

University of Gondar
The Ohio State University
**OIE Veterinary Education
Twinning Program**

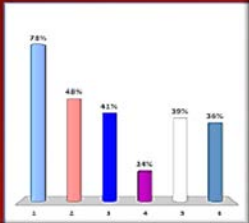


**UoG FOCUS FORWARD EVENT
Twinning Action Plan**



What should be done to improve students ability to recognize, diagnosis and manage TAD and ED? (Pick up to 3)

1. Add practical components to current classes
2. Increase collaboration with local district veterinarians
3. ID Key diagnostic techniques (TAD/ED/Zoo) to develop lab capacity
4. Have a specific core rotation off-site
5. Insert in the curriculum case-based outbreak scenarios
6. Create Video-Library of TAD/ED



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Introduction

As part of the World Organization for Animal Health (OIE) PVS Pathway program, the OIE has created a series of recommended competencies that graduating veterinarians must fulfill by graduation. The goal of the OIE Day-1 Competencies is to assure that young veterinary professionals can support their Country's National Veterinary Services. In addition, to assist countries developing new veterinary education programs, the OIE developed Guidelines for a Model Core Veterinary Curriculum. Within these guidelines, the OIE lists core courses as well as Day-1 Competencies that each class should fulfill, including recommendations on the sequence on how such courses should be taught in a strong veterinary curriculum.

On October 28-29, 2016, the University of Gondar – Faculty of Veterinary Medicine (UoG-FVM) and the Ohio State University (OSU) Twinning Team organized a one-and-a-half day event using the *Focus Forward* methodology in the capital of Ethiopia, Addis Abba. The main goal of this event was to analyze, together with their boundary partners and stakeholders (i.e. government officials, policymaker, professional associations, etc.), the identified gaps and deficiencies in the UoG Veterinary Curriculum, as well as discuss and prioritize potential solutions.

The Focus Forward event was attended by 51 participants, including the General Manager of the Ethiopian Veterinary Association, the Director of the Ministry of Livestock and Fishery, 7 Deans of Veterinary Schools across Ethiopia (in addition to the Dean from the UOG-FVM), roughly 90% of the UoG faculty involved with delivering OIE Day-1 Competencies, as well as other guests from Ethiopian higher education and OSU personnel. The Director for Higher Education within the Ministry of Education, who manages the entire Ethiopian Veterinary Curriculum, also attended. In his closing remarks, the Director for Higher Education indicated how pleased he was with the event and stated that “they will apply this experience not only with the incoming revision of the veterinary curriculum in 2017, but across the educational sector at large.” He indicated that he enjoyed the process that was employed to identify potential solutions to current problems and how to prioritize such solutions.

During the first day of the event, the Twinning team presented the recognized gaps detected during the *Curriculum Mapping and OIE Day-1 Competency Assessment* of the UoG veterinary curriculum. After presenting these results, different boundary partners or stakeholders, along with UoG-FVM faculty and students, were grouped in a workshop style format. They were asked to share ideas and strategies on how to improve or solve the identified gaps in regards to the OIE Day-1 Competencies in the UoG professional curriculum. This face-to-face format allowed for a very healthy, but heated debate and exchange of ideas. The methodology employed to collect potential solutions is described in detail later in this document.

During the second day, there was a prioritization vote in which the attendees selected the best solutions, shared during the previous day. This process provided a clear mandate and a list of

prioritized actions for the Twinning team to pursue. After this very successful event, such prioritized needs and demands were then further analyzed by the UoG-OSU partners to draft an *Action Plan*. This plan will provide a framework for addressing the curriculum needs identified, while at the same time taking into account the Ethiopian's reality and needs. This plan triggered, and currently directs the implementation of Stage 2 of the UoG-OSU Twinning Program and is subsequently presented in this document.

Methodology and Final Product

In the following pages, the methodology applied in the Focus Forward event will be described in detail with the hope that other Colleges of Veterinary Medicine in Ethiopia or other countries could use this methodology to evaluate their own veterinary curriculum. The Focus Forward method is based on presenting a set of problems to a diverse group of participants, highly knowledgeable in the subject, who are asked to analyze the specific identified problems so they can provide innovative or forward-thinking solutions. The participants are subsequently tasked with prioritizing which problems and/or solutions will be addressed. These solutions were used to develop and implement an *Action Plan* to improve the veterinary curriculum at the UoG, with the purpose of increasing the level of competency of UoG-FVM Day-1 graduates.

