CAYUGA MEDICAL CENTER LABORATORY

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EXECUTIVE SUMMARY

Healthcare is a complex system with multiple inter-related parts all of which form the basis of patient care. This complexity requires effective teamwork to ensure the highest level of patient health outcomes. Within any team communication and collaboration are key elements. In a highly technical team, such as a laboratory, it is essential to place a strong emphasis on and encourage these qualities as the focus shifts from individual to team performance.

The aim of this project is to identify if current communication patterns and practices between members of the core lab team are congruent with the new mission of increasing overall team performance. By looking at the who, what, when, where and why"s of communication amongst lab team members we hope to inform and improve both the process flow as well as the spatial relationships across the lab. To identify these patterns the researchers developed a two-way approach that entailed systematic observation (Communication Observation Tool) and administering of a survey (Social Network Analysis). Researchers used the communication observation tool to record details of any communication that occurred in the lab and the survey was filled out by members of the core lab to identify key experts.

This data helped to identify the areas of effective and ineffective communication in the lab overall and also in each department- accession, hematology, and chemistry. This can point to the key issues areas in both the process flow and spatial configurations. For example, we identified that accession was a major communication hub where information was flowing both in and out which could result in a bottleneck of either information or specimens. Also, we discovered that a majority of communication in accession was due to the need of teamwork.

Findings from this project can help to inform the spatial configuration and the process flow in the future lab. By knowing the critical paths of communication, work processes can hypothetically be improved. Likewise knowing these critical paths of communication will help inform the design of the future lab space by allowing for appropriate proximity, adjacency and lines of sight. This information will lead to establishing a more effective and efficient process flow that can support an increase in positive patient outcomes.

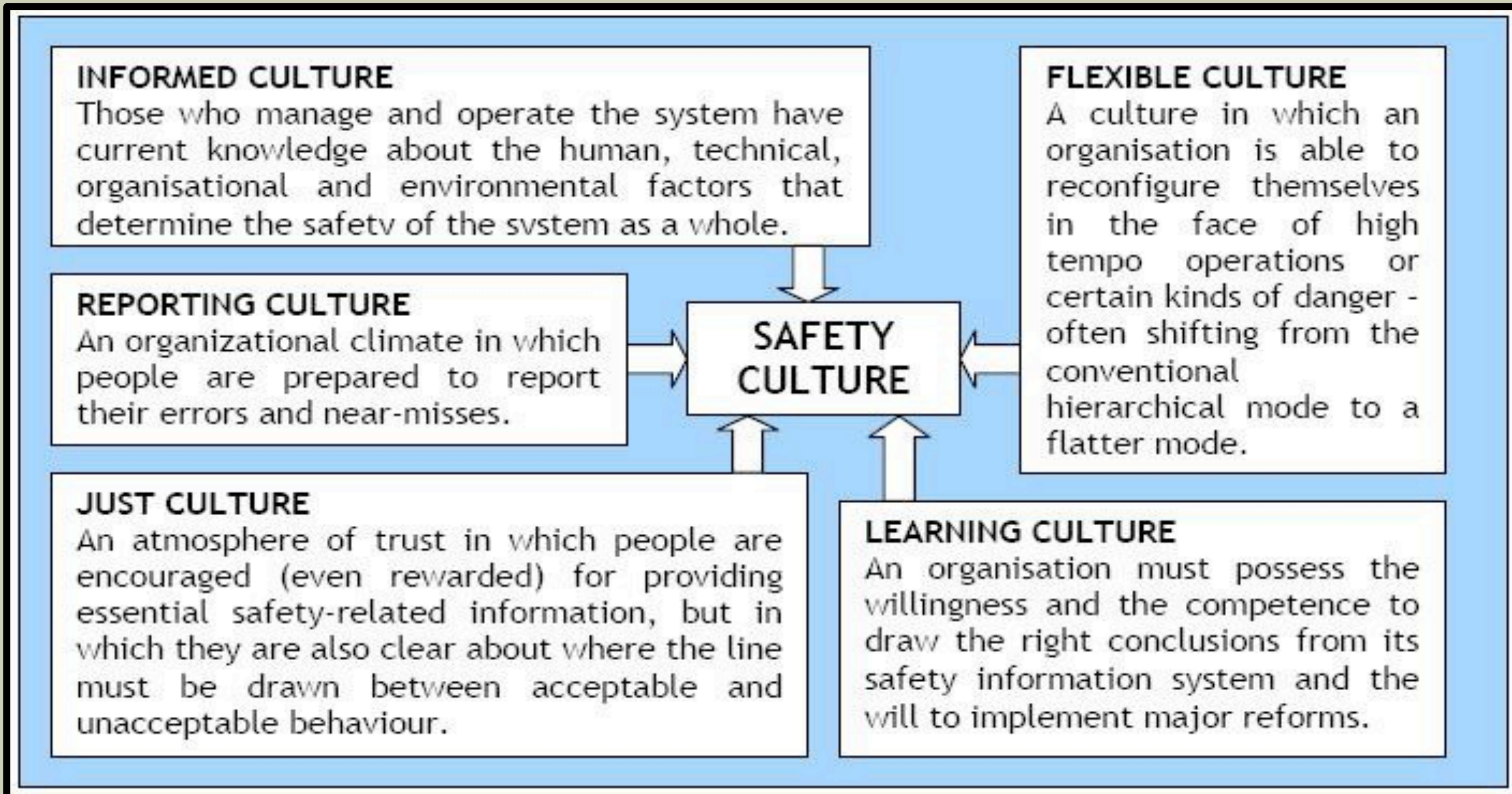
BACKGROUND

Awareness of the severity and implications of medical errors has drastically increased since the publication of the Institute of Medicine"s report in 2000 titled To Err is Human. In this report the IOM estimated that as many as 98,000 Americans die each year from medical mistakes. The report goes on to say that based on these estimates more people die in a given year as a result of medical errors than from motor vehicle accidents (43,458) and breast cancer (42,297) combined (Kohn, Corrigan, & Donaldson, 2000). Due to this report, patient safety has become more than just an issue to those within the medical community.

As healthcare becomes more transparent and patients have more and more access to information, the issue of patient safety has transferred into the public realm and is thus an even greater focus of care providers. From this, the notion of a culture of safety has arisen and taken ahold in all contexts of the healthcare process. So the questions of „what is a culture of safety?" and „how can it be achieved?" must be asked and ultimately answered in order for the prevalence of medical errors to decrease.

BACKGROUND

What is a "culture of safety"?



BACKGROUND

First and foremost a culture of safety is a just culture, one in which people are not punished for making errors but one in which deliberate violations and misconduct are not tolerated. Second, it must be an environment in which the discussion and reporting of errors is seen as a step towards future improvements. If those involved in a work process feel as though they cannot share or discuss actions that have led to or may lead to errors in the future a culture of safety will never be attained. Thirdly, a culture of safety must involve an environment that provides for the continual learning of those within it. Everyone should be encouraged to think about the who, what, when, where and why"s of an error and then investigate how to fix or amend the parts of the system that can eliminate the error in the future. Other important issues in a culture of safety revolve around trust and transparency where people work in teams in which responsibility, collaboration, and communication are all key components (Leape, 2009).

BACKGROUND

From the previous ideas it can be concluded that significant improvements in patient safety tie directly into the ability of caregivers to effectively work in interdisciplinary teams. It is not enough to have policies and procedures and require personnel to follow them. An effective team effort is needed to make sure that each step in the care process is working towards the end goal of patient safety. Once each team member envisions themselves as a part of the team rather than an individual within that team the work can really begin.

The idea of teamwork parallels the idea of healthcare as a system or a group of systems working as one. As a majority of errors in healthcare are due to bad systems rather than bad people within those systems; it follows, then, that individuals should not be punished for the error that the system they are a part of has caused. These „systems" include all of the processes and methods used to organize and carry out virtually everything done – whether simple or complicated – in healthcare environments.

BACKGROUND

CULTURE

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STRUCTURE

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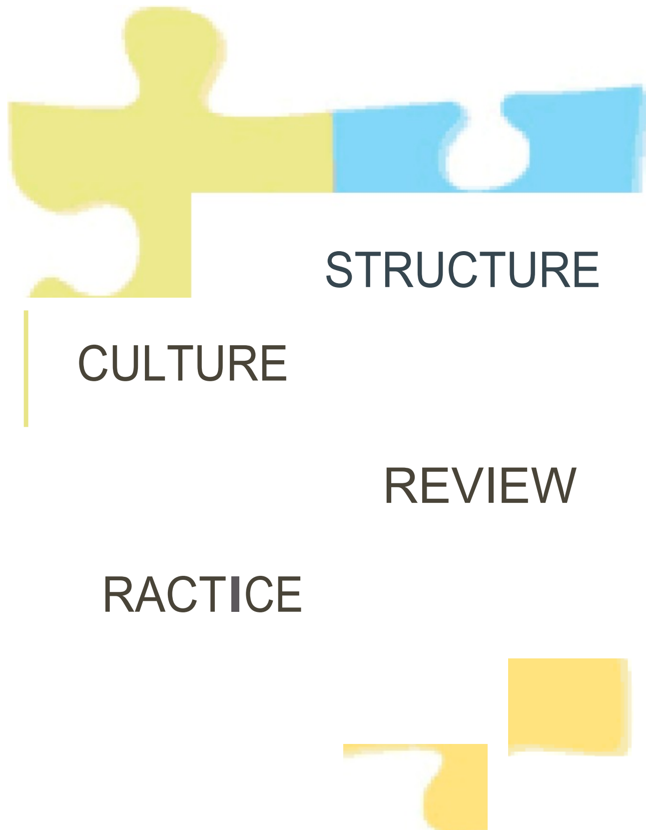

PRACTICE

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REVIEW

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BACKGROUND

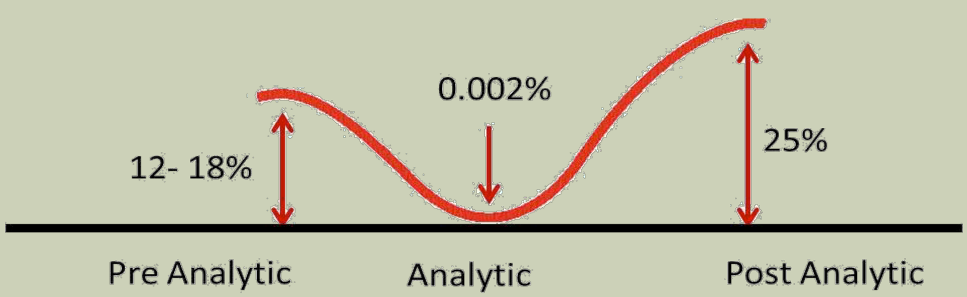
This systems approach is transformative and often a different way of thinking. It replaces the previous focus on individuals with a more holistic systems approach with a focus on patient centered care revolving around a team of professionals working towards patient health and safety. As healthcare organizations become more oriented towards the systems and teams that make them up it is clear that new practices are needed to make them work. Often times, this results in the fact that work gets done by those from different professional backgrounds and the outcome is a system in which communication and collaboration become even more important.

So, it may be safe to assume that care providers are well aware of the need for a shift towards patient centered care and interdisciplinary teams. Why, then, has it not been realized by a majority of healthcare organizations? It may be that the complexity of healthcare is a reason why this systems approach is so hard to conceptualize. It may also be due to the tradition of how things have customarily been done across time in healthcare. The traditional doctor-nurse relationship is a good example of this, in which collaboration has not been the norm but over time we are slowly seeing a transformation towards collaboration and knowledge sharing (Vazirani, Hays, Shapiro, & Cowan, 2005).

