GTTPS Evaluation

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Gwent Test Trace Protect Service (GTTPS) Evaluation

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Purpose and Summary of Document:

After its set-up at an unprecedented pace, the Gwent Test Trace Protect Service (GTTPS) has gradually developed into the service as it currently operates. While the SARS-CoV-2 response remains paramount, it is essential to understand how, why, and when the GTTPS changed its way of working to continually shape an effective service. This evaluation seeks to contribute to the evidence base for planning population-scale, integrated, collaborative contact tracing and health protection services in the future.

This report provides the key findings of the GTTPS evaluation project, conducted between Oct 2021 and Feb 2022, as a multi-method research project in cooperation between the Aneurin Bevan University Health Board and the University for Continuing Education Krems (UWK), Austria. The focus is on TTP's contact tracing and incident management (regional cell) elements rather than the test or protect elements.

The paper aims at (1) understanding how organisational structures developed around a specific need during the early phase of the GTTPS, describing the initial set-up of the GTTPS (established towards the end of the first SARS-CoV-2 wave in Wales, UK), (2) investigating when governance structures were established and how they evolved, (3) comprehending how the design deviated from the initial set-up, proactively adapted and further evolved according to the needs of the service, (4) analysing the robustness of the emergent systems, and (5) identifying the specific learning

for future TTP service developments or other Public Health partnerships (e.g., around organisational culture).

Research findings reveal the success factors of the Gwent TTP service, contribute to the evidence base on developing a contact tracing service at a population scale, and include workforce recommendations to enhance the resilience of the service.

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“I have worked on many projects across partners, but none that have been as successful as the TTP service.”

A team member of the Gwent TTP service

Content

background

1. Introduction

On 13 May 2020, Welsh Government (WG) published its Test, Trace and Protect (TTP) strategy supported by the Public Health Wales Public Health Protection Response Plan. The overall objective was to create a new TTP service to break the chains of SARS-CoV-2 transmission. The central role of health boards and local authorities was clearly outlined: to set up regional and local contact tracing structures to tackle the onward transmission of COVID-19 and reduce the need for restrictions on people's lives.

The Gwent TTP service (GTTPS) commenced contact tracing at the beginning of June 2020. The service's workforce consists of staff from Aneurin Bevan University Health Board (ABUHB), Public Health Wales (PHW), Blaenau Gwent County Borough Council, Caerphilly County Borough Council, Monmouthshire County Council, Newport City Council and Torfaen County Borough Council.

This evaluation highlights the enabling features and challenges of establishing and implementing a TTP service. The evaluation focuses on TTP's contact tracing and incident management (regional cell) elements rather than the test or protect elements. In 2021, this branch of the GTTPS successfully followed up on 81% of 101,743 positive cases and 81% of 164,926 associated contacts (21,951 of these tested positive). In particular, the Staff and Wellbeing Cell successfully followed up on 1,785 positive healthcare staff and 402 positive contacts in the workplace and identified 7,519 community contacts. The Clinical Leads actioned 14,344 requests for support, and the Data Cell actioned 33,724 CRM Regional Queue requests.

The GTTPS evaluation appraises the collaborative approach taken by the service, the structures that emerged and evolved, and the determinants of the inclusive working climate. Specifically, the online survey (as part of this evaluation study) seeks to comprehend how information sharing was initially set up and adapted (to remote working) during the COVID-19 crisis. The survey pays attention to the formality of communication (and how it has changed over time). It aims to identify critical roles and the leadership style that morphed the service into what it is today. Also, it seeks to explain facets of the inclusive working climate which characterise the service. Finally, this report picks up lessons learnt about what was effective and describes new ways of working collaboratively. These elements aim to improve the understanding of rapidly developing and sustaining an integrated service, take stock of the learning for designing population-scale contact tracing or health protection partnerships and offer recommendations for improvement.

The GTTPS evaluation study was delivered in conjunction with the University for Continuing Education Krems (UWK), Austria, to conduct an independent evaluation of the GTTPS and guarantee academic rigour. The evidence base for this report comes from document reviews, focus group discussions, interviews (with staff in ABUHB, PHW and the five local authorities in Gwent), and the responses of GTTPS staff to an online survey. Data were collected between October and November 2021. The report includes many direct yet anonymised quotes to give GTTPS team members a voice, in line with General Data Protection Regulation (GDPR) requirements.

As mentioned above, this study evaluates the enabling and challenging features of the GTTPS and the service's evolution, not its performance (or impact). There is ample acknowledgement of the latter. For example, Audit Wales (2021) recognised that the "*TTP programme was rapidly developed*

from scratch." (p. 4). "*Processes have been put in place in a matter of days, which in normal times, would have taken months or years*."(p. 33) (The GTTPS employed a peak workforce of over 400 whole-time equivalent staff (WTEs) in local authorities and over 70 WTEs within the Health Board.)

"*It was particularly encouraging to see how well public sector partners worked together at a national, regional, and local level to combine specialist expertise with local knowledge*." (p. 8) (The GTTPS consists of six core public sector partners but works with many more and has been recognised for innovative approaches to effective and evidence-based decision-making as published in the Operational Research Societies' *Impact* magazine (Behrens, et al. 2021).)

In March 2021, the Modelling Subgroup of the Technical Advisory Cell (TAC) estimated that TTP reduced the R_t from approximately 1.7 to 1.3 (TAC Modelling Subgroup 2021).[1] The Modelling Subgroup added that, based on their simulation modelling, "*using recent R values and improvements to case ascertainment and test and trace times, the effect may be a reduction from approximately 1.3 to 0.8*" (TAC Modelling Subgroup 2021, 2). In May 2021, we observed that contact tracing (combined with social distancing and the rapid progression of the vaccination programme) had helped significantly reduce the 7-day incidence in South Wales. In Blaenau Gwent, for example, the weekly incidence per 100,000 population decreased from more than 900 (December 2020) to 1.4 (end of April 2021).

Until the surge of the Delta variant, in combination with reducing restrictions on people's activity, the GTTPS exhibited a 98% success rate, i.e., the service followed up 98% of the contacts within 24 hours of being identified as a close contact of a positive case.[2] The move to Alert Level 0 (Zero) in the summer of 2021 significantly impacted the ability to contact trace within 24 hours. For example, the proportion of eligible cases followed up (within 24 hours) dropped from 90.4% (17 Jul 2021 till 7 Aug 2021) to 58.7% (8 Aug 2021 till 8 Sep 2021). The latter corresponded to quadrupling levels of community transmission (within less than a month), which also affected the proportion of eligible contacts followed up within 24 hours.

At the time of writing this report (Feb 2022), the service – like the rest of the world – faces challenges different from last year's, and no one knows future development with certainty. The research team took forward in this paper a study of structures and organisational culture that proved successful in the context of COVID-19. These learnings about structures and culture could help tackle other population health protection challenges. In that case, several amendments (see section 5) would be necessary, however.

[1] R_t (or short: R) is the reproduction number at a particular point in time. It tracks the number of all people a single infected person is likely to infect at a particular point in time.

[2] https://abuhb.nhs.wales/news/news/test-trace-and-protect-across-gwent/

2. Objectives

The Regional Oversight Group (ROG) agreed upon the service evaluation of the GTTPS in September 2021 with permission from ABUHB R&D under number SE/1338/21 (dated 13 Oct 2021). Data were collected during October and November 2021 (see section 3).

The overarching objectives of the service evaluation are:

A. To understand how **organisational structures** (including a functional IT system) developed around a specific need during the early phase of the GTTPS (rather than needs being tweaked to serve existing structures); to describe the initial set-up of the GTTPS (established towards the end of the first COVID-19-wave in Wales, UK)

B. To investigate when **governance structures** were established (and how they evolved)

C. To comprehend how the design deviated from the initial set-up, proactively **adapted** and further evolved according to the (anticipated) needs of the service

D. To analyse the **robustness of the emergent systems**[3]

E. To identify the **lessons learnt (labelled as "takeaway insights") for future TTP service developments or other Public Health partnerships** (e.g., around organisational culture).

This project was delivered in conjunction with the University for Continuing Education Krems, Austria, whose researchers independently conducted the data collection, analysis and development of the findings. Intellectual property remains with Aneurin Bevan University Health Board. Still, the multi-organisational, interdisciplinary, and international research team is committed to disseminating the evaluation study's outcome and learning as a joint academic publication.

[3] The research team paid particular attention to the difference between design and individual skills and competencies necessary at critical positions within the service to understand robustness.

3. Methods

For the GTTPS evaluation project, the research team developed a multi-method research design. The evidence base for this report comes from multiple channels, including

- semi-structured interviews (focus: objectives A, B, C, D, E),
- focus group discussions (focus: objectives A, C, D, E),
- an online survey (focus: objectives C, E), and
- document reviews (focus: objectives A, B, C).

Appendix 1 includes the data collection schedule. The research team analysed the resulting qualitative and quantitative data in an integrated manner. Data collection profited from the ample experience of stakeholders across organisations, diverse professional backgrounds and various levels of responsibility within the GTTPS. This maximum variation sampling approach is well suited to provide rich and varied information on the different perspectives, perceptions and interpretations of organisational structures.

Initially, the researchers conducted three interviews to pick up emerging themes on (1) what building blocks formed the GTTPS, (2) how structures and processes were shaped and challenges mastered (or not mastered), and (3) whether (and why) the GTTPS was perceived as a successful endeavour. Some emerging themes, e.g., leadership style or culture, were not anticipated and not part of the designed research agenda. Thus, the research team considered these cues when setting up the online survey (described in section 3.2) to avoid missing out on essential learning. The survey findings then underpinned the qualitative study's core, consisting of nine interviews and two focus groups. For set-up and design, see section 3.1.

An additional focus group of staff from all partner organisations discussed the survey results and the draft report in February 2022; this final report *incorporates* their feedback. Issues raised during the workshop (but not during the study) were added at the end of the report.

3.1 Qualitative research

3.1.1. Research instruments

Semi-structured interviews focused on providing a deeper insight into employees' perceptions of the GTTPS. Focus group discussions explored the collective interpretations and perceptions of organisational structures and culture. In both instances, the research team applied standardised questions, whereby modifications of questions (or new ones) made room for unexpected and exciting themes that emerged during the interviews.

The interview guide consisted of 18 questions and covered three themes: (1) organisation, (2) communication and (3) leadership. After conducting three kick-off interviews, the research team refined the interview guide to eliminate some questions and rephrase others. The revised version contained 13 questions. They covered the three main themes and two general, loosely formulated closing questions ("*Are there any critical issues we have not mentioned yet? Any additional aspects you*

would like to share?"). The research team used this final version of the interview guide (see Appendix 2) for the remaining nine interviews and the two focus groups.

3.1.2. Data collection and processing

The selection of the study participants relied on purposeful sampling. Interviewees were from leading positions across all partner organisations (three from ABUHB, two from the Coordination Unit, and one (or two) from each local authority team), accounting for gender parity. Focus group participants were selected accounting for the diversity of professions, job roles and gender. Most focus group participants were members of a tracing team, the Regional Oversight Group (ROG), the Gwent Incident Management Team (GIMT) and the GTTPS team within the health board (Data Cell, Clinical Leads, Staff Cell, Regional Cell Delivery Programme). Seven group participants came from ABUHB, five from the local authorities and one from PHW. Study participants received an invitation with a short explanation of the purpose of the meeting and a suggested date from the Regional Cell Delivery Programme team.

The research team collected data through interviews between 5 Oct 2021 and 17 Nov 2021 and focus groups on 18 Oct 2021 and 18 Nov 2021 (see Appendix 1). Two researchers conducted 12 interviews and two focus group discussions via MS Teams. The first focus group consisted of six participants and the second of seven participants. Interviews lasted 30-45 minutes; focus groups lasted around 90 minutes.

Interviews and focus groups were transcribed verbatim with annotations following the recommendations of Dressing and Pehl (2018). I.e., transcribers included pauses, intonations and nonverbal expressions to give an even better insight into what the respective interviewee intended to say. Three team members of the Regional Cell Delivery Programme volunteered for this task, which guaranteed that transcribers were familiar with service-specific wordings and abbreviations used by study participants. Transcribers received standard transcription guidelines and preserved the anonymity of study participants. The latter included removing all names from the transcripts (including those dropped in conversation).

3.1.3. Data analysis

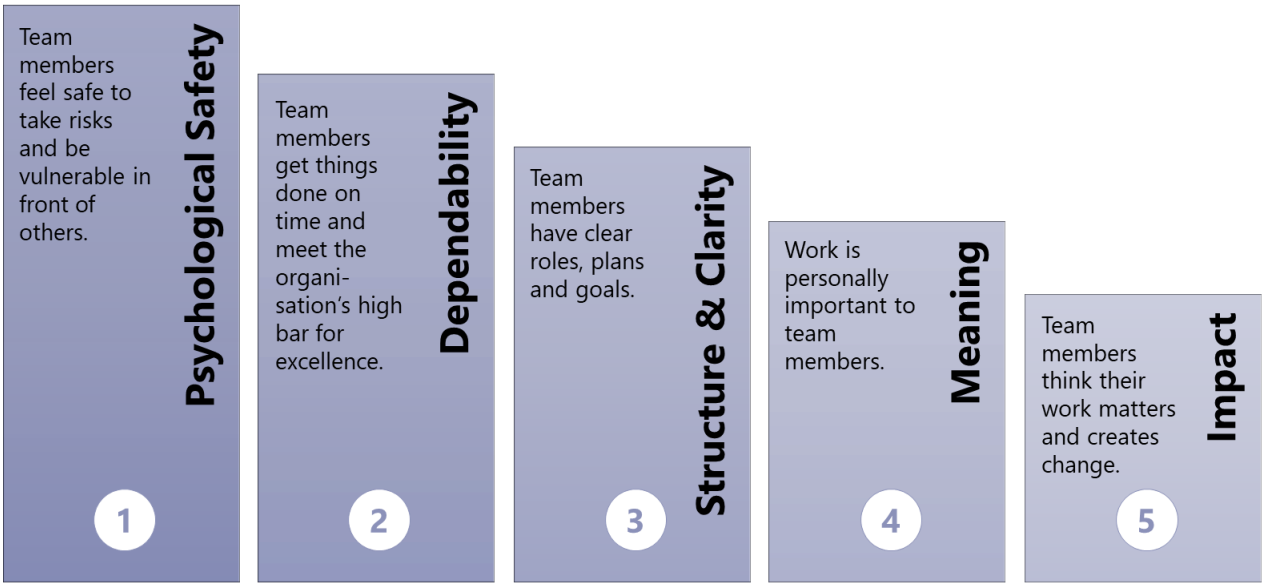
The research team investigated the qualitative data following the thematic analysis of Braun and Clarke (2006) and organised the data into six main themes:

1. Organisation
2. Communication
3. Leadership
4. Success Factors
5. Challenges
6. Suggestions for Improvement

The study utilised the software programme MAXQDA, version 2020. During the associated coding process, the researchers read the transcripts. Then they generated codes representing a particular

element or idea emerging from the qualitative data. The codes were attached to the corresponding text segments and filed under a category name corresponding to the central theme. In an iterative process, first- and second-order codes were created, revised, combined and separated. A combination of deductive and inductive coding was applied to the themes above. The exception was "4. Success Factors". Their coding followed the *Aristotle* framework presented in Figure 1.[4]

Figure 1: The five characteristics of high-performing teams (graph adapted from (Rozovsky 2016))



The *Aristotle* framework organises attributes of high-performing teams (Delizonna 2017, Rozovsky 2016). It identifies "psychological safety" as the number-one characteristic of a successful, high-performing team (Bergmann and Schaeppi 2016). Psychological safety corresponds to "*a shared belief held by members of a team that the team is safe for interpersonal risk-taking. It describes a team climate characterised by interpersonal trust and mutual respect in which people are comfortable being themselves.*" (Edmondson 1999). Section 4.5.1 discusses psychological safety within the GTTPS. Further characteristics of a high-performing team are dependability, clarity, meaning and impact. Sections 4.5.2 through 4.5.4 discuss these characteristics and their prevalence within the GTTPS as essential components of the service's working climate.

