domiciliary Care jobs
(~677'000 people)

All of whom have to be
In the **Right Place**
At the **Right Time**

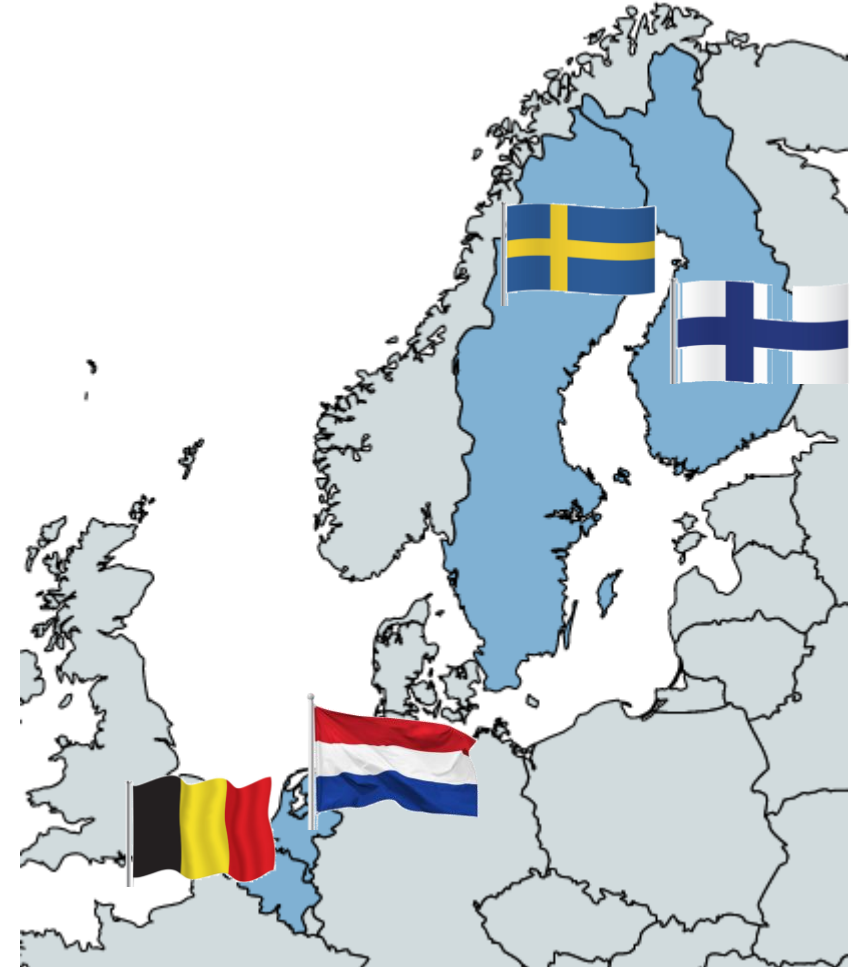
That's a **Big** Logistics Problem

**So what can
Domiciliary Care learn
from the Logistics
sector?**

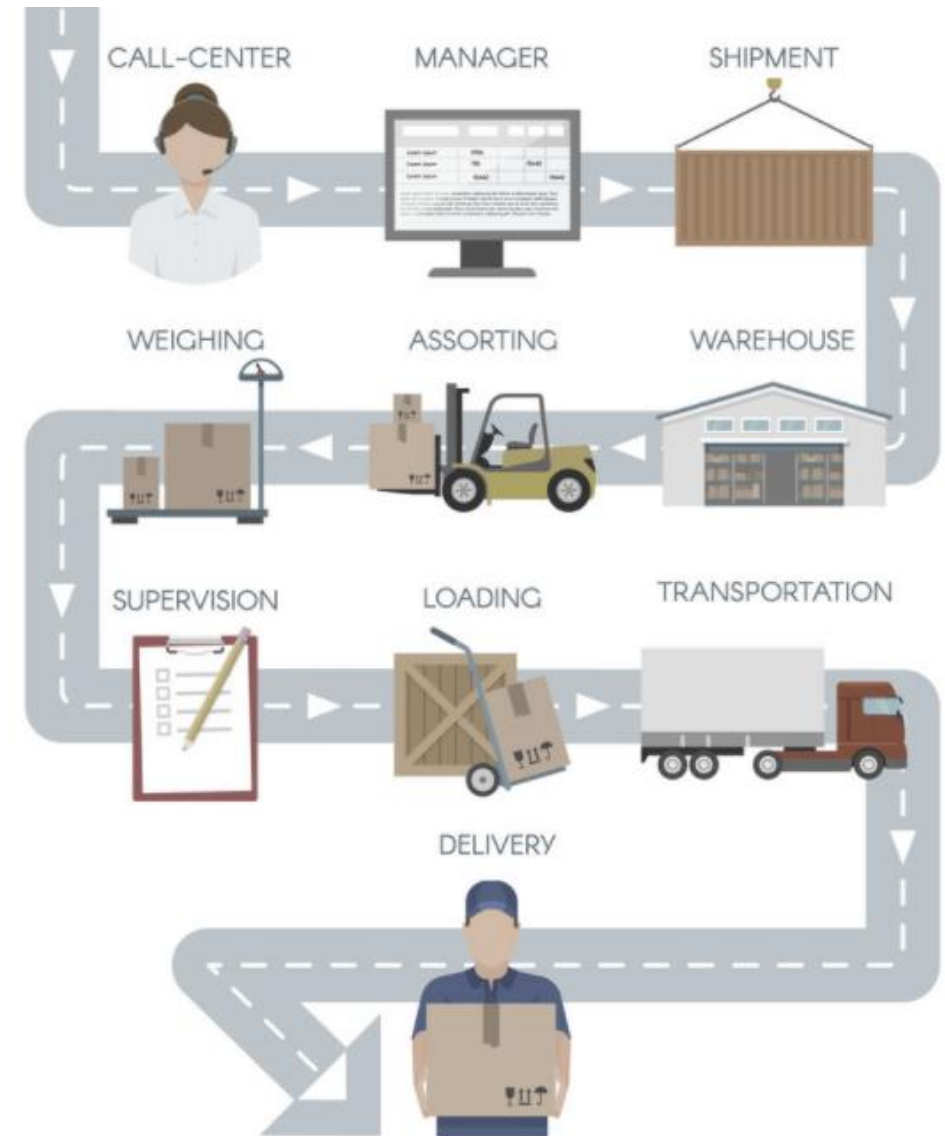


And...

What has Domiciliary
Care in other countries
already learnt from
the Logistics sector?



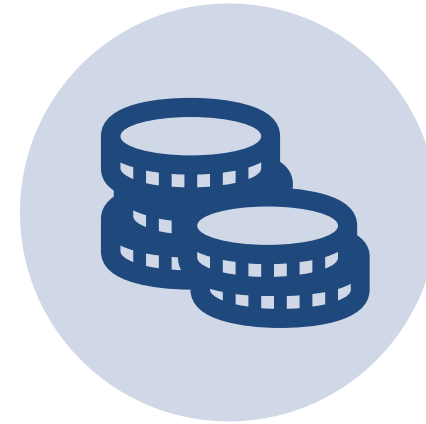
How does the Transport Logistics sector Operate?



Logistics Providers primarily compete on



QUALITY
(SPEED, TIMELINESS)



COST

Logistics Providers want to

Minimise the
number of vehicles



Vehicles are costly assets

Minimise Mileage



Reduces cost, exposure to
traffic, increases speed

Keep employees
happy



Drivers are governed by
strict work regulations

How do Logistics Providers Plan?

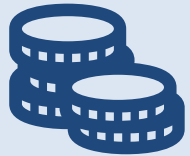
Operational
Tactical
Strategic

Clue: Nothing is left to chance



Operational Planning is performed with advanced tools, such as Procomp's R2

Plans must be



Efficient



Realistic & achievable: High quality

(Drivers can't make up time by cutting visits short)