BACKGROUND

These issues are quite apparent when looking at a laboratory within any hospital environment. A laboratory is a complex environment that includes many different professions, located in different areas of the hospital, and over an extended period of time. This complexity of how, where and when a sample gets analyzed is often not fully understood, even by those within the laboratory.

In terms of quality control, laboratories often produce extremely low error rates. In the analytic phase, some studies indicate that the average error rate is a low as 0.002%, functioning at the 5 sigma level (Leape, 2009). However this is only during the analytic phase of the process and neglects the rest of the parts of the system. When the entire process of selecting, ordering, obtaining specimens, delivering, analyzing, reporting, and utilizing lab tests is considered the error rates can jump to levels as high as 12% to 25% (Plebani, 2006)

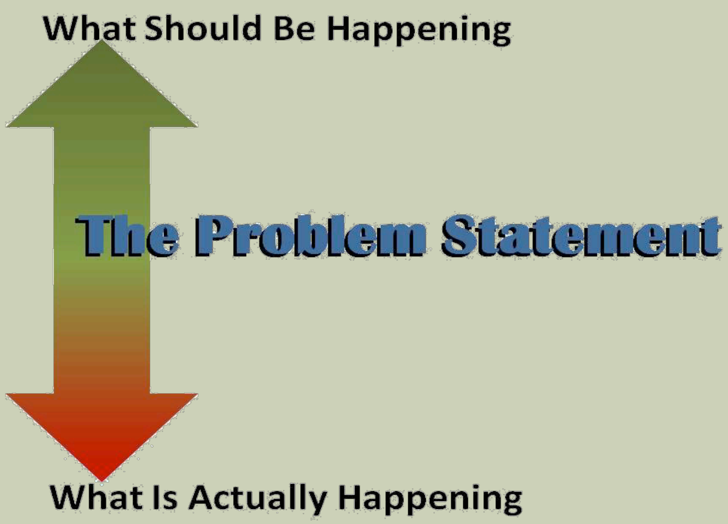


BACKGROUND

This points to the importance of looking at the whole process and why a systems approach is necessary to make the highest level of patient care possible. While all members do not have "control" throughout of the process, the patient could care less where the error occurred. All the patient cares about is that an error occurred and that it affected them (Leape, 2009). Thus to make patient centered care, health, and safety attainable the whole processes needs to be understood and requires a high performing team.

From the previous points it has been shown that communication and collaboration are key elements of any high performance team. In a highly technical team, such as a laboratory, it is essential to place a strong emphasis on and encourage these qualities. As the emphasis in the lab shifts from that of individual to team performance, communication and collaboration are even more important.

PROBLEM STATEMENT



Problem Statement:

Are communication patterns and practices between members of the core lab team congruent with the new mission of increasing overall team performance?

The purpose of this study is to understand the who, what, when, where and why‟s of communication amongst lab team members. By looking at this issue we hope to inform and improve both the process flow as well as the spatial relationships across the lab. By knowing the critical paths of communication, work processes can hypothetically be improved. Likewise knowing these critical paths of communication will help inform the design of the future lab space by allowing for appropriate proximity, adjacency and lines of sight.

METHODOLOGY

METHODOLOGY

To capture the current communication patterns in the lab and their efficacy in supporting the overall aim of the lab, we adopted a two-way approach of observation (done by Cornell students) and a survey (done by Core lab members). This two way approach ensures the validity of data and findings as it uses a multi-method protocol to measure communication patterns (See figure 1). We will discuss these two instruments in detail in further sections.

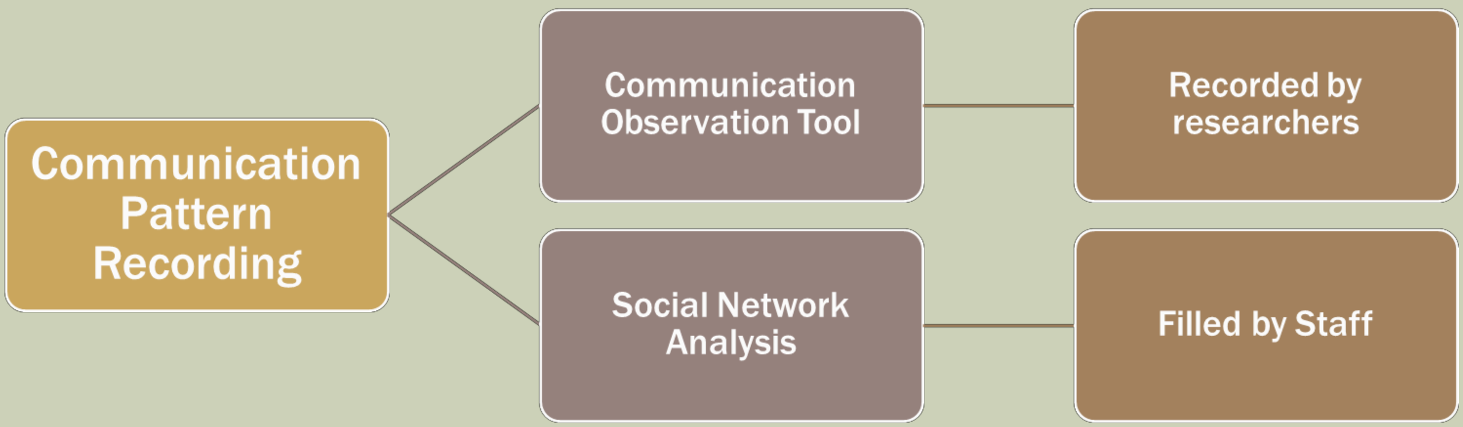


Figure 1: Communication pattern recording instruments

METHODOLOGY

Communication observation tool was filled out by the researchers each time a communication was observed in the laboratory with an aim to record the current communication patterns. The construct of communication patterns can be understood by focusing on three major aspects: basic communication details, type of communication, and quality of communication (See Figure 2).

Basic Communication Details

- Duration
- Between whom
- Location

Type of communication

- Locating a specimen
- Validation of work
- Technical
- Administrative
- Work frustrations
- Personal Communication

Quality of communication

- Source/Reason
  - Lack of 'Best Practices'
  - Lack of Process Knowledge
  - Teamwork Necessity
- Helpfulness

Figure 2: Key aspects of communication patterns

METHODOLOGY

'Social network analysis' is a self-report survey instrument that captures the existing network of communication flow in the laboratory (See Appendix 2). This instrument outlines the major types of communication that occur between lab members and with whom do they occur. It is filled out by a majority of Core Lab team members. Each member delineates their top two preferences from the staff that they go to for help for each of the aforementioned types of communication (See Figure 2). This instrument aims to identify the key experts in the laboratory who are the „critical communication nodes" for different types of communication. It also helps to gain more insight into the patterns of information flow in the laboratory. This information can help in creating a spatial assignment of these experts in the new lab that is conducive to smooth and efficient process flow. 20 staff members filled out this survey indicating their 1st and 2nd preferred go to co-worker for each type of communication in an ideal case scenario.

RESEARCH PROTOCOL

The communication pattern observation tool was filled out by the researchers each time a communication was observed in the laboratory during observation hours. Observation hours were between 10:00 AM to 6:00 PM on weekdays.

We focused on 3 departments of the lab: Accession, Hematology and Chemistry.

In all we have 35 hours of observation with 18.5 hours of communication observations and 16.5 hours of preliminary observation. Communication observation means the time that we filled out the tool that was explained earlier. Communication duration was approximately 11% of the time of total observed so out of 18.5 hours that we observed people were communicating for 2 hrs. Total number of communications recorded were 205.

Department	Communication Observation Hours	Preliminary Observation Hours
Accession Room	6.5 hours	
Hematology	6 hours	
Chemistry	6 hours	
Total	18.5 hours	16.5 hours

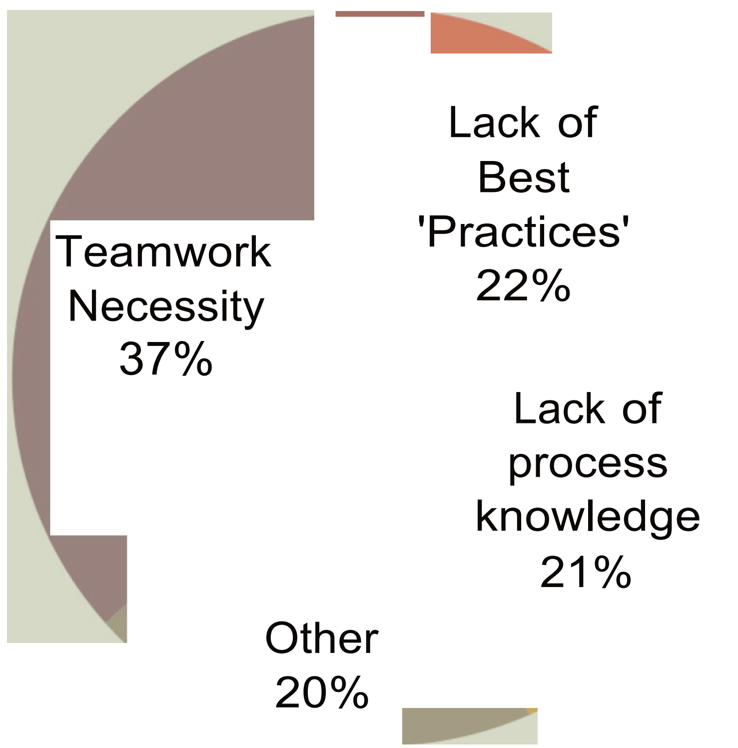
RESEARCH PROTOCOL

The communication observation tool was calibrated for inter-rater reliability by doing simultaneous observations and then comparing the data collected. In case of discrepancies, the instrument was edited and the meaning behind each response category was discussed among all the researchers. This ensured that all researchers had similar understanding of the concepts being captured by the instrument. The social network analysis instrument was administered by the researchers during the observation hours. Participants were asked to anonymously fill out the instrument.