[4] After conducting the first interviews, the research team observed strong similarities between study participants' descriptions and the *Aristotle* framework. Therefore, the research team decided to use the framework for coding the Success Factors of the GTTPS and to incorporate questions on psychological safety in the online survey. This procedure allows comparing qualitative data with quantitative data from the online survey.

Table 1: Final thematic map

Codes and Sub-Codes	Description
1. Organisation	Perceptions and description of organisational structures and adaptations
Changes	Perceptions on features and pace of change, adaptability of the service
Organisational structures	Perceptions and opinions referring to the organisational structure
Initial development	Descriptions and experiences during the set-up phase (service's initial 2-3 months)
After the initial phase	Descriptions and experiences of the service after three months
Present organisation	Perceptions and experiences referring to the present organisation (Nov – Dec 2021)
Roles and duties	Descriptions of roles and duties of partner organisations and groups
2. Communication	Perceptions and experiences concerning communication within the service, communication style and communication channels
Formal communication	Associations with and role of formal communication
Informal communication	Associations with and role of informal communication
Virtual communication	Reflections on virtual communication
Building relationships	Role of communication in building relationships
Meetings	Perceptions of the number, organisation and purpose of meetings
3. Leadership	Expressions describing the leadership style within the organisation
Reflections on leadership	General perceptions and reflections on leadership within the service
Own leadership style	Descriptions of one's leadership style
Leadership style of others	Reflecting the leadership style of others
Speaking about staff	Reflections and descriptions of leaders when talking about their staff
4. Success factors	Personal opinions concerning the success factors of the organisation
Psychological safety	Perceptions of working climate which reflect the organisational culture of the service
Dependability	Perceptions on working conditions: personnel and financial resources, communication and cooperation within teams and between partner organisations
Structure and clarity	Perceptions of organisational structure, aims and purpose of the service
Meaning	Statements referring to personal engagement with the service aims and purpose
Impact	Expressions that work matters and creates change
5. Challenges	Challenges reported by study participants concerning the service, organisation, leadership, workforce or work in general
Setting up the organisation	Challenges referring to the set-up of the organisation
Communication	Challenges referring to the communication within a team/with partner organisations
Coordination/Cooperation	Challenges referring to the coordination and cooperation with partner organisations
Workforce challenges	Challenges referring to HR issues
6. Suggestions for improvement: preparedness	Suggestions of interview partners to improve service, including individual opinions on issues that need to be changed or modified to improve the service
Building up expertise	Suggestions to retain knowledge, skills and experience of the workforce
Systems, processes, SOPs	Improvements referring to systems, working processes, SOPs
Sustainable organisation	Suggestions to enhance the sustainability of organisational structures
Cooperation and communication	Suggestions to improve cooperation and communication with partner organisations and Welsh Government

Table 1 displays the final thematic map, along which the research team evaluated the qualitative data. Appendix 3 provides the complete list of sub-codes generated from interviews, focus groups and survey open questions and the number of corresponding quotes.

3.2 Quantitative research of the online survey data

In early October 2021, the Regional Cell Delivery Programme invited around 570 current and former GTTPS team members to participate in an online survey. The survey consisted of six thematic blocks:

1. General Information
2. Communication & Information Sharing Structure
3. Organisational Structure
4. Tasks and Duties & Working Environment
5. Motivation & Leadership
6. Personal Characteristics.

The survey design included 65 closed and two open[5] questions (answered in 20-25 minutes). The survey was conducted using MS Forms between 15 Oct 2021 and 1 Nov 2021 (see Appendix 1). The response rate was around 30%, i.e., 188 GTTPS members participated in the online survey (57 from ABUHB, nine from PHW, 29 from Blaenau Gwent CBC, 32 from Caerphilly CBC, 39 from Newport CC, 12 from Torfaen CBC and ten from Monmouthshire CC; see Figure 2). The main characteristics of the survey participants are as follows. 94% of the respondents currently work for GTTPS. One quarter were redeployed. Four in five survey participants work mainly or entirely home-based (see Figure 3). The share of female employees in the data is 69%, and the mean age of all participants is 42 years (for the age distribution, see Figure 4).

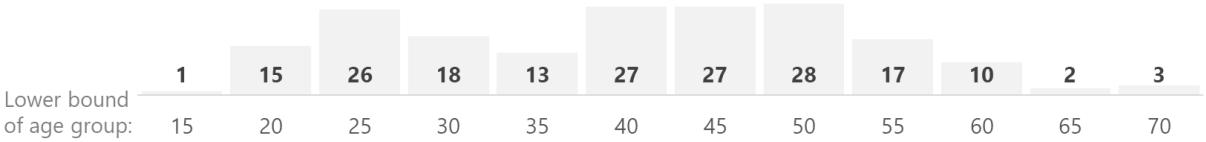
Figure 2: Survey participants by partner organisation

Figure 3: Survey participants by workplace

70% of the survey participants are contact tracers or advisors (see Table 2). In this context, the research team observed some differences depending on age. While an average proportion of younger survey participants work as tracers and advisors (69% between 19 and 29 years and 71% between 30 and 39), survey participants between 40 and 49 display the lowest share of tracers and advisors (65%). 73% of survey participants between 50 and 59 are tracers and advisors.

[5] The open questions were evaluated alongside the qualitative data from the interviews and focus group discussions.

Figure 4: Survey participants by age group

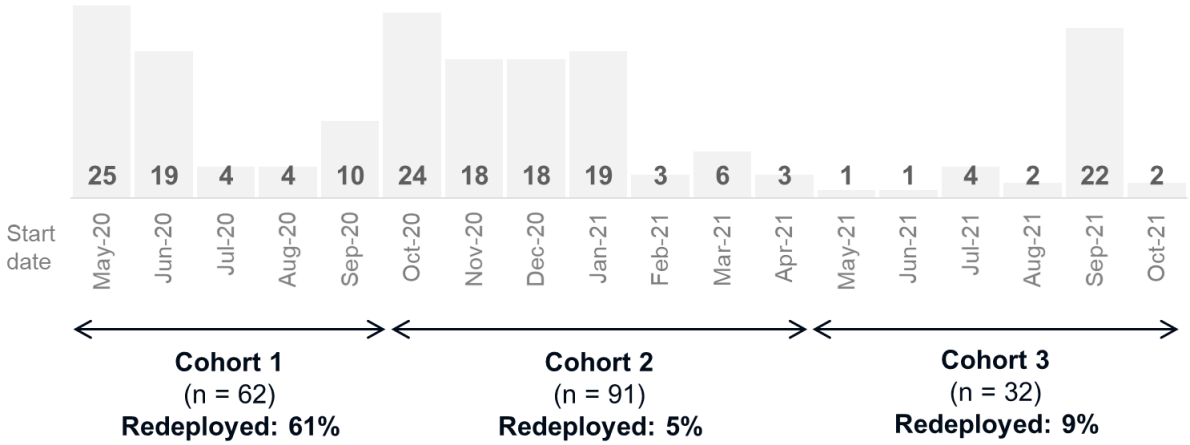


Participants aged 60 and above are predominately tracers or advisors (between 60 and 69: 92%; 70+: 100%). However, the configuration of the workforce does not only depend on age. Over time, the service required a change in the skill mix of its workforce, which established a relationship between the job role and start date of the 188 respondents.

For the analysis of some aspects of the service, the research team distinguishes between three cohorts of GTTPS staff (and periods, respectively): those who started to work in the early days of the service until September 2020 (*cohort* 1), those who started in the second-wave period namely October 2020 until April 2021 (*cohort* 2), and those who started between May and October 2021 – the phase where the UK experienced the onset of the Delta variant (*cohort* 3). During the early phase, among the survey respondents, the share of freshly recruited contact advisors was relatively small (about 11%). It then steadily increased until it covered 44% of all the new posts commenced between May and October 2021. At the same time, the share of new positions, filled neither with tracers nor advisors, decreased sharply (from 48% in the early days of the service to 9% between May and October 2021). Comparing the recruitment of survey-participating contact tracers across the three periods, the research team found that their relative share was relatively balanced (on average 46%), with a peak during the second-wave period (about 51%).

Figure 5 visualises the three cohorts of survey respondents (split by their start date).

Figure 5: Survey participants by start date



For this report, the research team decided to deviate from the standard practice of presenting the description, interpretation and discussion of the results separately. To further ease readability, the qualitative study and the online survey results are jointly presented in section 4.

Table 1: Characteristics of survey participants

		n	%
Partner organisation	Aneurin Bevan University Health Board	57	30%
	Public Health Wales	9	5%
	Blaenau Gwent CBC	29	15%
	Caerphilly CBC	32	17%
	Newport CC	39	21%
	Torfaen CBC	12	6%
	Monmouthshire CBC	10	5%
Gender	female	130	69%
	male	58	31%
Redeployed?	no	141	75%
	yes	47	25%
Age	≤ 29	42	23%
	30-39	31	17%
	40-49	54	29%
	50-59	44	24%
	60-69	12	6%
	70+	3	2%
Job role	contact advisor	46	24%
	contact tracer	86	46%
	other	56	30%
Start date	May 2020 - Sep 2020 (cohort 1)	62	34%
	Oct 2020 - Apr 2021 (cohort 2)	91	49%
	May 2021 - Oct 2021 (cohort 3)	32	17%
Workplace	entirely home-based	9	5%
	mainly remote	139	74%
	mix office and remote	28	15%
	mainly office	11	6%
Total		**188**	

findings

4. Findings

4.1 Development of GTTPS organisational structures during the early phase

Objective A: To understand how **organisational structures** developed around a specific need during the early phase of the GTTPS; to describe the initial set-up of the GTTPS

The Test, Trace and Protect overarching plan published by the Welsh Government and supported by the Public Health Protection Response Plan from Public Health Wales (PHW) formed the basis for setting up a contact tracing service (ABUHB 2021). In line with the Contact Tracing Governance & Delivery Framework (ABUHB 2021), study participants confirmed that health boards and local authorities were key in developing contact tracing structures. The clear and shared aim "*to support people in Gwent to prevent the transmission of COVID-19*" (I3: 2) guided the joint development of organisational structures. Study participants explicitly described the establishment of the GTTPS as a **collaborative effort** of the health board, councils and local health authorities (I1, I2, I5, I7, I10, I11). Still, the set-up phase of the service (before June 2020) was occasionally dubbed "*initially fragmented*" and "*characterised by independent local initiatives aiming to respond rapidly*" (I7). A study participant remembered that in May 2020, "*before the formal conception of TTP as we know it today, we were undertaking contact tracing through different methods, not through a nationally governed process, but locally because we wanted to be ahead of the game*" (I2). "*When the Response Plan and ABUHB intended a central service for Gwent*", another study participant remembered, "*the five local authority teams were already operating. It was then decided to keep the five local teams and establish what is now called the GTTPS Coordination Unit*" (I1).

The Coordination Unit was established in the early autumn of 2020 and has taken over the responsibility for coordinating the local TTP teams. This approach allowed the ABUHB-based PMO (now known as Regional Cell Delivery Programme Office) to focus on incident management (cf. next section, Figure 6). Some interviewees explicitly emphasised the importance of the "*councils [being] coordinated by the council*" (I2). "*So, [we have] two different programme offices with two different responsibilities*", a study participant explained (I2). However, the transition was not seamless. "*I think we [at ABUHB] felt some tension that we were worried [as] it was our baby we were handing over […] Equally, the Coordination Unit expected everything to be in a package, and we didn't have it. We had writing on the walls. We had flipchart paper. We weren't in a position to quite neatly [say] this is [the] one thing for you to do. Here is sort of a standard operating procedure. These are our lessons learnt. […] Because we developed so quickly, we didn't have any of those products that were expected of us*" (I2). What is truly remarkable in this context is not the absence of any tensions but the fact that (and how) the partnership of organisations overcame them, **reached a consensus and succeeded in collectively developing an approach** to set up and continue the GTTPS (ABUHB 2021).

Local people undertook local contact tracing based on "*real, local knowledge, governed by a real strong organisational approach*" (I2), where members of the GTTPS highlighted the unprecedented speed of setting up the service (I1, I2, I3, I5, I6, I9). Welsh Government adequately and swiftly provided funding, which allowed the service to be innovative and effective in delivering contact tracing. "*I think TTP is proof that if we're allowed to be governed correctly but proportionately, and we're*

allowed proportionate funding, we can deliver a world-class service", an interviewee remarked (I2). Altogether, study participants involved in the GTTPS's founding phase described the setting up (of the service) as an entirely novel experience (I1, I2, I9). One study participant defined the service's initial stage with the words, "*we had set all of this up from nothing, and it was all brand new, and we were working in ways that had never been tried and tested before*" (I1: 5/33). A rapid development and implementation process accomplished these new working methods, ex-post identified as sequences of informal improvement cycles (enabling innovation). "*People didn't realise that […] we were doing PDSAs [Plan-Do-Study-Act cycles]. [They thought] we were just doing the norming, storming and performing. But actually, we were going through PDSA cycles very quickly, to find out how we worked better as a team*" (I2). Of course, processes did not pan out perfectly – but good enough. A study participant put it this way, "*we would probably have done things slightly differently, but given what we've been through and given the situation we were dealing with, [you know] the best decisions were taken at the time with the information we had*" (I1: 56). This statement reflects the early days of the GTTPS well, during which the service design encountered its baptism of fire to **function in an uncertain and volatile environment**.

The research team found that the pandemic situation encouraged cohesion across organisational boundaries. *"When something is new, and we all learn together, it's a really bonding experience*" (S31), reflected a survey participant. An interviewee added, "*Everybody was in the common position of not really knowing what the service was going to be, what the demand was going to be, how the pandemic was going to unfold, and so, I think, that position of everybody not knowing what's going to happen was quite unifying*" (I9: 5). The Gwent response was to pool diverse expertise and decide on the most appropriate strategy for contact tracing cooperatively. A study participant explained, "*the way in which we've worked has been very much about collectively trying to identify the best course of action within any given situation with the information we have at that point of time*" (I3: 20). These statements reveal the strong partnership that has evolved out of the response to the pandemic. Many other study participants (interviewees, focus group members and survey respondents) confirmed the **collaborative and supportive working climate** and the excellent relationships between partner organisations. The evolving culture was labelled as "*collective*" (I3), "*partnership*"-like (I5), "*supportive"* (I1, I4, I8, I9, I13) and "*wonderful community*" (S121). A survey participant added, "*[…] There was a common goal and commitment to the objectives and benefits for the Gwent communities. […] I feel no barriers between each team and would happily seek support and advice from any partner*" (S89).

This initial response (characterised by collective efforts based on a common aim) directed towards a clear and shared goal very likely explains the unique organisational design of the GTTPS. It reflects features of a **network organisation** where the constituent parts work in agile, multidisciplinary, self-directed teams and are connected by a common purpose (Alstyne 1997). Compared to a hierarchical service, communication between staff at different hierarchical levels of the network lends itself to lateral consultation rather than top-down commands. Network structures promote learning, creativity and innovation in the connected organisations. Consequently, network structures are well suited to foster organisational adaptability under dynamic environmental conditions. The GTTPS Governance & Delivery Framework (ABUHB 2021) presents an organisation chart (see next

section, Figure 6), where lateral consultation-type communication between the various partner organisations manifests in the form of the (multi-organisational) Gwent Strategic Coordinating, Leadership and Regional Oversight Groups.