Program Structure and Dynamics of the Event

Day 1 - Gaps Description and Solution Identification

The event was held off-campus over one and a half days (see program in Appendix A). The first full day was focused on describing the highest priority gaps or shortcomings of the current veterinary curriculum at the UoG. Concurrently, the participants worked in groups (workshop-style) to brainstorm and identify potential solutions to the previously discussed problems. This first day was divided into 4 sessions (See Appendix B), in which the different gaps and problems were grouped around a common theme. Each session was further divided into several topics as summarized in this table:

Main Themes	Topics		
Curricular Mapping (Session 1)	OIE Missing Competencies	OIE Missing Content	OIE Course Misalignment
OIE Specific Competencies (Session 2)	Infectious Diseases Related Competencies	Regulatory Medicine Related Competencies	OIE General Competencies
OIE Advanced Competencies (Session 3)	Organization of Veterinary Services	Management of Contagious Disease	International Trade Framework
Human Factor and Infrastructure (Session 4)	Student Issues	Teaching Issues	Infrastructure

Dynamics. After welcoming the attendees and general opening statements, a description of the goal and objectives of the OIE Twinning program was presented followed by a detailed explanation of the logistics and expectations for the Focus Forward event.

Then, the following sequence of events was used in each one of the four sessions. At the beginning of each session, the moderator presented the identified gaps detected during the evaluation phase that started in February 2016 and ended with this event. For example, during session 1, the gaps and problems identified during the “Curricular Mapping” evaluation were presented (the full report entitled “University of Gondar, Faculty of Veterinary Medicine Curriculum Mapping and OIE Day-1 Competency Evaluation Report” is available by request). After the presentation of the identified problems, the floor was opened for questions and any clarification needed by the audience.

Next, the participants were divided into multiple groups (6-8 professionals per group). To allow different points of view and ideas, the groups were organized to guarantee a mix of faculty, students, recent graduates, and stakeholders. Each table had at least one current student, one alumnus, and one or more outside stakeholders, in addition to the UoG faculty directly involved in the teaching of the OIE related core courses or Day-1 competencies.

The working groups were given a set of specific questions (see appendix B) and 30 minutes to discuss the assigned topic. The questions were designed to **focus the discussion** and facilitate the brainstorming of ideas to solve the problems presented to such group. Each group had a facilitator that recorded the comments and discussion that took place, capturing the main ideas and solutions suggested by participants and surrounding discussion including different points of view. After the group brainstorming, a representative from each table shared the main points with all the participants and summarized potential ideas. Three working groups addressed each topic during the brainstorm period.

After each interactive problem solving session, the participants were reassigned and rotated to different groups. Because teaching was a very complex issue it was the only topic that was divided in two subsections, so each working group could discuss in depth very specific topics. The participants were asked to be **forward thinking** and innovative in their solutions, and advised not to judge suggested ideas, discussing neither their implementation nor their need of resources to make them work, but they had to be realistic and sustainable if implemented.

Analysis and Assembly of Recommendations. After the first day of the program ended, the UoG-OSU partners worked overnight to analyze, reorganize, and consolidate the different ideas and solutions provided by the participants for each topic. The identified solutions came from either the facilitator’s notes or comments and suggestions provided by each participant when they returned their questions forms at the end of each session. Similar suggestions were

collapsed into one idea. Those significantly different were presented as a standalone solution(s). All of them were then transferred to a Power Point® and linked to an interactive polling system (TurningPoint®) for the prioritization process the next day.

Day 2 - Prioritization Process

The second day was focused on presenting the suggested solutions provided by the attendees and previously interviewed stakeholders so the participants could discuss and prioritize them (See Appendix C). This day was also divided into four sessions as indicated above and each topic was discussed individually. An additional “Cross Cutting Gaps” sub-session was added in regards to the implementation or “Addition of Electives” in the Ethiopian veterinary curriculum. Currently, the veterinary curriculum is rigid across the country (all the students take the same courses, and there are no electives or alternative training paths) and there were multiple ideas and points brought by the audience regarding this issue. It was then determined that the inclusion of electives in the veterinary curriculum was needed to be discussed as a standalone theme.

Dynamics. At each session, a slide summarizing the problem to be addressed was presented, immediately followed by a slide showing a list of the potential solutions (see appendix C). The moderator described each solution based on the comments or information obtained the day before. Then, the floor was opened for further clarification or discussion by the attendees. If needed, further changes to the list were done in real time, including adding new ideas or suggestions, clarifying the text, or adding the option to vote for two or three alternatives, among others. Once there was consensus (and after a prudent amount of time of interchange of ideas and opinions), an assembly vote was called, asking them to prioritize and select the top solution(s) displayed to be undertaken by the UoG-OSU Twinning team. At this point, each participant voted using their own unique Clicker®, which is an electronic polling system that sends an infrared signal to a computer to anonymously register the individual votes and display the collective results instantly to the audience. This system allowed the participants to vote for their preferred idea(s) or solution(s) without major concerns or worries of exposing themselves to their superiors, senior professionals, or major stakeholders (i.e. government representatives).