OBSERVATION TOOL ANALYSES

SOURCES OF COMMUNICATION

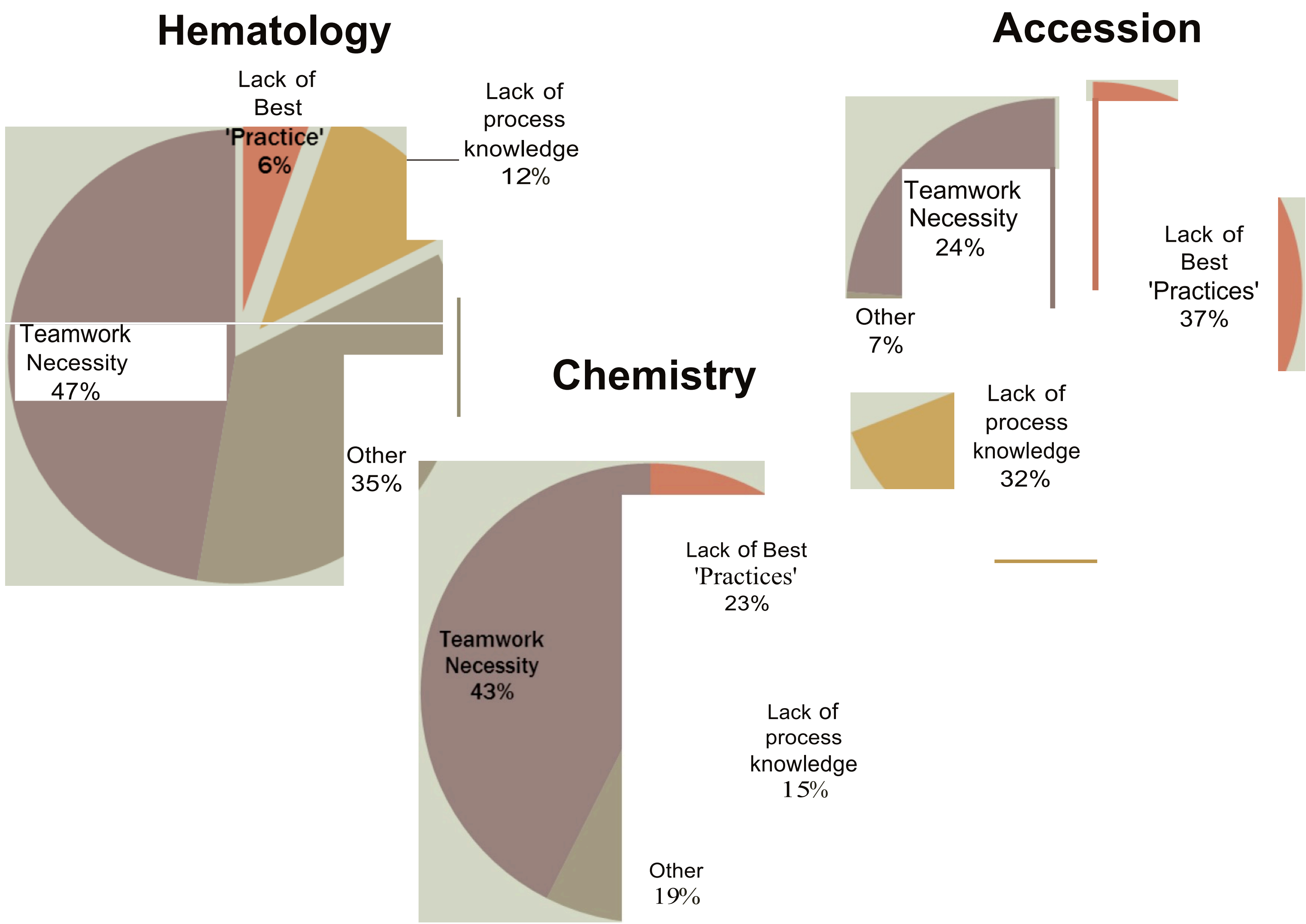
Overall Laboratory



SOURCES OF COMMUNICATION

The chart on the left shows the distribution of the source of communication observed in the l aboratory. In terms of the overall lab, the key highlight is that 43% of the communications observed were due to either a lack of best practices or process knowledge. These factors may point to obstacles in ensuring accuracy and efficiency in all areas of the core lab. This data shows that both on an individual level (process knowledge) and systems level (best practices) there is room more improvement.

However, 37% of the communications observed were based on teamwork necessity. This data s hows that the lab is making strides away from an individual focus towards the goal of overall team performance. The fact that teamwork necessity was observed so often shows that the core lab has the capabilities to work as a group and the new circular design of the lab may help to increase the amount of teamwork.


Hematology
Lack of Best 'Practice' 6%
Lack of process knowledge 12%
Teamwork Necessity 47%
Other 35%
Chemistry
Teamwork Necessity 43%
Lack of Best 'Practices' 23%
Lack of process knowledge 15%
Other 19%
Accession
Teamwork Necessity 24%
Other 7%
Lack of Best 'Practices' 37%
Lack of process knowledge 32%

SOURCES OF COMMUNICATION

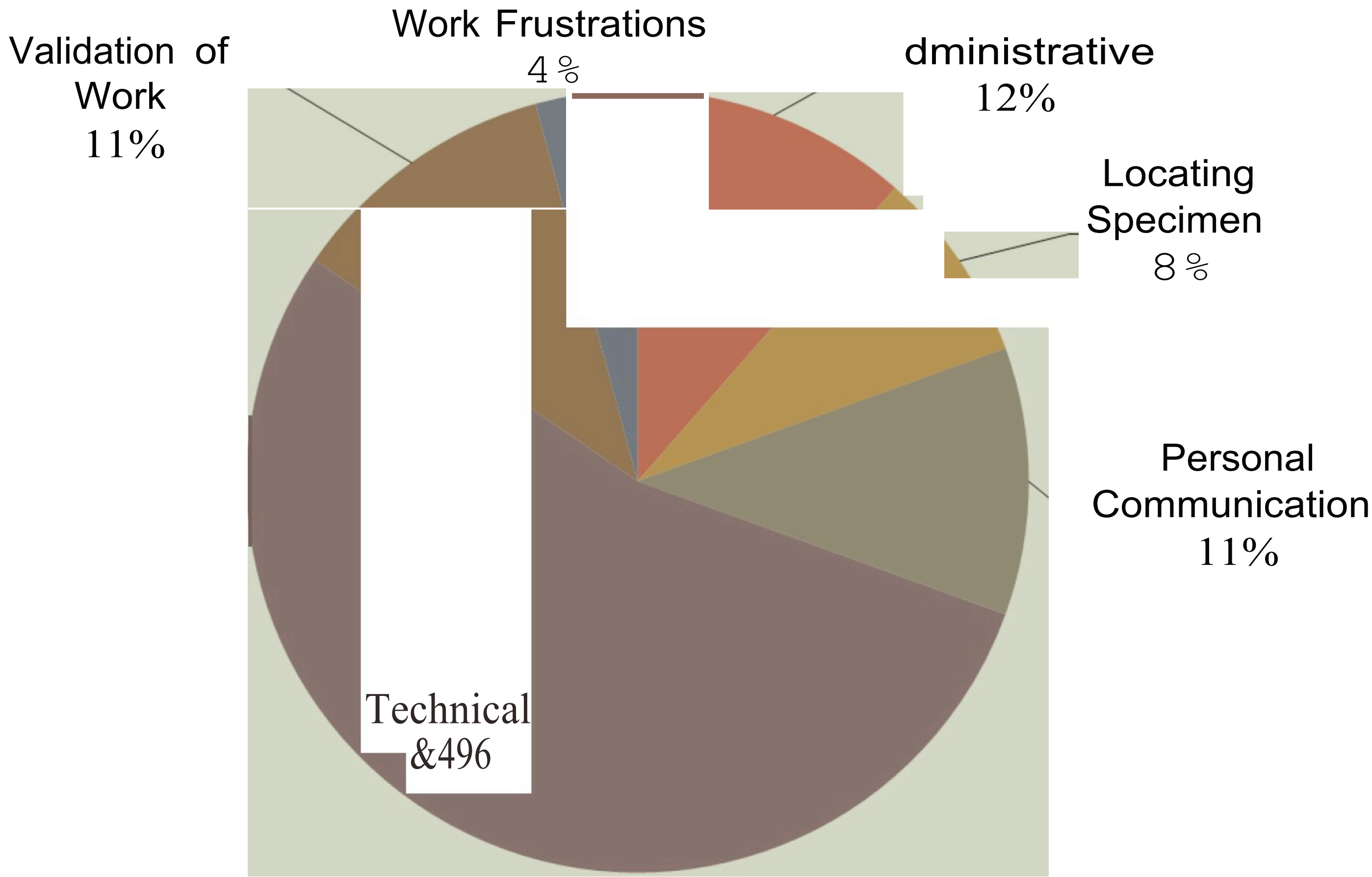
The charts on the left show the distribution of the sources of communication across the different departments of the lab.

Hematology: From the data it can be seen that hematology has the most efficient practices in place. Only 18% of communication observed were due to a lack of best practices or process knowledge. Why might t his be? Perhaps, it is due to the spatial layout unique to the hematology department. Individuals are located around a central work bench which may facilitate effective communication and allow for the sharing and dissemination of best practices and process knowledge.

Accession: In the accession room, 70% of the communication was based on either a lack of best practice or process knowledge. This statistic can possibly contribute to increased errors in the future. The data shows that both individual and team processes and practices should be standardized and shared between members of the accession room.

Chemistry: Chemistry is generally performing on par with the overall lab. The 15% of communications attributable to lack of process knowledge show that individuals in chemistry are performing slightly better t han the overall lab average. As always there is room for improvement, especially as it pertains to best practices. What is it about chemistry that resulted in such a high percentage of lack of best practices as compared to accession? They are both very technical and analytical departments, so the answer to this question may be useful in the future.