The notion of a network organisation with agile and self-directed teams might also explain heterogeneity in managerial solutions for organising contact tracing. In the service's very early days, ABUHB considered establishing a physical contact tracing centre for the whole of Gwent because the Incident Coordination Centre had been site-based and worked very well. However, "*there was a big push from local authorities to say 'we want everybody to be remote'. […] Some local authorities started off working in a big call centre and then moving into remote working; some were only ever going to be remote*" (I2). Because of this resistance and implications for social distancing and safe working practices for a vast workforce pulled together in one place, the health board decided against a Pan-Gwent contact tracing centre (I1, I2). Note that the two local authorities who decided to set up (at least initially) a physical contact tracing centre (I1) did so because they were the first teams to test all the contact tracing processes and train staff. The subsequent learning enabled the other teams to work remotely more effectively.

Study participants highlighted **two specifically challenging structural elements** in the service's founding phase: (1) the information management system (I9) and (2) workforce management (I1, I3, I5, I13, I9, I11, I14).

Information management issues refer to problems with the joint software solution that enables effective contact tracing. For the early stages of the GTTPS, the Shared Resource Service (SRS) had to develop an interim database because there were delays in establishing the nationwide Microsoft Dynamics Customer Relationship Management (CRM) information system (ABUHB 2021). "*NWIS [NHS Wales Informatics Service] procured the CRM system and negotiated a software licensing contract where the number of users could be scaled up or down, which helped to control costs. The CRM system links to the Welsh laboratory information system and updates every 30 minutes with new positive cases. The system allocates positive cases to the tracing team where they live*" (Audit Wales 2021, 24).

Notwithstanding that a study participant reported that the local contact tracing teams had initial problems working with the CRM information system because nobody was familiar with it (I9), CRM demonstrated several advantages. CRM had an integrated telephony solution to perform all tracer and advisor activity within one system. Performance data could (and can) be extracted from the system. Moreover, CRM was entirely cloud-based, so staff could continue to use their corporate equipment and logins to access the system wherever they needed to work. (ABUHB 2021)

Workforce issues referred to recruitment, training and team building. During the service's founding phase, a challenge emerged concerning clear (enough) definitions of the team member roles when establishing contact tracing teams. Another challenge concerned the rapid filling of vacancies and swiftly training the new team members. A third challenge was managing staff remotely (the predominant workplace). In combination, these challenges caused some staff to feel inadequately prepared for their range of duties (S35, S42) or overburdened with low-impact tasks (S98).

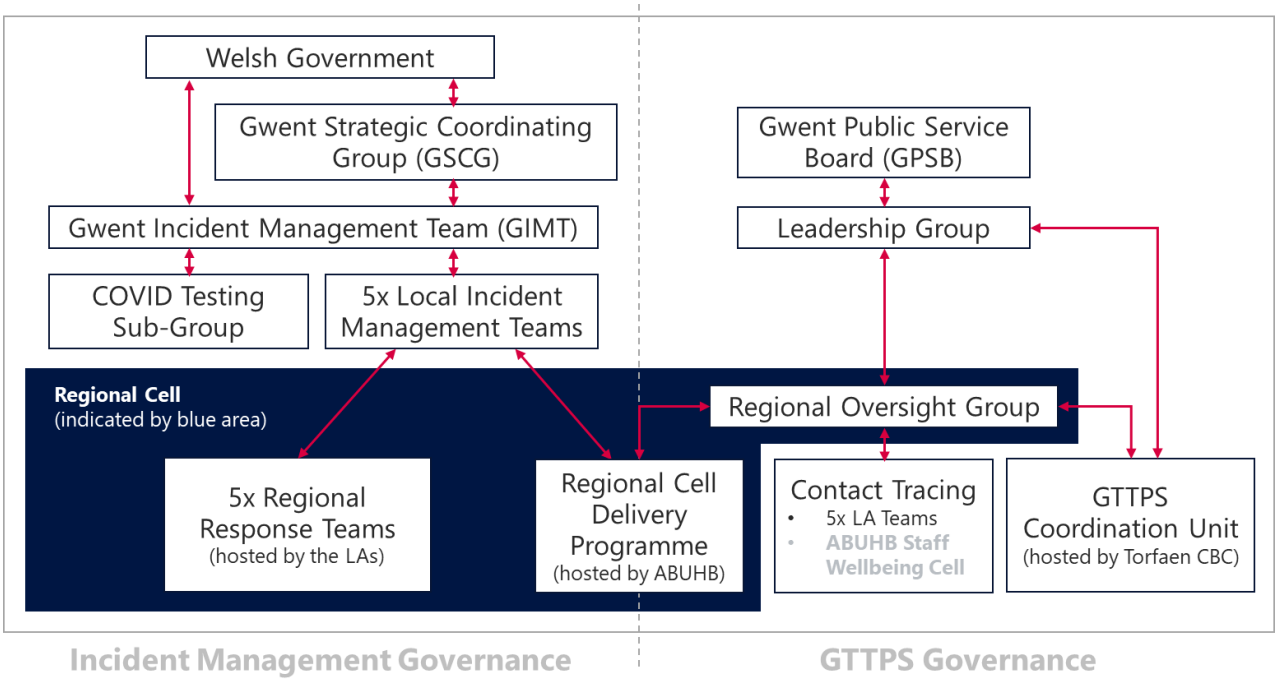
4.2 Establishment of GTTPS governance structures

Objective B: To investigate when **governance structures** were established (and how they evolved)

The GTTPS governance structure evolved in May 2020 out of the Strategic Coordinating Group. A sub-group of representatives from ABUHB and the five local authorities, which later became the Leadership Group, prepared the Operational Plan for Contact Tracing in Gwent.

The Regional Oversight Group (ROG) has been one of the central organisational governance structures for the GTTPS (see Figure 6 above). ROG has brought together different areas of expertise (e.g., Public and Environmental Health, clinical, and project management) to get a shared decision-making forum that allowed the creation of an approach suitable for the population of Gwent (customised from what the guidance may be nationally in Wales). An interviewee noted, "*Gwent is very different; there are five local authorities in Gwent, not just one or two, like many other areas in Wales*" (I2). ROG was established to perform programme management for the GTTPS and initially "*met twice a day, seven days a week*" (I2). "*[ROG's] ability to make very fast decisions through a collaborative approach is how we've delivered*", said the same study participant (I2). In autumn 2021, half of the survey respondents found ROG *helpful* or *somewhat helpful*, 49% were indifferent or *did not know*, and only 1% regarded ROG as *somewhat unhelpful*.

Figure 6: GTTPS Governance; illustration adapted from the G&D Framework v10 (ABUHB 2021)



Contact tracing in Gwent started at the beginning of June 2020. In the initial phase, the set-up of operational structures was pivotal. One study participant explained, "*[we] had to make decisions very quickly based on small amounts of information and then maybe we've had to [...] wrap the governance around that afterwards*" (I3: 12). When decision-making processes were later embedded into governance structures, they became more formalised.

According to study participants, governance arrangements served to pool expertise from different backgrounds and professions, assign accountability for establishing and managing the service and coordinate local authorities (I1, I2, I3, I11). Coordinating local contact tracing teams was mainly the responsibility of the Coordination Unit. One study participant explained the initial role of the Coordination Unit as "*to work with Welsh Government and Public Health Wales to understand what was needed from contact tracing and as part of the system across the whole of Wales. And to make sure that their performance [local authority teams] was as consistent as possible across the region in order to make sure that as a region we would be delivering the best possible service that we could*" (I1: 66-67). When starting to operate, the relationship with the local authorities had to be negotiated (I1). The associated process was challenging because it initiated discussions about standardising and formalising processes and the division of tasks and responsibilities (I1, I9, I14). Additionally, all partner organisations had to define their roles, duties and targets—and they had to do so in the unfamiliar and unpredictable pandemic situation (I1).

According to study participants, governance structures affected the adaptability of the service in different directions. **In the initial phase, governance structures added to the agility of the GTTPS.** One study participant explained, "*governance structures […] have really helped us make decisions very quickly and allowed frequent communication and sharing of information amongst all partners*" (I3: 4).

"*As the service matured, the focus turned from enablement to project management, governance and developing the service*", said a survey participant. Interviewees experienced that the governance structure became more formal than at first, and decision-making slowed down (I4, I9). One study participant described this process by referring to the initial phase as one where "*there were no barriers. Everything was possible if you had a good idea. Yes, let's go with it*" (I4: 3-4) and comparing it with the current situation where "*it's back to writing a paper; take it to a committee. […] It seems like it's all creeping back to the old way of doing things*" (I4: 5-7). Another study participant noted, "*I think to some extent, it can adapt. People will try within the confines of that sort of rigid governance structure, to provide answers, but it still relies on, for example, the ROG meeting to make decisions and sanction things" (*I9: 5/5). The following case reflects well the trade-off between acting according to the initial purpose of the service and adhering to the formal job descriptions; "*when we were looking early on at really pushing the vaccination uptake when case numbers were relatively low, we were able to utilise our tracers and advisors to make calls to previous cases to alert them to walk in vaccination centres, just to give them that information. […] it was through discussion with our colleagues that we're delivering the walk-in vaccination centres, and from all reports, it worked well, yet we were criticised because that wasn't seen as a core TTP function. […] It wasn't particularly agile in that sense*" (I9: 5/5).

A survey participant from one of the councils put the above sentiments in a nutshell: "*It [GTTPS] was set up quickly and became effective in a very short period of time. I feel that there is an element of 'over-governance' and 'top-down' direction that has stifled innovation and prevented agile responses to quickly developing situations. There is a constant series of additions and amendments that detract from the service's effectiveness. TTP has become over-technical and has lost sight of the simple principle of contact tracing*" (S90). This comment explains why it does not surprise that discussions

on the appropriate level of centralisation (concerning decision-making authority), the standardisation of operating procedures, and defining/revising roles and duties frequently appeared in the interviews (and were an issue in November 2021). In summary, **later in the service's existence, interviewees and survey participants perceived governance structures as a limiting factor regarding the adaptability and flexibility of the GTTPS**.

In this context, acknowledging the difference between "governance" and "perceived governance" is essential. The service cannot function without appropriate governance. But what do staff feel?

Thirty per cent of the survey participants understood the increase in governance as an increase in the "steepness of the organisational hierarchy" (see Figure 7 for a picture diversified by start date and Table 3 for cohort averages). Notably, participants who have been with the service since its early days (cohort 1) felt the movement towards a steeper hierarchy most. Survey participants who felt an increase *and* started after September 2020 perceived the hierarchy level higher when they commenced work than cohort 1 (start-date scores of 5.0 vs 3.8; see Figure 7), while all cohorts scored the October-2021-level hierarchy similarly (about 7.4; see Figure 7).[6]

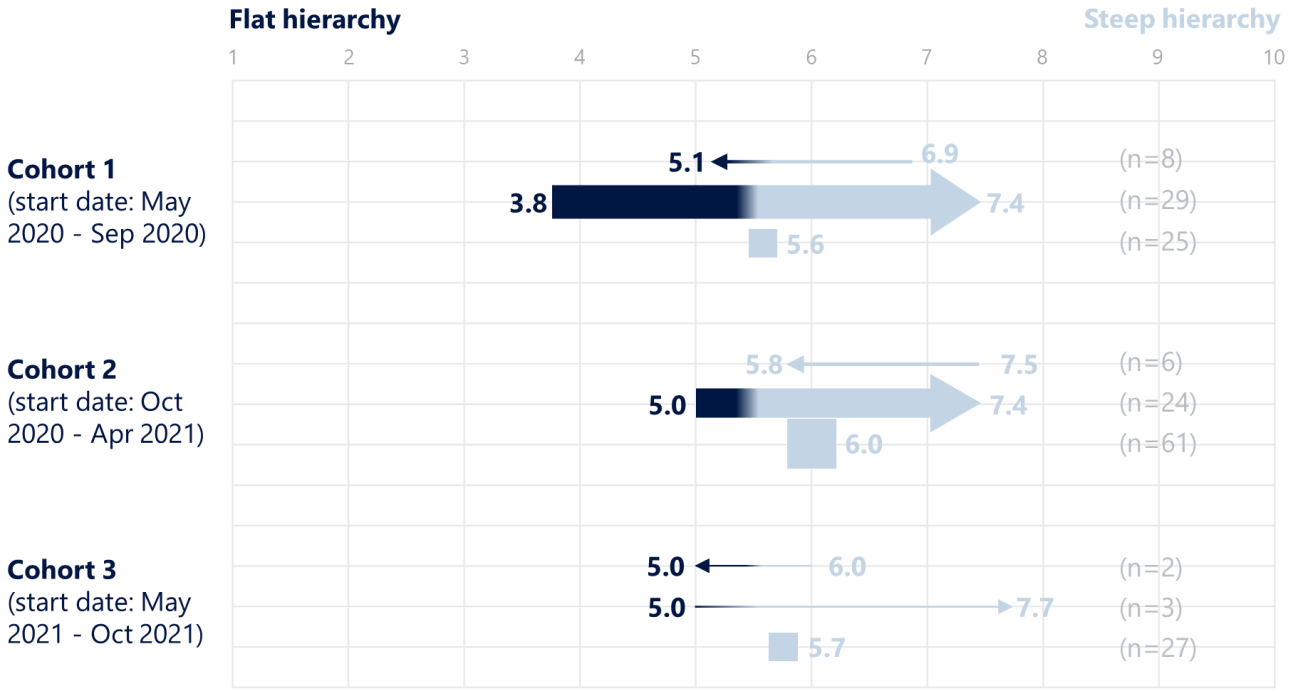
Table 3: Changes in perceived governance structures

			Cohort 1 May 2020 - Sep 2020	**Cohort 2** Oct 2020 - Apr 2021	**Cohort 3** May 2021 - Oct 2021	**Total**
Survey item	**Time**	**Scale unit**	**Mean**	**Mean**	**Mean**	**Mean**
How hierarchically was the GTTPS structured?	start date	1=flat 10=steep	4.8	5.8	5.7	5.5
	Oct 2021		6.4	6.4	5.8	6.3

"*It has become management heavy, and front-line people have left because of this*" (S123), said one of the survey participants. Responding to the perceived confinements is vital if the intention is to keep the workforce engaged, especially team members of cohort 1. They are innovators, highly committed to the purpose of the service and need to feel "enough air to breathe" to perform and orchestrate change. They also need to believe that their contribution matters. Continuously refining processes starting with the grassroots, may be an opportunity to keep staff engaged, e.g., within the framework of Quality Improvement (QI) or Lean Six Sigma initiatives, which correspond to the staff's sense of autonomy in a clearly defined space (which creates agency).

[6] The width of an arrow and the side length of a square in Figure 7 correspond to the number of respondents expressing the corresponding opinion.

Figure 7 Comparison of perceived organisational hierarchy between the start date and October 2021 by cohort



4.3 Adaptations of the GTTPS's organisational structures

Objective C: To comprehend how – over time – the service design deviated from the initial set-up, proactively **adapted and further evolved** according to the (anticipated) needs of the service

Study participants referred to the GTTPS as a working environment where (organisational) changes occurred permanently (I4, I9, I14), and staff had to adapt (see Table 4). The adjustments result(ed) from both external factors (mainly the pandemic situation, I14) and refinement of internal processes (operating procedures and structural adaptions). Interviewees and survey participants explained that staff must adapt to frequent changes in guidance, alert levels, testing regimes and scripts (I5, I6, I8, I9). Additionally, the GTTPS was "*continually looking to improve the service throughout*", as a survey participant pointed out (S189).

