HUMAN RESOURCES REQUIRED FOR ANTIBIOTIC MANAGEMENT TEAMS

BELGIAN EVALUATION 2024 - 2025

C. BRIQUET • C. VERCHEVAL • D. HUIS IN 'T VELD • L. CATTEAU

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BEAST

February 2025 • Brussels • Belgium
Internal reference number: D/2025.14.440/26

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With the financial support of

BAPCOC
Belgian Antibiotic Policy Coordination Committee

Please cite as: C. Briquet, C. Vercheval, D. Huis in 't Veld, L. Catteau. Human resources required for antimicrobial stewardship teams. Belgian evaluation 2024. Brussels, Belgium : Sciensano ; 2025 50p. Report number: D/2025.14.440/26.

EXECUTIVE SUMMARY

Introduction

This report presents an evaluation of the human resources required for Antimicrobial Management Teams (AMTs) in Belgian hospitals, with a focus on determining appropriate staffing levels to ensure the success of antimicrobial stewardship (AMS) programs. AMTs play a critical role in optimizing antimicrobial use, requiring a multidisciplinary approach that integrates the expertise of infectious disease (ID) physicians, microbiologists, and hospital pharmacists. This study builds upon the Dutch consensus model (1), and adapts it to the Belgian healthcare context, considering hospital size, type, and available resources to calculate the Full-Time Equivalent (FTE) requirements for AMTs.

Method

This study assessed stewardship activities performed by dedicated AMT members to enhance the appropriate use of antimicrobial agents in Belgian hospitals. The FTE calculation goes beyond the routine professional activities specific to ID specialists, microbiologists, and hospital pharmacists, focusing on their dedicated AMT stewardship responsibilities. The methodology was structured into three phases:

1. **Conceptualization of an exhaustive list of AMT activities and influencing factors:**

- Identification of key factors influencing AMT workload, including hospital size, type, group structure, and outpatient services.
- Development of a list of 43 AMT-specific activities across seven domains, guided by existing literature and the BEAST structural survey (2).

2. **Survey dissemination:**

- A perception survey (3,4) was conducted among AMT members to gather input on FTE calculation criteria and the inclusion of specific activities in the staffing model.
- The survey was administered online via LimeSurvey in English, with Dutch and French versions provided for reference. Responses were collected from October 21 to November 18, 2024.

3. **Consensus meetings:**

- Two structured meetings were organized to validate and refine the findings, with participation from 39 AMS experts representing Belgian hospitals.
- The first meeting (December 13, 2024) focused on confirming AMT activities and estimating annual hours per task.
- The second meeting (February 14, 2025) aimed to validate AMT FTE estimates. Discussions also explored the feasibility of mutualizing certain tasks and the distribution of FTE among the three core AMS professions.

Results

The perception survey and consensus process highlighted the substantial time required for AMS activities such as surveillance, auditing, and feedback as well as the considerable variation in time allocated to specific tasks. A minimum staffing requirement of 3.03 FTEs was agreed upon for a 400-bed primary hospital, with scaling adjustments based on hospital size and type.

However, no consensus was reached regarding the distribution of tasks and FTE across the different professions involved in AMS.

Regarding mutualization, experts acknowledged that some AMT tasks, such as developing and updating guidelines for infection management and prophylaxis as well as educational material, could be shared at a national level to reduce local workloads. However, the consensus strongly emphasized that most AMS activities must remain the responsibility of local AMTs to ensure hospital-specific expertise and implementation.

Conclusion

This study underscores the importance of a multidisciplinary approach to AMT staffing, integrating ID physicians, microbiologists, and hospital pharmacists. Given the challenges of defining precise FTE allocations due to task overlaps, flexible staffing models should be considered, particularly in the context of workforce shortages. While certain AMT functions could benefit from better national coordination and support, the majority of AMS activities require dedicated local teams. These findings provide a robust foundation for optimizing AMT staffing strategies, improving resource allocation, and strengthening AMS in Belgian hospitals.

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ABBREVIATIONS

AMT (GGA/ABTBG)	Antibiotic Management Teams (Groupe de Gestion de l'Antibiothérapie/Antibiotherapiebeleidsgroep)
AMC	Antimicrobial Consumption
AMR	Antimicrobial Resistance
AMS	Antimicrobial Stewardship
BAPCOC	Belgian Antibiotic Policy Coordination Committee
BEAST	Belgian Evaluation of Antimicrobial Stewardship Teams
ECDC	European Centre for Disease Prevention and Control
FPS	Federal Public Service (FPS) Health, Food Chain Safety and Environment
FTE	Full-Time Equivalent
KCE	Belgian Health Care Knowledge Centre
ID	Infectious Diseases
IPC	Infection Prevention and Control
IT	Information Technology
OPAT	Outpatient Antimicrobial Therapy
RD	Royal Decree
WAAW	World Antimicrobial Awareness Week
WHO	World Health Organisation

INTRODUCTION

The effective management of antimicrobials in Belgium has been a priority for policymakers since 1999, when the Belgian Antibiotic Policy Coordination Committee (BAPCOC) was established (5). In 2002, BAPCOC initiated a pilot project to fund part of the activities of an Antibiotic Management Team (AMT) member (called the delegate) in general hospitals (6). Initially launched in 37 hospitals, the project was later expanded to 61 hospitals, laying the foundation for a nationwide strategy (7). This culminated in the issuance of a Royal Decree (RD) in 2008, which mandated the establishment of AMTs in all general hospitals with 150 beds or more (8). The RD explicitly defined the minimum composition and core responsibilities of AMTs, and federal funding was allocated to support the minimal funding of a (partial) full-time equivalent (FTE) delegate, as well as funding for the secretary of national AMS courses (8).

Since then, AMTs have played a crucial role in optimizing antimicrobial use in hospitals. They are multidisciplinary teams involving healthcare professionals from at least three hospital departments: the medical department, the hospital pharmacy, and the laboratory. This structure of an AMT is more complex than the structure of Infection Prevention and Control (IPC) teams, which generally consist of an IPC-doctor and IPC-nursing staff. Evaluations of AMT implementation in Belgian hospitals up to 2011 demonstrated significant progress, with increased adherence to key AMS activities (9). Between 2007 and 2011, AMTs strengthened their working methods, leading to higher implementation rates for concurrent antibiotic therapy review, de-escalation after a few days, and sequential intravenous-to-oral therapy (10). These findings highlighted the added value of AMTs in optimizing antibiotic use and facilitating national and international initiatives.

However, long-term sustainability and effectiveness have been challenged by structural and financial limitations, as highlighted by evaluations conducted by the European Centre for Disease Prevention and Control (ECDC) in 2017 and a subsequent study commissioned by the Belgian Health Care Knowledge Centre (KCE) (11,12). The funding model introduced in 2008 was based on the number of hospital beds but did not specify how resources should be distributed among the three core departments. As a result, financial support remained modest relative to the multidisciplinary nature of AMTs and their legally defined responsibilities in the RD. Moreover, the absence of a minimum FTE requirement in hospitals led to the emergence of “hat-wearing” roles, where some healthcare professionals had to manage AMT responsibilities alongside their own obligations, without additional funding or exemptions from other tasks. This significantly limited their effectiveness. The situation was further complicated by the lack of formal recognition for infectious disease (ID) specialists in Belgium, forcing professionals from other medical disciplines to lead AMTs without the necessary expertise or dedicated time to fully engage in AMS activities. This stands in contrast to the organization and funding of IPC teams, where minimum FTE requirements are specified in a RD, ensuring more consistent financial support. Over time, this has resulted in an unequal distribution of available funding.
In 2023, the federal budget for IPC, AMS, and the Hospital Outbreak Support Team (HOST) was €37,026,348. However, funding was unevenly allocated, with 46.5% designated for IPC, 40.2% for the HOST pilot project, and only 13.2% for AMS. Additionally, governing bodies do not provide structural funding for antimicrobial consumption surveillance at either the national[1] or local level, the development

[1] In the RD of June 22 2017 amending the RD of April 25, 2002 on setting and liquidating the budget for hospital financial resources (13), confusion about the inclusion of national antimicrobial surveillance in the federal funding stems from a discrepancy between the Dutch and French versions. Only the French version mentions antimicrobials in relation to IPC quality indicators (14) (*“…en matière d’antibiotiques.”*). However, the actual indicators related to antimicrobials are minimal, with limited focus on antimicrobial stewardship (e.g., surgical prophylaxis).

of national clinical practice guidelines for infection management and prophylaxis, or IT support for tools that facilitate AMS policies in hospitals.

In mid-2023, the Belgian Evaluation of Antimicrobial Stewardship Teams (BEAST) project was launched, funded by the Federal Public Service (FPS) and led by Sciensano with the support of Belgian and international AMS experts. Its goal was to reassess the situation of AMTs in Belgium.

To achieve this, the BEAST project followed the methodology outlined below:

1. **AMT global framework** (2)
   Described relevant legislation, funding, partnerships, AMS programs and quality indicators related to AMS in Belgium

2. **Assessment of current AMS programs implementation: structural surveys**
   Collected detailed information on the current landscape of AMS programs at both national and institutional levels.
   a. **At institutional level** (2)**:** A nationwide survey was sent to all AMTs in Belgium (one questionnaire per AMT) to assess the current landscape of AMS programs at institutional level.
   b. **At the national level** (15)**:** An expert group meeting was held in June 2024 to evaluate Belgium's progress in implementing the 19 AMS core elements developed by the World Health Organization (WHO) across four domains.
      - National plan and strategies,
      - Regulations and guidelines,
      - Awareness, training and education,
      - Supporting technologies and data.

3. **Perception survey** (3)
   Gathered insights from AMT members (all AMT members in Belgium were invited) to develop recommendations for improving the functioning of the AMTs in Belgian hospitals. It assessed AMT members' perspectives on proposed recommendations and associated measures to enhance AMT operations. Additionally, two other specific topics were explored:
      a. AMT collaboration at the network level
      b. AMT staffing needs

4. **Expert consensus meetings**
   Defined the minimum number of FTEs required per AMT in Belgian hospitals, based on the perception survey results.

This report specifically details the findings from the expert consensus meetings that evaluated the minimum FTEs required for an effective Belgian AMT capable of fulfilling its eight legal responsibilities as outlined in the 2008 RD (8). Although defining minimum FTE requirements was not part of the original BEAST project objectives, authorities explicitly requested this additional assessment. The tight timeline (3.5 months) made this task particularly challenging. All the methodologies within the BEAST project were validated with the (inter)national expert team of professionals related to the BEAST project.

METHODS

This study aimed to define the structural activities that must be performed by the AMT - i.e. the essential activities that are either performed continuously or recur periodically – as well as the time required to complete them.

By assessing these activities and their associated time investment, FTE staffing estimates could be made. Notably, the profession-specific roles and clinical duties of ID specialists, microbiologists and hospital pharmacists were not included in the FTE calculations. The activities proposed in this study go beyond standard job responsibilities and require additional efforts.

The methodology for defining AMT activities and estimating staffing requirements was adapted from the Dutch consensus report on AMT functions and workload (1). This framework informed both the survey development and the consensus process in the present Belgian study.

The study was conducted in four consecutive phases in collaboration with experienced AMT members :

1. **Defining AMT activities and influencing factors** – Identifying key contextual factors influencing FTE needs and compiling a comprehensive list of AMT responsibilities.
2. **Survey**– Conducting a survey to identify and validate all relevant AMT activities and contextual factors affecting the time required to perform these tasks.
3. **First consensus meeting** – Validating the list of AMT activities and estimating the time required for each validated task.
4. **Second consensus meeting** – Finalizing consensus on each AMT activity, influencing factors and time requirement. Additionally, this meeting explored opportunities for mutualization (i.e., sharing activities or responsibilities with others, such as the national level or the hospital IPC team) to enhance efficiency, provide additional support, and optimize resources. Discussions also explored the feasibility to distribute the AMT FTEs among the three core AMT professions.

The primary objective was to define the **minimum FTE required for AMTs** to support policy decisions and clarify the legal responsibilities of AMTs.

1. Defining AMT activities and influencing factors

Five criteria that could influence AMT workload and requirements were identified based on existing literature and results from the BEAST structural survey (2). These include:

- **AMT Activities** – Number and complexity of essential activities required for hospital AMS programs
- **Hospital size** – Number of beds, as larger hospitals may require greater AMS efforts. Since AMS activities involve patient care, which is directly tied to the number of patients and beds, we based our calculations on the actual number of beds agréés (in french)/ erkende (dutch) rather than on the justified beds (lits justifiés / verantwoorde bedden) (16).
- **Hospital type** – Hospitals in Belgium are categorized into three types (17):
    - *Primary hospitals = classical general hospitals*

These are hospitals that admit patients for both day and overnight stays, providing specialized medical care. They typically offer surgery and internal medicine, supplemented by other specialties such as geriatrics, maternity care, paediatrics, neuropsychiatry, or rehabilitation.
Some atypical hospitals are also included in this category. During the 6th state reform in Belgium, specialized hospitals (offering only rehabilitation and/or geriatric care) became the responsibility of regional governments. Some of these institutions merged with classical general hospitals, while others

expanded their services, often adding psychiatric care. By default, these facilities are now considered general hospitals, even if they lack surgery or internal medicine departments.

- *Secondary hospitals* = general hospitals with a university affiliation

These are general hospitals that have been assigned a number of university hospital beds under the authority of a university. However, they do not offer the full scope of university hospital missions like research or education at the same level as full university general hospitals.