Analysis of the Prioritization Vote and Creation of an Action Plan

After the event, the UoG-OSU Twinning team had multiple meetings to further analyze, in detail, the participants’ comments and their votes. The team discussed the potential application and feasibility of the top 2 -3 suggested solutions picked by the audience. Once all the topics were discussed, an Action Plan was prepared to provide a framework for addressing the curriculum needs identified. This plan takes into account the Ethiopian’s reality and needs. Both the OSU

team and the recently created UoG DVM Curriculum Review Taskforce reviewed the first draft. The final approved Action Plan was designed to address the identified gaps (based on their relevance and prioritization) with defined action items and timelines for implementation.

The current Action Plan provides a strategy to update the UoG current veterinary curriculum, including minor revisions to current courses, their content as well as the inclusion of new content on specific core competencies. The Action Plan also calls for the development of several new courses, plans for a laboratory-twinning project, and/or business plans for a sustainable, extended curriculum revision. In total, there are 32 action items that are focused on harmonizing and improving the UoG veterinary curriculum with the OIE Model Core Veterinary Curriculum, while at the same time fulfilling and improving the level of proficiency of the UoG veterinary graduates on the OIE Day-1 Competencies. Each action item (which are presented as a checklist) is addressing one or more unique pre-identified gaps discussed during the Focus Forward event. Each one of them also includes specific approaches and activities that will allow their implementation or execution. There is also a comment section accompanying each action item that is used to provide additional details of the propose actions. This comment box will also be used later to report the progress of such activity and the potential metrics that could be used to determine the level of success of the implemented intervention or measure.

Action Plan

Session 1

Curricular Mapping

Missing Competencies

- **GAP:** Three OIE Day-1 Competencies were identified as missing during the curricular mapping of the UoG College of Veterinary Medicine curriculum:
- General Certification Procedures (2.10)
 - Inspection and Certification Procedures (3.2)
 - International Trade Framework (3.7)

Action Item	Description
<input type="checkbox"/> 1. Revise current courses to incorporate missing Day-1 Competency (2.10) General Certification Procedures to an existing class(es).	<p>Two courses will be revised to incorporate the missing content:</p> <p>A. Theory concepts will be incorporated into the 4th year Veterinary Preventive Medicine (Vetm5233) course.</p> <p>B. Practical elements will be incorporated into the 4th and 5th year clinical practices: Clinical Practice I Vetm4181, Clinical practice II Vetm4182, Clinical practice III Vetm5241, and Clinical practice IV, Vetm5242.</p>

Comments:

Action Item	Description
<input type="checkbox"/> 2. Revise current courses to incorporate missing Day-1 Competency (3.2) Inspection and Certification Procedures to an existing class(es).	<p>Theory concepts will be incorporated into the 4th year Veterinary Public Health I (Vetm4171) and II (Vetm4172) courses.</p>

Comments:

Action Item	Description
<input type="checkbox"/> 3. Revise current courses to incorporate missing Day-1 Competency (3.7) International and Trade Framework to an existing class(es).	Theory concepts will be incorporated into 4 th year Animal Health Economics (Vetm5234) course.

Comments:

OIE Missing Content

- **GAP:** Significant content from the OIE Veterinary Education Core Curriculum were identified as missing during the UoG College of Veterinary Medicine curricular mapping, among them:
- Risk analysis.
 - Drug withdrawals times and drug residues (including testing and impact).
 - Environmental health and biological waste management.
 - Outbreak investigation and outbreak management.

Action Item	Description
<input type="checkbox"/> 4. Incorporate Risk Analysis through expanding content already in the UoG Veterinary Curriculum and add a practical oriented teaching component.	Two main approaches will be utilized: A. Theory concepts will be incorporated into the 5 th year Veterinary Epidemiology (Vetm5232) course. B. Practical portions will be incorporated in the same course via assignments which could include: case based scenarios, group homework assignments, and/or risk analysis exercises.

Comments:

Action Item	Description
<input type="checkbox"/> 5. Incorporate Drug Withdrawal content into the UoG veterinary Curriculum.	<p>Two main approaches will be utilized:</p> <p>A. The 3rd year courses Pharmacology and Therapy I (Vetm3121) and II (Vetm3122) will be revised to incorporate the theory concepts in regards to Drug Withdrawal.</p> <p>B. During clinical courses in the 4th and 5th year students will fill out prescription forms and write instructions for clients to include withdrawal information. These forms will be reviewed and grade by faculty. Since there are no local regulations on this subject, best practice concepts will be utilized.</p>

Comments:

Action Item	Description
<input type="checkbox"/> 6. Incorporate Drug Residue Testing into the UoG veterinary Curriculum.	<p>Two main approaches will be utilized:</p> <p>A. The DVM Curriculum Review Taskforce will evaluate how to incorporate such content to the 4th year course Veterinary Public Health II (Vetm4172). Since there are no local regulations on this subject, best practice concepts will be utilized.</p> <p>B. Evaluate how to add to the 4th year Veterinary Public Health II (Vetm4172) course the practical testing of the presence of Drug Residues in carcasses and other food products. Consider this activity as part of a future Laboratory Twinning proposal.</p>

Comments:

- Lab twinning project potential.