Particularly, when talking about earlier phases of the pandemic, study participants highlighted the service's high level of adaptability (I4, I5, I9, I14). A need for (early) rapid adaptations concerned, for example, the **working environment** (I4), where setting up a remote mode of working necessitated adapting communication processes and leadership. Local contact tracing teams and the Regional Oversight Group (ROG), the Leadership Group, and the Strategic Coordinating Group had to establish an effective communication structure, which almost exclusively relied on virtual communication (unthinkable in pre-pandemic settings). Some study participants mentioned that they had learned to pay attention to nonverbal cues to ensure their colleagues understood information as intended when meetings were held via video conferencing. Generally, participants reflected on strategies to enhance staff well-being and motivation in a virtual environment. Moving contact tracing – from working exclusively on-site to (almost) exclusively working remotely – occurred in

different stages (I1, I3, I5, I13, I9, I11, I14). For example, when case numbers were rising, contact tracing teams (who initially worked on-site) switched to a remote working mode because the service could more easily recruit people when offering remote work (I1, I11, I14) or due to an incident in a factory near the office (I7).

The survey participants contributed some insight in favour of **remote working**. They believed remote working was essential to ensure the service's effectiveness (see Table 4). I.e., the importance of remote working for the GTTPS's effectiveness scored 8.6 CI [8.3, 8.8] on a 10-point scale (where "1" indicated *Not important* and "10" represented *Very important*). Indeed, remote working brings several benefits, e.g., positive attitudes towards the employing organisation and economising on the employer-provided physical workspace (Kelliher and Anderson 2010). "*We were also conscious that other teams were operating effectively using the remote system and that we had confidence in the technology*", expressed a study participant (I11). Another factor enhancing effectiveness is that remote working (in a pandemic situation) reduces the transmission risk prevalent in a shared office space, retaining a stable workforce (I2). (Recall that this was also why ABUHB decided against a physical call centre.)

Table 4: Changes in organisational structures and information flow

Survey items	Scale unit	Mean	95% Confidence interval	
How important was remote working for the effectiveness of the GTTPS?	1=not important, 10=very important	8.6	8.3	8.9
Our remote working style was essential to be perceived as a credible service.	1=strongly disagree, 10=strongly agree	7.6	7.3	8.0
How important was it to adapt to new challenges?	1=not important, 10=very important	9.5	9.3	9.7

Remote workers experience their jobs as more pleasurable, stimulating and satisfying than office-based staff (Felstead and Henseke 2017). Working remotely with the virtual teams *"has developed my communication skills"*, said a study participant (I12). Remote work has been witnessed as effective in problem-solving. It is "*easy to use [Microsoft] Teams […] you can quickly get hold of someone or communicate with them, chat or questions with advisors or managers can be sorted out straight away"*, added another study participant to the topic (I13). Finally, individuals value job autonomy during remote working, which affects performance, wellbeing and work-family balance (Wang, et al. 2021). All this comes at a price. In general, remote workers report longer working days, a higher intensity of each hour worked and more voluntary effort expended than office-based workers (Felstead and Henseke 2017).

Still, survey participants were (to some extent) convinced that remote working is essential to be perceived as a credible service by the public (see Table 4). I.e., remote working's credibility-enhancing capability scored 7.6 CI [7.3, 8.0] on a 10-point scale (where "1" indicated *Strongly disagree* and "10" represented *Strongly agree*). This judgment does not represent the opinion of the cohort of tracers and advisors recruited since May 2021. Cohort 3 believed that serving as a role model (for the type of behaviour GTTPS wanted to see during the pandemic) mattered. Their score regarding

the importance of remote working for the GTTPS's credibility was 8.4 CI [7.6, 9.1] on a 10-point scale.

Other early-phase service adaptations concerned operating procedures such as **refining the recruitment process** (I9, I14). Throughout the conception and development of TTP, the service pulled the "right" people into the "right" roles. While three in five team members were seconded from within the organisations to rapidly set up the GTTPS during the initial phase (see Figure 5), formal recruitment processes made it possible to competitively recruit staff into posts (with dedicated roles) later in the pandemic (I11). Further adaptations occurred in defining new job roles and increasing the duration of (new and renewed) working contracts (I13, I14). These steps were intentional and aimed to improve planning reliability for employers *and* employees (I11, I13).

Some study participants noted that roles and responsibilities within the GTTPS were not fully understood and described defining positions and job roles as a permanent process of fine-tuning (I4, I13). For example, **additional management structures** were sometimes required to cope with an increasing volume of work. One study participant very touchingly articulated this need with the words "*trying to run it on my own, in effect, as a single point […] we needed something in-between. We needed support, and I was falling down. Not being able to do the things I needed to do as effectively as I needed to do them*." (I9: 11). The courage and confidence to admit the need for support, the ability to swiftly create new posts, and the resulting workload division was an integral step to steadily building resilience within the existing structures of the GTTPS to ensure the organisation's functioning in the long run. Also, establishing the GTTPS Coordination Unit enabled flexibility of the whole service. Specifically, the Coordination Unit helped allocate personnel resources throughout the Gwent region to respond quickly to emerging clusters (I14). Consequently, local authority teams practised "mutual aid" and helped each other respond to local needs (daily decisions).

Study participants mentioned other vital ingredients for the flexibility and adaptability of the service and referred to the **supportive, high-engagement and solution-oriented working climate**. One study participant used the words "*can-do attitude and a preparedness to take some risks at the beginning*" (I4: 10). Another study participant described the working climate as a "*culture of acceptance and change*" (I6: 2/21). An interviewee explained, "*One of the most important things we do for each other is to support each other in finding solutions to problems. So, I think we were very adaptive. We knew how to work with each other to find the solutions*" (I10: 43). This supportive and collaborative working climate was embraced by study participants from health board teams, local authority teams, and team members from the Coordination Unit and the councils (I6). One interview partner claimed, "*there's certainly that support network across Gwent TTPS that we can call upon. And we built up some fast, fantastic […] working relationships*" (I7: 5/2). Interview partner 6 reflected, "*We've seen some amazing innovation and collaboration across departments, and I think of those communication skills and adaptability skills as something that can be really built upon and used in future programmes of work*" (I6: 3). Section 4.5 will address the components and outcomes of the supportive working climate/culture in more detail.

The GTTPS's adaptability and flexibility also rest upon its **workforce policies**. Focus group members considered the recruitment process vital for enhancing adaptability and flexibility (I13). The service recruited people from diverse backgrounds; there were secondments from within the public

service but also recruitments from outside public service.[7] The agile work mode also contributed to the flexibility of the workforce both directly and indirectly by creating ties between different organisational units and authorities (I13). One study participant reported flexible staff deployment and allocation within local authorities. For example, the service could redeploy people from other parts of the public service when case numbers skyrocketed locally (I5). Study participants also emphasised staff openness and willingness to change (I4, I5, I6, I7, I8, I9, I13, and I14), a key feature confirmed by survey participants. Almost all online survey participants considered "adapting to new challenges" to be significant (see Table 4). The average score was 9.5 CI [9.3, 9.7] on a 10-point scale (where "1" corresponded to *Not important* and "10" meant *Very important*). The workforce that thrived[8] (or at least coped well) in the ever-changing work environment was hand-picked—but not directly. It resulted from requirements intentionally expressed in the job descriptions, allowing the "right" individuals to succeed in competitive recruitment. The latter accomplished that the ever-adapting system was built by choice, not by chance.

Interviewees noted that (for them) it was essential to **propose improvements and be involved in decision-making** (I6, I9).[9] A survey participant expressed, "*My ideas have been implemented, and I'm also asked what I think as a tracer. This is very important coming from a working role where I was micromanaged […]. Thank you for everything*". Other study participants added that smooth communication channels and the opportunity to contact other members within the organisation quickly contributed to the agility of the service (I7, I13). One interviewee explained, "*we were able to work adaptively because there's enough people to bounce ideas off and speak to. There's a lot of knowledge and experience being built up across all organisations over the last 18 months*" (I7: 5/2). This argument refers to organisational learning processes. Intense **communication and information sharing** between partner organisations stimulated this kind of learning. Indeed, some study participants emphasised all partners' willingness and desire to share information and best practices (I3, I7).

In the context of communication and information sharing, the research team found that the service needed informality to bring people along. Communication had to be adapted to remote working. A study participant shared his experiences with informal communication. "*I guess learning how to do informal communication, not being in an office, was difficult for some. [You know …] sending a message, having a random phone call with each other […]. Normally, we have emails and meetings. That's it, and that's how we talk. Now we have got all these different ways of communicating. We send some things by email; we send some things by Teams messages; sometimes, we do a Teams call.*

---

[7] "*So, people have come into TTP, they've never worked in this area. You know, we've got some staff who have been bar managers and worked in Tesco's, and they've never worked for the NHS. And every single day I go home, incredibly proud that they've developed such a specialist knowledge in what we do*", a study participant shared with the research team (I2).

[8] A survey participant responded, for example, "*I have enjoyed watching how quickly the service has developed and changed in reaction to what has happened with the virus. I like change, and it keeps me motivated and the service relevant*."

[9] The significance of engaging staff in shaping improvement processes is addressed at the end of section 4.2.

[…] I think informal communication is the reason we have been able to deliver" (I2). Formal communication[10] through governance groups, emails and documents brought the GTTPS team together. Still, rapid service improvement (especially in the early phase) depended on informal communication. It depended on trusting teammates to provide correct information without going down a formal route.

The online survey confirms the interviewees' perception of **information exchange gradually tipping to the "more formal" side** (which makes sense given the higher level of the service's maturity and a workforce becoming increasingly familiar with each other) (see Table 5).

Table 5: Information exchange and meetings

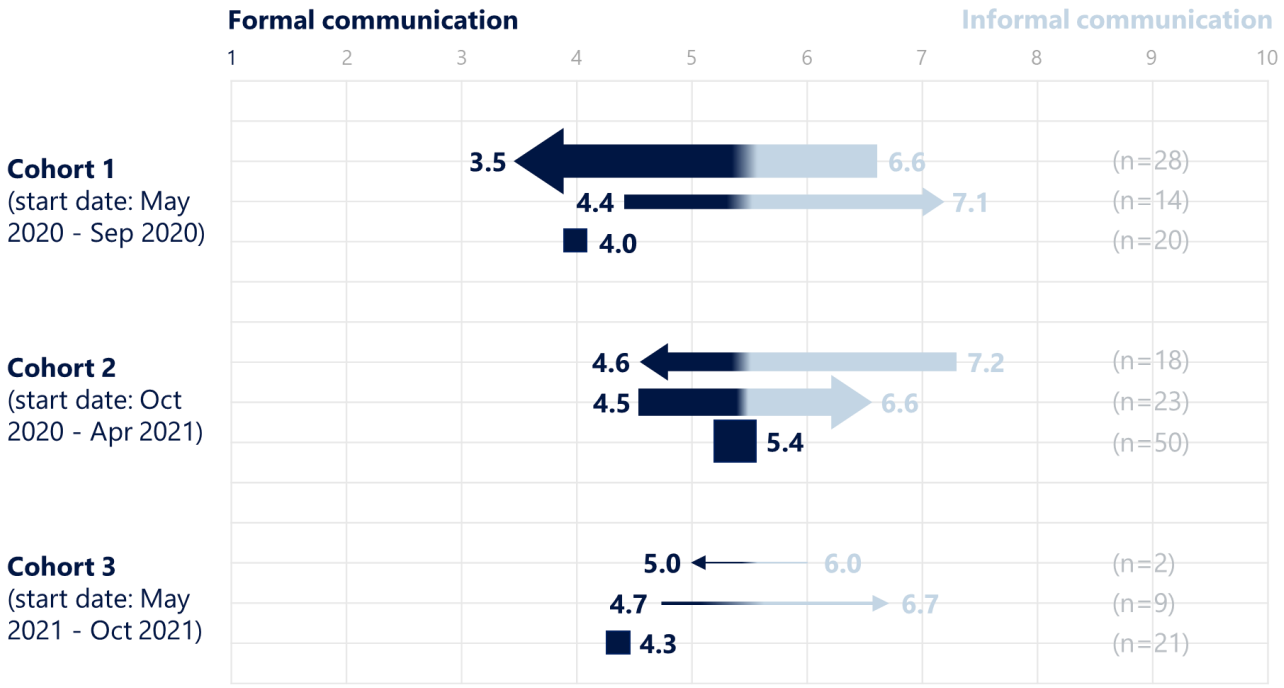
			Cohort 1 May 2020 – Sep 2020	**Cohort 2** Oct 2020 - Apr 2021	**Cohort 3** May 2021 – Oct 2021	**Total**
Survey item	**Time**	**Scale unit**	**Mean**	**Mean**	**Mean**	**Mean**
How was information exchanged?	Start date	1=formal, 10=informal	5.5	5.6	4.5	5.3
	Oct 2021		4.5	5.6	5.0	5.2
How many formal meetings per week did you have?	Start date	no./week	2.8	1.8	1.9	2.1
	Oct 2021		2.6	1.7	1.9	2.0
How many informal meetings per week did you have?	Start date	no./week	4.1	4.1	3.8	4.0
	Oct 2021		4.0	4.0	2.8	3.8
Did you share the information immediately?	Start date	0=no, 1=yes				0.4
	Oct 2021					0.5

As expected, it is predominantly "early starters" (who commenced work before the second SARS-CoV-2 wave) who feel that communication has become significantly more formal (p-value = 0.0000 < 0.05).[11] Two in five survey participants who started after September 2020 did not feel any change in the formality of communication (see Figure 8). Nonetheless, the service acknowledged the human need for (informal) communication by intentionally introducing informal online gatherings, like virtual "coffee & connect" rounds.

[10] Formal communication was associated with written information exchange in the form of legislation, script, guidance, SOPs, usually sent out via email (I7, I8, I9). Informal communication often happened alongside formal meetings and aimed to clarify unresolved questions, share individual opinions and ideas, discuss approaches, build good relationships and enhance formal meetings and decision-making (I3, I7, I9, I10).

[11] The width of arrows and squares in Figure 8 corresponds to the number of respondents who expressed the corresponding opinion.

Figure 8: Comparison of formality of communication between the start date and October 2021 by cohort



Study participants reported an appreciable number of **meetings** (I1, I3, I4, I7, I6, I9), where the unfamiliar situation and the service's network structure explain their recurrence rate. A study participant noted, "*We all needed to be in touch and to communicate quite frequently*" (I3: 8). Another interviewee added, "*So, we had three times a day Scrum meetings here, which were a way for us to provide situational awareness to everybody so that we didn't have to write 10- or 15-page emails all the time to tell everybody what was going on*" (I2).

Thus, frequent meetings regularly passed information back and forth between the working groups, health board, councils, and local contact tracing teams. Meetings (or their recordings) have enhanced everyone's situational awareness and have made everybody feel involved (I3, I8, I9). In this context, a study participant pointed out a unique communication feature within the GTTPS. "*There are people in leadership positions reporting to other people in leadership positions in different organisations. That simply does not happen in very many places, does it?* "(I2).

Meetings were also seen as a vital instrument to build trusting relationships (I3, I6, I9), discuss problems and find solutions (I9), and keep up working morale (I4, I8, I9). One study participant used the image of a "*well-worn suitcase where we're all comfortable with each other*" (when describing a meeting) and added, "*we don't always agree, we don't always get on, but there is trust*" (I9: 6/3). Especially early in the pandemic, when the teams went through their storming and norming phases, interviewees reported a very high frequency of meetings, which later decreased (I9). "*ROG used to meet seven days a week. Now, we meet twice a week with an exceptional meeting if we have to. So, our communication has been proportionate at a strategic level. We have communicated as much as we need to, and we have built that into our approach*", explained a study participant (I2).