Plans are effectively detailed simulations which drivers then execute

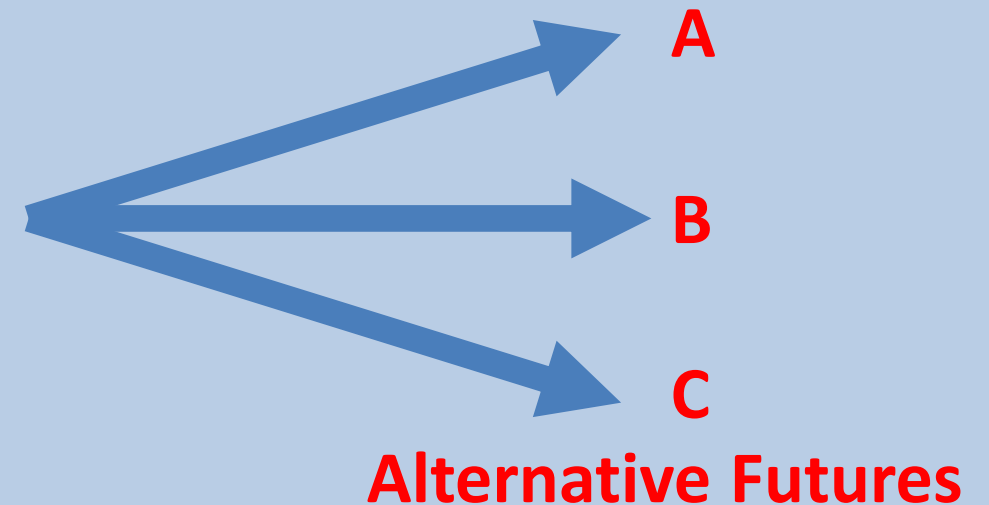
Strategic & Tactical Planning in Logistics



The same tools used for Operational Planning (such as R2) are used to support **Strategic and Tactical** decision-making by modelling alternative futures

How to

- Improve quality?
- Introduce a new service?
- Improve efficiency?
- Improve worker satisfaction?



The type of changes logistics providers often model in **Strategic Optimisation** include

Changing types or mix of vehicles

Changing location of hubs

Changing location of inventory

Changes to distribution network design

Changing working patterns

The effect of mergers or acquisitions

Changing delivery patches

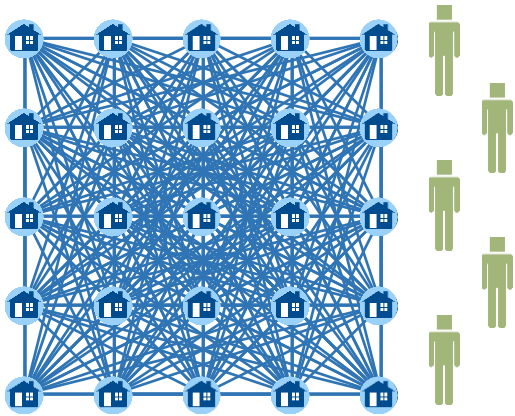


**There's been a
levelling up in the
logistics sector**

**Logistics Providers
wouldn't be competitive,
and we wouldn't have the
services we take for
granted without advanced
optimisation tools like R2
and methods like
Strategic Optimisation**

Home Visit Scheduling – Extreme Complexity

With only 8 workers and 62 visits there are more permutations for organising schedules than there are atoms in the known universe!



| Workers | Visits | Number of permutations |
|---------|--------|--|
| 3 | 3 | $3 \times 4 \times 5 = 60$ |
| 3 | 6 | $3 \times 4 \times 5 \times 6 \times 7 \times 8 = 20160$ |
| 3 | 9 | $3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 = 19.958.400$ |
| 5 | 25 | $368.410.000.000.000.000.000.000.000.000$ |
| 8 | 62 | 6.244×10^{81} |
| m | n | $m \circ (m+1) \circ \dots \circ (m+n-1)$ |

This complexity makes operational planning extremely challenging with traditional tools
It also makes it very challenging to find solutions to structural and systemic issues
R2 manages this complexity and provides solutions to these issues

Adapting Logistics planning tools and techniques for Domiciliary Care



Operational Optimisation of Domiciliary Care services using R2 Optimiser

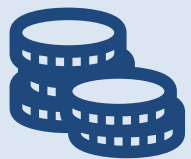
Adaptations for domiciliary care include

Double-up handling

Continuity – Based on history or planned into the future

Handling of complex clinical rules (initially for Belgium)

To ensure plans are



Efficient



High Quality

Strategic Optimisation for Domiciliary Care



Domiciliary Care **Strategic Optimisation** using R2 Optimisation

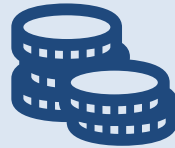
Procomp have carried out 60 Domiciliary Care Strategic Optimisation projects in Finland

This represents 1/3 of the total Finnish workforce

Projects have also been carried out in Benelux countries

Domiciliary Care **Strategic Optimisation** objectives are typically to:

Improve Efficiency



Improve Quality of Care



Improve Care Worker
Satisfaction



**Delivering care is not a
zero sum game; the
result is usually an
improvement in all
areas**

Types of changes which have been modelled with **Strategic Optimisation** in Finland include:

Changes to shares of responsibility in integrated teams

Changing care assessment and planning practices

Moving non-essential tasks to off-peak times

Changing working patterns

Changes to team sizes

Taking certain equipment into use

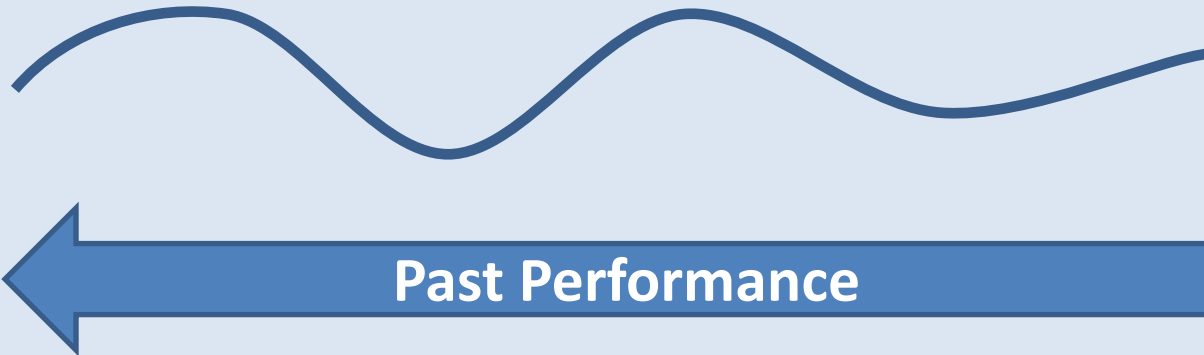
Insourcing and outsourcing planning

Changing team patches

Data Analytics vs. Strategic Optimisation

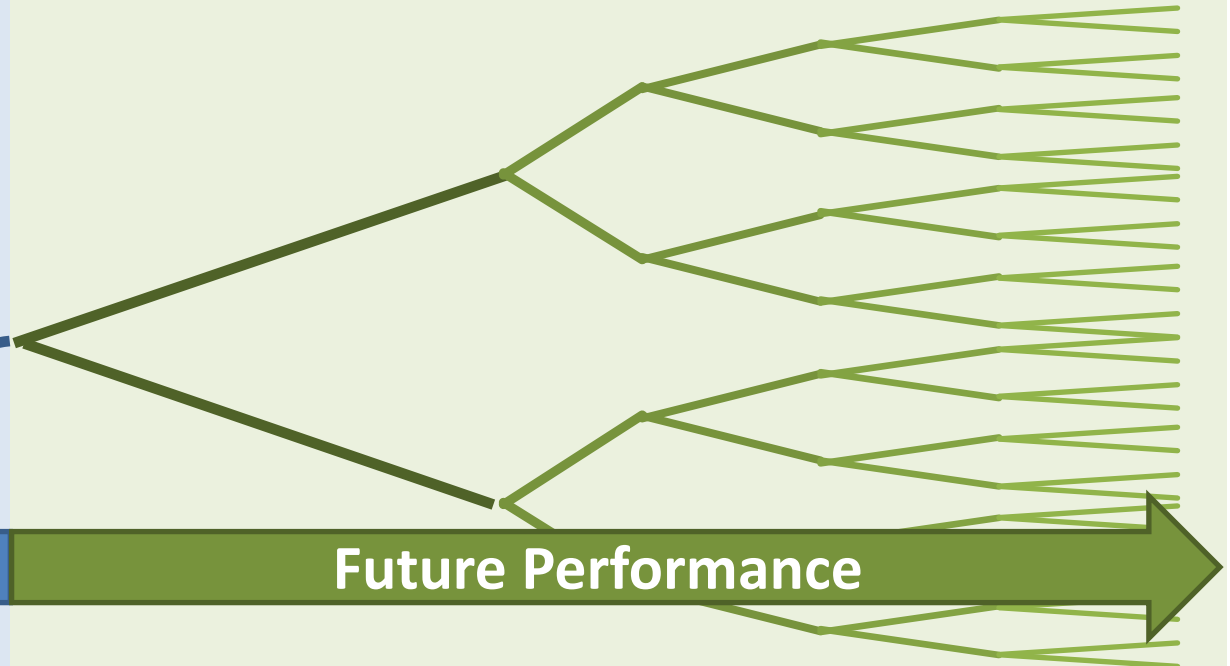
Data Analytics & ERP Data

There's only one version of the past:
Data from ERP systems & Data Analytics ('Big Data')
tell how you performed in the **past** – but it isn't
possible to go back and change anything