Action Item	Description
<input type="checkbox"/> 7. Incorporate Environmental Health and Biological Waste (manure) Management into the UoG veterinary Curriculum.	<p>The main approach will be the creation of a newly independent, semester long course entitled “One Health” (Vetm5173).</p> <p>In this course it will be covered the environmental health and biological waste management content as other One Health topics or areas identified missing or lacking in the curriculum. The course will count for 2 credit hours and it will be delivered on the 5th year second semester of the veterinary curriculum.</p> <p>This course will be incorporated in a future restructuring of the veterinary curriculum, which would take full effect in the 2017-201 cycle. All new incoming veterinary students will be placed under the new updated and harmonized curriculum following OIE guidelines.</p> <p>Since there are very few specific or detail local and national regulations on this specific subject, best practices will be used.</p>

Comments:

- One UoG faculty member will visit OSU Spring of 2019 to specifically receive training and experience to develop this new "One Health" course to be delivered at the UoG-FVM.

Action Item	Description
<input type="checkbox"/> 8. Incorporate Outbreak Investigation and Management into the UoG veterinary Curriculum.	<p>Two main approaches will be utilized:</p> <p>A. The DVM Curriculum Review Taskforce will evaluate how to incorporate such content to the 5th year Veterinary Epidemiology (Vetm5232) course.</p> <p>B. Organize a short term training course for staff members on Outbreak Investigation and Outbreak Management to be offered during the One Health summer Institute in Gondar, Ethiopia.</p>

Comments:

- One OSU faculty member will deliver a short course on this topic during the East Africa "One Health" summer program.

OIE Course Misalignment

- **GAP:** Several courses were identified to be taught in a different sequence in the UoG veterinary curriculum when compared with the Veterinary Education Core Curriculum OIE Guidelines:
- Animal Welfare (currently in the 5th year => ideally 1st or 2nd year)
 - Biostatistics (currently in the 5th year => ideally 1st or 2nd year)
 - Communications (currently in the 1st year => ideally across the program)

Action Item	Description
<input type="checkbox"/> 9. Relocate the Animal Welfare (Vetm5202) course from the 5 th year to the 4 th year of the curriculum.	This process will take 1 to 2 years. The UoG will discuss with the Ethiopian Ministry of Education and Veterinary Schools on how to start the process of relocation to harmonize their curriculum with the OIE recommendations.

Comments:

- One UoG faculty member will visit OSU Spring of 2018 to specifically receive training and experience on Animal Welfare.

Action Item	Description
<input type="checkbox"/> 10. Relocate the Introduction to Statistics course (Vetm5221) from the 4 th year to the 2 nd year of the curriculum.	This process will take 1 to 2 years. The UoG will discuss with the Ethiopian Ministry of Education and Veterinary Schools on how to start the process of relocation to harmonize their curriculum with the OIE recommendations.

Comments:

Action Item	Description
<p><input type="checkbox"/> 11. Incorporate Communication into other courses across the curriculum instead of developing a standalone course on this subject.</p>	<p>Three main approaches will be utilized to improve students' communication proficiency by providing additional opportunities and activities to practice such skill:</p> <ul style="list-style-type: none"> A. Change teaching methodology to incorporate specific activities to boost students' communication abilities in multiple courses across the curriculum, including more written communication exercises (i.e. production of factsheets), oral presentation of assignments, etc. B. The DVM Curriculum Review Taskforce will study potential courses where to change their current assessment methodology to move them from only written examination (i.e. exams) to other forms of evaluations that could further help to improve the students' communication skills (i.e. oral exams, seminar presentations, group projects, etc.). C. Evaluate current courses by external examiners to identify potential areas of improvement and compliance.
<hr/> <p>Comments:</p> <hr/>	

Session 2

OIE Specific Competencies

Infectious Diseases Related Competencies

- ▶ **GAP:** It was identified in UoG veterinary graduates low levels of confidence and proficiency across Transboundary Animal Diseases (OIE Day-1 competency 2.2), Emerging and Re-emerging Diseases (2.4), Zoonotic Diseases (2.3) and Disease Prevention and Control Programs (2.5) in regards to:
 - How to identify or recognize infectious diseases, especially Transboundary Animal Diseases (TADs) and Emerging Diseases (EDs)
 - How to select the proper diagnostic technique and how to interpret their results
 - How to identify proper therapeutic approaches and interventions to manage outbreaks

Action Item	Description
<input type="checkbox"/> 12.a Improve student’s ability to recognize and diagnose Transboundary Animal Diseases (Day-1 Competency 2.2) and Emerging Diseases (2.4); including their ability to Manage Disease Outbreaks (2.5).	Design, develop and incorporate practical, real-based outbreak scenarios into the 5 th year Veterinary Epidemiology (Vetm5232) course that address the identified deficiencies.