- *Tertiary hospitals* = university general hospitals

These hospitals provide the same medical services as classical general hospitals but are additionally tasked with training healthcare professionals**,** scientific research, development of new technologies. They are affiliated with a university that has a complete medical school curriculum.

- **Hospital group structure** – Some hospitals operate as part of a larger network, managing AMS activities across multiple sites, which could influence FTE needs.
- **Outpatient and ambulatory services** – Hospitals with extensive outpatient services may require additional AMT oversight, for example, to support outpatient parenteral antimicrobial therapy (OPAT).

In addition, a detailed list of AMT activities was developed based on the AMT tasks described in the current Belgian legislation (8) and international recommendations (e.g. World Health Organisation (WHO)), Centre for Disease Control and Prevention (CDC)) (18,19). A total of 43 activities were identified and categorized into seven key domains: (1) antimicrobial formulary management, (2) development and implementation of guidelines, (3) initiatives to minimize inappropriate antimicrobial use, (4) education and training, (5) monitoring and surveillance, (6) reporting activities, and (7) additional stewardship activities.

2. Survey

To validate the relevance of these five influencing factors and to assess which AMT activities should be included in FTE calculations, both elements were incorporated into Section 3 of the BEAST perception survey (3). Results from this section directly informed the subsequent consensus meeting.

The target population of the perception survey included all AMT members, such as AMT presidents, delegates, and other actively involved participants. To ensure broad participation, AMT leaders were identified using data from the BEAST structural survey and were asked to distribute the survey invitation to all AMT members within their respective hospitals.
The survey was administered online via LimeSurvey (English), with Dutch and French PDF versions provided for reference. Respondents could complete the questionnaire in Dutch, French, or English between October 21 and November 18, 2024.

Respondents answered three key questions:

- **Criteria for FTE calculation** – "In your opinion, which criteria should be considered when calculating FTE requirements for a well-functioning AMT?" Respondents rated each criterion on a scale from 0 (no importance) to 10 (very high importance).
  A criterion was considered endorsed if it received a score of ≥8 from at least 60% of respondents. Only endorsed criteria were included in further analyses.
- **Activity inclusion in FTE calculation** – For each of the 43 identified AMT activities, respondents were asked to indicate whether it should be carried out by the local AMT and therefore included in the FTE calculation (yes/no/no opinion).
  The result was depicted as a validation rate: the number of respondents that indicated the activity as a core AMT responsibility. Activities with an acceptance rate above 80% in the perception survey were automatically validated**.**
- **Additional information -** The respondent also had the option of adding criteria or activities not covered in the suggested list.

3. Consensus meetings

Two structured consensus meetings were organized to refine and validate the findings.

3.1 FIRST MEETING: DECEMBER 13TH, 2024

Each Belgian AMT (N=98) was contacted via email on October 4, 2024, and invited to designate one representative to attend an on-site meeting at the Sciensano offices in Brussels. To maximize participation, two reminder emails were sent (October 28 and November 29), followed by targeted phone calls. Ultimately, 39 AMS experts accepted the invitation.

On December 3, 2024, the confirmed attendees received preparatory materials, including:

- The list of AMT activities along with their acceptance rates from the BEAST perception survey.
- A request to discuss the activities within their AMTs and estimate the annual hours needed per activity**.**
- A request to specify whether each activity was dependent on hospital size and/or hospital type**.**

On December 13th 2024, the meeting began with a plenary session to present the initial results of the BEAST project, summarize relevant literature on the human resources required for AMS teams, and outline the organization of the consensus meeting.
To ensure efficiency and consistency across discussions, the following constraints and guidance were provided for the subgroup sessions:

- **Time allocation:** ~5 minutes of discussion per activity.
- **Moderator's role:** Keep discussions focused and manage time effectively.
- **Approach:** Be solution-oriented and aim for consensus.

During the meeting, three key steps were followed :

1. Validation of the activities to be performed by AMTs:

- Activities with an acceptance rate above 80% in the perception survey were automatically validated**.**
- Activities with an acceptance rate below 70% were excluded**.**
- Activities scoring between 70% and 80% were discussed individually and either validated or excluded.

2. Subgroup discussions to estimate time requirements:

The 39 AMS experts were divided into four groups (two Dutch-speaking and two French-speaking), each working in separate rooms under the guidance of a moderator. Participants were asked to assess each validated activity by considering:

- **Time classification:** Whether the activity is *fixed* (same time requirement across hospitals) or *variable* (depending on hospital type and size).
- **Estimated workload** (number of hours required per activity, per year for a AMT as a whole):
    - **Fixed activities:** Each group provided a single time estimate per activity. For example, a one-hour meeting with four participants was counted as four hours.
    - **Variable activities:** To ensure comparability, workload was estimated for a **primary hospital with 400 beds**, with adjustments for hospital type and size to be discussed later. These criteria were chosen because 400 is the median size of Belgian hospitals and the majority of Belgian hospitals are primary hospitals (in contrast to secondary or tertiary hospitals).

In addition, two activities (n°2 , Specifying a list of restricted antimicrobials and 22, Selection of quality indicators) were identified as requiring initial setup efforts next to continuous efforts. For these, experts

specifically estimated the number of hours and minimum FTE requirements needed for implementation separately from the overall AMT FTE requirements for continuous activities.

To facilitate discussions, standardized activity definitions were provided (Annex 1).

Based on the collected data, each group aimed to define **a minimal staffing recommendation** for the AMT as a whole. One full-time equivalent (FTE) was defined as 1519 hours per year.

3. Plenary session

After the subgroup discussions, a final plenary session was held to reach a general consensus across all participants.

- If the number of hours allocated to an activity by the four groups were similar, a consensus was reached by selecting the average, median, or a rounded value.
- In cases of significant discrepancies, the groups first discussed their interpretation of the activity to ensure a shared understanding. Once aligned, the number of hours was set by majority agreement.

Following the meeting, the **BEAST team** compiled and shared a **summary document** with all attendees, including:

- The **results** per group.
- The **refined definitions** of activities (Annex 1).
- A **statistical summary** (average, median, range) of hours per activity.

This document served as the foundation for a follow-up meeting, aimed at finalizing consensus on each activity.

3.2 SECOND MEETING: FEBRUARY 14TH, 2025

Due to time constraints that prevented the working group from finalizing the discussion during the first meeting, a follow-up consensus meeting was held on February 14, 2025, to complete the findings from the initial meeting.

All 39 AMS experts who attended the initial session were invited via email on January 16, 2025. Due to a low initial response rate, a reminder was sent on January 28, 2025. To facilitate participation, a hybrid format was offered, allowing attendees to join either in person or remotely via teleconference.

The primary goals of this session were to finalize the first consensus meeting by:

1) **Finalize the validation of the assigned time estimates and flexibility** of each activity assigned to the AMT
2) **Assessing the variability of activity** based on hospital characteristics:
    - Does the hospital **type** (e.g., primary, secondary, tertiary) and/or **size** (number of beds) influence the FTE calculation for AMTs?

To support this discussion, the BEAST team provided a comprehensive hospital database, including each facility's bed count and classification (as defined by the Federal Public Service (FPS) (17)), allowing experts to visualize the real-world impact of these calculations on FTE allocation per hospital.
Building on discussions from the first expert session and preliminary workload estimates provided by experts for their own hospitals, the BEAST team proposed a calculation method during the second consensus meeting to account for hospital type and bed count:

- Hospital type: a 15% increase for secondary hospitals and a 30% increase for tertiary hospitals on timing allocated to activities dependent on hospital type.
- Hospital size: a proportional adjustment (rule of three) for activities dependent on hospital size, with an upper limit set at 1,000 beds. For hospitals exceeding 1,000 beds, an additional 1% increase per 100 extra beds was proposed upon for size-dependent activities.

- For activities dependent on both hospital type and size, the adjustments were applied cumulatively: first, the percentage increase based on hospital type (15% for secondary hospitals, 30% for tertiary hospitals), followed by the proportional adjustment based on hospital size.

The final points to be discussed were :

1) **Explore opportunities for mutualisation** of certain AMT activities to enhance efficiency, provide additional support, and optimize resource use, such as:
    - No – The activity must be performed by the local AMT.
    - Yes, at the hospital level (e.g., IPC team).
    - Yes, at the hospital network level (collaborative effort between hospitals in a network).
    - Yes, at the regional level (coordination at a regional scale).
    - Yes, at the national level (centralized execution).
    - Yes, within hospitals of the same type (standardized approach across similar institutions).
2) **The allocation of AMT FTEs among the three key professions** in a hospital AMS program—ID physicians, hospital pharmacists, and microbiologists. This distribution would help estimate the total budget required to fund AMTs across all Belgian hospitals. The allocation of AMT FTEs among these three professions was not predefined in the BEAST project methodology but was discussed at the specific request of participants during the first meeting. As such, no predefined methodology was available to guide this discussion.

RESULTS

1. Survey results

A total of 267 AMT members completed the BEAST perception survey. The main professional backgrounds were hospital pharmacists (70, 26.2%), specialist physicians excluding ID specialists (54, 20.2%), ID physicians (50, 18.7%), medical microbiologists (32, 12.0%), and pharmacist-microbiologists (20, 7.5%).
Most respondents worked in secondary hospitals (160, 60.8%), followed by tertiary hospitals (57, 21.7%) and primary hospitals (42, 16.0%). The majority of the respondents worked in large hospitals with more than 600 beds (117, 44.5%), followed by small hospitals with 400 beds or fewer (84, 31.9%) and medium-sized hospitals with 400 to 600 beds (62, 23.6%). A detailed description of participant characteristics is available in the BEAST perception survey report (4).

Table 1 summarizes the importance ratings assigned by respondents to the key criteria for determining the minimum human resources required for a standard AMT, excluding the respondents who had no opinion. All factors received high scores, with the highest median (9) and highest average score (9.0) observed for AMT activities, highlighting strong consensus on the importance of considering the number of essential activities and the time needed for their implementation.
The remaining four criteria—hospital size, hospital type, hospital groups, and outpatient/ambulatory services—received similar median scores (8), with average scores ranging between 7.3 and 7.9. However, when focusing on the percentage of respondents who strongly agreed with each criterion (i.e., those who rated it 8 or higher), the first three criteria—AMT activities (88.4%), hospital size (64.0%), and hospital type (67.5%)—were endorsed by more than 60% of participants. These 3 criteria were taken into account in the further evaluations.

Table 1. Summary of average importance scores and strong agreement (score ≥ 8) percentages for criteria to be considered when determining the minimum AMT human resources, BEAST perception survey, 2024.

Criteria	Median (IQR)	Average score	% Score ≥ 8 (n)	N*
AMT Activities Number of essential activities and the time needed to implement these in individual hospital AMS programs	9 (8-10)	9.0	88.4 (214)	242
Hospital Size Number of beds	8 (6-9)	7.7	64.0 (153)	239
Hospital Type Hospital's specialization and complexity of care (e.g. tertiary care hospitals or those with specialized units such as oncology, transplant, paediatric, burn or intensive care units) which may require additional AMS resources	8 (7-10)	7.9	67.5 (160)	237
Hospital groups Number of hospital sites (e.g. FTE requirements might be higher for hospitals that manage AMS activities across multiple sites)	8 (6-9)	7.3	53.6 (118)	220
Outpatient and ambulatory services Extensive outpatient or ambulatory care services in the hospital, which also may require AMT oversight (e.g. AMT resources may need to be allocated to oversee outpatient parenteral antimicrobial therapy (OPAT) and other outpatient services)	8 (6-9)	7.4	56.3 (129)	229

*Total number of respondents, excluding the respondents who answered “no opinion”.

Table 2 presents the list of 43 activities assigned to AMTs, along with the number of respondents who confirmed each activity as part of the AMT's responsibilities (n, yes) and the corresponding validation rate (percentage) (excluding the respondents who answered "no opinion").