The comments about formal meetings of interviewees and focus group members align with the findings from the online survey (see Table 5 and Figure 8). Compared to GTTPS's early days, the number of formal sessions (per week) significantly declined up to October 2021 (p-value = 0.0124 < 0.05), while the number of informal meetings did not significantly change (p-value = 0.1261 > 0.05). Regarding the speed of the information flow, the research team found that the proportion of individuals who *immediately* share information increased up to October 2021 (by more than 10%-points (p-value = 0.0023 < 0.05).

While communication generally scored excellently in people's feedback on the service, there is room for improvement in one particular area. Almost hidden in statements of appreciation endorsing their team's joint efforts to "*fight COVID-19*" (S183), some survey participants addressed issues concerning the communication of health information to tracers and advisors (S9, S35, S103, S113, S120, S182, S183). Reported concerns relate to regularity, accuracy and relevance of information (S120), local availability of documents (S9) and the ability to communicate and retain the sheer volume of information (103). In particular, part-time staff pointed out that they consistently (must) follow up on updates (before they start their shifts) because they would otherwise "*miss new developments and changes*" (S183) to guidelines and scripts. This context needs clear instructions on whether staff must inform themselves (and when) to avoid disengagement. Ideally, the job description would already pin down the required behaviours.

4.4 Robustness of the emergent GTTPS system

Objective D: To analyse the **robustness of the emergent systems**; here, the research team will pay particular attention to the difference between service design and individual skills and competencies that appear by chance at critical positions within the service.

In section 4.3, the research team pointed out that successfully conceptualising and intentionally phrasing **job descriptions** such that a competitive recruitment process selects the "right" person (i.e., the "right" skillset) contributes to a robust system. The resulting workforce is then intentionally formed according to the needs of the service (which makes an organisation more robust than one where the "right" people assemble by chance). Job requirements mentioned by study participants concern professional competencies, including subject knowledge, (local) expertise and methodological skills, and personal competencies, including social and self-management skills. Specifically, study participants described a working environment where collaborative skills (capacity for teamwork), communication skills, coping skills and willingness to put in the extra effort were essential for the service. A survey participant noted that her team intentionally recruited people who shared their values and beliefs to build a strong and effective team (S148).

Something to be mentioned in the context of robustness is the availability of Environmental Health Officers (EHOs). EHOs pioneered responding to the pandemic locally, forming a robust local response element. Study participants mentioned EHOs in several interviews (I1, I3, I5, I6, I8, I9, I10, I12, I13, I14), particularly their key role in running the service (due to experiences with similar situations and their local engagement); interviewees endorsed the significance of **knowing premises**

and local communities. Survey participants confirmed the "value of local" (Dyjack, et al. 2021) for understanding transmission routes and controlling outbreaks. The item "*It was essential that cases and contacts were approached by people from their own communities*" scored 7.0 CI [6.7, 7.4] on a 10-point scale (where "1" represented *Strongly disagree*, and "10" indicated *Strongly agree*). This highlights the importance of local empathy with the people and building trust. The research team's observations are also in line with Audit Wales (2021), stating that regional ownership of the programme and the use of local intelligence and knowledge contributed to shaping an effective response to the pandemic.

As an essential part of a robust network system, the research team considers the Coordination Unit to act in a support function within the GTTPS governance framework (Figure 6). 56% of the survey participants shared this opinion and answered, "*How helpful is/was the Coordinating Unit for service delivery?*" with *Very Helpful* or *Somewhat Helpful*. (43% of the survey respondents did not know or were indifferent.) The Coordination Unit has been responsible for supporting and coordinating the local authority contact tracing teams, performing some centralised management activities for the local contact tracing teams and communicating and cooperating with the Leadership Group, the Gwent Public Service Board (GPSB), partner organisations and members of the public (ABUHB 2021).

The Coordination Unit hosts the Head of Service. On the one hand, this is unusual for a support unit. On the other hand, it makes sense from a network thinking perspective. Support units are well suited for a coordinating function because staff members are suggested to have broader networks within the organisation than line managers (Kleinbaum and Stuart 2013). Concerning the relationship with the five local contact tracing teams, the Coordination Unit's approach was to support rather than manage the five local contact tracing teams (I1). The selection process for the Head of Service was geared to the job description and competence profile to ensure the fit between the person and the position (supporter/advisor for the local contact tracing teams). In conclusion, the organisational design (support unit) and the position of the Head of Service were defined in a way that reflects some fundamental service principles: **working together, mutual aid, and subsidiarity** (ABUHB 2021).

An element that surfaced specifically in response to the open questions in the survey was **staff well-being**. On the one hand, an exemplary participant shared, "*I enjoy the fact that an individual's wellbeing is considered, and also the Buddy Scheme is an excellent platform for sharing and caring*" (S180). On the other hand, a few team members felt their "*well-being has not been a priority*" (S32) for the service. People feeling like the latter guided ABUHB's direction to implement internal well-being sessions for the entire GTTPS team and address the needs of the local Public Health team exhausted by nearly two years of fighting COVID-19. Thus, interventions have started to help cope with the joint trauma, the permanently changing environment (situation, regulations, guidelines) and the fading appreciation of the GTTPS's work within the community/by the public. This compassionate approach shows that the service cares for people and retains the GTTPS workforce (rendering the service more robust).

4.5 Lessons learnt from the GTTPS for future service developments

Objective E: To identify the specific **learning for future** TTP service developments or other Public Health partnerships (e.g., around organisational culture)

Several insights have been accumulated so far should the Gwent region seek to build a TTP service or a Public Health partnership in the future. For keeping up the GTTPS, a couple of recommendations found their way into the report to complement the identification of the service's numerous success factors.[12] Among the latter are that network organisations (with a well-balanced level of governance) lend themselves to function better for Public Health partnerships than top-down control organisations. Local knowledge surfaced as a crucial element of an effective Public Health Service. These components are fundamental – but not enough to replicate a service like the GTTPS. Ongoing adaptability is critical to continuously improving the service according to current needs. Coordination of work and teams is superior to control. Appreciative communication matters. The workplace as an opportunity for personal growth is vital. What made GTTPS unique was its organisational culture and its working environment.

Findings regarding the driving factors for creating the GTTPS working environment are organised following the components of the *Aristotle* framework (recall Figure 1). These findings capture learnings that have come up in the responses of interviewees, focus group members and survey participants when reflecting specifically on communication, leadership and organisational culture. Loosely labelled as "takeaway insights" (organised into four sections), they can contribute to building a sustainable service. These four sections relate to

1. Psychological Safety,
2. Dependability,
3. Structure & Clarity and
4. Meaning & Impact.

Note that category (4) initially consisted of two separate categories in the *Aristotle* framework (Rozovsky 2016). The research team merged them because "meaning" and "impact" were too strongly interrelated (within the context of the GTTPS) to be meaningfully disentangled. The interrelationship was due to jointly fighting a virus, protecting our communities, friends and families as a team and eventually saving lives—that had intense personal meaning for people and made a massive difference to the Gwent communities.

[12] The research team decided to put suggestions for improvement in one place and present them in a nutshell in section 5 alongside the service's success factors.

4.5.1 Shaping the work environment through psychological safety

A work environment where "*people feel able to speak up with relevant [work-related] questions, concerns or mistakes without fear of being punished or humiliated*" is called psychologically safe (Edmondson 2019).

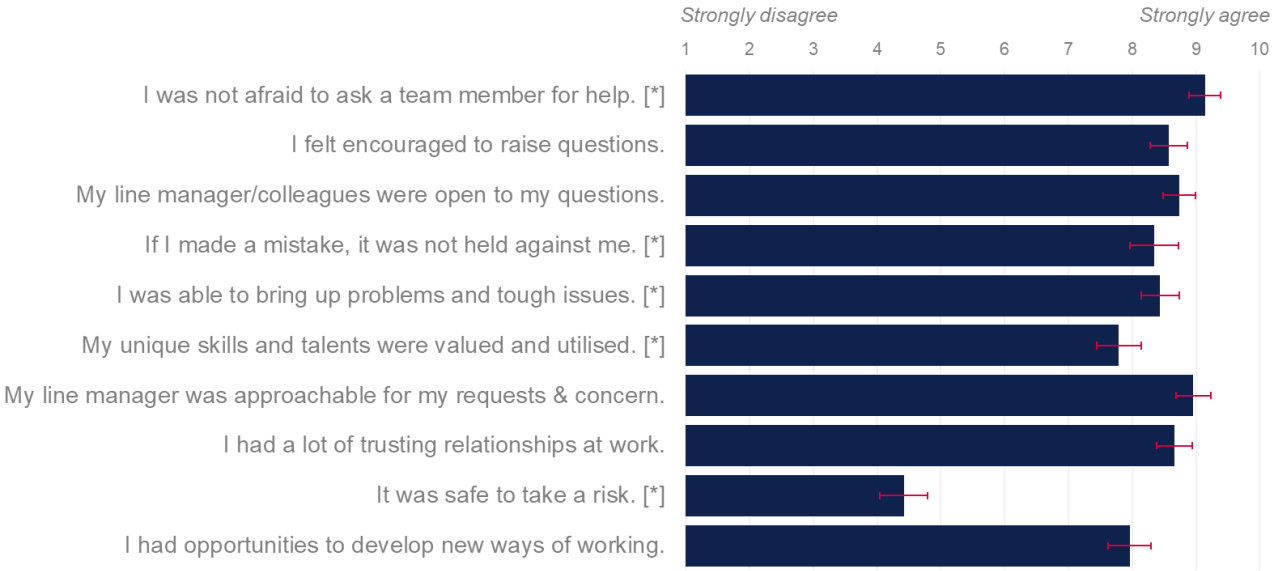
Psychological safety is a key characteristic of a high-performing team (Bergmann and Schaeppi 2016) that directly and indirectly **increases team performance through structured learning processes** (Edmondson 1999). Psychological safety pervades an entire group and constitutes a strong bond between team members. The working climate induced by psychological safety reduces staff turnover and improves team learning, as the absence of fear enhances the ability to learn from what went wrong (Lechner and Mortlock 2021).

Ten survey items (and corresponding statements in the interviews and focus group discussions) measured the level of psychological safety within the GTTPS workforce. In Figure 9 and Table 6, the items annotated with an asterisk are extracted from Edmondson's 7 Questions (Edmondson 1999), which she introduced to measure a team's psychological safety. The other five items seek to compensate for the omission of "*Do people on the team sometimes reject others for being different*?" (one of Edmondson's 7 Questions). The seventh question of Edmondson, "*Do people on the team deliberately act to undermine your efforts*?" has been intentionally left out (instead, an open survey question offered participants an opportunity to share issues anonymously). All indicators displayed in Figure 9 refer to a 10-point scale (where "1" indicates *Strongly disagree*, and "10" *Strongly agree*).

Figure 9 displays a kind of jigsaw puzzle. Bringing all items in Figure 9 (and Table 6) together – jointly evaluating them – starts painting a picture of the working climate/environment within the GTTPS. The first item in Figure 9 (and Table 6), "*In situations where I didn't know the right answer, I was not afraid to ask a team member for help*", scored 9.1 CI [8.9, 9.3] on the 10-point scale. GTTPS staff in high-responsibility jobs scored even higher than the average (9.8 CI [9.4, 10.0]), which had a remarkable effect. Leaders likely created an atmosphere of mutual trust and interest in each other's opinions by exposing that they did not have all the answers. According to Brown (2018), their exemplary behaviour might have **encouraged team members not to hide their vulnerabilities and imperfections**. Support for the latter is reflected by item no 2, "*I felt encouraged to raise questions*", scoring 8.6 CI [8.3, 8.9], and item no 3, "*My line manager/colleagues were open to my questions to get a shared understanding*", scoring 8.7 CI [8.5, 9.0] (see Figure 9).

Another (psychologically) safe-environment puzzle piece relates to the "permission" to admit a mistake. Item no 4, "*If I made a mistake, it was not held against me*", scored 8.3 CI [8.0, 8.7] (see Figure 9). The fifth item, "I was able to bring up problems and tough issues", scored 8.4 CI [8.2, 8.7]. It is plausible to assume that people less afraid that a mistake will be held against them are more likely to admit it happened. Edmondson (1999) supports that a high willingness to report mistakes allowed the GTTPS to improve through **collective learning from these reports**. Sensing "permission" to speak up might even help prevent mistakes. It includes appreciatively addressing problems and issues perceived concerning own work or surfacing elsewhere. What is mandatory is the absence of humiliation or unkind exposure of shortcomings.

Figure 9: Measures of psychological safety (survey results), including 95%-confidence interval



Some interviewees and survey participants sometimes felt "*underappreciated by management and uncared for*" (S32). Those (few) disappointed were by far outnumbered by GTTPS staff who praised their line managers. Figure 9 displays both. The sixth item, "My unique skills and talents were valued and utilised", scored (only) 7.8 CI [7.4, 8.1], while item no 7, "*My line manager was approachable for my requests and concerns*", scored 9.0 CI [8.7, 9.2]. "*Since starting [at the] GTTPS, I have felt fully supported by my manager, and he […] has believed in me and encouraged my progression*" (S11), endorsed a study participant. "*I believe […] our line manager has helped not only the team but also me personally progress in the service. The fact that we have and are allowed to build a close-knit team provides clear and easy lines of communications between multiple levels of 'hierarchy' with little to no nervousness about approaching each other*" (S79), shared another participant. These statements (like many others) exemplify the service's working climate. **Inclusive managers are approachable and develop staff**, and the GTTPS evidently hosts them.

Consequently, it is no surprise that survey participants spoke of a "*team feeling that is completely supportive of each other*" (S173). Another participant seconded this statement by acknowledging the "*tremendous support and help from all colleagues under very trying circumstances*" (S165). These testimonials relate to item no 8, "*I had a lot of trusting relationships at work*", which scored 8.7 CI [8.4, 9.0] (see Figure 9 and Table 6). It is plausible to assume that **sustained support generates trust** within the respective teams. Study participants confirmed they felt safe and trusted their teams and line managers (I7, I8, I9). In this working climate, people thrive. For example, "*The trust and support […] has allowed me to use my skills and experiences to their full potential, and I have flourished as a person and in my career because of this*" (S100).

In the context of contact tracing, the research team expected a lower "*safe to take a risk*" score as the purpose of the service does not lend itself to risk-seeking behaviour. Indeed, the score of item no 9 was no more than 4.4 CI [4.0, 4.8]. This result does not necessarily reflect an absence of psychological safety, which becomes more apparent in the tenth statement. The final item in Figure 9

and Table 6, "*I had opportunities to develop and implement new ways of performing tasks*", scored 8.0 CI [7.6, 8.3]. Survey participants reported that they "*have pioneered and tested new ways of working*" (S152). When people feel safe and comfortable raising their voices, knowledge and information will be shared, cooperative learning will be enabled, and the team will better understand an issue's complexity (Schulz-Hardt, et al. 2006). Then, nothing will jeopardise the team's mission.