Comments:

- These scenarios will be created by UoG and/or OSU graduate students as their Master Thesis project. These scenarios will be focused on relevant diseases for Ethiopia (i.e. Rift Valley fever), be culturally appropriate, and comply with international standards.
- Action item 8 will also be addressed together within this action point (and vice versa) in regards on how to teach advanced outbreak investigation and outbreak management.
- One UoG faculty member will visit OSU to specifically receive training and experience on emergency response and outbreak investigation.

<input type="checkbox"/> 12.b Improve student’s ability to recognize and diagnose Transboundary Animal Diseases (Day-1 Competency 2.2) and Emerging Diseases (2.4); including their ability to Manage Disease Outbreaks (2.5).	Two main approaches will be utilized: A. Reinforce assignment of 5 th year veterinary students to official field veterinarian by strengthening the off-campus rotation program. B. Theory concepts on these subjects will be incorporated into the 5 th year Veterinary Preventive Medicine (Vetm5233) course.
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Comments:

Regulatory Medicine Related Competencies

- ▶ **GAP:** The average UoG veterinary graduate is not sufficiently competent in regards to General Certification Procedures (2.10) to determine if an animal is healthy and how to generate a health certificate.
- ▶ **GAP:** The average UoG veterinary graduate is also unsure of the proper authorities to report an incident event or outbreak of a Transboundary Animal Diseases and/or Emerging Diseases (TAD/ED), as well as the proper chain of reporting.

Action Item	Description
<input type="checkbox"/> 13. Incorporate the elaboration of Health Certificates and General Certification Procedures (2.10) into Clinical Diagnosis and Practice.	During clinical practice courses in the 4 th and 5 th year students will fill out health certificate forms to practice such certification procedure. Such forms will be reviewed and graded by faculty. Since there are no local regulations on this subject, best practice concepts will be utilized.

Comments:

Action Item	Description
<input type="checkbox"/> 14. Incorporate in the curriculum proper procedures to report the incidence or outbreaks of TADs/EDs , both at the national and international level.	<p>Seminars describing the proper chain of reporting will be incorporated into the 5th year Veterinary Epidemiology (Vetm5232) course. These seminars will be provided by four different regulatory authority entities, who will be invited to teach this class/seminar on a rotating basis:</p> <ul style="list-style-type: none"> A. Ministry of Livestock and Fishery-Division lead. B. Ministry of Livestock and Fishery-Regional Office. C. Ministry of Livestock and Fishery-Zonal Office. D. OIE Country Delegate.

Comments:

General Competencies

- ▶ **GAP:** The students and recent UoG veterinary graduates did not feel competent managing animal welfare related issues in common or routine situations.
- ▶ **GAP:** The recent UoG veterinary graduates were also identified as insufficient or not competent in:
 - Proper use of veterinary products, especially in regards to withdrawal times,
 - Drug residue testing,
 - Issuing of Health Certificates, and
 - Mobilization permits.
- ▶ **GAP:** The recent UoG veterinary graduates were also identified as insufficient or not competent in identifying up-to-date information regarding subjects related to OIE Competencies.

Action Item	Description
<input type="checkbox"/> 15. Insert Animal Welfare related issues into existing veterinary courses at the UoG College of Veterinary Medicine curriculum.	<p>Design, develop and incorporate practical, real-based scenarios dealing with common animal welfare related issues into their 2nd year Animal Welfare course (Vetm5202) that address the identified deficiencies.</p> <p>Since there are no local regulations on this subject, best practice concepts will be utilized, including OIE standards and lessons learned from other countries, until Ethiopia develops their own standards. Then Ethiopia standards would be taught.</p>

Comments:

- As indicated in Action Item #9, one UoG faculty member will visit OSU Spring of 2018 to specifically receive training and experience on Animal Welfare.

Action Item

- | | |
|--------------------------|--|
| <input type="checkbox"/> | <p>Identified deficiencies in this section, including proper use of veterinary products (especially in regards to withdrawal times), drug residue testing, issuing of health certificates, and mobilization permits are already planned to be covered under the Action Items #1, 2, 5, 6, and 13.</p> |
|--------------------------|--|

Comments:

Action Item	Description
<input type="checkbox"/> 16. UoG is opening a new veterinary library and will design special services to allow its students to have easy access to up-to-date information regarding subjects related to OIE Competencies	<p>During the site visits to OSU, the UoG faculty will meet and consult with OSU-CVM Veterinary Library staff to obtain ideas and guidelines on how to provide easy access to their specific subject in a library setting.</p>

Comments:

Session 3

OIE Advanced Competencies

Organization of Veterinary Services

- **GAP:** The average UoG veterinary graduate was identified as not sufficiently competent in regards to Organization of Veterinary Services (3.1), specifically in regards to the organization of veterinary services in Ethiopia.