Table 2. List of 43 AMT-assigned activities and validation rate by AMT Members, BEAST perception survey, Belgium

Missions		Activities	Validated (n)	Total respondents (N)	Validation rate (%)
1. Antimicrobial formulary	1	Developing and updating the antimicrobial formulary	239	250	95.6
	2	Specifying a list of restricted antimicrobials	240	248	96.8
2. Guidelines	3	Developing and regularly updating clinical practice guidelines for infection management	237	248	95.6
3. Initiatives to limit the inappropriate use of antimicrobials	4	Performing preauthorization (expert approval) for specific antimicrobial agents	216	240	90
	5	Reviewing courses of therapy for specific antimicrobial agents (post-prescription review) with immediate feedback to the prescriber in case of inappropriate use	229	244	93.9
	6	Systematic advice for defined clinical situations (e.g. positive blood cultures)	205	237	86.5
	7	Infection and antimicrobial prescribing focused ward rounds in specific departments	215	240	89.6
	8	Organizing multidisciplinary meetings focusing on defined clinical situations (e.g. endocarditis)	213	235	90.6
	9	Organizing multidisciplinary meetings in specific departments	214	237	90.3
	10	Organizing bedside consultations focusing on AMS[1]	154	227	67.8
	11	Advice on therapeutic drug monitoring	207	239	86.6
	12	Outpatient Parenteral Antibiotic Therapy (OPAT) service	204	228	89.5
	13	Mandating prescribers to thoroughly document an antimicrobial plan in the medical record for all antimicrobial prescriptions	200	229	87.3
	14	Conducting scientific research to improve AMS evidence[1]	132	211	62.6
	15	Managing emerging infectious diseases[2]	176	233	75.5
	16	Implementing additional interventions to improve antimicrobial use	219	232	94.4
4. Education and training	17	Developing educational material	189	226	83.6
	18	Organizing educational meetings to support healthcare professionals training (basic or continuous) on how to optimize antimicrobial using	220	237	92.8
	19	Organizing educational outreach visits[1]	129	195	66.2
	20	Organizing educational games[1]	74	189	39.2
	21	Education outside hospital[1]	108	203	53.2
5. Monitoring and surveillance	22	Selection of quality indicators	198	224	88.4
	23	Measuring quality indicators	213	225	94.7
	24	Audits or point prevalence surveys	217	226	96
	25	Surveillance of antimicrobial consumption	242	244	99.2
	26	Surveillance of antimicrobial resistance	239	243	98.4
	27	Surveillance of OPAT treatments	199	223	89.2
6. Reporting	28	Drafting annual report for the individual AMT	208	221	94.1
	29	Drafting BAPCOC activity report	173	202	85.6

7. Additional activities	30	Drafting an action plan	203	222	91.4
	31	Drafting of meeting agendas and minutes	194	216	89.8
	32	Coordination of AMT	220	229	96.1
	33	Participation in AMT meetings	226	233	97
	34	Participation in Drug and Therapeutics Committee meetings[2]	159	210	75.7
	35	Participation in Infection prevention and control (IPC) committee meetings	194	221	87.8
	36	Participation in Infection prevention and control (IPC) team meetings[2]	149	205	72.7
	37	Regular policy meeting with the hospital management	180	211	85.3
	38	Regular policy meeting with the head of the nursing department[1]	133	203	65.5
	39	Regular policy meeting with the medical council[1]	136	203	67
	40	Participation in Hospital Outbreak Support Team (HOST) meetings[2]	157	200	78.5
	41	Participation in National bodies (e.g. BAPCOC) meetings	170	198	85.9
	42	Participation in national AMS conferences	190	207	91.8
	43	Setting-up of IT support	171	205	83.4

[1]Activities with a validation rate below 70% which were excluded from further discussion.
[2]Activities with a validation rate between 70% and 80% which were retained for further discussion during the first consensus meeting.

Based on the validation rate, 31 out of 43 activities received a score above 80% and were validated as core AMT responsibilities.

In contrast, 7 activities scored below 70% (red colour in Table 2) in the perception survey and were excluded from further discussions:

- **N°10: Organizing bedside consultations focusing on AMS** – This activity was considered a core responsibility of the involved healthcare workers and was therefore not included in the AMT FTE calculation.
- **N°14: Conducting scientific research to improve AMS evidence** – While some research activities may receive ad hoc funding—typically for studies proposed by authorities such as Sciensano, ECDC, or PPS rather than individual AMTs—they are not considered routine AMT tasks. According to the structural survey (2), only 30% of respondents reported being involved in research. However, participation varied significantly depending on hospital type and size. Among tertiary hospitals, all reported research involvement (100%), whereas participation was much lower in primary (26%) and secondary hospitals (43%). Similarly, large hospitals accounted for the majority of research activity (57%), while participation was significantly lower in small (22%) and medium-sized hospitals (28%).
- **N°19: Organizing educational outreach visits** – The structural survey (2) indicated that only 20 AMTs engage in this activity, with 75% conducting five or fewer visits annually. Some respondents misunderstood the activity, perceiving it as part of general AMS training. During the consensus process, it was noted that this activity had been removed, despite the fact that all audits should include feedback. Consequently, the feedback component was integrated into each relevant activity, acknowledging that it remains a time-consuming task.
- **N°20: Organizing educational games** – The structural survey found that 20% of respondents had organized educational games (2). While this is an innovative training approach, the majority of AMS experts did not consider it a routine AMS activity. Instead, such initiatives are typically ad hoc, for example, during World Antimicrobial Awareness Week (WAAW).

- **N°21: Providing AMS education outside the hospital** – Currently, AMTs do not have a formal role outside the hospital setting, as this responsibility may fall under the HOST program. The structural survey indicated that only 11% of AMS training is directed at general practitioners (2). When professionals, such as ID physicians, provide training for general practitioners, it is often considered part of their professional responsibilities rather than an AMS-specific activity.
- **N°38: Holding regular policy meetings with the head of the nursing department** – While some AMTs collaborate with nurses (approximately 50% include them in their composition), the structural survey found that direct engagement with the head of the nursing department is not common) (2).
- **N°39: Holding regular policy meetings with the medical council** – According to the structural survey findings, 32% (31/98) Belgian AMTs reported limited interactions with the medical council (2). Given these results, interactions with the medical council were deemed too infrequent to justify inclusion in the AMT workload.

Additionally, four activities received a validation rate between 70% and 80% (orange colour in **Table 2**) and were retained for further discussion during the first consensus meeting:

- N°15: Managing emerging infectious diseases
- N°34: Participating in Drug and Therapeutics Committee meetings
- N°36: Participating in Infection Prevention and Control (IPC) team meetings
- N°40: Participating in Hospital Outbreak Support Team (HOST) meetings

2. First meeting: December 13th, 2024

2.1 PARTICIPATION

Following the invitation, a total of 35 experts representing 32 Belgian AMTs attended the meeting in person, resulting in a countrywide participation rate of 33% (32/98). **Table 3** illustrates the distribution of participants across four groups—two Dutch-speaking and two French-speaking—along with their representation by profession, hospital type, and size. As some participants have multiple professional roles or are affiliated with more than one hospital, the total counts may exceed the number of individual participants in each category.

Among the 35 participants, 13 (37.1%) were ID physicians, 10 (28,6%) were hospital pharmacists, 8 (22.8%) were medical microbiologists , 2 (5.7%) were pharmacist microbiologists and 2 (5.7%) IPC physicians.

Table 3. Distribution of participants by language group, profession, hospital type, and size, BEAST consensus meeting, December 13th 2024.

	Group 1 (N=9)	Group 2 (N=8)	Group 3 (N=11)	Group 4 (N=7)	TOTAL (N= 35)
Language	French	French	Dutch	Dutch	
Profession					
ID physician	4	6	2	1	13
Hospital pharmacist	3	2	2	3	10
Medical microbiologist	0	0	5	3	8
Pharmacist microbiologist	1	0	1	0	2
IPC physician	0	0	2	0	2
Geriatrician	0	0	1	0	1
Intensivist	1	0	0	0	1
Pneumologist	0	0	1	1	2
Nurse	0	0	0	0	0
Hospital type					

Primary	4	3	9	7	23
Secondary	4	4	1	0	9
Tertiary	2	1	2	1	6
Hospital size					
Small	5	3	5	3	16
Medium	1	2	2	2	7
Large	4	3	5	6	18

ID: Infectious disease, IPC: Infection Prevention and Control. Since some participants have multiple professional roles or affiliations with more than one hospital, the total counts may exceed the number of individual participants.

2.2 VALIDATION OF AMT ACTIVITIES

The four activities that received a score between 70% and 80% in the BEAST perception survey (highlighted in orange in Table 2), were discussed and all were included in the subsequent discussion on time requirements and variability, except for activity n° 40: *Participating in Hospital Outbreak Support Team (HOST) meetings*. HOST is a pilot project launched in 2021 by the FPS Public Health to support IPC and AMS teams in hospitals, as well as to improve collaboration between hospitals, residential care facilities, and primary care providers in these areas (20). Experts at the BEAST consensus meeting decided to exclude this activity from the discussions due to the lack of a legal framework at the time.

2.3 TIME REQUIRED BY AMT TO PERFORM VALIDATED ACTIVITIES

Prior to the meeting, experts estimated the time and flexibility required for each of the 34 validated activities based on their experience and work in their respective hospitals. These time estimates were then subject to a consensus process within each group and standardized for a primary hospital with 400 beds. **Table 4** summarizes the consensus reached among the four groups regarding the number of annual hours required by the AMT to perform the 34 validated activities in a 400-bed primary hospital, as well as the variability of these estimates based on hospital size and type.

During the plenary session, it was concluded that, based on the estimated hours in the four groups and considering the annual working time for one full-time equivalent (FTE) (1519 hours/year), the AMT composition varied between **2.0 and 3.2 FTEs** for a 400-bed primary hospital. However, significant variability was noted when analysing activities individually, often due to differences in interpretation of their definitions.
In preparation for the meeting, two activities were initially identified as start-up activities (Activities 2 and 22), alongside continuous activities. During the meeting, additional activities were recognized in some groups as requiring time to start up. For instance, Group 1 divided Activity 12 (Outpatient Parenteral Antibiotic Therapy (OPAT) service and Activity 30 (Drafting an action plan) into two parts to differentiate the time required for initial implementation from the time needed for ongoing activities. Group 3 made a similar distinction for Activity 30 only. Based on these discussions, four activities were identified as start-up activities (highlighted in orange in **Table 4**):

- **Activity 2** (specifying a list of restrictive antimicrobials)
- **Activity 12a** (initial implementation of OPAT)
- **Activity 22** (selection of quality indicators)
- **Activity 30a** (initial development of an action plan)

However, it was agreed upon that Activity N°12 (OPAT service)**—**which had been divided into implementation (12a) and continuous activities (12b)—should be excluded from further discussions, as this activity benefit from independent financial support under a RD (21,22)**.**
The minimum FTE requirement to implement the three start-up activities (N°2, 22 and 30a) was assessed separately from the overall AMT FTE requirement for continuous activities.

Finally, during the first consensus meeting, experts reached consensus on the time estimates and variability for the first three categories of activities:

- **Antimicrobial formulary management** (activities N°1 and 2)
- **Guidelines development** (N° 3)

- **Initiatives aimed at reducing inappropriate antimicrobial use** (which initially included 10 distinct activities)

During discussions, it became evident that some flexibility should be maintained in selecting “Initiatives to reduce inappropriate antimicrobial use”, which constitute the 3rd of the seven AMT missions. To address this, the remaining nine activities in this mission were combined, and a **global consensus was reached on the minimum time required to carry them out.** By plenary agreement, it was decided that these initiatives should account for **at least 1.5 FTEs (2278 hours)**.
Although the BEAST methodology did not initially intend to allocate specific FTEs to particular professions, several participants, especially from smaller hospitals without an ID-physician in place, called for a mandatory ID-physician in every Belgian hospital to perform clinical tasks related to AMS, alongside the other AMT members). As a result of discussion, a suggestion was made to allocate a minimum FTE to an ID physician for this specific 3rd mission (i.e. 0.5 FTE).

Overall, the 1.5 FTE closely aligns with the estimates from the four working groups, which ranged from 1519 to 3040 hours, with an average of 2243 hours for a 400-bed primary hospital. While this figure was not explicitly calculated as an average during the session, some experts had estimated the conversion of hours into FTEs, leading to a consensus that was very close to the calculated average. These estimates apply specifically to a 400-bed primary hospital, with the understanding that the third mission comprises activities recognized by experts as being dependent on the size and type of hospital.

Due to time constraints, no consensus was reached on the remaining activities related to education and training, reporting, and additional tasks. Therefore, a follow-up consensus meeting was scheduled after refining the definitions of these activities.

Table 4. Consensus on time required to perform the 34 AMT activities in a 400-bed primary hospital in Belgium, with variability based on hospital type and size - Results from the four groups, BEAST consensus meeting, 2024

Missions		Activites[1]	GROUP 1			GROUP 2			GROUP 3			GROUP 4		
			Variable (yes =1 ; no=0)		Time (hours)	Variable (yes =1 ; no=0)		Time (hours)	Variable (yes =1 ; no=0)		Time (hours)	Variable (yes =1 ; no=0)		Time (hours)
			Hospital type	Hospital size		Hospital type	Hospital size		Hospital type	Hospital size		Hospital type	Hospital size	
1. Antimicrobial formulary	1	Developing and updating the antimicrobial formulary	0	0	35	0	0	40	0	0	35-40	0	0	35
	2	Specifying a list of restricted antimicrobials[2]	0	0	5	0	0	20	0	0	10	0	0	12
2. Guidelines	3	Developing and regularly updating clinical practice guidelines for infection management and prophylaxis	1	0	300	1	0	800	1	0	832	1	1	900
3. Initiatives to limit the inappropriate use of antimicrobials	4	Performing preauthorization (expert approval) for specific antimicrobial agents	1	1	300	1	1	130	1	1	120	1	1	30
	5	Reviewing courses of therapy for specific antimicrobial agents (post-prescription review) with immediate feedback to the prescriber in case of inappropriate use	1	1	500	1	1	260	1	1	600	1	1	400
	6	Systematic advice for defined clinical situations (e.g. positive blood cultures)	1	1	900	1	1	800	1	1	250	1	1	365
	7	Infection and antimicrobial prescribing focused ward rounds in specific departments	1	0	180	1	1	1000	1	1	162	1	1	104
	8	Organizing multidisciplinary meetings focusing on defined clinical situations (e.g. endocarditis)	1	1	52	1	1	150	1	1	(in n°7)	1	1	156
	9	Organizing multidisciplinary meetings in specific departments	1	1	150	1	1	100	1	1	(in n°7)	1	1	260
	11	Advice on therapeutic drug monitoring	1	1	50	1	1	50	1	1	60	1	1	120
	~~12a~~	~~OPAT service (implementation)~~[3]	~~0~~	~~0~~	~~150~~				~~1~~	~~1~~	~~80~~			
	~~12b~~	~~OPAT service~~[3]	~~1~~	~~1~~	~~20~~	~~1~~	~~1~~	~~160~~	~~1~~	~~1~~	~~15~~	~~1~~	~~1~~	~~342~~
	13	Mandating prescribers to thoroughly document an antimicrobial plan in the medical record for all antimicrobial prescriptions (implementation)	0	0	80	0	0	200	0	0	NC (national)	0	0	342
	15	Managing emerging infectious diseases	0	0	50			NC			NC			40
		CONSENSUS : Minimum number of hours required to perform initiatives in a 400-bed hospital per year			**2412**			**1519**			**2000**			**3040**
4. Education and training	17	Developing educational material	0	0	150	0	0	90	0	0	50	0	0	30
	18	Organizing educational meetings to support healthcare professionals training (basic or continuous) on how to optimize antimicrobial using	1	1	150	0	1	250	1	1	50	0	1	50