Table 6: Measures of psychological safety (survey results), including 95%-confidence interval

	Scale unit	Mean	95% Confidence Intervals	
I was not afraid to ask a team member for help. [*]	1=strongly disagree, 10=strongly agree	9.1	8.9	9.4
I felt encouraged to raise questions.		8.6	8.3	8.9
My line manager/colleagues were open to my questions.		8.7	8.5	9.0
If I made a mistake, it was not held against me. [*]		8.3	8.0	8.7
I was able to bring up problems and tough issues. [*]		8.4	8.1	8.7
My unique skills and talents were valued and utilised. [*]		7.8	7.4	8.1
My line manager was approachable for my requests & concern.		9.0	8.7	9.2
I had a lot of trusting relationships at work.		8.7	8.4	8.9
It was safe to take a risk. [*]		4.4	4.0	4.8
I had opportunities to develop new ways of working.		8.0	7.6	8.3

4.5.2 Enhancing team culture through dependability

Apart from psychological safety (discussed in section 4.5.1), dependability and team support (I4, I5, I6, I7, I8, I9, I10, I14) also contribute to the positive working climate and the exceptional team spirit that made the GTTPS effective. A study participant reported that GTTPS staff were "*very positive and supportive and very able and very willing to give their time to advise and guide"* (I4). *"[Within the team], you know, everyone is there to support each other*", added another study participant (I6). Likewise, a survey participant said, *"support and help from all colleagues have been tremendous under very trying circumstances*" (S165). **Support, help, mutual aid, being in it together and learning from one another**—all these things encourage building a work environment characterised by the open sharing of new experiences, thereby fostering dependability and helping to cope with day-to-day processes (Zhang, et al. 2010, Lechner and Mortlock 2021).

In a high-performing team, all members (can) rely on each other—to achieve a shared goal. Precisely this shared goal was the additional element that made GTTPS teams fly. "*There was a common goal and commitment to the objectives and benefits for the Gwent communities. People worked at pace and trusted each other to take on activities within their expertise and then develop knowledge and skills for each other*", wrote a survey participant (S89). Besides, (when individuals feel safe and dependable) sharing information and work-related personal insights with teammates creates a **shared identity across a virtual team** (Lechner and Mortlock 2021). "*Working with a remote-based team was initially challenging, but we developed a strong team ethos very quickly, probably because we have similar values and beliefs*", confirmed a survey participant (S148). Adding to a joint (team)

knowledge base and caring for each other then upholds psychological safety and fosters dependability. The research team identified this positively reinforcing cycle of behaviours in interviews, focus group discussions and survey responses.

The research team further utilised the *"Why are you sharing information?"* item from the online survey to generate a quantitative measure of dependability.[13] Figure 10 shows the proportions of survey participants who agreed with the statements underneath the respective pie charts. About half of GTTPS staff shared information because they were asked (Figure 10, left-hand chart; cf. Table 7). Significantly more survey respondents (71%) considered sharing information "to help their team" as motivation for communication (Figure 10, middle chart; cf. Table 7). Most individuals shared information because "it was necessary to get the job done" (Figure 11, right-hand chart; cf. Table 7).

Figure 10: Measure of dependability: proportion of survey participants agreeing with statements about their motivation for information sharing

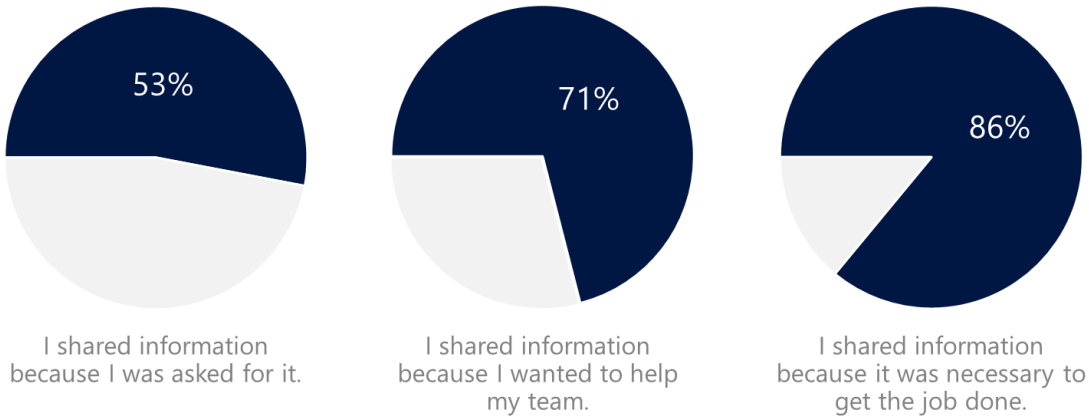


Table 7: Dependability

Survey item		Scale unit	Mean
I shared information with others because	*I was asked for it.*	0=no, 1=yes	0.53
	I wanted to help my team.	0=no, 1=yes	0.71
	it was necessary to get the job done.	0=no, 1=yes	0.86

Figure 10 reveals the **team focus, the robust goal orientation** within the GTTPS team(s) and the staff's proactive working style. The driver for this working style was a shared enemy: the SARS-CoV-2 virus (I1). In "peace times", Public Health partnerships like health protection services will need other drivers, other elements that unite and give direction.

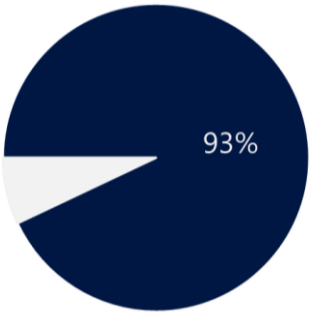
[13] Please note that response options were not mutually exclusive.

4.5.3 Ameliorating performance through structure and clarity

Organisations require clear structures to encourage autonomous action (Seibert and Silver 2004). Autonomy in workgroups (achieved through clear boundaries) then facilitates effective teamwork, cohesion during processes and coordination of work (Campion, Medsker and Higgs 1993). With a clear allocation of resources, organisational processes provide the day-to-day context for work. In such a structured environment, employees can perform their jobs effectively.[14] A survey participant endorsed this by saying, *"[…] we have a great understanding of what works and what doesn't and a clear procedure in place*" (S138). Therefore, the research team devoted sections 4.1 through 4.4 to discussing the service's structure. In what follows, the research team addresses (no more than) clarity of the aim, job roles and responsibilities within the service.

Interviews, focus group discussions, and feedback from the online survey show how unmistakably GTTPS conveyed its aim to its employees (firmly uniting its workforce). 93% of the survey participants confirmed that (right from the start) there had been **clear communication of the GTTPS's aim** (Figure 11 and Table 8).[15]

Figure 11: Proportion of positive responses to the question "When you first started, was the aim of the GTTPS clearly communicated?"



"*We've all […] had a common understanding of the overarching aims and objectives of the service and what we wanted to deliver*", a study participant confirmed (I7: 7/3). While Figure 11 shows that GTTPS staff understood what the service intended to achieve, the statement above also demonstrates a common understanding of how to achieve the aim. What further united staff across the GTTPS was a shared goal (i.e., reaching as many contacts of a positive case as possible within 24 hours to break transmission chains).

[14] Lack of direction, structure or clarity leads to confusion, tension, and demotivation for an employee.
[15] The GTTPS Governance & Delivery framework sets out the service's aim "to protect our residents through breaking the chains of transmission of COVID-19 in our communities and places of work" (ABUHB 2021).

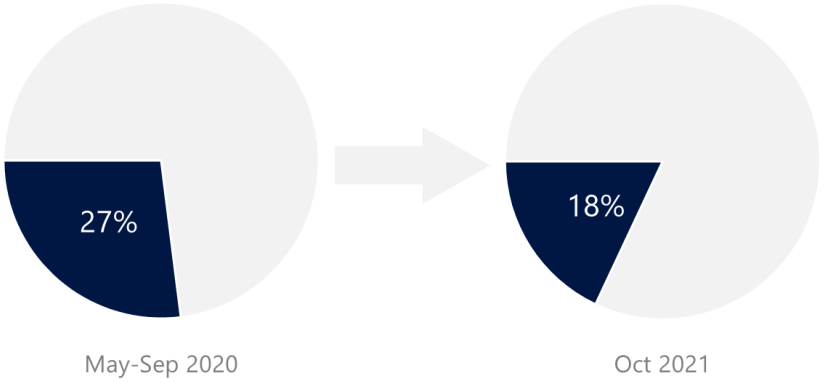
Table 8: Structure and clarity

Survey item	Scale unit	Mean	95% Confidence intervals	
When you first started, was the aim of GTTPS clearly communicated?	0=no, 1=yes	0.93	–	–
How much time did you spend performing tasks that did not coincide with your job description when you started working for the GTTPS?	% of workday	16	12	20
How much time did you spend performing tasks that did not coincide with your job description in Oct 2021?	% of workday	13	9	16
How important was it to adapt to new challenges?	1=not important, 10=very important	9.5	9.3	9.7

The GTTPS clearly communicated the service's aim and goal – and there was a clarity of the alignment of the aim and goal across the service, where "*it helped to have common priorities*" (as one of the workshop participants remarked). Clarity and prioritisation alignment may have been supported by a shared sense of public service (as another workshop participant presumed).

Job roles and responsibilities were less precise than the GTTPS's aim, especially in the early phase of the service's existence. Figure 12 displays the shares of a workday a member of cohort 1 spent performing tasks not coinciding with the job description. The diagram differentiates the period from May to September 2020 (the start dates of cohort 1; Figure 12, left-hand chart) and Oct 2021 (Figure 12, right-hand chart). As a comparison, Table 8 provides information for all survey participants.

Figure 12: Measure of clarity (of job roles): share of workday survey participants (cohort 1) spent performing tasks that did/do not coincide with their job description



In the early days of the service, staff spent more than a quarter (27%) of their workday doing tasks outside their job description. The range varied, however, from 0% to 100%. As the service matured, the share of the workday devoted to doing tasks not consistent with the job description declined significantly (p-value = 0.0008 < 0.05). For cohorts 2 and 3 (with higher proportions of tracers and advisors), changes between the start date and Oct 2021 were not significant, and proportions were a lot smaller (12% and 5% in Oct 2021, respectively). Most staff felt compensated for the lack of clarity of their job roles by a firm commitment to the service's aim, goal, and purpose. "*I joined TTP*

to fight a virus and to help the NHS during a pandemic. I was and am still willing to perform any task to be able to help." (S121).

Being adaptable is probably the *secret superpower*[16] of a GTTPS team member (cf. Table 8). Adaptability scored 9.5 CI [9.3, 9.7] on a 10-point scale (where "1" indicated *Not important*, and "10" represented *Very important*) and enabled staff to cope with sudden demand shocks by adapting their processes. Note that the latter is about unpredictability, not (necessarily) a lack of clear structures. Franco, Bennett and Kanfer (2002) suggest that clear, efficient service delivery results from clarifying staff's roles and responsibilities and providing sufficient authority and autonomy to complete the task. The latter comes to mind when reading the comment of a survey participant. "*My job role now requires me to be a lot more adaptable in my work in the sense that we could be asked to lead or support a new workstream at relatively short notice. […] Doing these extra workstreams has allowed us to see the importance of contact tracing in the wider context, which can only help to support and enhance the work that we do day-to-day*" (S10).

In the context of adaptivity, the research team wants to point out that many publications have described how those responding to COVID-19 have reinvented the view of how to deliver Agile Healthcare (Brunet, Malas and Fleury 2021), but GTTPS has taken this one step further by

- using an agile delivery model (from a service/project management perspective, including the use of daily sitreps and scrum meetings in the service's early days),
- agile resourcing (with many local authorities using agency staff and internal deployment to scale the workforce up and down rapidly), and
- agile roles and responsibilities (with staff feeling somewhat comfortable and empowered by changes to their jobs, sometimes overnight).

4.5.4 Invigorating staff through their work's meaning and impact

In sections 4.5.1 through 4.5.3, the research team already alluded to the close relationship between psychological safety, dependability, clarity and "meaning & impact" that capture the working climate observed within the GTTPS. Table 9 and Figure 13 provide five survey items that jointly quantify meaning and impact.[17] All indicators refer to a 10-point scale where "1" implies *Strongly disagree,* and "10" represents *Strongly agree*.

Almost all survey respondents considered it highly important to give their best at work (see Figure 13). The corresponding score was 9.5 CI [9.3, 9.6]. GTTPS staff displayed a high level of commitment and supreme work ethic—but this was not the end of the story. Staff also **felt genuinely engaged in the purpose of the service** (the engagement score is 9.0 CI [8.7, 9.2]; see Figure 13).

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[16] "*The service has been successful because the team's superpower is its ability to roll with the changes and remain focused and enthusiastic*" (S186), was what a survey respondent wanted to share with the researchers.
[17] Note that the research team refers to meaning for team members and impact on team members and not, for example, about meaning for or the impact on the 7-day incidence.

Table 9: Measures of meaning & impact

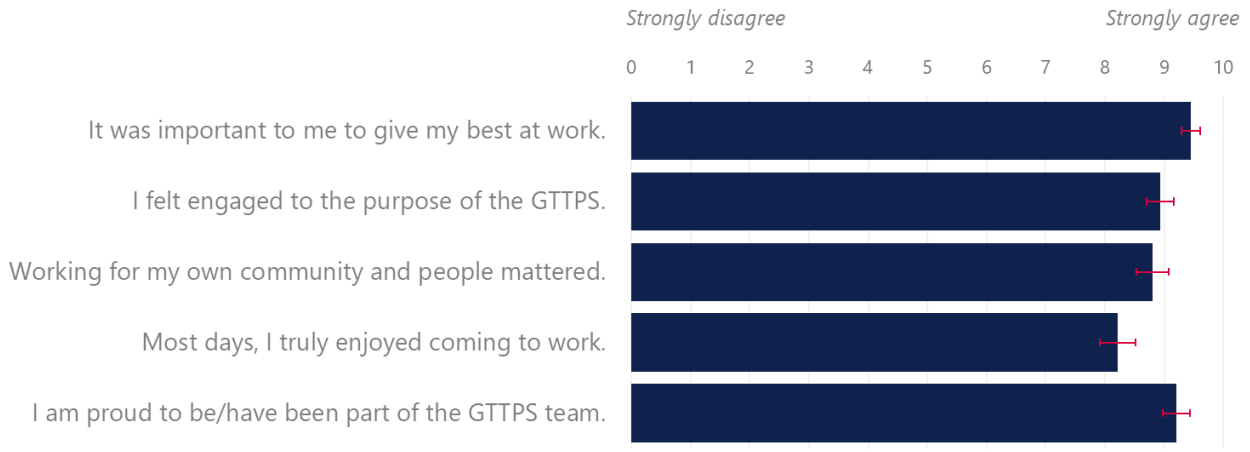
Survey item	Scale unit	Mean	95% Confidence intervals	
It was important to me to give my best at work.	1=strongly disagree, 10=strongly agree	9.5	9.3	9.6
I felt engaged with the purpose of the GTTPS.[18]		8.9	8.7	9.2
Working for my own community and people mattered.		8.8	8.5	9.1
Most days, I truly enjoyed coming to work.		8.2	7.9	8.5
I am proud to be/have been part of the GTTPS team.		9.2	9.0	9.4

The online survey included an open question where individuals could raise any issue on the development of the GTTPS that seemed essential to them. 37% of the survey participants chose to comment on this open question. Out of these, nearly 60% made very positive, even enthusiastic, remarks referring to the meaning and impact of their work within the service (and how positively it affected their lives). For example, a Team Lead shared, "*I have loved my time at TTP; I have had the best support and been given so many opportunities to learn new skills. I have met amazing people and feel honoured to be part of this process. This is an experience I will never forget*" (S47). This response behaviour highlights the high level of **commitment** of the GTTPS workforce. "*There was a desire to make it work, so there was a real motivation there […], and each of those teams wanted to do the best they could for their councils and for their local communities as well"*, mentioned a study participant (I1) and further points to a high level of intrinsic motivation.