Action Item	Description
<input type="checkbox"/> 17. Reinforce and/or include in the curriculum identification of the laws and regulations that provide governmental veterinary services (VS) their authority.	<p>Two main approaches will be utilized:</p> <p>A. The 5th year Ethics and Jurisprudence (Vetm5202) course will be restructured and it will include new case-based teaching methods to improve the level of competency of the students in this subject.</p> <p>B. A two year rotation of guest speakers including the governmental agencies listed under Action Item 14 will be organized in the form of seminars. These will target 2nd and 3rd year veterinary students to provide them a complete picture of governmental veterinary services in Ethiopia, including potential job and career opportunities.</p>

Comments:

Management of Contagious Disease

- **GAP:** The average UoG veterinary graduate reported not to be sufficiently competent in regulatory components related to Management of Contagious Disease (3.3), specifically in regards to how to respond to outbreaks of contagious diseases (including TADs and EDs), such as:
- Movement Control and Quarantine,
 - Traceability,

- Humane Euthanasia,
- Carcass Disposal,
- Disinfection and Sanitization, and
- Zoning and Compartmentalization Principles.

Action Item	Description
<input type="checkbox"/> 18. Incorporate these advance competencies on Management of Contagious Diseases into the UoG veterinary curriculum.	All the issues listed here will be incorporated into the newly independent, semester long “One Health” (Vetm5173) course that would be created as previously described in Action item #7. These topics will be delivered using a practical format to increase the level of student competency.

Comments:

International Trade Framework

- ▶ **GAP:** The average UoG veterinary graduate was identified to be not sufficiently competent in regards to laws and regulations for international trade of animals and animal products.
- ▶ **GAP:** The average UoG veterinary graduate was reported not to be sufficiently competent in regards to international intergovernmental agencies and their roles and responsibilities.

Action Item	Description
<input type="checkbox"/> 19. Include International framework and regulations (i.e. terrestrial animal health code, aquatic animal health code, <i>Codex Alimentarius</i>) into the UoG veterinary curriculum.	The 5 th year courses Animal Health Economics (Vetm5234) and Ethics and Jurisprudence (Vetm5202) will be revised to incorporate this content.

Comments:

Action Item	Description
<input type="checkbox"/> 20. Include roles and responsibilities of intergovernmental organizations (i.e. OIE, WTO, FAO, WHO) into the UoG veterinary curriculum.	Two main approaches will be utilized: A. The first step will be as indicated in Action Item #19. Include subject in current courses. B. The second stage step will be to produce hard copies of material in the form of a Communicational Package Material.

Comments:

- The communication package material to be developed by the UoG on intergovernmental organizations associated to veterinary services is planned to be distributed throughout the other Ethiopian veterinary schools.

Session 4

Human Factor and Infrastructure

Student Issues

- ▶ **GAP:** Lack of motivation, proactiveness, and confidence were described by the UoG veterinary students as major road blocks in their education. Some of the reasons provided were:
 - Students are assigned to DVM degree although this is not their professional passion (veterinary medicine was not their first or second choice).
 - There are no clear career paths post-graduation – they have difficulty identifying relevant career options.
 - Strong hierarchical teaching structure which discourages student participation.
 - Limited communication skills.

Action Item	Description
<input type="checkbox"/> 21. Change admission process to Veterinary Colleges to select motivated students who wish to pursue veterinary careers.	Due to the fact that the admission process to Veterinary Colleges in Ethiopia is centrally managed by the Ministry of Education, the UoG cannot directly act on this action item. However, it was decided to perform a retrospective study on student admission criteria and its association with performance during school and job placement.

Comments:

- The retrospective study was suggested to be focused on the past 5 years of data.
- The results are expected to be presented to the Ethiopian Veterinary Association.
- It was suggested for this study to be a MPH project for a UoG graduate student.

Action Item	Description
<input type="checkbox"/> 22. Improve student motivation.	<p>Multiple approaches will be utilized:</p> <ul style="list-style-type: none"> A. Several veterinary student clubs will be created to promote activities to increase their level of motivation and to envision future career paths. B. The UoG College of Veterinary Medicine will establish an Office of Alumni and Professional Development to provide direct support to its students in regards to job placement. C. Organize a regular veterinary symposium with other Veterinary Colleges focused on career development and related topics to Lobby the Government of Ethiopia for job opportunities and improved working conditions for veterinary personnel.