5. Monitoring and surveillance	22	Selection of quality indicators[2]	0	0	12	0	0	50	0	0	10	0	0	48
	23	Measuring quality indicators	0	0	40	1	1	100	1	1	150	0	1	72
	24	Audits or point prevalence surveys	1	1	100	1	1	100	1	1	52-100	0	1	78
	25	Surveillance of AMC	1	1	80	1	1	120	1	1	24	0	1	88
	26	Surveillance of AMR	1	1	40	1	1	50	1	1	24	0	0	24
	27	Surveillance of OPAT treatments	1	1	40	1	1	50	1	1	15	0	1	16
6. Reporting	28	Drafting annual report for the individual AMT	0	0	16	0	0	16	0	0	4	0	0	4
	29	Drafting BAPCOC activity report	0	0	16	0	0	16	0	0	4	0	0	4
7. Additional activities	30 a	Drafting an action plan start up[2]	0	0	50									
	30 b	Drafting an action plan (update)			24	0	0	50	1	1	4	0	0	12
	31	Drafting of meeting agendas and minutes	0	0	44	0	0	50	1	1	6h per meeting	0	1	56
	32	Coordination of AMT	0	0	25	0	0	100	1	1	416	0	1	24
	33	Participation in AMT meetings	0	0	150	0	0	256	1	1	120			156
	34	Participation in Drug and Therapeutics Committee meetings	0	0	6	0	0	6	0	0	0	0	0	0
	35	Participation in IPC committee meetings	0	0	18	0	0	12	0	0	8			16
	36	Participation in IPC team meetings			0	0	0	0	0	0	0	0	0	0
	37	Regular policy meeting with the hospital management	0	0	4	0	0	8	0	0	12			24
	41	Participation in National bodies (e.g. BAPCOC) meetings	0	0	32	0	0	16	1	1	24	0	0	72
	42	Participation in national AMS conferences	0	0	80	0	0	32	0	0	24	0	0	96
	43	Setting-up of IT support			200	0	0	40	1	1	200			60
TOTAL START-UP (hours)					**67**			**70**			**20**			**60**
TOTAL CONTINUOUS ACTIVITIES (hours)					**3962**			**3721**			**3038**			**4857**
N FTE (1519h/year)					**2.60**			**2.45**			**2**			**3.20**

AMC: Antimicrobial Consumption, AMR: Antimicrobial Resistance, AMS: Antimicrobial Stewardship; AMT: Antibiotic Management Team, IPC : Infection Prevention and Control; IT: Information Technology; OPAT: Outpatient Antimicrobial Therapy

[1] A detailed definition of activities provided for the first consensus meeting, held on December 13, 2024, is included in Annex 1.

[2] Identified start-up activities (orange): The time required for their implementation was estimated separately from the minimum FTE required for continuous AMT activities.

[3] Activity excluded from AMT responsibilities during the consensus meeting, as it is financed separately under the Royal Decree of 22 June 2023 (21).

3. Second meeting: February 14th, 2025

3.1 PARTICIPATION

A total of 25 experts participated in the second consensus meeting, with 12 attending onsite and 13 joining online representing 21 out of 98 Belgian AMTs (21%). **Table 5** provides a breakdown of participants by profession, hospital type, and size. Since some attendees hold multiple professional roles or are affiliated with more than one hospital, the total counts in each category may exceed the number of individual participants.

Among the 25 participants, 13 (52%) were ID physicians, 8 (32%) were hospital pharmacists, 3 (12%) were medical microbiologists and 1 (4%) was pharmacist microbiologist. Notably, microbiologist representation was lower compared to the first consensus meeting.

Table 5. Participants by language, profession, hospital type, and size, BEAST consensus meeting, February 14th 2025.

	Dutch-speaking expert (N=9)	French-speaking experts (N=16)	TOTAL (N=25)
Format			
Onsite	7	5	12
Online	2	11	13
Profession			
ID physician	3	10	13
Hospital pharmacist	3	5	8
Medical microbiologist	3	0	3
Pharmacist microbiologist	0	1	1
IPC physician	1	0	1
Paediatrician	0	1	1
Hospital type			
Primary	7	8	15
Secondary	0	8	8
Tertiary	2	2	4
Hospital size			
Small	3	8	11
Medium	2	3	5
Large	4	7	11

3.2 TIME REQUIRED BY AMT TO PERFORM VALIDATED ACTIVITIES

During the second meeting, experts continued to discuss the time required to perform AMT activities. They reviewed summary statistics from the December 13 consensus meeting (**Table 6**) on the time needed for AMT activities, along **with additional details on each activity (Annex 1)**. Based on this, they reached an agreement on the minimum number of hours required to perform all 34 AMT activities. They also validated the variability or not of these activities according to hospital size and/or type.
Notably, while experts confirmed that Activity 35 (Participation in *IPC committee* meetings) is an AMT responsibility, they decided not to allocate specific AMT time to Activity 36 (Participation in *IPC team* meetings).
As shown in **Table 6**, consensus was reached on the requirement of **92 hours** to complete the three start-up activities (highlighted in orange). Furthermore, based on the total estimated time required for the AMT to perform its tasks (4,598 hours), it was determined that **the AMT composition for a 400-bed primary hospital should consist of 3.03 FTEs.**

Table 6. Consensus on time required to perform the 34 AMT activities in a 400-bed primary hospital in Belgium, with variability based on hospital type and size and mutualisation potential – Results of the consensus, BEAST consensus meeting, 2025 (orange=start-up activities)

Missions		Activities	Summary consensus December 13th 2024					Consensus February 14th 2025		
			Required time (hours)			Variable (yes =1 ; no=0)		Required time (hours)	Variable (yes =1 ; no=0)	
			Range	Average	Median	Hospital type	Hospital size		Hospital type	Hospital size
Antimicrobial formulary	1	Developing and updating the antimicrobial formulary	35-40	36.7	35	0	0	40	0	0
	2	Specifying a list of restricted antimicrobials	5-20	11.8	11	0	0	12	0	0
Guidelines	3	Developing and regularly updating clinical practice guidelines for infection management and prophylaxis	300-900	708	816	1	0	800	1	0
Initiatives to limit the inappropriate use of antimicrobials	**CONSENSUS** : Minimum number of hours required to perform initiatives in a 400-bed hospital per year		1519-3040	2242.8	2206	1	1	2278.5	1	1
Education and training	17	Developing educational material	30-150	80	70			100	1	0
	18	Organizing educational meetings to support healthcare professionals training (basic or continuous) on how to optimize antimicrobial using	50-250	125	100			125	1	1
Monitoring and surveillance	22	Selection of quality indicators	10-50	30	30			30	0	0
	23	Measuring quality indicators	40-150	90.5	86			100	0	1
	24	Audits or point prevalence surveys	75-100	92.7	100			300	1	1
	25	Surveillance of AMC	24-120	78	84			100	1	0
	26	Surveillance of AMR	24-50	34.5	32			50	1	0
	27	Surveillance of OPAT treatments	15-50	30.3	28			30	1	1
Reporting	28	Drafting annual report for the individual AMT	4-16	10	10			10	0	0
	29	Drafting BAPCOC activity report	4-16	10	10			10	0	0
Additional activities	30a	Drafting an action plan start up	/	50	/			50	0	0
	30b	Drafting an action plan (update)	4-50	22.5	18			12	0	0

31	Drafting of meeting agendas and minutes	44-56	50	50	50	0	0
32	Coordination of AMT	25-416	141.3	62.5	200	0	0
33	Participation in AMT meetings	150-250	170.5	153	150	0	1
34	Participation in Drug and Therapeutics Committee meetings	0-6	3	3	3	0	0
35	Participation in IPC committee meetings	8 - 18	13.5	14	14	0	0
36	Participation in IPC team meetings	0	0	0	0	0	0
37	Regular policy meeting with the hospital management	4 - 24	12	10	10	0	0
41	Participation in National bodies (e.g. BAPCOC) meetings	16-72	36	28	32	0	0
42	Participation in national AMS conferences	24-96	58	56	58	0	0
43	Setting-up of IT support	40-200	125	130	125	0	0

TOTAL START-UP (hours)	**92**
TOTAL CONTINUOUS ACTIVITIES (hours)	**4598**
N FTE (1519h/year)	**3.03**

AMC: Antimicrobial Consumption, AMR: Antimicrobial Resistance, AMS: Antimicrobial Stewardship; AMT: Antibiotic Management Team, IPC : Infection Prevention and Control; IT: Information Technology; OPAT: Outpatient Antimicrobial Therapy

3.3 IMPACT OF HOSPITAL TYPE AND SIZE ON AMT COMPOSITION

Table 7 presents the total annual hours required to perform continuous AMT activities (excluding start-up investments), categorized as follows:

- **Fixed activities**: Time requirements remains constant regardless of hospital characteristics.
- **Variable activities**: Time requirements depend on hospital type, hospital size, or both (as categorized in Table 5).

The corresponding FTE requirements was calculated based on a standard of 1FTE = 1519 hours.

The experts agreed on the calculation method to account for hospital type and size, with modifications to the originally proposed percentages. The final adjustments are as follows:

- **For activities dependent on hospital type:** A 10% increase for secondary hospitals and a 20% increase for tertiary hospitals (instead of the initially proposed 15% and 30%).
- **For activities dependent on hospital size:** A proportional adjustment (rule of three) was applied, with an upper limit of 1,000 beds. For hospitals exceeding 1,000 beds, an additional 1% increase per 100 extra beds was agreed upon for size-dependent activities.
- **For activities dependent on both hospital type and size:** Adjustments were applied cumulatively—first, the agreed percentage increase based on hospital type (10% for secondary hospitals, 20% for tertiary hospitals), followed by the proportional adjustment based on hospital size.

Table 7. Total yearly hours and corresponding FTE for AMT activities, categorized by fixed and variable activities (hospital type, size, or both) – BEAST Consensus meeting, 2025.

Hospital characteristics		Required time (hours per year)					Total FTE required*
Type	Size	Fixed Activities	Variable by Type	Variable by Size	Variable by Type & Size	Total	
Primary	400 beds	566	1050	250	2734	4600	3,03
Secondary		566	1155	250	3007	4978	3,37
Tertiary		566	1260	250	3280	5356	3,53
Primary	1000 beds	566	1050	625	6834	9075	5,97
Secondary		566	1155	625	7517	9863	6,49
Tertiary		566	1260	625	8201	10652	7,01
Primary	1400 beds	566	1050	650	7107	9373	6,17
Secondary		566	1155	650	7817	10188	6,71
Tertiary		566	1260	650	8529	11005	7,24

* 1 Full-Time Equivalent (FTE) = 1519 hours

Annex 2 provides a reference list of Belgian acute care hospitals, detailing the estimated ideal number of FTEs required for their AMT based on hospital type and size. The group discussion highlighted that the current national categorization of hospital types may not accurately reflect the complexity of care provided by hospitals. Several hospitals classified as primary hospitals according to the FOD definition, for example, are performing specialized tasks that align more closely with the definitions of secondary hospitals under the ECDC criteria (17,23). Similarly, some secondary hospitals are carrying out tasks typically associated with hospitals classified as tertiary under the ECDC definitions.

The BEAST project can only rely on the current national classification of hospitals. However, it acknowledges the concerns raised by participants and suggests that public authorities consider reviewing the existing hospital categorization system to better reflect the increasing complexity of specialized care across all hospital types. Such a revision could help ensure that AMS policies and resource allocation are better aligned with hospitals' actual service profiles.

3.4 MUTUALISATION OF AMT ACTIVITIES

During the discussions, participants agreed that the vast majority of activities attributed to the AMT should remain the responsibility of the local AMT.

However, strong national support remains essential to coordinate AMS policies and ensure coherence across hospitals. In particular, the development of monitoring and oversight mechanisms for local AMS activities is needed, guided by a medium- and long-term vision.

Out of all the AMS activities listed (Table 6), participants identified two that could be partially mutualized to reduce the workload of local AMTs (Table 8). This mutualization could reduce the local AMT workload, though it will not eliminate it entirely, as local AMTs will still need to adapt activities to their specific work environment.

Table 8. Potential for mutualization of AMT activities with an impact on estimated local AMT workload, BEAST Consensus meeting, 2025.