Overall Laboratory

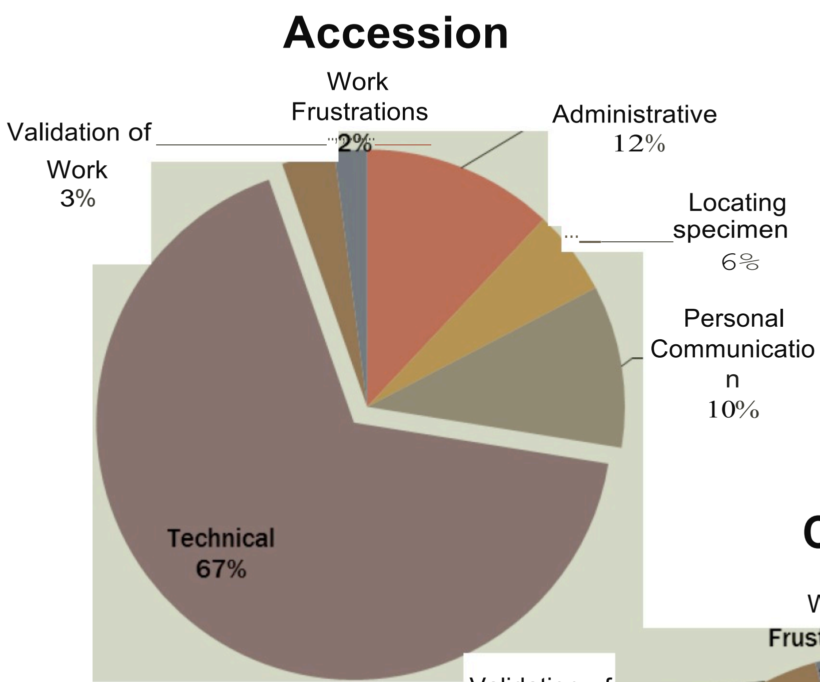


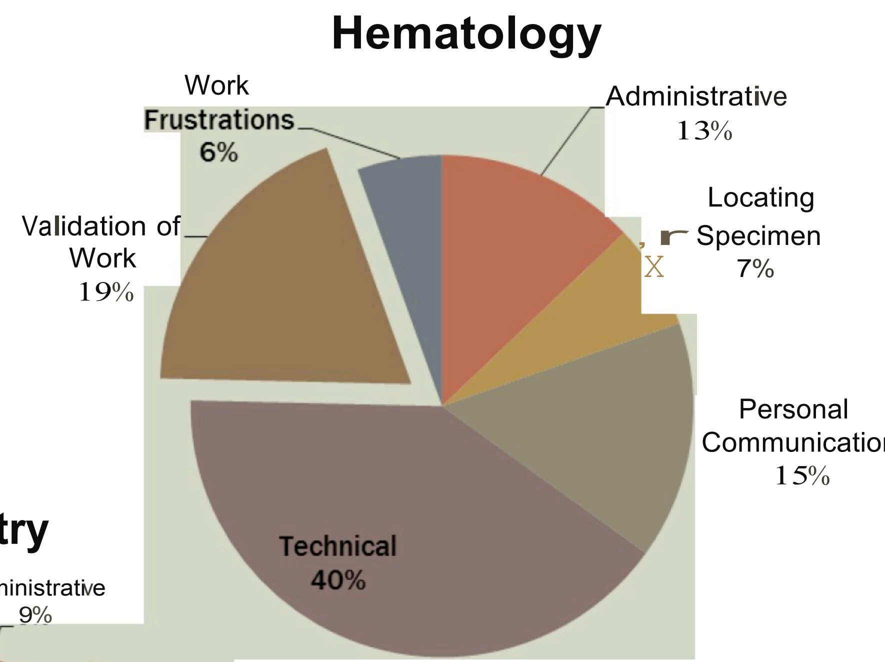
TIME BY TYPE OF COMMUNICATION

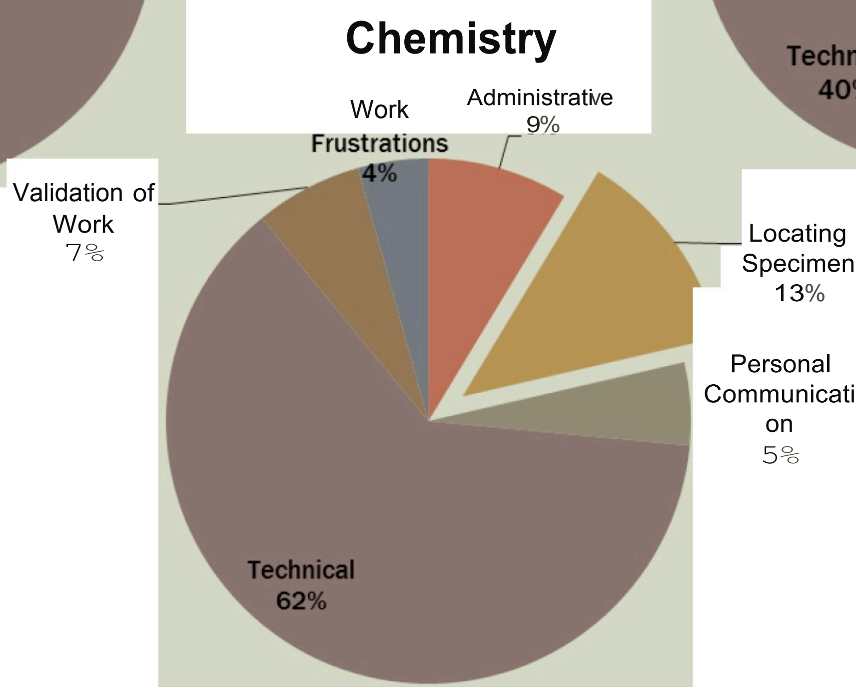
The chart on the left shows the distribution of the amount of time spent per type of communication for the overall lab.

As can be seen, 54% of the time spent on communication was technical. This makes sense because the lab, regardless of the department under observation, is a technical work environment requiring communication between individuals. Furthermore, 70% of the time spent on communicating was directly related to work processes when instances relating to work validation are included. These ideas may possibly show that the colocation of team members is i mportant for the sharing and diffusion of knowledge or best practices.

However, 8% of the time spent on communication observed was about the location of specimens. Is this an acceptable number? Does this number show that there needs to be a more standardized or easily accessible way to locate specimens? How does this overall percentage compare to the individual departments?


Accession
Work Frustrations 2%
Administrative 12%
Validation of Work 3%
Locating specimen 6%
Personal Communication 10%
Technical 67%


Hematology
Work Frustrations 6%
Administrative 13%
Validation of Work 19%
Locating Specimen 7%
Personal Communication 15%
Technical 40%


Chemistry
Work Frustrations 4%
Administrative 9%
Validation of Work 7%
Locating Specimen 13%
Personal Communication 5%
Technical 62%

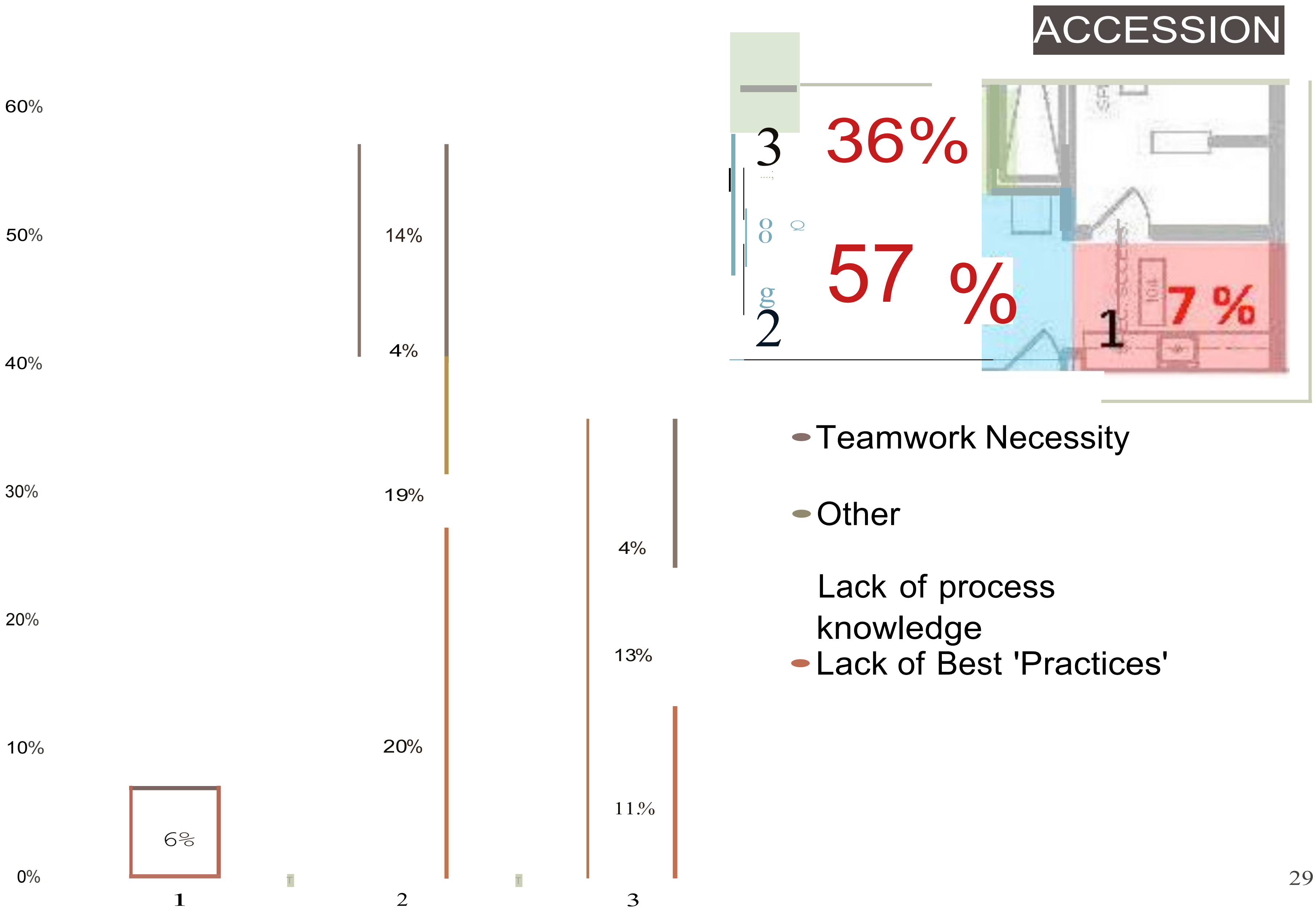
TIME BY TYPE OF COMMUNICATION

The graphs on the left shows the distribution of the amount of time spent per type of communication in each department.

Hematology: In hematology, 19% of the time spent communicating was on validation of work. This primarily revolved around validating the findings on slide samples. What could this imply for the future lab design? Perhaps the new design should strive to facilitate a space in which the validation of work between lab members is as easy as possible and takes as little time as possible.

Accession: In examining accession, 67% of the time spent communicating was technical. This indicates that there is little time wasted on unrelated elements of work. Validation of work was 3%; the lowest percentage as compared to other departments. Why might this be? It might be that accession based communication is primarily technical such as how to correctly label a specimen. Once a specimen is labeled and processed to move throughout the lab, validation may be no longer a factor.

Chemistry: In chemistry, 13% of the communication was spent on location of specimens. Remember that for the overall lab only 8% was spent on location of specimens. Why is more time being spent in chemistry on the location of specimens? It may be due to the spatial layout that chemistry currently has. Send outs occur in one zone, drop off occurs in another and the cooler is on the other side of the room. Future work processes may be improved if the relationships between these areas are accounted for.


ACCESSION
36%
57 %
7 %
3
2
1
60%
50%
40%
30%
20%
10%
0%
14%
4%
19%
20%
4%
13%
11.%
6%
1
2
3
Teamwork Necessity
Other
Lack of process knowledge
Lack of Best 'Practices'

REASON FOR TYPE OF COMMUNICATION: ACCESSION

The information on the previous page shows data relating to the accession room, specifically the reason for communication by zone. The image at the top right of the page shows a layout of the accession room and the zones that the room was broken into for the analysis. The graph to the left shows the reason for communication per zone for the accession room.

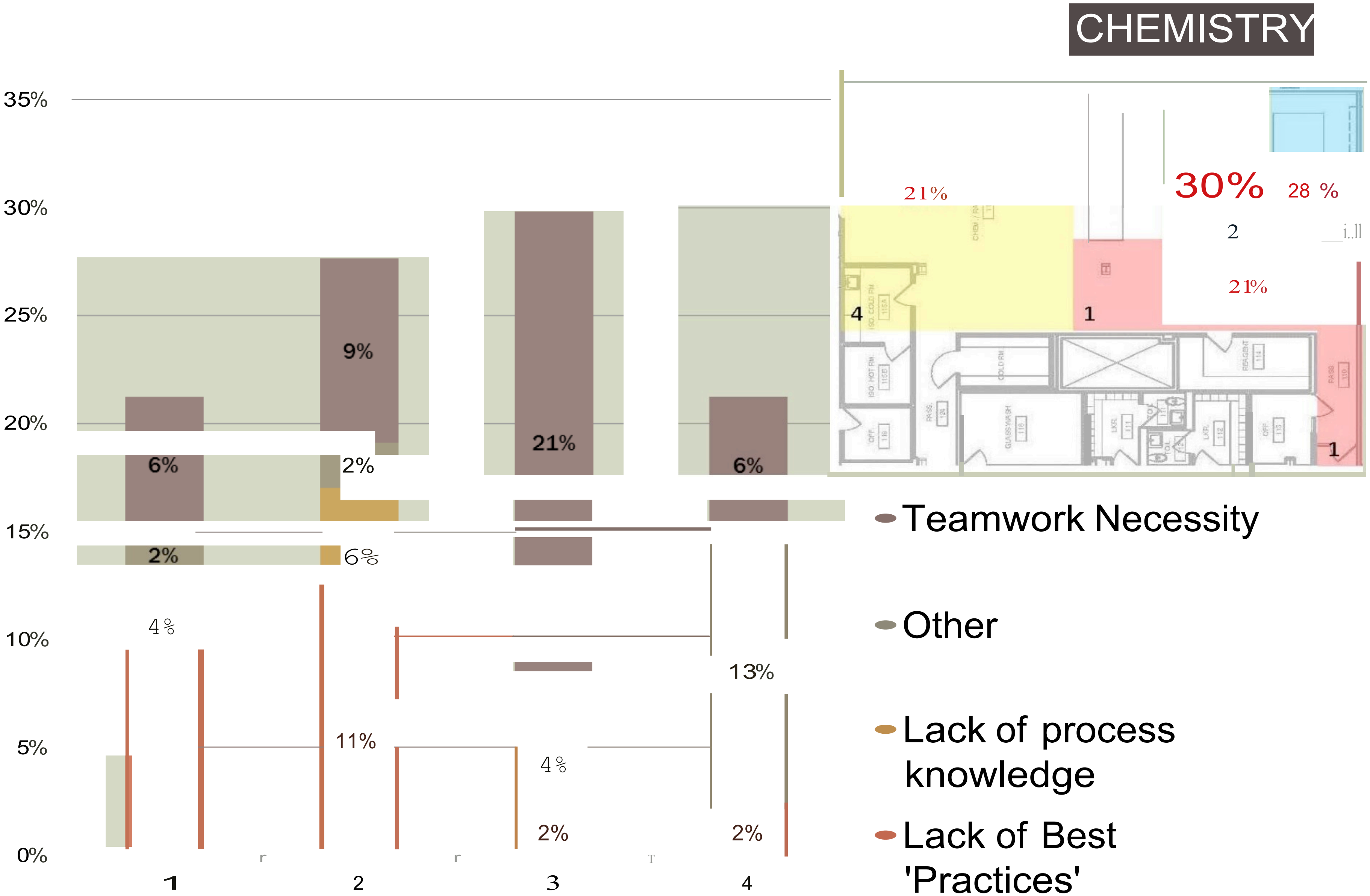
The room was divided by the work done in each zone. For instance the high work bench and low work bench were designated as two different zones based on the work done in each area. The percentages in the image show the amount of communication that went to the corresponding zone. This was done so as to ascertain where the flow of communication was the greatest. From the image it can be seen that zones two and three had the highest amount of total communication with 57% and 36%, respectively. This shows that these two areas are vital communication centers in the accession room.