The quote above was not random. **Working for the benefit of one's community mattered greatly** for the GTTPS workforce (see Table 9 and Figure 14). The corresponding score was 8.8 CI [8.5, 9.1]. "*Each of those teams wanted to do the best they could for their councils and for their local communities as well"*, explained a study participant (I1). Another participant said, "*The workforce really understood the importance of establishing this service, and so everybody went over and above their day job to make it happen, so I think this public service commitment and dedication was quite extraordinary"* (I3). A study participant used the term "*Dunkirk spirit*" to describe the genuine desire to provide care and support for the community in a dangerous and challenging situation (I9: 18). The possibility of saving lives as a direct impact of their efforts most likely fuelled the intrinsic motivation of the GTTPS workforce. The following statement from a survey participant reflects the motivational power of receiving recognition and feedback on one's efforts: "*the response from the local community when making calls to them has been heartwarming, they have been so compliant, and most of the people have appreciated the help and assistance*" (S190). Personal engagement, relatedness and commitment form another driver of successfully building a safe, inclusive and vibrant work environment (West and Dawson 2012, Edmondson 2019).

[18] The GTTPS Governance & Delivery framework indicates the purpose of the service as (1) Find, Act, Prioritise and Report, (2) Stay at Home an (3) Save Lives (ABUHB 2021).

Figure 13: Measures of meaning & impact (survey results), including 95%-confidence intervals



Therefore, it is less of a surprise that staff engaged with the purpose of the GTTPS to a large extent. Additionally, they **truly enjoyed coming to work** (recall, it is work, after all). Among survey participants, "joy at work" scored 8.2 CI [7.9, 8.5] on a 10-point scale (see Table 9 and Figure 13). Joy sounds, for example, like the following comment of a survey participant, "*GTTP has been a fantastic opportunity and a real eye-opener. […] Hard work, a whole new way of working and lots of new information. I look forward to going to work every day*" (S5). Another participant reinforced this view, "*I love working with my team and don't want it to end*" (S45).

The **pride** expressed in the related score (9.2 CI [9.0, 9.4]; see Table 9 and Figure 13) does not merely come from being part of something great. It is the outcome of a conscious journey of personal growth under challenging circumstances (which relates back to the learning enabled by a sufficient level of psychological safety). Two survey participants voiced their journeys (and they represent many others; S30, S58, S76, S110, S127, S137, S145, S155, S156, S166). As they put in a nutshell, what the research team observed throughout the service, this section closes with their words.

"*I thoroughly enjoy my role as a contact tracer and would love to continue if the opportunity arose. I am much happier working remotely and doing a job that I feel fulfilled in doing. I really do feel our work is making a difference, and we are a positive and very helpful team. Very proud to work for GTTP*". (S81)

"*Excellent experience, really good learning in a constantly changing environment. There are many knowledgeable and talented members of the team who inspire me. I feel it has been a really positive experience, and [I am] proud to be part of the team.*" (S8)

summary

5. Conclusions and recommendations

The set-up and further development of the GTTPS have created a strong and effective network structure and a unique organisational culture. When reflecting on the service's success, it is crucial to recall that the pandemic has played a significant role in cultivating collaboration and support between partner organisations and fuelling the engagement and commitment of the GTTPS workforce. Thus, when using the GTTPS as a blueprint for future Public Health partnerships, knowing the GTTPS network structure, governance, and culture needs to be complemented by learning how to build a sustainable service. Therefore, the research team supplements the presentation of key features of the GTTPS's success with recommendations for establishing an inclusive working climate/environment without a threat like COVID-19.

Establishing a robust network structure and strong partnerships

The establishment of the GTTPS has been a collaborative effort of Welsh Government, Public Health Wales, ABUHB and Gwent's five local authorities. However, the more comprehensive network included others as well (e.g., schools) and jointly developed an effective response to COVID-19 for Gwent. Most importantly, the network of partner organisations formed a strong alliance seamlessly working together towards the overall goal (i.e., to protect Gwent residents through breaking the COVID-19 transmission chains in communities and places of work), an essential feature of the GTTPS. Future Public Health partnerships could build upon the existing relationships between organisations and the collaborative GTTPS culture to grow and prosper. An important lesson learnt – an insight to take away – is the significance of establishing *support units* and *groups with decision-making authority* consisting of representatives from all partner organisations (built into the network's organisational/governance structure). These groups provide programme management across the organisations and keep communication flows lateral (not top-down). Another takeaway insight is that the *agile work mode* of GTTPS staff enhanced the creation of (informal) links, shared understanding, and collaboration, thereby contributing to the alignment of the organisations' priorities and strengthening the network that rests on local knowledge of people and communities. A third takeaway insight is that this type of shared understanding and ongoing collaboration (of national and local experts) led to the staff's deep feelings of *belonging* to the network and *pride* in being part of it. The robust network, the partnerships and the unique collaborative culture were built from scratch, and blueprints are far from being foregone conclusions. The research team encourages GTTPS leaders to share what worked well and what did not (both structure and culture) within the GTTPS network and beyond as a best-practise example.

At the same time, the research team would like to point out that GTTPS findings suggest keeping an eye on the network's governance. Some study participants raised the issue of "over-governance" and "too much formalism", which hampers agility, flexibility and innovation. There seems to be a need to reconsider the degree of governance to ensure some amount of self-direction and self-determination of GTTPS staff and agility for the TTP teams. If governance becomes too rigid, there is a risk of undermining key success factors of the service. Then, overregulation and over-structuring could imply higher expenses and staff disengagement with the service's purpose.

Manifesting a collaborative and supportive organisational culture through leadership

A collaborative working climate based on psychological safety is necessary for establishing a high-performing team that increases its performance through organisational learning, a healthy failure culture and mutual support. The GTTPS shows that psychological safety has penetrated the network of partner organisations and represents an "invisible glue" between constituents. The research team observed an environment shaped by trust, appreciation, sharing, gratitude and courage. During meetings (and across the whole service), the inclusive and agile communication style contributed immensely to the GTTPS success story. For future collaborations supporting prevention and protection within a Public Health partnership framework, the research team recommends the establishment of a work environment shaped by the absence of fearing interpersonal risk-taking (characterised by, e.g., freely raising work-related issues, reporting mistakes or asking questions without being ridiculed or punished). This environment implements the cultivation of trusting relationships among staff, communicating the appreciation of people's skills and talents, sharing information (also about what went wrong) and best practise without hesitation, expressing gratitude and fostering the courage "to go for it", to mention just a few features. A vital ingredient in this regard is the "right" type of leaders – in a way, role models – shaping the organisational culture.

GTTPS staff experienced leadership as supportive, engaging and inclusive. These features relate to *servant leadership*, where the leader empowers and enables employees and focuses on the staff's needs to "grow" and reach outstanding performance levels (Sendjaya and Sarros 2002). The positive reinforcement of servant leadership rests on the Social Exchange theory stating that employees tend to reciprocate supportive and caring behaviours by returning these desired behaviours (Blau 1964). Following this notion, the leadership style represents a fundamental source of employee commitment and engagement even without a pandemic. Therefore, the research team would like to encourage future Public Health partnerships to pay particular attention to selecting relationship-oriented leadership competencies through carefully designed recruitment processes.

Keeping up workforce diversity (through standardised recruitment processes)

Within the GTTPS, national experts (knowing response modes to large-scale communicable diseases), local experts (knowing their communities inside out) and individuals with the "right" mind- and skillsets worked together very well. The service's workforce consisted of teams that respected, empowered, supported and developed each other. Recruiting GTTPS staff from the private, third and wider public sectors brought new skills and perspectives to the service (and it contributed to building bonds with businesses and manifesting them across local communities). The concept of workforce diversity is already integral to public sector workforce planning. The GTTPS paradigm took the next step and extended this concept to account for diversity in professions, formal training and backgrounds (public, third and private sector).

Identifying suitable candidates for such a workforce – able to thrive under volatile, uncertain and ambiguous circumstances, willing to orchestrate change and eager to go the extra mile – compares to looking for a needle in a haystack. Within the GTTPS, a competitive recruitment process selects the "right" individuals, contributing to the system's robustness with job requirements (intentionally

expressed in the job descriptions) relating to subject knowledge, leadership style, communication competencies and personal skills. Partially, the recruitment process also pays attention to the values and beliefs of candidates, ensuring "a good fit" and, thereby, a collaborative and supportive team climate. The recruitment process was a critical asset of the GTTPS and can serve as a best-practice example for future Public Health partnerships.

Collecting learning through continuous improvement

Within the GTTPS, intense communication and information-sharing between partner organisations stimulated understanding and an organisational climate conducive to learning and continuous improvement (involving staff). By establishing a psychologically safe working environment (through leadership, role modelling and unity due to the shared enemy COVID-19), people felt trusted, confident, and empowered to ask questions and make decisions (and, to some degree, take risks). In addition, the research team noticed a strong willingness of staff to stimulate innovations and minor improvement projects. Innovations observed within the GTTPS focused on establishing rapid communication (of guidelines and scripts) and boosting the speed of the tracing process. Also (despite formal Quality Improvement methodology not being fully established), the research team could identify the rapid development and implementation process as a sequence of informal improvement cycles. To enhance the sustainability of the service, the research team would recommend formally establishing learning logs (in daily processes), embedding Quality Improvement or Lean Six Sigma projects into daily routines and sharing best practices, e.g., in the form of quality circles.

Cherishing an engaged workforce united by a common aim

People within the GTTPS team experienced their work's contribution as part of something bigger, united by a common aim, contributing to a common goal and serving their communities by protecting them from a rapidly spreading virus. The latter brought together personally meaningful work activities with the wider impact of the service. Consequently, staff felt intensely engaged in the purpose of the GTTPS and truly enjoyed coming to work. For future TTP or health protection services, the research team would recommend informing staff very clearly that (and how) they work towards a common goal (whatever it is), serving their neighbours, friends and families and making their communities healthier places. Feedback cycles and acknowledgement of individual efforts and performance constitute a means to orchestrate staff buy-in. In this context, strategic communication might inform the public, shape "the brand", and create an identity for staff.

Keeping an eye on workforce wellbeing

From the comments of a few study participants, the research team inferred the first signs of exhaustion. GTTPS staff have worked ceaselessly throughout the COVID-19 pandemic. As mentioned in section 4.4, the local Public Health team within ABUHB has already acknowledged the ongoing exposure to stress GTTPS staff experienced by setting up well-being sessions. Also, ABUHB has implemented procedures to respond to the *ABUHB Staff Well-being Survey* results. Within some

teams, frequent reminders about taking breaks, taking annual leave, looking after oneself and supporting colleagues, and speaking to their line managers if the workload is too heavy mitigate the risk of burnout. Other teams have set up a Buddy Scheme to care for each other. In this context, it feels vital to advise a consistent roll-out of well-being measures (already existing in some pockets of the service) to retain the high working morale and exceptional staff engagement we still observe today.

Additionally, the research team encourages further investment in staff well-being. To avoid team members feeling unappreciated and not cared for, GTTPS managers are recommended to practise self-care and mindfulness so that exhaustion does not impair the communication of appreciation to those managed. Another opportunity would be the involvement or cooperation with an Employee Assistance Programme (EAP) or psychological counselling to support the employees. Service-internal support structures must consistently help the individual integrate self-care in daily practice for any of these approaches.

Enhancing clarity and the (perceived) feeling of security

Frequent change and uncertainty cause stress within the workforce. Therefore, the research team would recommend building four elements of stability and security into the working routines.

- Team leaders and line managers should ensure that their team members fully understand job roles and duties. No ambiguity should be left.
- Job insecurity can be daunting. Study participants reported that the service has already taken steps to increase job security by increasing the duration of working contracts. Another variation of improving perceived stability could be offering staff to be retained in public service even when the GTTPS downsizes.
- The research team would recommend clarifying sharing-and-information-gathering responsibilities, focusing on health information. Staff members feel challenged by frequent changes in legislation, script, guidance and standard operating procedures. Whenever possible, a change in the guidance (documents) should be arranged at predefined times, days or intervals. Keeping staff (especially part-time staff) updated should be integrated into the daily working routine (with expectations clearly outlined in the job description).
- Several training methods and styles (e.g., morning sessions, job rotation, job enlargement, peer coaching, online training) have been implemented in pockets of the service but not throughout the organisations. The research team recommends aiming at consistency in training skills and conveying knowledge. Regular training programmes will make staff feel valued, empower staff "to do", and reduce failure and demotivation. Staff consider their situation "safer" when they feel appropriately equipped for the tasks ahead.

Final remarks on risk-taking, governance and financial resources

When analysing data and writing this report, the research team contacted GTTPS managers to obtain feedback and discuss findings. A senior manager remarked that risk-taking attitudes, governance, and financial resource release were inconsistent throughout the pandemic. Those attitudes depended on the situation, especially the intensity of the respective COVID-19 wave. This issue had not appeared in the interviews or the survey responses and received particular attention in the final workshop discussion with GTTPS staff members after the draft report's release in mid-February 2022. Another aspect of the service's financial situation was reemphasised in this discussion. During the COVID-19 pandemic (and especially in the founding stage of the GTTPS), Welsh Government awarded TTP services sufficient financial resources to "do the right things" and not only "to do things right" under severe budget constraints. Alongside continuous improvement and local knowledge being used for local contact tracing, this has undoubtedly contributed to the service's success, as it has made everything described in this report possible.

References

ABUHB. *GTTPS - Contact Tracing Governance & Delivery Framework, version 10.* Caerleon, Wales: mimeo, 2021.

Audit Wales. *Test, Trace, Protect in Wales: an Overview of Progress to Date: Report of the Auditor General for Wales.* Auditor General for Wales, 2021.

Behrens, D.A., D. Gartner, J. Brown, E. Powell, D. Westwood, and I. Spernaes. "COVID-19: Test, Trace and Protect in Wales." *Impact* 2021, no. 1 (2021): 10-12.

Bergmann, B., and J. Schaeppi. "A data-driven approach to group creativity." *Harvard Business Review*, 2016.

Blau, P. *Exchange and Power in Social Life.* New York: John Wiley, 1964.

Braun, V., and V. Clarke. "Using thematic analysis in psychology." *Qualitative Research in Psychology* 3, no. 2 (2006): 77-101.

Brown, B. *Dare to Lead: Brave Work. Tough Conversations. Whole Hearts.* London: Vermilion, 2018.

Brunet, F., K. Malas, and D. Fleury. "A model of an agile organization designed to better manage the COVID-19 crisis." *Healthcare Management Forum* 34, no. 2 (2021): 115–118.

Campion, M.A., G.J. Medsker, and A.C. Higgs. "Relations between work group characteristics and effectiveness: implications for designing effective work groups." *Personnel Psychology* 46, no. 4 (1993): 823-847.

Delizonna, Laura. "High-performing teams need psychological safety. Here's how to create it." *Harvard Business Review*, 2017.

Dresing, T., and T. Pehl. *Praxisbuch Interview, Transkription und Analyse. Anleitungen und Regelsysteme für qualitativ Forschende.* 8. Marburg: Eigenverlag, 2018.

Dyjack, D.T., et al. "The COVID-19 pandemic and environmental health: lessons learned." *Journal of Environmental Health* 84, no. 5 (2021): 20-25.

Edmondson, A.C. "Psychological safety and learning behavior in work teams." *Administrative Science Quarterly* 44, no. 2 (1999): 350-383.

—. *The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth.* Hoboken, NJ: John Wiley & Sons, 2019.

Felstead, A., and G. Henseke. "Assessing the growth of remote working and its consequences for effort, wellbeing and work-life balance." *New Technology, Work and Employment* 32, no. 3 (2017): 195-212.