Activity	Level of mutualization	Comments
3. Developing and updating clinical practice guidelines for infection management and prophylaxis	**National**	National guidelines would save time for local teams in both implementation and updates. Experts drafting them should be compensated.
	Local	Local adaptations remain necessary, but if national guidelines are consistently updated, the 800 hours allocated to local AMTs could be reduced to 400 hours.
17. Developing educational material	**National**	The centralized development and dissemination of educational materials would help standardize content and reduce duplication of effort at the local level.
	Between hospitals	Sharing educational materials through a common platform would promote efficiency by facilitating the exchange of existing resources and best practices among hospitals.
	Local	While adaptation to hospital-specific needs remains necessary, mutualization could slightly reduce the 100 hours allocated to local AMTs for educational material development.

In contrast, certain AMT activities could benefit from collaboration with other teams, such as IPC staff or secretarial support, without affecting the local AMT workload estimates outlined in Table 6.

For instance, developing and updating the antimicrobial formulary (N°1) was identified as a task where both national and local efforts are required. While a national task force—including field experts—should oversee the development of shortages management procedures, the role of the AMT remains crucial at the hospital level. Although pharmacy teams manage procurement and alternative sourcing (such as importing unavailable antimicrobials), AMTs are responsible for clinical decision-making and identifying patient-specific alternatives when shortages arise. In some hospitals, this task is fully integrated into AMT responsibilities, with estimates up to 200 hours of workload. However, the consensus allocated 40 hours to local AMTs, specifically for introducing into the hospital formulary new antimicrobials, assessing new formulations, and providing guidance on epidemiology-driven adaptations. This distinction reflects the variability in hospital organization, where some AMTs play a larger role in shortages management, while others rely more on pharmacy teams.

Similarly, measuring quality indicators (N°23) presents an opportunity for collaboration with IPC teams, as AMS and AMC indicators could be assessed alongside IPC metrics. However, AMS activities remain distinct, and collaboration does not replace AMT responsibilities. The 100 hours allocated to local AMTs for AMS indicator monitoring remain unchanged. The same applies to audits and point prevalence surveys (N°24), where IPC teams can provide support but do not reduce the AMT workload, with 300 hours still allocated at the local AMT level. As part of the collaboration with IPC, we did not include any hours for the IPC physician in Table 6, as these are accounted for within their IPC activities.

Administrative support was also discussed, particularly regarding the drafting of meeting agendas and minutes (N°31) and coordinating AMT meetings (N°32). While secretarial assistance could help reduce the burden on AMT professionals, supervision by AMT members remains necessary to ensure administrative needs are properly addressed. Additionally, secretarial support could be considered a limited variable allocation within the AMT FTE. Therefore, the estimated 250 hours should remain allocated at the local level, representing the minimal administrative workload required for the proper functioning of the AMT.

Experts emphasized that local IT support is essential, not only due to the diversity of software solutions across hospitals but also because AMS measures rely on IT technologies for proper implementation of AMS tools and the measurement of key indicators. AMT experts must dedicate time to guiding IT specialists on their specific needs, which aligns with the time estimates allocated to local AMTs for activity n°43 in Table 6. While national support should focus on harmonizing protocols, a dedicated IT budget is necessary to facilitate local implementation and incentivize hospital management to adopt IT-support tools.
Since IT infrastructure is fundamental to AMS policies (18,19), national policies should establish minimum IT requirements for hospitals. These should include:

- Mandatory documentation of indications when prescribing antimicrobials,
- Automated monitoring of antimicrobial consumption and resistance trends,
- Integration of outbreak detection tools within hospital IT systems.

Implementing such measures would encourage hospital management to prioritize IT solutions that effectively support AMS efforts.

3.5 DISTRIBUTION OF PROFESSIONS WITHIN AMTS

While not a primary aim of the BEAST evaluation, participants emphasized the need to establish a fair distribution key to ensure AMT membership is based on professional expertise rather than cost considerations by hospital management.

A key point of debate was whether the inclusion of an IPC physician should remain mandatory, as currently required by the RD. While experts acknowledged the importance of close collaboration between AMTs and IPC teams—demonstrated by AMT participation in IPC committee meetings—they agreed the inclusion of an IPC physician in the AMT should not be mandatory. Notably, the BEAST structural survey found that only 48 out of 98 AMTs currently include an IPC physician, despite the legal requirement (2,8)

Beyond IPC involvement, the discussion centered on defining the core AMT professions and their respective contributions. There was a clear consensus on the necessity of including three key professions: ID physicians, microbiologists, and hospital pharmacists. While some participants suggested incorporating additional roles—such as AMS nurses, administrative support, and IT specialists—there was no agreement on making these positions mandatory across all AMTs. One proposal suggested allocating a portion of FTEs to be flexibly assigned based on local needs, but since no final consensus was reached, this was not adopted by the group.

Several proposals for a distribution key among professions were discussed, but again, no consensus emerged. The lack of agreement stemmed, among other factors, from differing views on the core responsibilities of each profession outside of AMT tasks. These responsibilities are also shaped by the relatively recent recognition of Infectious Diseases and Medical Microbiology as specialties in Belgium. In many hospitals, the absence of an ID physician and/or a medical microbiologist means that their tasks are currently performed by other available professionals.
This situation highlights the need for improved personnel policies in Belgian hospitals, including making the presence of an ID physician mandatory in every hospital—not only for AMS/AMT purposes but for broader infectious disease management. Additionally, addressing disparities in the recognition of medical microbiologists and pharmacist-microbiologists is essential. Further specialization for hospital pharmacists in antimicrobial use, infectious diseases, and AMS should also be considered, as is common in many other countries (24–28).

Another major barrier to consensus was the variation in local and regional AMT structures due to the lack of a standardized national policy. The structural survey showed significant regional differences in AMT composition: 85.7% (13/14) of AMTs in Brussels included an ID physician, compared to 67.6% (23/34) in Wallonia and only 32% (16/50) in Flanders, where there were more medical microbiologists involved (2).

Finally, consensus was also complicated by the uneven representation of different professional groups at the meeting. Given the limited time to organize the second session and despite multiple invitations from the BEAST team, attendance varied across professions, making it difficult to reach agreement on a standardized model.

DISCUSSION

1. BELGIAN LEGISLATIVE CONTEXT

The 2008 Royal Decree defines the minimum composition of an AMT but does not specify the time allocation for each professional (8). According this legislation, an AMT must include:

1. An AMT delegate
2. An IPC physician from the IPC team
3. A physician or pharmacist specialized in clinical biology
4. An ID physician and/or a physician specialized in microbiology, in accordance with the recognition of the clinical infectious diseases and medical microbiology professional title
5. A hospital pharmacist

Under Belgian legislation, the term *AMT delegate* refers to the team member (partly) funded by federal resources to carry out the AMT's legal tasks alongside other team members. The delegate may belong to any of the required professional categories listed above.

The AMT functions as a cross-departmental team, involving the pharmacy, microbiology laboratory, and infectious diseases departments. However, financial support for AMTs and AMS policies in Belgian hospitals remains minimal. The only dedicated funding is the partial financing of the AMT delegate, ranging from €13,829.69 to €143,336.31 per hospital in 2023, depending on hospital size.

In contrast, IPC funding follows a structured approach, with legal requirements for FTE positions, ensuring mandatory financing for IPC physicians and nurses. This has resulted in a significant imbalance in funding allocation between IPC and AMS policies. In 2023, the federal budget for IPC, AMS, and HOST was €37,026,348, with 46.5% allocated to IPC, 40.2% to HOST (which covers both IPC and AMS, though the internal distribution is not specified),, and only 13.2% to AMS. Moving forward, AMS funding should be aligned with the actual time required for legally mandated activities and the profiles of involved professionals, thus enabling a more equitable distribution between IPC and AMS.
Ensuring adequate FTEs for AMTs is crucial for the effectiveness of hospital AMS programs. Given the complexity of AMS activities and structural differences between hospitals, staffing needs should be determined based on these activities. The methodology used in this study—drawing from a Dutch consensus and international literature—aims to calculate AMT FTE requirements by considering workload distribution, shared responsibilities, and hospital-specific variations. To our knowledge, this is the first study in Belgium to comprehensively assess these factors.

2. CONSENSUS PROCESS AND KEY FINDINGS

The consensus process brought together experts from diverse backgrounds and regions to assess key factors influencing staffing needs, including AMT activities, hospital size, and hospital type. Experts validated a list of 43 activities that could be attributed to the AMT. Seven activities received less than 70% agreement in the perception survey and were excluded from further discussions. An additional activity was removed during the consensus meeting, bringing the total number of excluded activities to eight.

One of the excluded activities was AMS-related research. This exclusion may be influenced by the lower representation of tertiary hospitals (21.7%) in the perception survey compared to secondary (60.8%) and primary hospitals (16%) (4). In contrast, all AMTs in university hospitals (100%) engage in AMS research, while this is less common in secondary (43%) and primary hospitals (26%) (2). Excluding this activity from FTE allocation may disproportionately affect tertiary hospitals, representing a missed opportunity. Moreover, if AMTs had more staff, even primary hospitals could have incorporated research as a small-scale activity. By anticipating increased staffing levels, primary hospitals could have

envisioned research as part of their mission. Given the overall limited funding for AMS research, greater national investment is needed. As antimicrobial resistance is a critical public health issue, dedicated funding for AMS research in all hospital types should be prioritized to strengthen AMTs and improve healthcare outcomes across Belgium.

Although time estimates for activities were refined based on expert feedback and local experience, certain tasks—such as surveillance, auditing and feedback, and education—were recognized as particularly time-intensive. As these activities are essential to the success of AMS programs, dedicated resources must be allocated within each hospital to ensure their effective implementation.

3. STAFFING CALCULATIONS

A consensus was reached on a minimum requirement of 3 FTEs for an AMT in a 400-bed primary hospital. Our model applies a scaling approach based on hospital size, with additional adjustments for secondary and tertiary hospitals. To ensure appropriate adjustments, we considered both the official hospital classification in Belgium and the actual number of beds. Since AMS activities involve patient care, which is directly tied to the number of patients and beds, we based our calculations on the actual number of beds (*Agrées* / *Erkende*) rather than the justified (*Justifiés* / *Veraantwoorde*) beds, which do not reflect the real workload.

Annex 2 provides a reference list of Belgian acute care hospitals, detailing the ideal number of FTEs required for their AMT based on hospital type and size according to our estimates. However, as noted during the group discussion, the current national categorization of hospital types in Belgium may not always align with the actual complexity of care delivered by individual hospitals. Several institutions classified as primary or secondary hospitals are engaged in highly specialized activities that could justify higher staffing levels than their category suggests. While this model incorporates hospital type as an adjustment factor, these discrepancies highlight the importance of contextual interpretation when applying the estimates.
The presented FTE calculations primarily focus on three key professions: physician, hospital pharmacist, and microbiologist.
Additionally, 92 hours allocated for start-up investments—such as defining a list of restricted antimicrobials, selecting quality indicators, and drafting an initial action plan—were not included in our calculations. While this is a limited amount, it could still be integrated as an annual package of hours to support the development of new activities, either systematically (with justification) or upon request when launching a new project.

According to the BEAST structural survey, the median number of FTEs dedicated to AMS in Belgian hospitals in 2023 was 0.12 per 100 beds (IQR: 0.05–0.28), with notable variability across regions, hospital types, and professions (3). Several studies from countries such as France, the United States, Australia, Germany, Austria, Canada, and the Netherlands have assessed the time allocated to stewardship activities across national or local hospital samples. Reported estimates of AMT human resources range from 0.2–1.25 FTEs per 100 acute-care beds (1,29–32). Some studies provided breakdowns by profession, with estimates of 0.08–0.36 FTEs per 100 beds for physicians, 0.25–1.00 FTEs for pharmacists, 0.06 FTEs for microbiologists (based on one study), and 0.05 FTEs for administrative personnel (based on one study).
These findings are broadly consistent with our model, which estimates the need for 6 FTEs in a 1,000-bed primary hospital and 7 FTEs in a 1,000-bed tertiary hospital. Variations in international FTE estimates may reflect differences in the efficiency of AMS implementation, particularly where centralized or integrated electronic medical record systems support streamlined stewardship activities.

4. FTE ALLOCATION

Discussions at the end of the second consensus meeting addressed the distribution of professions within AMTs.

While no consensus was reached on the exact distribution of FTEs within AMTs, there was clear agreement on the inclusion of three key professions: ID physicians, microbiologists, and hospital pharmacists. The role of an IPC physician was also discussed, with experts emphasizing the importance of AMS-IPC collaboration but agreeing that an IPC physician should not be a mandatory AMT member.

The discussion highlighted substantial differences in how AMTs are organized across Belgium, as well as varying interpretations of professional roles within these teams. These disparities were also reflected in the BEAST structural survey, which revealed notable regional variations in AMT composition. For example, the proportion of AMTs including at least one ID physician was higher in Brussels (93%) and Wallonia (68%) compared to Flanders (32%). In contrast, at least one medical microbiologist was present in 70% of AMTs in Flanders and 86% in Brussels, but only 56% in Wallonia (2). These differences likely reflect regional variations in the availability of specific expertise and may influence how AMTs are structured and how responsibilities are distributed locally.