This information could prove very useful in the future design of the lab. Since it is shown that these two areas each have a large amount of communication and different work being done in them in the future they should continue to be separate entities. By keeping them separate the work occurring in each zone might be more efficient due to a lack of interruptions resulting from a differing work process.

The bar graph takes the previous information a step further by introducing another variable. Each zone is still under review but now the source of the communication is being investigated. By knowing the reasons for communication one can better understand where improvements can be made or instances in which current practices can be highlighted and encouraged. Unfortunately, for the accession room there is a large amount of communication in both zones two and three that relate to either a lack of process knowledge or best practices.

This data points more to the process than the design of the accession room. Perhaps more could be done to increase each individual‟s process knowledge, through more training or the development of a “frequently asked questions” sheet which individuals can refer to. The same ideas can be applied to the team as a whole in hopes to increase their best practices.

REASON FOR TYPE OF COMMUNICATION:


CHEMISTRY
35%
30%
25%
20%
15%
10%
5%
0%
9%
6%
2%
21%
6%
2%
6%
4%
11%
13%
4%
2%
2%
1
2
3
4
21%
30%
28 %
21%
Teamwork Necessity
Other
Lack of process knowledge
Lack of Best 'Practices'

REASON FOR TYPE OF COMMUNICATION:

CHEMISTRY

The information on the previous page again shows the reason for communication by zone, this time for chemistry.

Like the other departments, chemistry was divided into zones based on the work done in that zone. Zone one is the l ong analyzer station, zone two is the specimen send out area, zone three is the specimen drop off area, and zone four is Allison"s desk and HIV testing area. Unlike the previous two rooms, however, chemistry does not have a zone which dominates in the amount of overall communication.

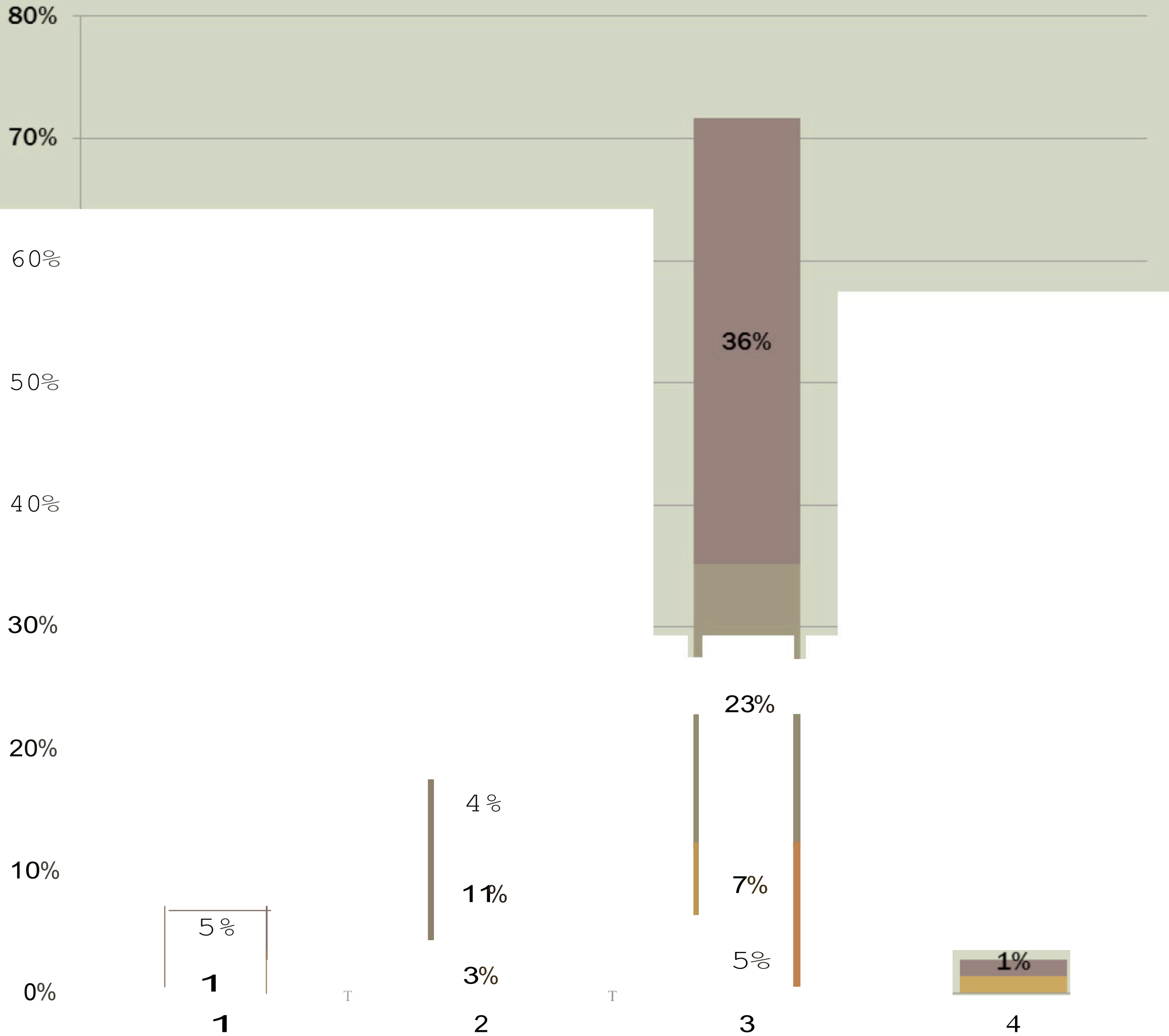
This may raise the question of „Why?" The best answer may likely due to the current arrangement of both people and equipment in the space. This idea points to the design of the future lab should incorporate a central location for not only specimen analysis but specimen drop off as well.

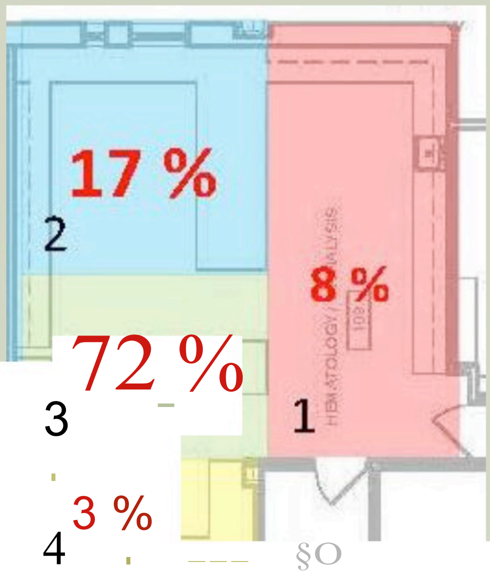
The two zones which do have the highest percentage of overall communication are zone three and zone two with 30% and 28%, respectively. However, when looking at the reasons for communication within each zone some major differences can be seen. Zone three had the highest percentage of communication as a result of teamwork necessity while zone two had the highest percentage of communication due to either lack of process knowledge or l ack of best practices.

This may show that the work that is done at zone three is much more standardized and regardless of the person who i s working the work gets done. The opposite may be true in zone two, perhaps the processed occurring within the send out area should be more standardized to reduce the chance of an error occurring, especially since these samples are sendouts and any error that occurs may not been realized for some time.

REASON FOR TYPE OF COMMUNICATION:

HEMATOLOGY





REASON FOR TYPE OF COMMUNICATION: HEMATOLOGY

The information on the previous page relates to Hematology and again shows the reason for communication by zone.

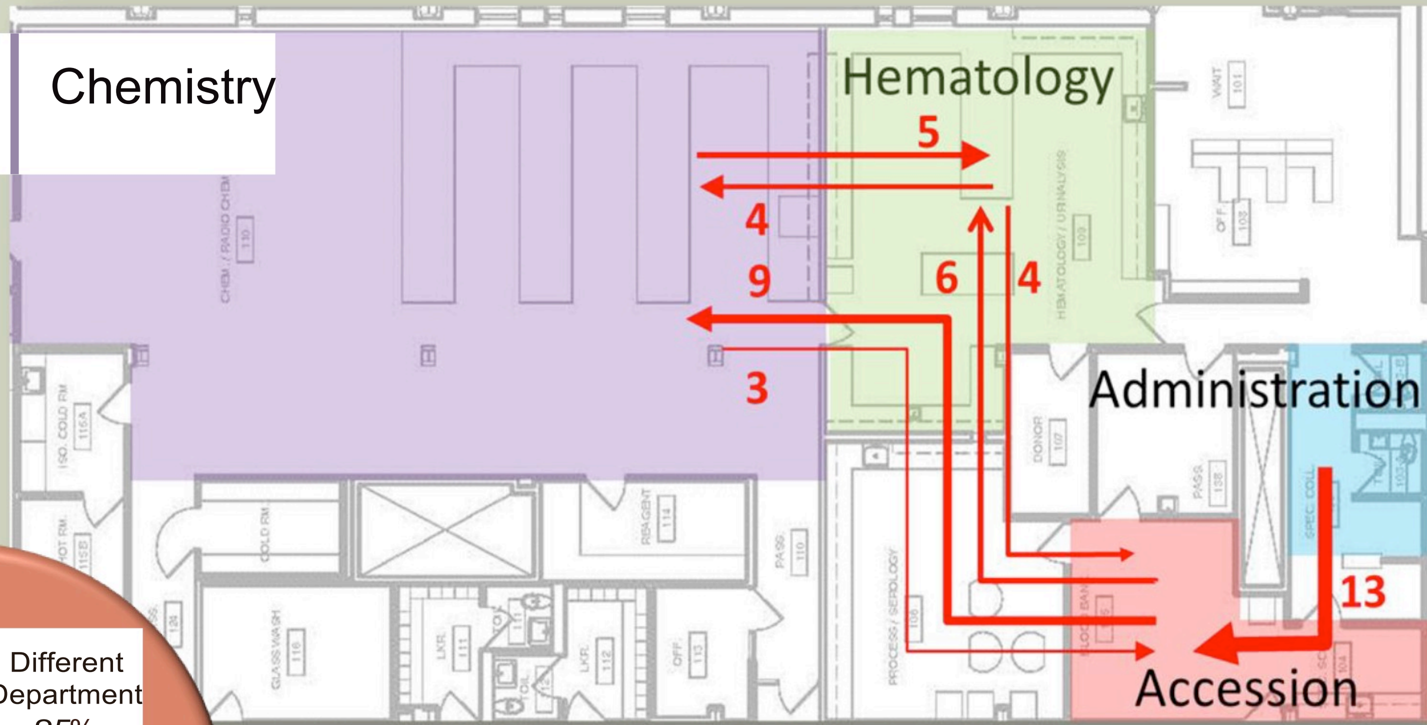
Hematology was also divided into zones based on the work done in that zone. Zone one is the coag/urine bench, zone two is the LH750 analyzer bench, zone three is the microscope work area, and zone four is the sample drop off area. It can be seen that an overwhelmingly large amount of the communication observed in hematology was directed towards or occurred between individuals in zone three.