Comments:

Action Item	Description
<input type="checkbox"/> 23. Counter strong hierarchical teaching through a pedagogical training program.	<p>Create a short term pedagogical training program for UoG Professors to attend during early summer.</p>

Comments:

- One OSU faculty member will deliver a short course on this topic during the East Africa "One Health" summer program.
-

Action Item	Description
<input type="checkbox"/> 24. Strengthen teacher-student relationships.	<p>Involve faculty as advisors for student clubs.</p>

Comments:

Action Item

- Identified deficiencies in this section in regards to Communication are already planned to be covered under the Action Items #11.

Comments:

Teaching Issues

- ▶ **GAP:** Several issues were identified, by both students and faculty, which were interfering with an effective teaching and learning environment, among them:
 - Severe pedagogy or instructional method problems (from course design to class delivery and evaluation).
 - Teaching methods are heavily classroom based.
 - Insufficient experience (especially by young faculty) in certain subjects.
 - Unenthusiastic students with little motivation to learn.

Action Item

Description

25. Improve teaching methodology or pedagogy.

Three main approaches will be utilized:
 A. Request more seats for the UoG High Diploma Program (HDP), which is mainly focused on teaching methodology; with a goal to reach 100% of faculty trained and certified.*¹
 B. Require for the entire UoG staff to apply at least one active learning method for each course across the curriculum.*²
 C. UoG Faculty visiting OSU should rotate through the university teaching department.

Comments:

*1 The total number of faculty trained to such program should be determined and compared after the twinning program has ended.

*2 Measure courses with active learning activities in their program before and after the twinning program.

Action Item

Description

- | | | |
|--------------------------|---|--|
| <input type="checkbox"/> | <p>26. Audit courses/classes on a routine based to evaluate their teaching methodology or pedagogy applied and suggest further changes (if needed).</p> | <p>Each department has created a faculty committee comprised of 3 members that will evaluate all courses. They will perform this task through student evaluations, peer evaluations, and supervisor evaluations.</p> |
|--------------------------|---|--|

Comments:

- This metric should be compare before and after the twinning program.

Action Item	Description
<input type="checkbox"/> 27. Provide more teaching CE courses or advance training opportunities for the UoG faculty.	<p>Initially UoG faculty visiting OSU will create training opportunities to share teaching methodologies and pedagogical techniques. The main goal is to eventually create a future Ethiopian centered program on veterinary medicine education.</p>

Comments:

Action Item	Description
<input type="checkbox"/> 28. Identify sources of funding for continuing education and research to improve lack or limited experience in certain subjects by the UoG faculty.	<p>The UoG College of Veterinary Medicine will establish an Office of Research and Publication. This office will work in identifying such opportunities and potential funding sources to support such training and research opportunities.</p>

Comments:

Action Item	Description
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29. Establish an Ethiopian faculty exchange program across the Veterinary Colleges.

A proposal for faculty from Ethiopian veterinary schools to rotate through other schools in order to exchange and advance knowledge and increase both experience and collaboration opportunities will be created. Funding for this activity will be pursued at the central government level.

Comments:

Infrastructure

- ▶ **GAP:** It was reported that many of the OIE Competencies are primarily theory-based teaching, especially those with a clinical component. Some of the reasons listed were:
 - There are no diagnostic or service laboratories at the university and the teaching laboratories are largely didactic due to limited resources.
 - There are not (or are very limited) field diagnostic tests (i.e. CMT) for practice and teaching purposes, as well as limited supplies and materials for field training (i.e. sample collection).

- ▶ **GAP:** It was also identified one recognized gap present across the majority of competencies, the newly UoG veterinary graduates ability to identify updated national and international sources of information relevant to Day-1 Competency subjects was considered insufficient or completely lacking.

Action Item	Description
<p><input type="checkbox"/> 30. Identify sources of funding to develop diagnostic or service laboratories, which could be used to expand applied teaching.</p>	<p>Two main approaches will be utilized:</p> <ul style="list-style-type: none"> A. UoG-FVM will develop a proposal(s) to be presented to the Ethiopian Central Government to request annual funding to develop such labs. B. UoG would also develop a proposal for OIE to perform a lab twinning program.

Comments:

Action Item	Description
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31. Improve student access to information.

Two main approaches will be utilized:
A. The UoG-FVM will create a computer center in the new academic building.
B. The UoG will acquire tablets for students. The FVM will discuss with School of Medicine, as they have already identified funding streams for this purpose.

Comments:

Action Item	Description
<input type="checkbox"/> 32. Teach students to search for up-to-date information online.	This will be accomplished by listing preferred internet references and sources throughout the curriculum in the syllabi as appropriate.