The BEAST team recognizes that a clearer distribution of professional roles would have facilitated AMS budgeting at both the national and hospital levels. However, the BEAST project timeline did not allow for the organisation of a third consensus meeting specifically dedicated to defining professional roles within AMTs. Such a meeting would have required a well-prepared methodology and balanced representation from all relevant professions to reach meaningful conclusions.
Indeed, achieving such a distribution remains highly complex. On one hand, hospitals vary in which professions they employ, and their internal organization differs significantly. On the other hand, the recent recognition of ID physicians (who currently lack nomenclature funding) and medical microbiologists (both physicians and pharmacists) is still incomplete. These ongoing challenges contribute to the difficulty in reaching consensus. Additionally, overlapping responsibilities complicate role definitions: for instance, ID physicians and medical microbiologists often share certain tasks, as do pharmacists specialized in microbiology and medical microbiologists.

Looking ahead, several options could be explored for distributing FTEs within AMTs. These could be implemented through national funding, but also by setting minimum hiring quotas for each profession at the hospital level, or through a combination of both approaches. Possible models include:

1. Even distribution with a variable component

A balanced allocation of FTEs across the **three key professions (e.g., 30% each) with a 10% flexible component** that allows for local adaptation. This flexible portion could be used to strengthen a specific profession based on hospital needs or to include additional roles such as an (AMS-)nurse, who is already present in 61/98 Belgian AMTs (62.2%) according to the structural survey (2).

- 30% ID physician
- 30% hospital pharmacist
- 30% pharmacist/medical microbiologist
- 10% flexible : AMS nurse, secretary, epidemiologist

2. Activity-based allocation

Instead of assigning FTEs by professional title, roles could be distributed based on the **type of activity**, such as:

- 50% clinical activities (ID physicians and medical microbiologists)
- 30% pharmaceutical activities (hospital pharmacists)
- 20% laboratory activities (pharmacist and medical microbiologists)

Alternatively, allocation could be based on the role of the professional (doctor vs. non-doctor):

- 55-65% doctor (ID physician and medical microbiologist)
- 35-45% non-doctor (pharmacist/other)

3. Minimum FTE requirements per profession

This approach would set minimum FTE allocations for key professions to ensure a **baseline presence** of key professions. While allowing flexibility in total staffing, this model would mandate the inclusion of ID physicians, microbiologists, and hospital pharmacists, addressing current gaps in some hospitals.

4. Flexible, locally determined distribution

Rather than enforcing a fixed distribution, hospitals could be given the **flexibility** to determine their own AMT composition based on local needs. Under this model, each of the three key professions would have dedicated AMS time included in their employment contracts, with national funding ensuring hospitals meet their obligations.

To refine these proposals, a broader expert panel should be consulted in a future study with a more balanced representation of all relevant professions. Ideally, experts should be surveyed in advance to gather input before engaging in a consensus process.

Although no agreement was reached on the distribution of professions within AMTs, the discussion was highly informative and represents an important first step in a process that should continue beyond the BEAST project. However, it is important to note that in the Dutch consensus, there is resistance to allocating FTEs in this context. They argued that providing specifications for individual stewardship team members was too speculative and, moreover, undesirable, as many activities can be performed by all core disciplines (1).

5. MUTUALIZATION OF AMT ACTIVITIES

Mutualization of certain activities could be a viable option. For example, the development and regular updating of clinical practice guidelines for infection management and prophylaxis could save considerable time for the 98 AMTs. While local adaptations to specific settings or epidemiology would still be necessary, these would require significantly less effort. Building trust in these recommendations is essential, which is why they must be developed and maintained by recognized Belgian experts in the field, compensated for their work, and based on evidence-based, systematic methodology.
Having a unified set of national guidelines would also provide a consistent foundation for antimicrobial use surveillance, enabling more accurate evaluation of prescription appropriateness across hospitals. In contrast, multiple local guidelines create variability that hinders national-level assessment of AMS outcomes. National guidelines would thus facilitate the establishment of qualitative AMS indicators, complementing the predominantly quantitative metrics currently in use.
It is neither efficient nor cost-effective to expect local AMTs to create and maintain their own guidelines from scratch. In practice, this would result in 98 different versions of the same guidelines per topic, largely duplicating the same scientific evidence, and requiring an enormous amount of effort and resources.

Additionally, it is important to highlight that experts have not identified any added value in network-based mutualization for AMS. If mutualization is to occur, it should be at the national level or between hospitals, rather than within the same network. Collaboration between hospitals of similar type, size, or those facing similar challenges at the same time is likely to be more effective. This suggests that while mutualization can enhance efficiency, maintaining a strong local presence remains critical for the successful implementation of AMS.

6. GAPS AND FUTURE CONSIDERATIONS

- **Role of AMS nurses**: While AMS nurses are increasingly recognized as key players in stewardship programs, their role was not explicitly covered in this consensus. Their contribution to surveillance, education, and implementation should be further explored.
- **Role of paediatric ID-physician**: Traditionally, Flanders has had fewer paediatric ID physicians compared to French-speaking Belgium. However, this is evolving. In hospitals with paediatric intensive care units, neonatal ICUs, and/or paediatric oncology departments, the role of

paediatric ID physicians is indispensable, particularly in shaping and implementing AMS policies. Their involvement in AMTs is highly valued and is expected to further enhance the quality and effectiveness of antimicrobial stewardship efforts.

- **"*Support team for the AMT*",** including IT personnel, data specialists, communication experts, statisticians, administrative staff, etc. Although common practice in other countries, this is currently not implemented in Belgium. Their interventions could be either occasional or more permanent, depending on the needs, size, or type of hospital. This support helps the AMT members in task shifting, but does not replace them. In the current BEAST-evaluation of calculated FTEs, the time needed for support by these professions was not taken into account. However, in the discussions it was mentioned that one of the major challenges of optimizing the AMS programs in hospitals is the lack of this support. This is an element that should be mentioned to hospital management to raise awareness that AMS should be considered within the hospital as a medical service that, like others, needs access to support services.
- **Diagnostic stewardship**: Although not initially included as a core AMT activity, diagnostic stewardship is gaining recognition as a key component of AMS strategies. Effective diagnostic stewardship enhances antimicrobial use by ensuring timely and accurate diagnoses, thereby reducing unnecessary prescriptions and improving patient outcomes. Given their expertise in laboratory diagnostics, microbiologists are essential in this area. They guide test selection, interpretation, and reporting, helping clinicians make informed antimicrobial prescribing decisions. Strengthening collaboration between microbiologists, ID physicians, and hospital pharmacists could further integrate diagnostic stewardship into AMS efforts.
- **Fungal and other stewardship measures**: While AMS encompasses stewardship for all antimicrobials, the terminology currently in use—"Antibiotic Management Teams" (antibioticatherapiebeleidsgroep / Antibioticabeleidsgroep / Groupe de gestion de l'antibiothérapie)—creates confusion and may inadvertently lead to forgetting the oversight of antifungal stewardship. To enhance clarity and ensure a comprehensive approach, the terminology should be reconsidered and better aligned with the full scope of AMTs' responsibilities.
- **Funding requirements**: While this consensus establishes the minimum FTE requirements for an optimal AMT, its financing should not rely solely on a single source. To ensure sustainability and stakeholder engagement, a co-financing model could be proposed, where federal funding is contingent upon a minimum financial contribution from hospital management or other relevant parties. This shared responsibility approach would strengthen institutional commitment to AMS. Basic funding should be sustainable and continuous, rather than project-based, to allow for the development of a solid and enduring AMS policy. There is also a lack of awareness that optimizing AMS not only reduces mortality but also saves significant costs in the long term. In contrast, a suboptimal AMS policy leads to unnecessary loss of life and exorbitant costs. If policymakers recognize this, securing a budget for AMS will become less contentious.
- **Challenges in implementation**: Differences in hospital governance, staffing structures, and AMS priorities may pose challenges to the universal application of this model. Furthermore, implementing standardized FTE calculations may face financial and administrative barriers, particularly in resource-limited hospitals. Tailored strategies will be needed to ensure equitable and practical adoption.
- **Sustainability and long-term evaluation**: Beyond initial implementation, national bodies should establish mechanisms for ongoing evaluation and adaptation of AMT staffing models. Regular national assessments of AMT effectiveness, workload distribution, and resource allocation will be crucial to refining this framework over time. This requires coordinated efforts to develop standardized performance indicators, ensure adequate funding, and provide guidance on best practices. Strengthening national oversight can help address disparities in AMT structures across hospitals and regions, ensuring a sustainable and equitable approach to antimicrobial stewardship.
- **Dedicated AMT leader**: Under current legislation, the AMT president must be a physician. The possibility of opening this role to a pharmacist (either a microbiologist or hospital pharmacist)

was not discussed during the consensus meetings. Similarly, the duration of the AMT president's mandate was not addressed, despite the fact that periodic turnover can sometimes be essential to the success of an AMS program within an institution.

- **Integration across care settings**: This evaluation focused on AMS policies within hospitals. However, antimicrobial stewardship should not be restricted to a single setting. There is significant interaction and overlap between AMS activities in hospitals and those in other care settings, such as nursing homes and primary care, as well as between different hospitals. While certain initiatives—such as HOST—are being implemented and evaluated to address these cross-setting dynamics, they fall outside the scope of the BEAST project, which is limited to hospital AMS.

  When developing national AMS policies, these interconnections must be taken into account. Policies should be designed to foster coordination across settings rather than operate in silos. That said, the BEAST project consistently highlights that sustained support for local AMTs is a prerequisite for the success of broader, system-wide AMS strategies.

7. STRENGTHS AND WEAKNESSES OF THE EVALUATION

One of the key strengths of this project is that it marks the first time in Belgium that AMS experts have come together to discuss the specific human resource requirements (FTEs) for AMTs. The discussions were constructive, with strong expert engagement despite the limited timeframe for the study. Additionally, we developed a structured approach for calculating FTEs, using a robust methodology aligned with international recommendations. This included a preliminary validation of the activity list and the identification of key factors influencing the baseline calculations.

However, several weaknesses were noted: the overall timeline for organizing the study was very short (only 3.5 months), and because the first meeting took longer than expected, we had to hold a second meeting instead of finishing everything in one session. As a result, attendance at the second meeting was lower, with only half of the experts from the first meeting able to participate due to scheduling constraints. The language barrier also posed challenges, slowing down discussions and revealing differences in the interpretation and implementation of an activity that is nonetheless defined in a Royal Decree. Finally, the lack of consensus on the distribution of FTEs remains a significant limitation. We encourage policymakers to support the continuation of these discussions to address the barriers identified during the first two consensus meetings.

CONCLUSION

This evaluation highlights the need for a systematic and flexible approach to staffing AMTs in Belgian hospitals. The consensus process underscored the complexity and diversity of AMT activities and the critical importance of allocating sufficient resources, particularly for essential tasks such as surveillance, auditing, and feedback. These core activities are fundamental to the success of AMS programs and require significant time and professional engagement. Strengthening local AMS structures is not only essential for improving outcomes at the hospital level but also serves as the cornerstone for the effectiveness of national AMS policies.

Consensus was reached on a set of activities to be carried out by AMTs and the estimated time required for these tasks. However, discussions on the distribution of professions within AMTs remain ongoing, with no final agreement yet. We recommend continuing this discussion. While some activities can be streamlined, most require significant investment at the local level. There is a strong call for the development and regular updating of clinical guidelines and educational materials at the national level to improve efficiency and optimize the use of time and resources.

A data-driven and adaptable approach to AMT staffing is essential for strengthening AMS programs in Belgium. The findings from this evaluation provide a solid foundation for future improvements in staffing, resource allocation, and the overall effectiveness of AMS in Belgian hospitals.

This evaluation also reveals a critical issue: despite global agreements on the importance of addressing AMR, awareness remains insufficient at various levels in Belgium. Although AMR is a high priority on the international agenda, with commitments from Belgian leaders, there is still a gap in consistent policy and funding for AMR and AMS in the country (33). As AMR continues to drive significant mortality, morbidity, and costs, both now and in the future, it is imperative for authorities to take substantial actions to prevent these outcomes (34).