Strategic Optimisation

An infinite number of alternative futures are available:
Strategic Optimisation ('Big Computing' and AI)
gives choice and control over **future** performance



Strategic Optimisation in Finland: Care planning

From the ESSOTE consortium of municipalities in Eastern Finland

Multiple scenarios were modelled in multiple settings. The scenarios of most interest are summarised

| | Scenario A | Scenario B | Scenario C | Scenario D |
|--------------------------|---------------|---------------|---------------|---------------|
| Changes made | | | | |
| Reconciled Care Planning | X | X | X | X |
| No team boundaries | X | | X | |
| Redefined team areas | | X | | X |
| Electronic locks used | | | X | X |
| Results | | | | |
| Mileage | -34% | -36% | -49% | -54% |
| Number of Carers | -17% | -17% | -17% | -17% |

Reconciled Care Planning refers to a type of three-way co-production involving the client, assessor and local domiciliary care manager or coordinator

Strategic Optimisation in Finland: Integrated Teams

From Rovaniemi, Finland

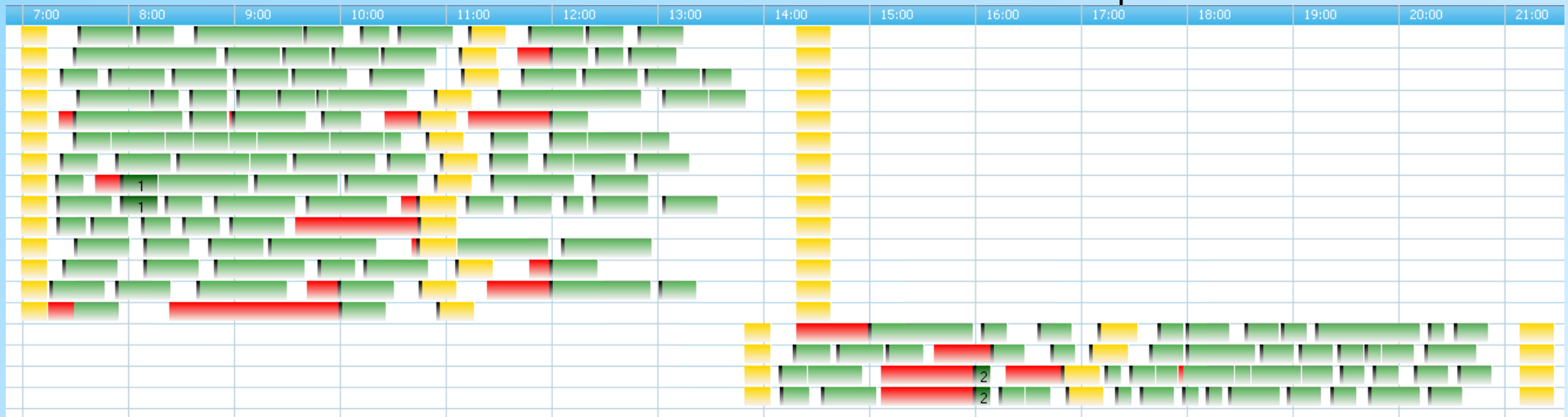
Integrated teams in use. Typical team had 11 care assistants plus 6 Registered Nurses

Strategic Optimisation used to find the optimal share of responsibility and mix of staff

Staff and unions involved in the Strategic Optimisation process

Result: Number of RNs reduced by 50%

Utilisation of RNs was restricted to allow them to handle unplanned events



What's been achieved in Finland

Domiciliary Care has levelled-up and local authorities have a better understanding of the logistical factors which affect the delivery of care

Care assessment & planning practices advocated by Procomp are widespread

Finnish Nurses' Union have recognised the positive impact on the working lives of their members, and have written two articles about Procomp

Local authorities and unions have seen quality improve

Domiciliary Care in the UK

The UK Care system is more fragmented than we have seen elsewhere

Care Worker Utilisation is also lower

Many issues are universal and the same as elsewhere

The fragmented system and commissioning practices add additional layers and inefficiencies

Greater potential to improve!