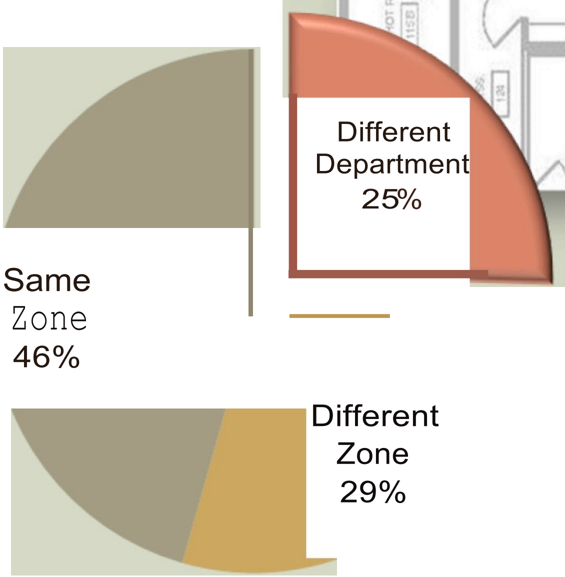
This data may prove to have some large implications for the design of the future lab. Perhaps the future space needs to accommodate for the ability for those in hematology to locate around a central working table. If a huge amount of the communication currently occurs in one small portion of the space it would be a drastically different way of working if the future space did not accommodate for this simple current design feature. The new space is overall designed as a circular core lab but this information may show that this idea may also be best if applied at a more micro level. Adjacent work stations may work most effectively if they provide for the ability to have their work validated by another team member.

The bar graph shows that of the 72% of communication within zone three a majority of it occurs because of teamwork necessity. This data further reinforces the idea that centrally located work tables may be a crucial design recommendation for the future lab. Also, the current data shows that hematology is working towards the labs mission of team rather than individual performance.

It can also be seen that hematology has a very low amount of communication attributable to either lack of process knowledge or best practices. What is it about hematology that results in these low numbers? Perhaps it is the people within the space but it may also be the space itself. Maybe the current spatial arrangement of people and equipment has led to a culture of knowledge sharing and cross training. Although the answer to this question may never be fully understood it is still important to ask.

PROXIMITY OF COMMUNICATION





PROXIMITY OF COMMUNICATION

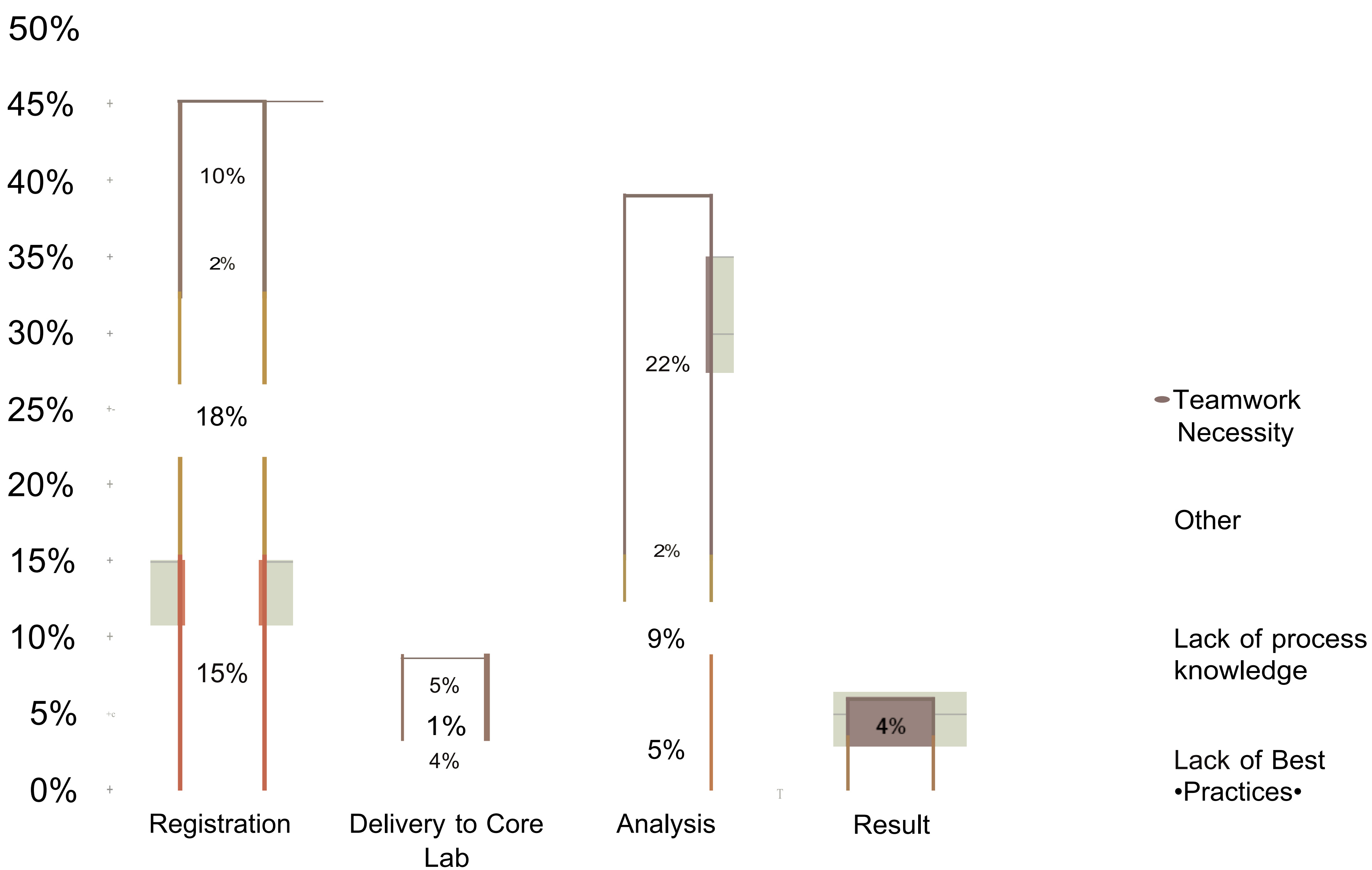
Two of the key points of our observation relate to the proximity and flow of the communication across the lab. The images to the left address each of these variables separately. The pie chart shows the proximity of the communicators, whether they were in the same zone, different zone, or different department. The large image shows the flow of communication between departments. The arrow designates where the initiator of the communication normally works and where the recipient of the communication was. The numbers represent the amount of times this type of communication flow was observed.

From the pie chart it can be seen that 46% of communications occur within the same zone. The rest of the communications that were observed were spilt between those within the same room but a different zone and those from a different department with 29% and 25% respectively. This shows that people often ask questions or share information with those directly adjacent to them. This point could have drastic implications for the design of the future space. If those with the most knowledge are not located within eyesight or directly adjacent to those that need the information it may prove to have a huge effect on error rates and patient safety.

The different department data has been broken down into what department the communication came from and what department the communication went to. This way a better understanding of the communication flows across the lab can be garnered. From the image it can be seen that a majority of the communication revolves around the accession room. Of the 44 total different department communications observed 13 of them (30%) originated from administrators and went to the accession room. The next highest values also involved the accession room with 9 observations originating in the accession and going to chemistry and 6 going from accession to hematology. As a result of these observations, the adjacencies within the new lab might be best if the current knowledge is used during the final design process

REASON FOR COMMUNICATION:

IN EACH PART OF THE SPECIMEN PROCESS



REASON FOR COMMUNICATION:
IN EACH PART OF THE SPECIMEN PROCESS

The information on the previous page shows the reason for communication during the entire specimen journey through the core lab. By knowing this information, areas with high teamwork can be identified and those practices may be replicated. Likewise, areas with a high proportion of communication resulting from either a lack of process knowledge or best practices can also be identified and improved upon to improve efficiencies while simultaneously reducing error rates.

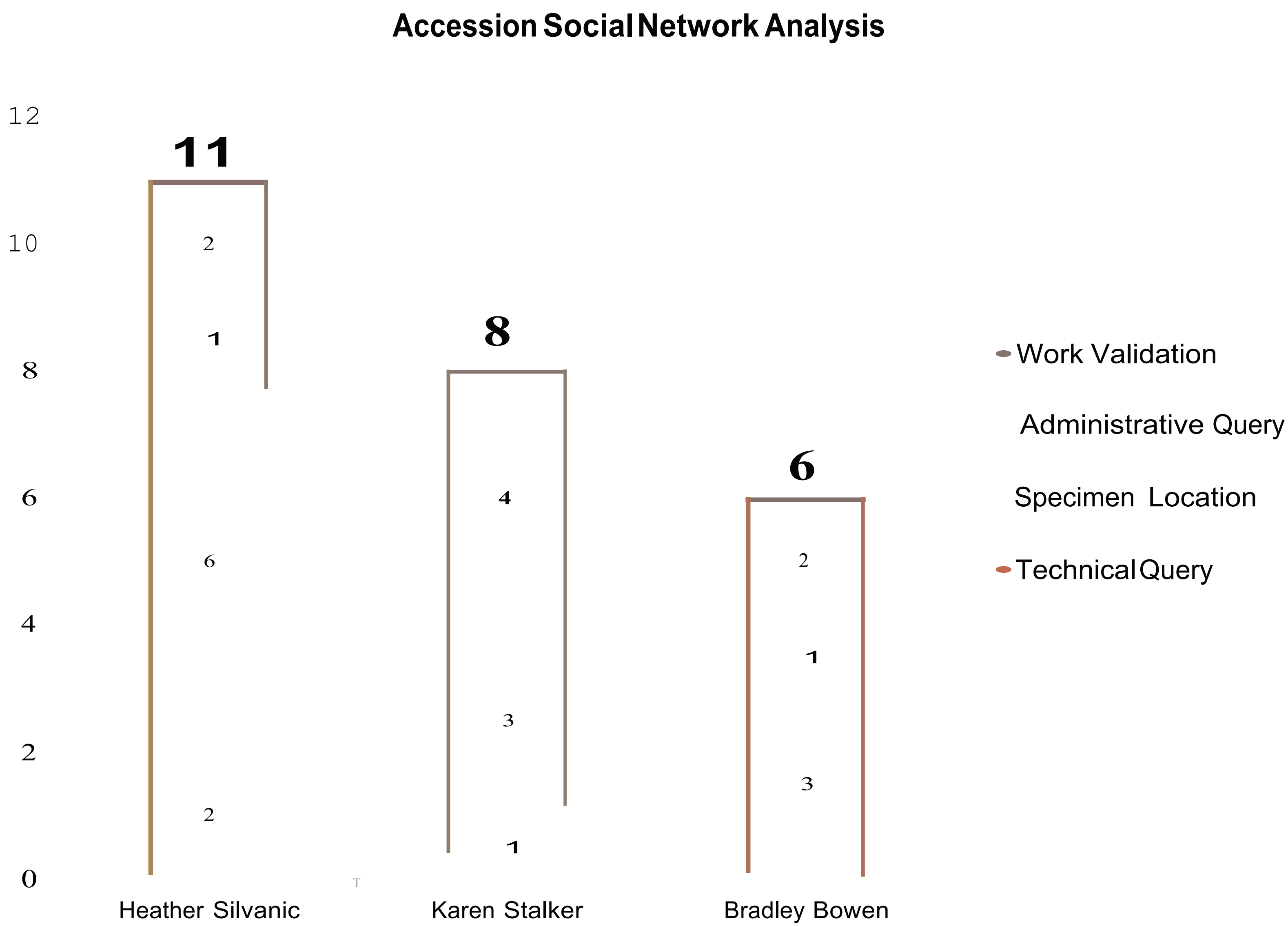
From the chart it can be seen that during the registration period, most of the communication occurs due to a lack of process knowledge or best practices. This shows that this area has room for improvement and when these areas are improved efficiencies and turn-around times would most likely be improved. When a specimen is in the registration process it is likely to be within the accession room and thus this analysis confirms some of the previous analyses.