REFERENCES

1. ten Oever J, Harmsen M, Schouten J, Ouwens M, van der Linden PD, Verduin CM, et al. Human resources required for antimicrobial stewardship teams: a Dutch consensus report. Clinical Microbiology and Infection. 2018 Dec 1;24(12):1273–9.
2. Vercheval C., Briquet C., Damian E., Huis in 't Veld D., Catteau L. A nationwide survey to describe the current landscape of antimicrobial stewardship programs in Belgian hospitals. Brussels, Belgium. Brussels, Belgium: Sciensano; 2025 p. 116. Report No.: D/2025.14.440/28.
3. Vercheval C., Briquet C., Huis in 't Veld D., Catteau L. Belgian evaluation of antimicrobial stewardship teams (BEAST Project) - Perception Survey. Brussels: Sciensano; 2024. Report No.: D/2024.14.440/67.
4. L . Catteau, C. Briquet, E. Damian, D. Huis in 't Veld, C. Vercheval. Strengthening the functioning of Antimicrobial Management Teams in Belgium. Insights from a 2024 national survey. Brussels, Belgium: Sciensano; 2025 p. 52.
5. Ministry of social affairs, public health and the environment. Royal Decree of 26 April 1999 about the creation of an Antibiotic Policy Coordination Commission [Internet]. 1999. Available from: https://etaamb.openjustice.be/fr/arrete-royal-du-26-avril-1999_n1999022485
6. Sourdeau L, Struelens MJ, Peetermans WE, Costers M, Suetens C, Committee (BAPCOC) THCWG of BAPC. Implementation of antibiotic management teams in Belgian hospitals. Acta Clinica Belgica [Internet]. 2006 Apr 1 [cited 2025 Feb 19]; Available from: https://www.tandfonline.com/doi/abs/10.1179/acb.2006.011
7. Goossens H, Coenen S, Costers M, Corte SD, Sutter AD, Gordts B, et al. Achievements of the Belgian Antibiotic Policy Coordination Committee (BAPCOC). Eurosurveillance. 2008 Nov 13;13(46):19036.
8. Federal Public Service Health. Royal Decree amending the Royal Decree of March 4, 1991 setting the standards that a hospital pharmacy must meet in order to be approved. [Internet]. 2008. Available from: https://www.ejustice.just.fgov.be/cgi/article_body.pl?language=fr&caller=summary&pub_date=08-03-28&numac=2008024120
9. Van Gastel E, Costers M, Peetermans WE, Struelens MJ, on behalf of the Hospital Medicine Working Group of the Belgian Antibiotic Policy Coordination Committee. Nationwide implementation of antibiotic management teams in Belgian hospitals: a self-reporting survey. Journal of Antimicrobial Chemotherapy. 2010 Mar 1;65(3):576–80.
10. Van Gastel E, Balligand E, Costers M, Magerman K, Hospital Medicine Working Group of the Belgian Antibiotic Policy Coordination Committee. Antibiotic management teams in Belgian hospitals: continued improvement in the period from 2007 to 2011. Eur J Clin Microbiol Infect Dis. 2015 Apr;34(4):673–7.
11. Leroy R, Christiaens W, Maertens de Noordhout C, Hanquet G. Proposals for a more effective antibiotic policy in Belgium – Short Report. Health Services Research (HSR) Brussels: Belgian Health Care Knowledge Centre (KCE). KCE Reports 311. D/2019/10.273/25; 2019.
12. European Centre for Disease Prevention and Control. ECDC country visit to Belgium to discuss antimicrobial issues: 20 24 November 2017. [Internet]. LU: Publications Office; 2018 [cited 2022 Oct 28]. Available from: https://data.europa.eu/doi/10.2900/065952
13. Federal Public Service Public Health, safety of the food chain and environment. Royal Decree amending the Royal Decree of April 25, 2002 on setting and liquidating the budget for hospital financial resources [Internet]. 2017. Available from: https://etaamb.openjustice.be/nl/fr/koninklijk-besluit-van-22-juni-2017_n2017012829.html
14. I. Uwera Mpalirwa, K. Matthys. Quality indicators for infection prevention and control in acute care hospitals. Brussels, Belgium: Sciensano; 2024 p. 60. Report No.: D/2024.14.440/76.

15. Catteau L., Briquet C., Damian E., Huis in 't Veld D., Vercheval C. Assessment of antimicrobial stewardship implementation at the national level. Belgian evaluation 2024. Brussels, Belgium: Sciensano; 2025. Report No.: D/2025.14.440/27.
16. Federal Public Service Health. Lits justifiés et agréés 2024/Verantwoorde en erkende bedden 2024 [Internet]. 2024. Available from: https://www.health.belgium.be/en/node/45942
17. Federal Public Service Health. Key data in healthcare - general hospitals - edition 2019 [Internet]. Brussels: FPS; Report No.: D/2019/2196/41. Available from: https://www.healthybelgium.be/en/key-data-in-healthcare/general-hospitals/organisation/types-of-hospitals
18. CDC. Elements of Hospital Antibiotic Stewardship Programs. [Internet]. Atlanta, GA, US Department of Health and Human Services: CDC; 2019. Available from: https://www.cdc.gov/antibiotic-use/healthcare/pdfs/hospital-core-elements-H.pdf
19. World Health Organization. Antimicrobial stewardship programmes in health-care facilities in low - and middle-income countries a WHO practical toolkit [Internet]. Geneva; 2019. Available from: https://www.who.int/publications/i/item/9789241515481
20. FOD Public Health. Santé Publique. 2021 [cited 2024 May 22]. Projet-pilote "Hospital Outbreak Support Teams" (HOST). Available from: https://organesdeconcertation.sante.belgique.be/fr/projet-pilote-hospital-outbreak-support-teams-host
21. Federal Public Service Social Security. Royal Decree of June 22 2023 determining the conditions for dispensing medicines and medical devices in the context of home hospitalization. [Internet]. 2023. Available from: https://etaamb.openjustice.be/fr/arrete-royal-du-22-juin-2023_n2023043077
22. National Institute for Health and Disability Insurance. Home hospitalization for oncology and antimicrobial treatment [Internet]. 2023. Available from: https://www.riziv.fgov.be/nl/thema-s/verzorging-kosten-en-terugbetaling/wat-het-ziekenfonds-terugbetaalt/thuishospitalisatie-voor-oncologie-en-antimicrobiele-behandeling
23. European Centre for Disease Prevention and Control (ECDC). Point prevalence survey of healthcare associated infections and antimicrobial use in European acute care hospitals. Protocol version 6.0. Stockholm: ECDC; 2022.
24. Ernst EJ, Klepser ME, Bosso JA, Rybak MJ, Hermsen ED, Segarra-Newnham M, et al. Recommendations for training and certification for pharmacists practicing, mentoring, and educating in infectious diseases pharmacotherapy. Pharmacotherapy. 2009 Apr;29(4):482–8.
25. Sneddon J, Gilchrist M, Wickens H. Development of an expert professional curriculum for antimicrobial pharmacists in the UK. J Antimicrob Chemother. 2015 May;70(5):1277–80.
26. Gauthier TP, Worley M, Laboy V, Hernandez L, Unger NR, Sherman EM, et al. Clinical infectious diseases pharmacists in the United States: a problem of both supply and demand. Clin Infect Dis. 2015 Mar 1;60(5):826–7.
27. Dellit TH, Owens RC, McGowan JE, Gerding DN, Weinstein RA, Burke JP, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. Clin Infect Dis. 2007 Jan 15;44(2):159–77.
28. Australian Commission on Safety and Quality in Health Care. https://www.safetyandquality.gov.au/ [Internet]. Available from: https://www.safetyandquality.gov.au/
29. Pulcini C, Morel CM, Tacconelli E, Beovic B, de With K, Goossens H, et al. Human resources estimates and funding for antibiotic stewardship teams are urgently needed. Clin Microbiol Infect. 2017 Nov;23(11):785–7.
30. Le Coz P, Carlet J, Roblot F, Pulcini C. Human resources needed to perform antimicrobial stewardship teams' activities in French hospitals. Med Mal Infect. 2016 Jun;46(4):200–6.
31. Doernberg SB, Abbo LM, Burdette SD, Fishman NO, Goodman EL, Kravitz GR, et al. Essential Resources and Strategies for Antibiotic Stewardship Programs in the Acute Care Setting. Clinical Infectious Diseases. 2018 Sep 28;67(8):1168–74.
32. Greene MH, Nesbitt WJ, Nelson GE. Antimicrobial stewardship staffing: How much is enough? Infect Control Hosp Epidemiol. 2020 Jan;41(1):102–12.

33. Global leaders groups on antimicrobial resistance. Brussels, Belgium; 2023. Available from: https://www.amrleaders.org/resources/m/item/glg-conference-on-amr-for-belgian-parliamentarians
34. Interagency Coordination Group on antimicrobial resistance. No time to wait : securing the future from durg-resistant infections. Report to the secretary-general of the united nations [Internet]. IACG; 2019. Available from: https://cdn.who.int/media/docs/default-source/documents/no-time-to-wait-securing-the-future-from-drug-resistant-infections-en.pdf?sfvrsn=5b424d7_6&download=true

ANNEXES

Annex 1. Definitions of AMT activities used during the BEAST consensus meetings

Activity			Definitions/Details First consensus meeting 13th December 2024	Definitions/Details Second consensus meeting 14th February 2025
Antimicrobial formulary	1	Developing and updating the antimicrobial formulary		Antimicrobial Formulary = A list of antimicrobials that have been approved for use in a hospital and that the hospital pharmacy stocks, along with information about each specific drug (this may be part of a general drug formulary in your hospital). Details : This task takes into account literature reviews when a new molecule is brought to market, and calls for tender (e.g. to find a generic).
	2	Specifying a list of restricted antimicrobials		Expert opinion: including indication for antimicrobials on list. Details : This activity takes into account the development of the restriction (i.e. decision tree, roles and responsibilities, monitoring)
Guidelines	3	Developing and regularly updating clinical practice guidelines for infection management and prophylaxis		Local recommendations = These recommendations should be based on international/national evidence-based guidelines and local/national susceptibility patterns (where possible), to assist antimicrobial selection (indication, agent, dose, route, duration) for common clinical conditions Details : 1. Difference if starting up activity or updating already established recommendations; 2. in specialized or tertiary hospitals more specific guidelines to develop or update (e.g. 28% more in tertiary hospitals) Expert opinion: this should be a national activity. Time wasted making guidelines at the local level when this activity could be done at the national level for all hospitals !
Initiatives to limit the inappropriate use of antimicrobials	4	Performing preauthorization (expert approval) for specific antimicrobial agents	Estimated time required (hours/year) for an hospital of 400 beds to perform preauthorization for minimum 5 molecules/year	Preauthorization = expert approval
	5	Reviewing courses of therapy for specific antimicrobial agents (post-prescription review) with immediate feedback to the prescriber in case of inappropriate use	Estimated time required (hours/year) for an hospital of 400 beds to perform post-prescription review for minimum 5 molecules/year	Post-prescription review = process of monitoring and providing feedback or guidance on antimicrobial prescriptions 48-72 hours after the initial prescription to ensure appropriate use and effectiveness
	6	Systematic advice for defined clinical situations (e.g. positive blood cultures)	Estimated time required (hours/year) for an hospital of 400 beds to perform systematic advice for minimum one clinical situation	

	7	Infection and antimicrobial prescribing focused ward rounds in specific departments	Estimated time required (hours/year) for an hospital of 400 beds to perform minimum one ward round	Clinical ward rounds = ward visit by the antimicrobial stewardship team to discuss and advice on the use of antimicrobials in individual patients.
	8	Organizing multidisciplinary meetings focusing on defined clinical situations (e.g. endocarditis)	Estimated time required (hours/year) for an hospital of 400 beds to organize minimum one multidisciplinary meeting	
	9	Organizing multidisciplinary meetings in specific departments	Estimated time required (hours/year) for an hospital of 400 beds to organize minimum one multidisciplinary meeting in a specific department	
	11	Advice on therapeutic drug monitoring	Estimated time required (hours/year) for an hospital of 400 beds to perform advice for minimum one molecule	
	~~12a~~	~~Outpatient Parenteral Antibiotic Therapy (OPAT) service (implementation)[2]~~		~~Details : Group 1 made the distinction between the start-up investment and day-to-day service~~
	~~12b~~	~~Outpatient Parenteral Antibiotic Therapy (OPAT) service [2]~~	~~Supervising OPAT service~~	~~Details : 1. Supervision of OPAT operations, 2. take into account launch of OPAT in 12a activity~~
	13	Mandating prescribers to thoroughly document an antimicrobial plan in the medical record for all antimicrobial prescriptions (implementation)	If not implemented : start up investment	Antimicrobial plan = This documentation should encompass details such as the indication, name, dosage, duration, route, and administration interval for all prescribed antimicrobials. Expert opinion : Should be developed at national level and be mandatory by law. If it is implemented it would save a lot of time in other fields (validation of medication, PPS etc.)
	15	Managing emerging infectious diseases		Expert opinion : number of hours very difficult to predict in advance. The AMT should ALWAYS be involved in every emerging infection
		CONSENSUS : Minimum number of hours required to perform initiatives in a 400-bed hospital per year		Expert opinion : 1. At least one half-time ID physician to perform initiatives in a 400-bed hospital per year; 2. Some activities depend on others to be implemented (mostly ICT support)
Education and training	17	Developing educational material		Educational material = e.g. Leaflet, Booklet, Poster, Newsletter, Newspaper, Email, Website (internet), Website (intranet), Video, Podcast, E-learning, Smartphone App, Social media, Campaign Details : Taking into account a 400 bed hospital. In larger and especially academic hospitals this number might be disproportionally higher Expert opinion : AMT must be to supported by the communication department