Franco, L.M., S. Bennett, and R. Kanfer. "Health sector reform and public sector health worker motivation: a conceptual framework." *Social Science & Medicine* 54, no. 8 (2002): 1255-1266.

Kelliher, C., and D. Anderson. "Doing more with less? Flexible working practices and the intensification of work." *Human Relations* 63, no. 1 (2010): 83-106.

Kleinbaum, A.M., and T.E. Stuart. "Inside the black box of the corporate staff: social networks and the implementation of corporate strategy." *Strategic Management Journal* 35 (2013): 24-47.

Lechner, A., and J.T. Mortlock. "How to create psychological safety in virtual teams." *Organizational Dynamics*, 2021.

Rozovsky, J. *What Google learned from Its quest to build the perfect team*. 2016. https://www.nytimes.com/2016/02/28/magazine/what-google-learned-from-its-quest-to-build-the-perfect-team.html (accessed Jan 29, 2022).

Schulz-Hardt, S., F.C. Brodbeck, A. Mojzisch, R. Kerschreiter, and D. Frey. "Group decision making in hidden profile situations: Dissent as a facilitator for decision quality." *Journal of Personality and Social Psychology* 91 (2006): 1080-1093.

Seibert, S.E., and S.R.: Randolph, W.A. Silver. "Taking empowerment to the next level: a multiple-level model of empowerment, performance, and satisfaction." *Academy of Management Journal* 47, no. 3 (2004): 333-349.

Sendjaya, S., and J.C. Sarros. "Servant Leadership: Its Origin, Development, and Application in Organizations." *Journal of Leadership & Organizational Studies*, 2 9 2002: 57-64.

TAC Modelling Subgroup. "Technical Advisory Group: modelling the current Welsh Test, Trace, Protect system." Welsh Government. 24 Mar 2021. https://gov.wales/technical-advisory-group-modelling-current-welsh-test-trace-protect-system (accessed Jan 29, 2022).

Wang, B., Y. Liu, J. Qian, and S.K. Parker. "Achieving effective remote working during the COVID-19 pandemic: A work design perspective." *Applied Psychology* 70, no. 1 (2021): 16-59.

West, M.A., and J.F. Dawson. *Employee Engagement and NHS Performance*. London: Kings Fund, 2012.

Zhang, Y., Y. Fang, K.K. Wei, and H. Chen. "Exploring the role of psychological safety in promoting the intention to continue sharing knowledge in virtual communities." *International Journal of Information Management* 30, no. 5 (2010): 415-436.

appendix

Appendix 1: Schedule for data collection

Interview 1:	5 Oct 2021	Interview 2:	6 Oct 2021
Interview 3:	7 Oct 2021	Interview 4:	3 Nov 2021
Interview 5:	3 Nov 2021	Interview 6:	3 Nov 2021
Interview 7:	4 Nov 2021	Interview 8:	5 Nov 2021
Interview 9:	5 Nov 2021	Interview 10:	8 Nov 2021
Interview 11:	12 Nov 2021	Interview 12:	17 Nov 2021

Focus group 1 (6 participants):	18 Oct 2021
Focus group 2 (7 participants):	18 Nov 2021

Survey opened:	15 Oct 2021
Survey closed:	01 Nov 2021

Obtaining feedback from GTTPS staff:	07 Feb 2022 – 28 Feb 2022
Workshop to discuss and comment on findings:	18 Feb 2022

Appendix 2: Interview guide

Introduction

Danube University Krems cooperates with the Aneurin Bevan UHB (Aneurin Bevan University Health Board) in a research project. The project aims to evaluate the Gwent Test, Trace & Protect Service (GTTPS). For this interview, we are especially interested in your views and opinions concerning the configuration and initial development of the service, including the organisation's success factors. We will ask several open questions and invite you to share your experiences and understanding of the organisation. The interview will take about 30 minutes. The interviews will be recorded and transcribed, with the latter done by ABUHB staff (following pre-defined guidelines).

- All names must be removed from the transcripts so the information is anonymous. The transcripts will be named Interviews 1, 2, 3, and so on.

We will analyse the interviews by conducting a content analysis. There will be a synthesis of opinions and views, and it will not be possible to assign certain declarations to certain persons (names) afterwards. In our summary, we will occasionally cite interview partners using phrasings like "One interview partner stated that …. ."

- Do you have any questions before we start the interview?
- We will now start recording the interview.

Thank you for participating in the interview. Would you consent to the interview being recorded and transcribed afterwards (saying, "That is OK for me")?

Thank you for your consent.

Interview Questions

Organisation (max. 20 min)

1. Think of the organisational structure of the GTTPS. What went well within the GTTPS?
   - Why did it work so well
2. When establishing a similar service in a similar situation, what would you do the same way the next time?
   - Why does doing this feel so important to you?
3. What would you do differently within the GTTPS?
   - What are the reasons behind this?
   - What do you hope to achieve when having changed this issue?
4. Did you experience certain events where the GTTPS did not work so well?
   - What and why did the GTTPS miss its mission?
   - How did organisational members cope with failure?

5. Do you feel that the GTTPS was able to act adaptively? If so, what were the reasons that the service could work adaptively?

Communication (max. 10 min)

6. How would you describe the communication within the GTTPS?
    - How did communication channels change over time?
7. How (or to what extent) was it possible to develop a shared understanding within the GTTPS?
8. How could communication be maintained when working remotely?
    - Was it difficult/easy?
    - What channels/strategies were adopted?
9. How would you describe the contribution of formal/informal communication within the GTTPS?

Leadership (max. 10 min)

10. How would you describe leadership within the GTTPS?
11. To what extent have you been able to bring in your ideas and opinions on getting things done?
12. How did you feel when discussing problems/challenging issues within the team/with your line manager?

Closing

We have reached the end of the interview. Are there any critical issues we haven't mentioned yet? Any additional aspects you would like to share?

We will send you a transcript of the interview. Feel free to make comments on the transcript. We cannot change the wording in the transcript, but we will add your comments and feedback at the end of the interview. Again, the comments will be stored and evaluated anonymously.

Thank you very much for your time.

Appendix 3: Full list of codes and sub-codes, inc. counts

Table 10 provides a complete list of codes and sub-codes generated from interviews, focus groups and survey open questions. Note that "counts" refer to the number of text segments added to the code. If a study participant has raised the same issue, for example, three times during the interview, there will be a "3" in the count column. Also, counts are recorded separately (they do not accumulate within a theme).

Table 10: Final thematic map with counts

Codes and Subcodes	Description	Counts
1. ORGANISATION	**Perceptions and description of organisational structures and adaptations**	**3**
1.1 Changes	Perceptions on features and pace of change, reflections on the adaptability of the service	0
Features of change		21
*Workforce changes		4
Pace of change	Perceptions and reflections on the pace of change concerning the organisation of the service	19
Capacity to adapt quickly	Reflections and experiences on the adaptability of the organization	35
*Adaptability and flexibility of the workforce		27
1.2 Organisational structures	Perceptions and opinions referring to the organisational structure	9
Hierarchy		10
Collaboration with different organisations		1
1.3 Initial development	Descriptions and experiences during the set-up phase of the service (first 2-3 months)	28
Setting up the information management system		10
New experiences		12
Creation of organisational structures		20
*Setting up workforce		40
*Setting up contact tracing teams		10
*Building teams		15
*Physical workplace vs working remotely		55
*Centralisation vs decentralisation		42
1.4 After the initial phase	Descriptions and experiences of the service after three months	11
Refining structure		1
Refining processes and systems		0
1.5 Actual organisation	Perceptions and experiences referring to the present organisation (Nov - Dec 2021)	7
Creeping back to the old way		7
1.6 Roles and duties	Descriptions of roles and responsibilities of partner organisations and groups	0
Unclear roles and responsibilities		5
Role of Environmental Health Office		1
Role of Data Cell		11
Role of Business Support Supervisors		1
Role of the Coordination Unit		2
Role of G10, Gwent PSB		2

Codes and Subcodes	Description	Counts
Role of the Leadership Group		1
Role of the Regional Cell Delivery Programme		6
Role of Strategic Coordinating Group		1
Role of Regional Oversight Group		8
Role of Coordination Unit		15
Roles and duties Contact Tracers and Advisors		2
2. COMMUNICATION	**Perceptions and experiences concerning communication within the service, communication style and communication channels**	**14**
2.1 Features and role of formal communication	Associations with / role of formal communication	24
Decision-making		8
Handover of work		2
Linkage between structures		1
Sharing information		3
2.2 Features and role of informal communication	Associations with / role of informal communication	19
Means of communication		1
Limitations due to working remotely		3
2.3 Virtual communication	Reflections on virtual communication	37
2.4 Building relationships	Role of communication in building relationships	11
2.5 Meetings	Perceptions of the number, organisation and purpose of meetings	54
Number of meetings		13
*Initial phase		2
Purpose of meetings		33
Organisation of meetings		4
Integration of personal aspects in virtual meetings		4
3. LEADERSHIP	**Expressions describing the leadership style within the organisation.**	**0**
3.1 Reflections on leadership	General perceptions and reflections on leadership within the service	21
3.2 Own leadership style	Descriptions of one's own leadership style	21
3.3 Leadership style of others	Reflecting the leadership style of others	22
3.4 Speaking about staff	Reflections and descriptions of leaders when talking about working staff, employees or subordinates	10
4. SUCCESS FACTORS	**Personal opinions concerning the success factors of the organization**	**12**
4.1 Psychological safety	Perceptions of working climate, which reflects the organisational culture of the service. The numbers refer to the features of the concept of psychological safety (Edmondson`s 7 Questions)	5
Dealing with failure	If you make a mistake in your team, is it held against you?	12
Discussing problems, challenging issues	Are you able to bring up problems and tough issues?	16
*From a senior leadership perspective		10
Accepting each other	Do people on the team sometimes reject others for being different?	9
Try things out (risk-taking attitude)	Is it safe to take a risk?	6
*Feeling safe		4
*Bring in own ideas and opinions		13
*Feeling trusted		10

Codes and Subcodes	Description	Counts
*Problem-solving attitudes		3
*Decision-making under risk		9
*Implement ideas straightforward		4
*Can-do attitude		1
Helpful and supportive	Is it difficult to ask other team members for help?	43
Undermine the efforts of others	Do people on the team deliberately act to undermine your efforts?	0
Pool of expertise	Are your unique skills and talents valued and utilised?	15
*Engagement in idea formulation		1
4.2 Dependability	Perceptions on working conditions: personnel and financial resources, communication and co-operation within teams and between partner organisations	0
Workforce resources		5
*Effective teams		3
*Training and knowledge sharing		4
*Experiences in working with each other		30
*Effective use of seconded staff		4
*Experiences with similar situations		9
Communication and Cooperation	General perceptions of communication and co-operation within the service	1
*Networking communication		12
*Common management system and operating procedures		3
*Good relationships/cooperation between partner organisations		22
Availability of financial resources		8
4.3 Structure and Clarity	Perceptions of organisational structure, aims and purpose of the service	0
Organisational structure	Special features of the organizational structure that contributed to the success of the service	1
*Streamlining		3
*Local teams		32
Government structures		3
*Aligning strategy to operations		2
*Flattening hierarchies		4
Aims and targets	Perceptions on the formulation of aims and targets of the service	8
*Clear priority		4
*Common purpose		17
4.4 Meaning	Statements referring to personal engagement with the service aims and purpose	3
Personnel development, Motivation and Commitment	Factors that stimulated motivation and commitment of leaders, managers and working staff	20
Enthusiasm		14
Being part of the team		32
Doing the best, we can / supporting each other		26
Proud to work for the service		16
4.5 Impact	Expressions that work matters and creates change	0
Making a difference		9
Caring and support for the community		10
Being part of the response		10

Codes and Subcodes	Description	Counts
5. CHALLENGES	**Challenges reported by study participants concerning the service, organisation, leadership, workforce or work in general**	**0**
5.1 Keeping up with change		10
5.2 Setting up the organisation	Challenges referring to the set-up of the organisation	0
Establishment of service		5
Definition of roles and organisational structures		5
Understanding organisation		5
Adequate processes and systems		14
5.3 Communication	Challenges referring to the communication within a team and with partner organisations	0
Communication front line - management		1
Communication when working remotely		12
Communication between organisations		3
*Explaining decisions		1
Information exchange		8
Develop a common understanding		10
5.4 Coordination/Cooperation with partner organisations	Challenges referring to the coordination and cooperation with partner organisations	7
Delegation of tasks and responsibilities		7
Central control		8
Accountability		2
Coordination Unit vs Local Authorities		24
5.5 Workforce Challenges	Challenges referring to HR issues	9
Mission focus		1
Different leadership styles		2
Work intensity		9
Limited staffing		1
Rising case numbers		11
Defining job roles		4
Limited flexibility in defining jobs		1
Qualified staff		4
Job security		7
6. SUGGESTIONS FOR THE FUTURE: PREPAREDNESS	**Suggestions of interview partners to improve the service, including individual opinions on issues that need to be changed or modified to improve the service**	**6**
6.1 Workforce management		35
Recognition and acknowledgement		7
Organisational learning		5
Building up expertise	Suggestions to retain knowledge, skills and experience of the workforce	17
Plan for downsizing workforce		2
Value of local		3
More fairness in promotions		1
6.2 Systems, working processes, SOPs	Improvements referring to systems, working processes, standard operating procedures (SOPs)	48
6.3 Sustainable funding		1
6.4 Establishment of sustainable organisational structure	Suggestions to enhance the sustainability of organisational structures	37
Centralisation vs. decentralisation		4

Codes and Subcodes	Description	Counts
Required skills and experiences		5
A clear picture of the organisation		5
A clear definition of roles		5
Less formality		8
6.5 Cooperation and communication	Suggestions to improve cooperation and communication with partner organisations and Welsh Government	54
Build upon strong partnership arrangements		4
Cooperation with Gwent partners		3
Cooperation/Communication Welsh Government		38
Cooperation/Communication with England		9
6.6 Objective, evidence-based decision-making process		3

Appendix 4: List of abbreviations/glossary

ABUHB	**Aneurin Bevan University Health Board** is the local health board of NHS Wales for the Gwent region. ABUHB serves about 600,000 people in the south-east of Wales by providing acute, intermediate, primary and community care and mental health services.
GIMT	Gwent Incident Management Team
GPSB	Gwent Public Service Board
GTTPS	Gwent Test Trace Protect Service
LG	Leadership Group
NWIS	Digital Health and Care Wales (DHCW) is a new Special Health Authority with a pathfinder role concerning how health and care services are delivered. Established in April 2021, it replaces the **NHS Wales Informatics Service**.
PHW	**Public Health Wales** is an NHS Wales organisation that works to protect and improve health and well-being and reduce health inequalities for the people of Wales.
ROG	The **Regional Oversight Group** was established to perform the overall governance and programme management for the GTTP.
TAC	The **Technical Advisory Cell** coordinates scientific and technical advice to support Welsh Government decision-makers during emergencies.
TTP	Test, Trace and Protect
UWK	The **University for Continuing Education Krems** (UWK) is Europe's leading public university for continuing education. The UWK specialises in enhancing the qualifications of working professionals with customised part-time programmes enabling students to deal with today's challenges in a transdisciplinary, praxis-oriented manner. Blended, self-governed learning, ample online seminars and inverted classroom settings support the need for flexibility of people with busy diaries.
WG	Welsh Government

Bwrdd Iechyd Prifysgol
Aneurin Bevan
University Health Board

Iechyd Cyhoeddus
Cymru
Public Health
Wales