The chart also shows that during the analysis process, most likely in chemistry and hematology, the vast majority of communication originates because of a necessity for teamwork. This idea, once again, shows that the new lab space should allow for proximities and direct adjacencies that promote teamwork.

So, what is it about the analysis process that results in this high level of teamwork communication and why don"t we see the same pattern in registration? Is it the type of work that gets done, the people, the design, or a combination o f these and other factors? We raise these questions in the hopes that it triggers some thought between members of th e lab on how to improve work processes and flows in certain areas of the lab based on other areas.

SOCIAL NETWORK ANALYSES

SOCIAL NETWORK ANALYSIS: ACCESSION



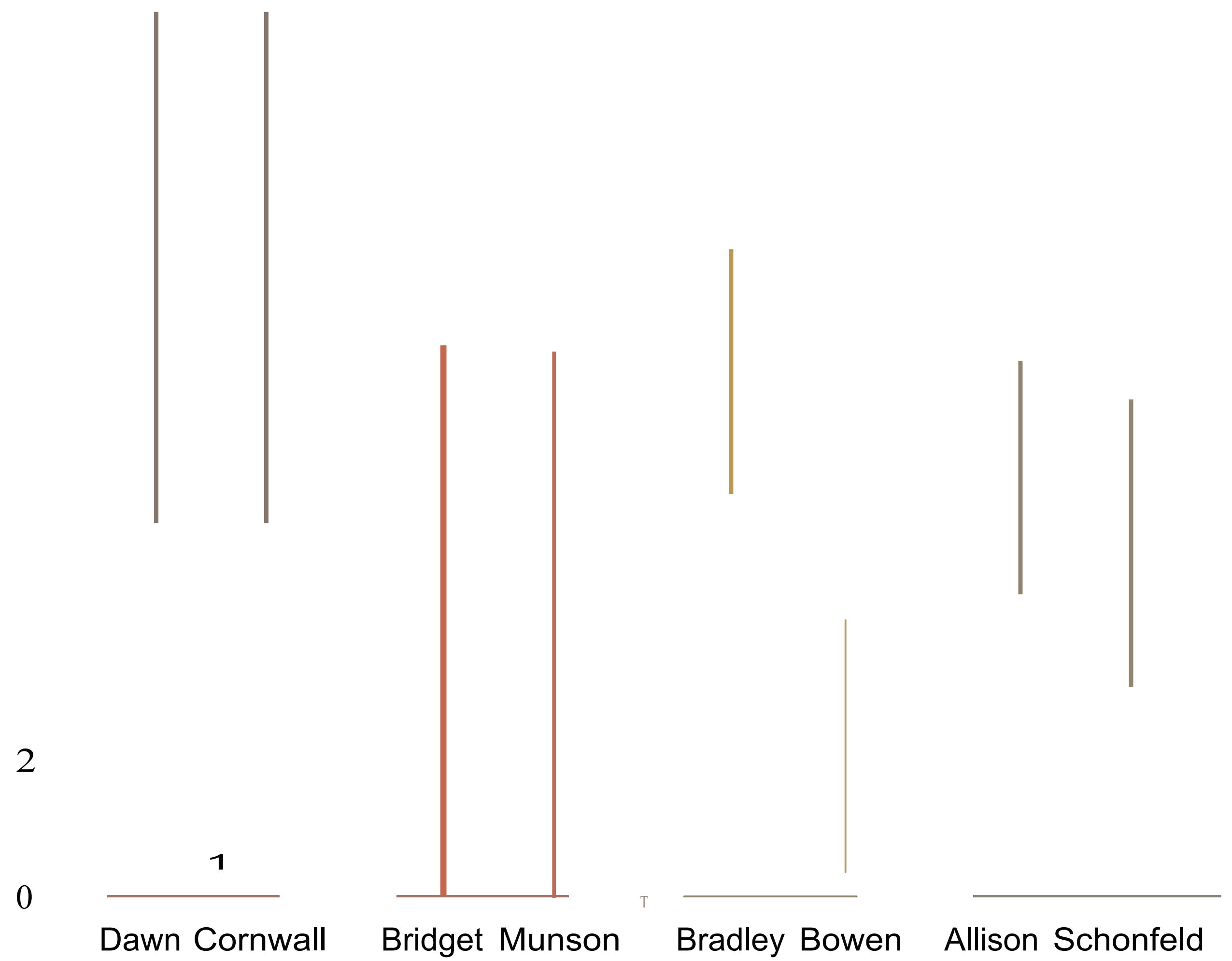
SOCIAL NETWORK ANALYSIS: ACCESSION

Heather was selected at least once for all four categories. In accession she received the highest score in the specimen location category. The data shows that she received the highest score, but we are unsure whether the spatial layout is prompting the question or whether it"s due to her expertise to locate specimens faster and more efficiently than anyone in her department.

Karen received a high score in work validation and in administrative queries. The data shows that lab technicians do understand her position in the lab as a supervisor and are utilizing her work process knowledge.

Bradley who doesn"t usually work in the accession department, ranked 3rd among all the experts i n accession. This may show that Bradley has a wealth of knowledge as it pertains to the flow of a specimen through the lab. He received the highest score for technical queries as well. This shows that there is a teamwork necessity in the laboratory. The scores that Bradley received show that he can be identified as a key expert in the laboratory that could play an important role in the location that he will be working in the new lab.

SOCIAL NETWORK ANALYSIS: CHEMISTRY



SOCIAL NETWORK ANALYSIS: CHEMISTRY

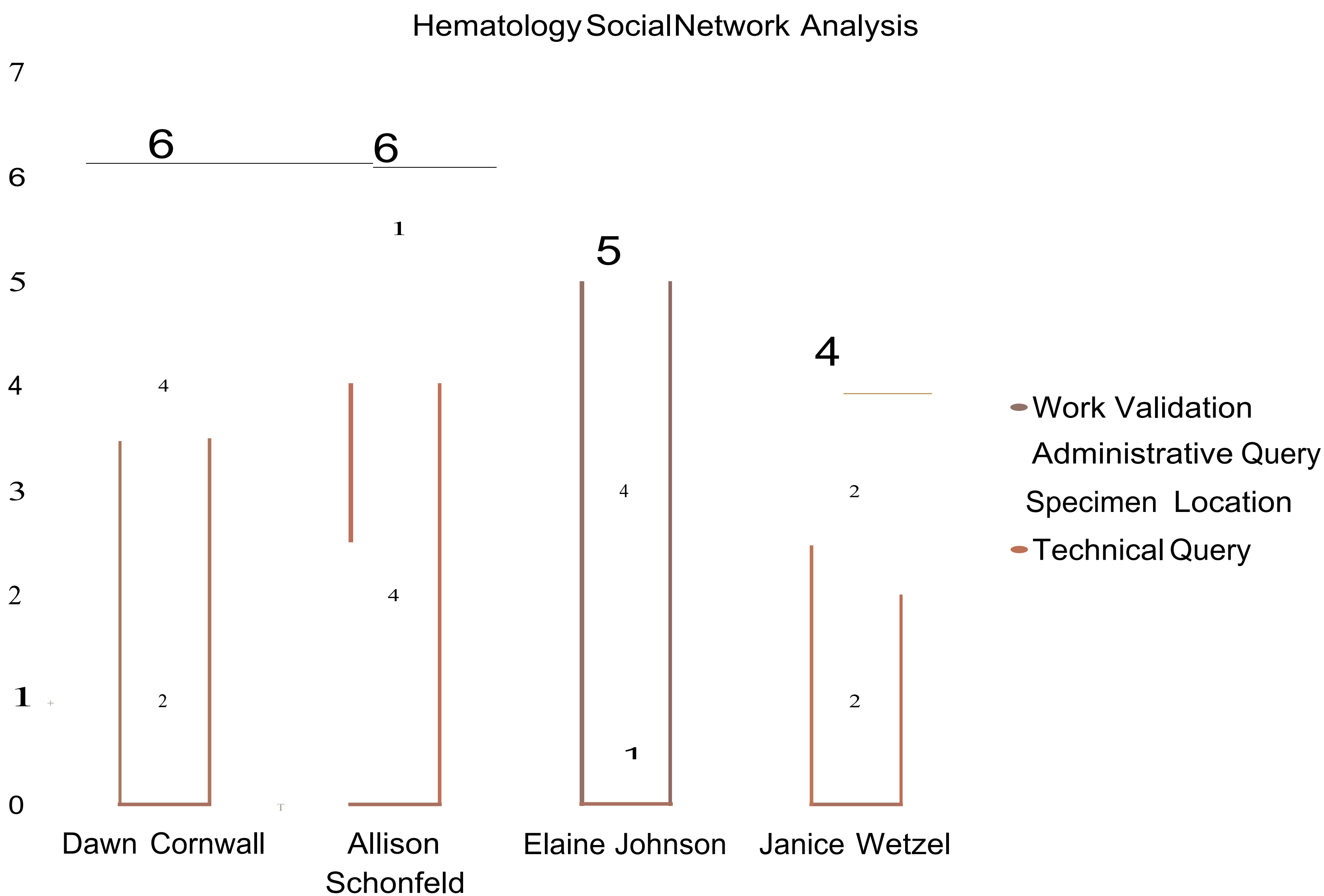
Dawn was the leading expert in the chemistry department even though her primary role is in administration. Her highest score was in the administrative query area. This shows that laboratory technicians are utilizing Dawn for her operations knowledge of administrative issues.

Bridget received the highest score in the of technical query category. Laboratory technicians have clearly identified that Bridget is the key person to go to in the department when a technical question arises. But this data also shows she is the only person to go to for technical queries and suggests that the lab should improve the process knowledge amongst all employees i n the lab. This will insure that more than one person is a key expert in the department

Bradley was observed on multiple occasions to be a key element in the chemistry department a nd across the lab. Bradley received the highest score in the specimen location category. This could be attributed to two things. 1) His spatial location in the lab, in zone 2 where he deals with specimen send outs or 2) It could be attributed to his process knowledge which allows him to efficiently locate specimens in and around the lab.