Poor Domiciliary Care workforce utilisation in the UK

- **Utilisation of the Domiciliary Care workforce is very poor in the UK**
- Care Workers often either have fragmented work patterns with periods of rush and large amounts of unpaid down time and travelling (e.g. below) or back-to-back schedules with no travel time



Reflected in national KPIs

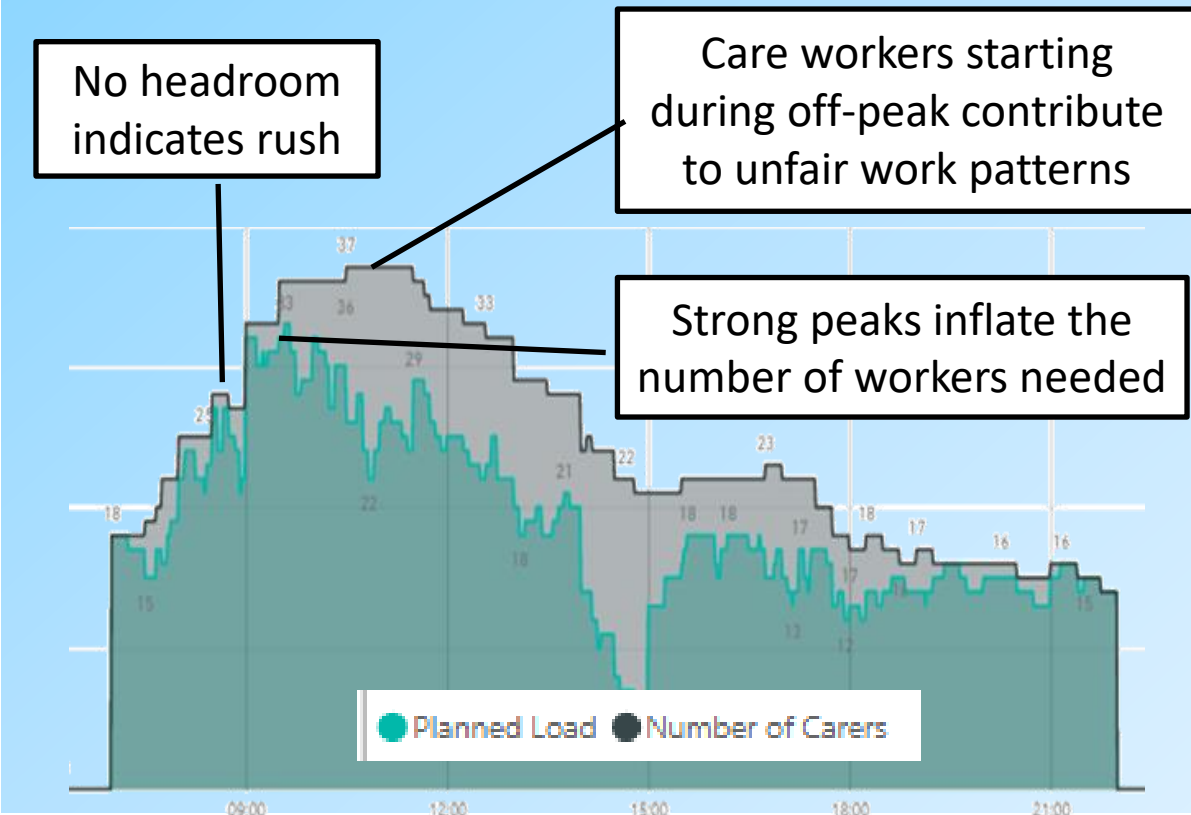
- Almost as many care workers as service users (~5 service users/care worker in Finland)
- ~3 miles/visit travelling (~1 mile/visit in Finland)

Domiciliary Care Workforce utilisation in the UK

We see several reasons for the poor workforce utilisation in the UK, including:

- Zero & guaranteed hour contracts have allowed people to be thrown at the problem
- Lack of coordination in Care Assessment/Planning practices – Disconnect between demand and supply
- Commissioning practices: Fragmentation and lack of cooperation between services. Expecting the market to provide the needed capacity

The load distribution graph below is quite typical of homecare in the UK and reveals a number of issues



Domiciliary Care Workforce utilisation in the UK

Current practices in the UK preclude fair & efficient utilisation of the domiciliary care workforce:

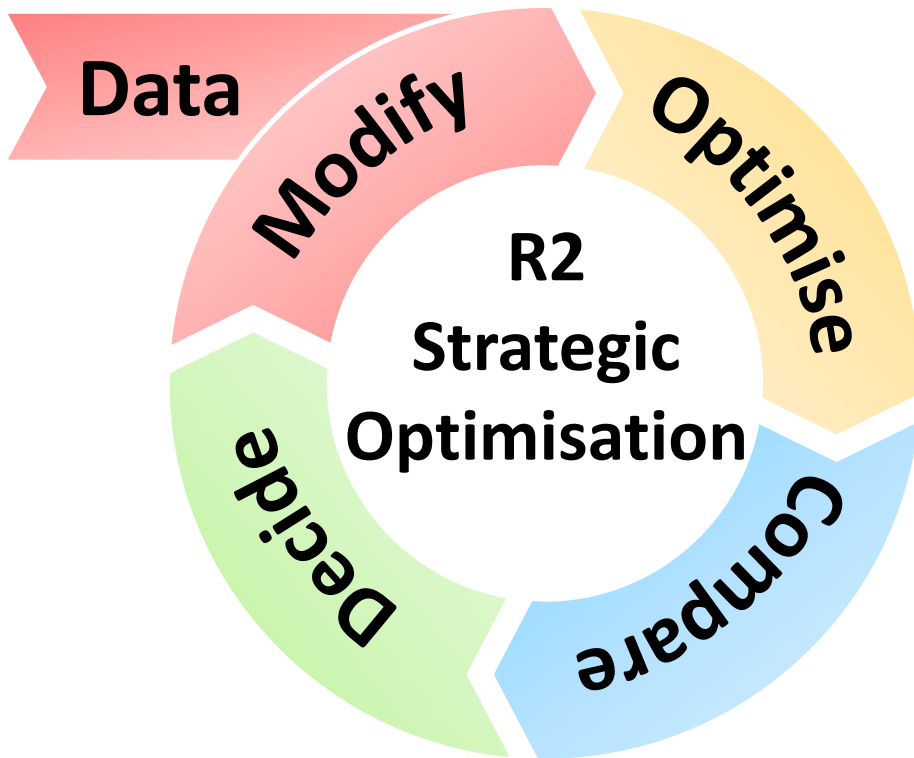
Care workers have unfriendly working patterns and poor pay:

Pay is thinly spread across a large, poorly utilised workforce

Changes are needed, but what changes?

Domiciliary Care Strategic Optimisation Proposal

Utilises a snapshot of anonymised data from Patient Management System or ERP



A Strategic Optimisation project is proposed to evaluate changes to ways of working which will lead to significant improvements in the utilisation of the Domiciliary Care workforce

Multiple workstreams include:

- **Care planning:** Model the impact of changes to care assessment and planning practices
- **Commissioning practices:** To ensure efficient utilisation of the available in-house and outsourced resources

Strategic Optimisation: Benefits

Significant benefits achieved in Finland and Benelux. Great deal of scope to improve in the UK

Care planning practices: Improved care assessment/planning practices typically increase productivity by 10-20%, however, in the UK we have seen that the potential is even greater

Coordination between different services: Different services (e.g. reablement, supported discharge, homecare) often have different load profiles and benefit from a coordinated approach (analogous to our work with Integrated Teams in Finland & Benelux). This typically increases overall productivity by 10-20%

Coordination between similar services: This issue is more severe in the UK than elsewhere where we work. Our modelling shows that splitting a service between 4 providers verses using a coordinated approach increases travelling by 40% and the number of carers needed by a similar factor

Providers and Commissioners are included in the Strategic Optimisation process to ensure a system-wide approach, and to identify changes which will have the greatest impact in the UK context

Strategic Optimisation Benefits

Strategic Optimisation provides visibility of the system-wide issues which limit carer utilisation, and enables informed decisions to be made for changes to address those issues

Lowering the barriers to improved carer utilisation has benefits for all stakeholders

For Care Workers

- More compact, friendly schedules with less travelling and less unpaid downtime
- More paid hours with less time away from home
- Possibility of career progression due to integration of services

For Service Users

- Improved continuity and timeliness of visits

For commissioners

- Improved understanding of the underlying logistical factors affecting domiciliary care
- Improved capacity and stability of the provider market

For Providers

- Improved carer utilisation, leading to lower staff turnover and lower operating costs
- Lower costs allow investment in the workforce

Possible sequencing of changes

Short-term
wins

Commissioners aware of the factors which affect workforce utilisation

Conservative changes to care assessment & planning practices

Brokerage trained to better utilise the market

Improvements to assessment/care planning practices

Improve integration of services

Shape the provider market

Longer-term
wins

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