	18	Organizing educational meetings to support healthcare professionals training (basic or continuous) on how to optimize antimicrobial using		Educational meetings = courses, workshops, conferences or other educational meetings to increase knowledge or understanding Basic training = The AMT (GGA/ABTBG) offers basic introduction training (e.g. sensitization on AMR and use of standard treatment guidelines) to staff on how to optimize antimicrobial prescribing, dispensing and administration Continuous training = The AMT (GGA/ABTBG) offers continuous educational resources (e.g. regular trainings on infection management) to train staff on how to optimize antimicrobial prescribing, dispensing and administration. Details : 1. considering in this activity the educational outreach visits (i.e. personal visits by a trained person to health workers in their own settings, to provide information with the aim of changing practice) 2. taking into account the meeting itself, 3. Taking into account a 400 bed hospital. In larger and especially academic hospitals this number might be disproportionally higher Expert opinion : Important AMT activity but one that is being neglected because people are not receptive and don't have the time.
Monitoring and surveillance	22	Selection of quality indicators[1]	If not implemented : start up investment	Quality indicators= quality indicators are measurable elements of practice performance, for which there is evidence or consensus that they can be used to assess the quality, and hence change in the quality, of care provided. Quality indicators can measure the quality of care by examining the structures, processes and outcomes of care. This acknowledges that good structures increase the likelihood of good processes, and good processes increase the likelihood of good outcomes Details: AMTs have no officialy quality indicators to monitor. Expert opinion : core elements (=structural indicators) should be defined at the national level
	23	Measuring quality indicators	Estimated time required (hours/year) for an hospital of 400 beds to measure minimum one quality indicator	Estimated time required (hours/year) for an hospital of 400 beds to perform minimum the **4 BAPCOC process quality indicators** at least once a year at hospital level (and no IT support - manual work !) Details : 1. depending on the IT support for processus quality indicators (manual work vs. automatic work) 2. This activity varies greatly according to QI (structure QI - e.g. presence of an ID physician in the team **vs.** process QI - e.g. choice of AB following local guidelines **vs.** outcome QI - e.g. mortality) 3. In connexion with activity 24 for some QI
	24	Audits or point prevalence surveys	Estimated time required (hours/year) for an hospital of 400 beds to perform minimum one quality indicator	Point Prevalence Survey (PPS) = A cross-section measurement of the quality of antimicrobial use Details: 1. take into account that audits measure some quality indicators (! Activity 23 !) 2. take into account the development of the method (choice of theme, criteria and measurement method), data collection, analysis of results, the feedback and the improvement action plan and reassessment.
	25	Surveillance of antimicrobial consumption		Details : 1. depending on the IT support 2. take into account data extraction, data analysis by the team, and feedback

	26	Surveillance of antimicrobial resistance	Details : 1. depending on the IT support 2. take into account data extraction, data analysis by the team, and feedback
	27	Surveillance of OPAT treatments	Details : 1. Depending on availability of an operational OPAT team in the hospital. 2. depending on the IT support 3. take into account data extraction, data analysis by the team (e.g. consumption, ecology, indications), and feedback (it's notified in the INAMI convention about OPAT)
Reporting	28	Drafting annual report for the individual AMT	Annual report = a summary of previous year's stewardship activities of the antimicrobial stewardship team. Details : take into account the feedback
	29	Drafting BAPCOC activity report	Details : fill in the BAPCOC activity report Expert opinion : Better governance structure is needed on national level. Since there is no feedback on the report, nowadays people don't fill in seriously
Additional activities	30a	Drafting an action plan start up[1]	Details : Group 1 made the distinction between the start-up and the update
	30b	Drafting an action plan (update)	Action plan = should encompass the following components: (1) objectives of the AMT (GGA/ABTBG) (what the AMT (GGA/ABTBG) aims to improve), (2) improvement strategies (how the AMT (GGA/ABTBG) plans to achieve these objectives), (3) identification of role players, (4) metrics (measurable indicators of progress) and (5) a defined timeline
	31	Drafting of meeting agendas and minutes	Details: 1) take into account the number of meetings
	32	Coordination of AMT	Details : 1. take into account plan meetings, arrange meeting rooms, check each team member's diary, information sharing, follow up on action plan.; 2. take into account extra meetings
	33	Participation in AMT meetings	Details : considering only AMS team members in the calculation ! Expert opinion: At least 4 AMS team meetings a year; it depends on the number of meetings
	34	Participation in Drug and Therapeutics Committee meetings	Details : considering only AMS team members in the calculation !
	35	Participation in IPC committee meetings	Details : considering only AMS team members in the calculation !
	36	Participation in IPC team meetings	
	37	Regular policy meeting with the hospital management	Details : considering only AMS team members in the calculation !
	40	Participation in Hospital Outbreak Support Team (HOST) meetings	Expert opinion : no conclusion due to lack of framework at present
	41	Participation in National bodies (e.g. BAPCOC) meetings	Details : e.g. explanations of a future national audit ; considering only AMS team members in the calculation !

42	Participation in national AMS conferences		Details : considering only AMS team members in the calculation !
43	Setting-up of IT support	Estimated time required (hours/year) for an hospital of 400 beds to set up IT support for minimum one project (e.g. alert, real time surveillance, automatic stop order)	Estimated time required (hours/year) for an hospital of 400 beds to set up IT support for minimum one project (e.g. alert, real time surveillance, automatic stop order) Details : considering only AMS team members in the calculation !

[1] Identified start-up activities: The time required for their implementation was estimated separately from the minimum FTE required for continuous AMT activities.

[2] Activity excluded from AMT responsibilities during the consensus meeting, as it is financed separately under the Royal Decree of 22 June 2023 (21)

Annex 2. Estimated Full-Time Equivalent (FTE) requirements for Antimicrobial Management Teams (AMTs) in Belgian hospitals by hospital name, number of beds, and type[1]: BEAST Consensus Meeting, 2025.

NIHDI	Hospital name	Number of beds	Type	Estimated number of AMT FTE
71003208	AZ ALMA	431	primary	3.18
71011720	AZ DELTA	1358	primary	6.15
71071207	AZ DIEST	224	primary	2.16
71055072	AZ GLORIEUX	340	primary	2.73
71039632	AZ GROENINGE	1044	primary	5.99
71030823	AZ HERENTALS	243	primary	2.26
71071306	AZ JAN PALFIJN	519	primary	3.61
71020430	AZ JAN PORTAELS	406	primary	3.06
71071009	AZ KLINA	589	primary	3.96
71001723	AZ MARIA MIDDELARES	542	primary	3.73
71068237	AZ MONICA	466	primary	3.35
71006770	AZ OOSTENDE SERRUYS	268	primary	2.38
71052597	AZ OOSTENDE DAMIAAN	541	primary	3.72
71017064	AZ OUDENAARDE	235	primary	2.22
71010433	AZ RIVIERENLAND	429	primary	3.17
71001228	AZ ST-BLASIUS	438	primary	3.21
71021717	AZ ST-ELISABETH	333	primary	2.70
71004988	AZ ST-JAN	886	secondary	5.88
71014094	AZ ST-LUCAS BRUGGE	419	primary	3.12
71029041	AZ ST-LUCAS GENT	779	primary	4.89
71002614	AZ ST-MAARTEN	643	primary	4.22
71010631	AZ ST-MARIA	350	primary	2.78
71013403	AZ ST-VINCENTIUS	165	primary	1.87
71006374	AZ TURNHOUT	647	primary	4.24
71071603	AZ VESALIUS	326	primary	2.66
71053686	AZ VOORKEMPEN	250	primary	2.29
71031021	AZ WEST	234	primary	2.21
71039236	AZ ZENO	327	primary	2.67
71012611	AZORG	1395	primary	6.17
71004295	CH BOIS DE L'ABBAYE	427	secondary	3.42
71016866	CH CENTRE ARDENNE	388	primary	2.97
71024784	CH DE MOUSCRON	355	primary	2.81
71053488	CH DE WALLONIE PICARDE (CHwapi)	760	secondary	5.21
71041018	CH EPICURA	569	primary	3.86
71072492	CH EPICURA	237	secondary	2.40
71000436	CH REINE ASTRID	151	primary	1.81
71033296	CHIREC - HOPITAL DELTA	438	primary	3.21
71072393	CHIREC - HOPITAL SARE	614	primary	4.08
71006869	CHR DE HUY	317	secondary	2.83
71000733	CHR HAUTE SENNE	246	primary	2.27
71000634	CHR SAMBRE ET MEUSE	397	primary	3.01
71010334	CHR SAMBRE ET MEUSE	303	primary	2.55

71002020	CHR VERVIERS EAST BELGIUM	436	primary	3.20
71024982	CHU CHARLEROI CHIMAY	149	primary	1.80
71071801	CHU CHARLEROI CURIE VAN GOGH	838	secondary	5.62
71032506	CHU CHARLEROI VESALE DE VINCI	504	secondary	3.83
71070712	CHU DE LIEGE	1038	tertiary	7.03
71034682	CHU HELORA - SITE NIVELLES-TUBIZE	234	primary	2.21
71025477	CHU HELORA HOPITAL DE MONS	493	secondary	3.78
71026665	CHU HELORA SITE CONSTANTINOPLE MONS WARQUIGNIES	331	primary	2.69
71014688	CHU HELORA SITE JOLIMONT-LOBBES	664	primary	4.32
71007661	CHU ST-PIERRE / UMC ST-PIETER	592	secondary	4.31
71009641	CHU TIVOLI	518	secondary	3.91
71007760	CHU/UVC BRUGMANN	849	secondary	5.68
71003901	CHU-UCL NAMUR	386	secondary	3.20
71016668	CHU-UCL NAMUR	315	primary	2.61
71026467	CHU-UCL NAMUR - HOPITAL DINANT	235	primary	2.22
71002317	CLINIQUE ANDRE RENARD	160	primary	1.85
71040919	CLINIQUE NOTRE-DAME DE GRACE	224	primary	2.16
71004394	CLINIQUE ST PIERRE	425	primary	3.15
71070613	CLINIQUE ST-LUC BOUGE	302	primary	2.55
71040325	CLINIQUES UNIVERSITAIRES ST-LUC (UCL)	973	tertiary	6.86
71011126	EUROPA ZIEKENHUIZEN - CLINIQUES DE L'EUROPE	709	primary	4.55
71001030	GRAND HOPITAL DE CHARLEROI	1112	primary	6.03
71015282	GROUPE SANTE CHC	781	primary	4.90
71015876	GROUPE SANTE CHC	228	primary	2.18
71072294	GROUPE SANTE CHC	6	primary	1.09
71009740	HEILIG HART ZIEKENHUIS LIER	451	primary	3.28
71010235	HEILIG HART ZIEKENHUIS MOL	183	primary	1.96
71041216	HOPITAL DE LA CITADELLE	900	secondary	5.96
71040622	HOPITAL ERASME (ULB)	986	tertiary	6.93
71015084	HOPITAL UNIVERSITAIRE DES ENFANTS REINE FABIOLA (HUDERF)	183	primary	1.96
71008750	HOPITAUX IRIS SUD - IRIS ZIEKENHUIZEN ZUID	550	primary	3.76
71068930	IMELDA ZIEKENHUIS	502	primary	3.53
71007958	INSTITUT JULES BORDET	250	secondary	2.47
71003703	ISOSL CLINIQUES DE SOINS SPECIALISES VALDOR - PERI	486	primary	3.45
71005780	JAN YPERMAN ZIEKENHUIS	532	primary	3.68
71024388	JESSA ZIEKENHUIS	981	secondary	6.39
71011027	KLINIEK ST-JAN - CLINIQUE ST-JEAN	548	primary	3.75
71025774	KLINIK ST JOSEF	156	primary	1.83
71071997	NOORDERHART	333	primary	2.70
71039731	OLV VAN LOURDES ZIEKENHUIS WAREGEM	266	primary	2.37
71010829	RZ HEILIG HART LEUVEN	287	primary	2.47
71010928	RZ TIENEN	288	primary	2.48

71003802	SILVA MEDICAL	440	primary	3.22
71039533	ST-ANDRIESZIEKENHUIS	287	primary	2.47
71071405	ST-FRANCISCUSZIEKENHUIS	268	primary	2.38
71012413	ST-JOZEFSKLINIEK	271	primary	2.39
71001525	ST-NIKOLAUS HOSPITAL	192	primary	2.01
71071504	ST-TRUDO ZIEKENHUIS	310	primary	2.59
71030031	UZ ANTWERPEN (UZA)	593	tertiary	4.65
71014391	UZ BRUSSEL	721	tertiary	5.39
71067049	UZ GENT	1049	tertiary	7.04
71032209	UZ LEUVEN	1738	tertiary	7.44
71054775	VALISANA	275	primary	2.41
71059527	VITAZ	944	primary	5.70
71016470	VIVALIA	200	primary	2.05
71024685	VIVALIA	403	primary	3.04
71009938	ZAS AUGUSTINUS VINCENTIUS ST. JOZEF	1012	secondary	6.50
71000931	ZAS MIDDELHEIM, CADIX, PALFIJN, HOGE BEUKEN, JOOSTENS	1888	secondary	6.97
71070910	ZIEKENHUIS GEEL	294	primary	2.51
71037157	ZIEKENHUIS OOST - LIMBURG	805	secondary	5.45
71071702	ZIEKENHUIS OOST - LIMBURG	213	primary	2.11
National AMTs FTE requirements				**368.1**

[1]Hospital types and bed counts are based on Belgian national definitions. FTE estimates use actual (Agrées/Erkende) beds rather than justified (Justifiés/Veraantwoorde) beds, as the latter may not reflect true workload. The Belgian hospital type categorization differ from the ECDC classification and may not fully capture their complexity of care (17).

ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to all the experts who contributed to the consensus process for this study. Their valuable insights and constructive feedback were instrumental in shaping the approach to determining AMT staffing requirements in Belgian hospitals. Special thanks go to the members of the consensus group, whose diverse backgrounds and expertise enriched the discussions and helped ensure that the methodology is both comprehensive and applicable across different hospital settings.

Finally, we thank the BEAST team for their dedication and hard work in conducting this study and preparing this report. Their efforts have provided a solid foundation for future initiatives aimed at optimizing staffing levels and enhancing the effectiveness of antimicrobial stewardship in Belgian hospitals.

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Responsible editor: C. Léonard, Managing director • Rue Juliette Wytsmanstraat 14 • Brussels • Belgium • D/2025.14.440/26