Allison received a high score of 7 in the administrative area even though her position is core lab manager. It makes us wonder why she isn‟t getting more technical queries. Is it due to her location? Or does Bridget have enough expertise to answer the technical questions so laboratory technicians don‟t have to go to Allison for these questions.

SOCIAL NETWORK ANALYSIS: HEMATOLOGY



SOCIAL NETWORK ANALYSIS: HEMATOLOGY

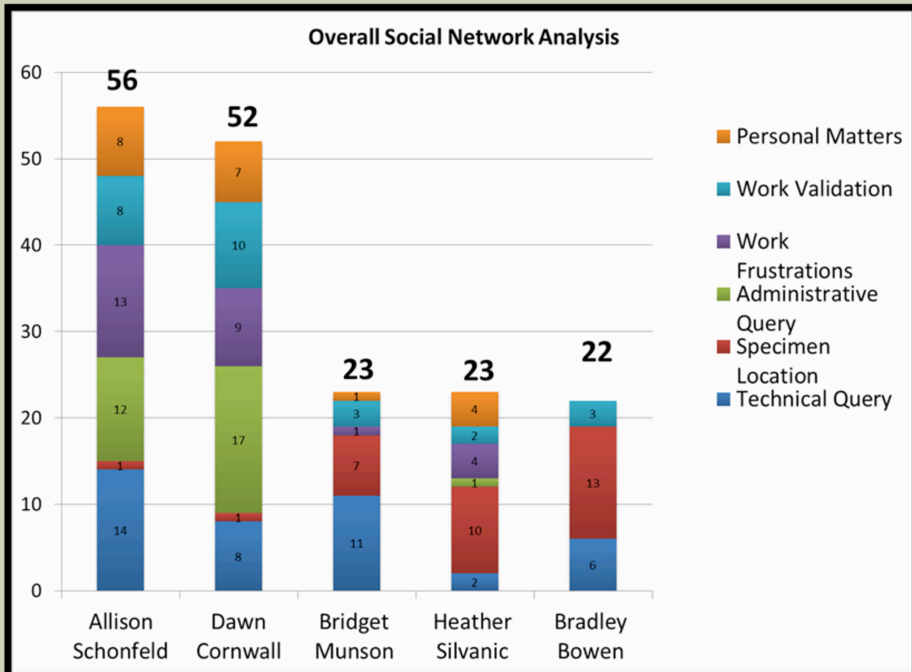
Dawn‟s score points to the same conclusions that were made in the chemistry department.

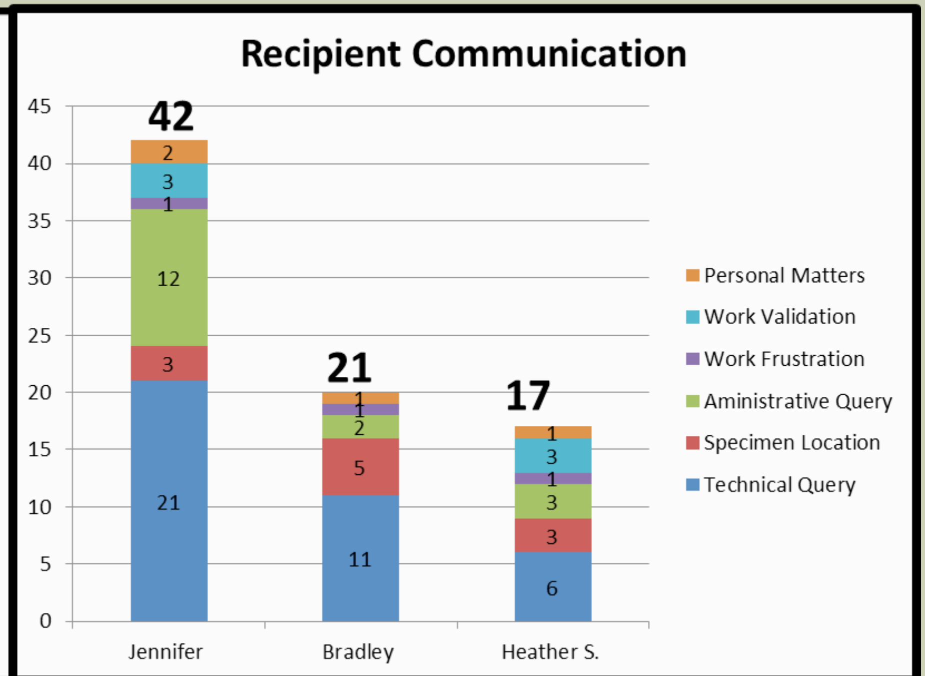
Allison received a high score in the Technical Queries category in Hematology in comparison to her rating in Chemistry department (a lower score in Technical Queries and a high score in Administrative Queries). This may be happening due to there not being a key expert on the floor i n Hematology like there was in the Chemistry department (Bridget who received the most technical queries). Thus, due to the lack of key expertise on the floor, technical queries are f lowing to Allison who is the core lab supervisor.

Elaine received the highest score in the Work Validation category. The fact that Laboratory Technicians are choosing Elaine as their preferred validator shows that she holds a strong knowledge base in her department. That factor could influence her location in the new lab but it also indicates that process knowledge can be improve in order to create more experts in the Work Validation area. This could lead to an increase in efficiency in the Hematology department i n terms of analyses and results time.

COMMUNICATION: PREFERENCE VS. IDEAL

- PREFERED GO-TO CO-WORKER
- OBSERVED GO-TO CO-WORKER





COMMUNICATION: PREFERENCE VS. IDEAL

Previously presented data from SNA looked at the ideal case scenarios. We can compare the conclusions derived from SNA to the information recorded in the observation tool. By this comparison we can see if there is any similarity or discrepancy between staff"s preferred go to co-workers and actual co-workers that they go to as observed.

The graph on the left in Figure 3 shows top 5 people listed as experts in the overall lab and the graph on the right shows top 3 recipients of communication as recorded in the observation tool.

A discrepancy can be seen in the ideal and observed scenario. Allison, Dawn and Bridget were not observed to be top recipients of communication while they were listed as the go-to people by their co-workers. This could be because of their availability spatially or temporally.

There were some commonalities like Bradley and heather who were listed in both the instruments. But both of them had high score on SNA on specimen location and it was observed that they were recipients of more technical communication. This information shows that there needs for appropriate placement of these identified key experts to meet the ideal case scenario supporting efficiency and safety.

CONCLUSION

KEY IMPLICATIONS

- New lab space might be best be suited to mimic the current collaborative spatial arrangement as seen in Hematology.
- Adjacencies in the new lab should be based on current observation of inter-departmental information flow.
- In order to reduce the likelihood of bottlenecks in accession it is important to keep the information flow separated spatially based on work processes.
- Strategic placement of various experts in the new lab design should facilitate ideal knowledge dissemination.

RECOMMENDATIONS

- **General Lab:** To help decrease the occurrences of both a lack of process knowledge and best practices each staff member should be encouraged to come up a list of a few of their personal best practices. This way each team members knowledge can be used by the team as a whole and the absence of any member would not effect the outcomes of the team. This also aligns with the ideas of participatory design, knowledge sharing, and teamwork.

- **Hematology:** Have a projection from the microscope to a screen that displays in real time what is being examined so co-workers can validate on the spot without moving.

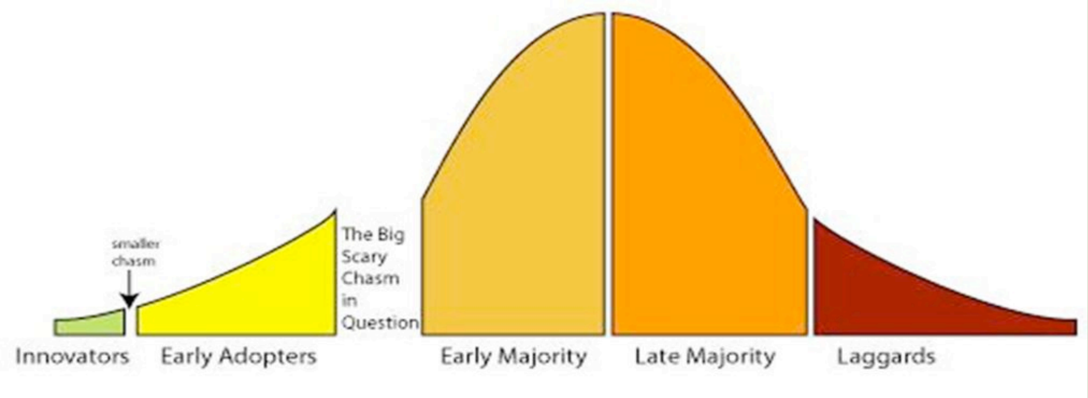
- **Accession:** Using smaller trays (say 5 specimens) for specimen drop off to core lab can serve as a visual cue and also enforce periodic delivery of specimens to the core lab as opposed to batching.

- **References for Laboratory:** Observations concluded that individuals were not using the available reference materials. Perhaps having an easy to use "FAQ" based computer program would encourage technicians to seek out a reference at their station. This would ensure that a minimal amount of time is spent on needless communication.

GOING FORWARD:
THE ROGERS INNOVATION CURVE

The image below is a picture of the Rogers innovation curve. It relates to a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures. Everett Rogers popularized the theory in his 1962 book Diffusion of Innovations. He said diffusion is the process by which an i nnovation is communicated through certain channels over time among the members of a social system. The key ideas to take from his thoughts are communication and social system. Any change that takes place within an organization requires communication and is done in a complex social system. Therefor it makes sense to communicate these changes to that social system and for the social system to communicate back.

The idea is all about participatory design, identify the key stakeholders, namely core lab team members, and listen to their ideas. Leaders should think about individuals and where they may fit along the innovation curve and then can include a subset of each of these groups in the decision making process. As a result more members of the team have a voice in the design and decision making process and hopefully it will take less time for all involved to adapt and acclimate to the new design and ways of work i n the future lab.



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Communication Recording Instrument

Observer:______________________

Date:____________________

1 Duration (In seconds) ___________

2 Between Whom

Initiator: __________

Recipient: __________

3 Location: (Use reoiplentlocatlon)

Accession – Zone 1

Zone 2

Zone 3

Hematology – Zone 1

Zone 2

Zone 3

Zone 4

Chemistry – Zone 1

Zone 2

Zone 3

Zone4 ___

4 What was the proximity of the person to whom the question was asked?

_______ Same zone

_______ Different Zone

_______ Different department

__________(Record departments)

5 What Is the communication about?

_______ Locating a specimen

_______ Validation of work

_______ Technical Query

_______ Administrative query

_______ Work frustrations

_______ Personal communication

- Other ___________________________

6 What part of the processIs the specimen In?

Registration

Delivery to Core lab

Analysis

Results

N/A

7. What was the source of the question?

Lack of 'Best Practices'

Lack or training or knowledge

Bottle neck

Teamwork necessity

- Other ________________________

____

____

8. Was the communication helpfulto the person who Initiated It?

Yes No N/A

9. Did the communication result Into a positive outcome?

Yes No N/A

Notes.________________________________

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APPENDIX 2:

SOCIAL NETWORK ANALYSIS

Employee	Technical Query	Specimen Location	Administrative Query	Work Frustrations	Work Validation	Personal Matters
Amy Anderson						
Tara Bailey						
Karen Black						
Bradley Bowen						
Da'M'l Cornwall						
Justin Daugherity						
Heather Gaffney						
Annette Heverfy						
lorraine Hufford						
Elaine Johnson						
Mary Johnston						
Deborah Mansfield						
Jennifer McDonnell						
Bridget Munson						
Roberta Oswalt						