Comments:

UoG-OSU Twinning Program UoG Faculty Exchange Plans

Topic	Action Item Covered	Eligible Candidates	Timeline	Comments
#1	Development of new "One Health" course.	#7 and 18.	TBD	
#2	Update Animal Welfare course.	#9 and 15.	Faculty teaching the Animal Welfare (Vetm5202) course.	Spring 2019
#3	Update Veterinary Epidemiology course.	#4, 8, 12a, 14, and 15	Faculty teaching the Veterinary Epidemiology (Vetm5232) course.	Fall 2018 This faculty will be expected to also design and develop, in association with the OSU faculty, the short Summer Continuing Education course on Outbreak Investigation and Management.
#4	Update Veterinary Preventive Medicine course.	#1, 12b, and 13	Faculty teaching the Veterinary Preventive Medicine (Vetm5233) course.	Spring 2018
#5	Update Veterinary Public Health II course	#2, 6 and 22	Faculty teaching the Veterinary Public Health II (Vetm4172) course.	Fall 2018 This faculty will be expected to also be involved in supporting the VPH student club. This faculty is also expected to help with the development of the Laboratory Twinning proposal.
#6	Update Animal Health Economics course.	#3, 19, and 20	Faculty teaching Animal Health Economics (Vetm5234) course.	Fall 2018/ Spring 2019 This faculty will require a specialized rotation at OSU as the subjects or topics of interest are spread across multiple classes and courses.
#7	Update Ethics and Jurisprudence course.	#17 and 19	Faculty teaching Ethics and Jurisprudence (Vetm5202) course.	Fall 2018/ Spring 2019 This faculty will require a specialized rotation at OSU as the subjects or topics of interest are spread across multiple classes and courses.
#8	Update Pharmacology and Therapy I and II.	#5	Faculty teaching Pharmacology and Therapy I (Vetm3121) and II (Vetm3122) courses.	Fall 2018/ Spring 2018 This faculty will require a specialized rotation at OSU as the subjects or topics of interest are spread across multiple classes and courses.
#9	Create Teaching Pedagogy and Methodology course for UoG staff.	#21, 23, 25, and 26	Faculty in charge of the Quality Assurance Program at the UoG-FVM	TBD This faculty will be expected to lead the implementation of Action Item #21, #25, specifically item B, and #26, as well as collect the metrics associated to these line items.

Appendices

Appendix A

UoG FOCUS FORWARD PROGRAM

**University of Gondar – Ohio State University
OIE Veterinary Education Twinning Program**

UoG Focus Forward

Advancing Veterinary Medicine Education in Ethiopia

October 28-29, 2016

Program

DAY 1

- 8:00 am Welcome and Opening Statements**
Dr. Achenef Melaku, Dean Faculty of UoG Veterinary Medicine
- 8:15 am UoG representative**
- 8:30 am Twinning Program, Focus Forward Logistics and Expectations**
Dr. Armando Hoet, Director OSU Veterinary Public Health Program
- 9:00 am Session 1: Curricular Mapping**
20 minutes: Results of the Curricular Mapping
10 minutes: Statement of Questions
30 minutes: Group Discussion (Prioritization and Brainstorming)
20 minutes: Group Interventions (One representative per table)
- 10:20 am Break**
- 10:50 am Session 2: OIE Specific Competencies**
20 minutes: Results of the Competency Evaluation
10 minutes: Statement of Questions
30 minutes: Group Discussion (Prioritization and Brainstorming)
20 minutes: Group Interventions (One representative per table)
- 12:10 pm General Discussion**
- 12:30 pm Lunch Break**
- 2:00 pm Session 3: OIE Advance Competencies**
20 minutes: Results of the Competency Evaluation
10 minutes: Statement of Questions
30 minutes: Group Discussion (Prioritization and Brainstorming)
20 minutes: Group Interventions (One representative per table)
- 3:20 pm Break**
- 3:50 pm Session 4: Human Factor and Infrastructure**
20 minutes: Results of the Competency Evaluation
10 minutes: Statement of Questions
30 minutes: Group Discussion (Prioritization and Brainstorming)
20 minutes: Group Interventions (One representative per table)
- 5:10 pm General Discussion and Closing Day 1**

DAY 2

8:30 am Welcome to Second Day

Dr. Achenef Melaku, Dean Faculty of Veterinary Medicine

8:45 am Logistics and Expectations for Assembly Vote

Dr. Armando Hoet, Director OSU Veterinary Public Health Program

9:00 am Session 1: Curricular Mapping Assembly Vote

Session 1, Topic 1:

- 5 minutes: Listing and Description of Options
- 10 minutes: Open Floor for Discussion and Assembly Vote

Session 1, Topic 2:

- 5 minutes: Listing and Description of Options
- 10 minutes: Open Floor for Discussion and Assembly Vote

Session 1, Topic 3:

- 5 minutes: Listing and Description of Options
- 10 minutes: Open Floor for Discussion and Assembly Vote

9:45 am Session 2: OIE Specific Competencies Assembly Vote

Session 2, Topic 1:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

Session 2, Topic 2:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

Session 2, Topic 3:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

10:30 am Break

11:00 am Session 3: OIE Advance Competencies Assembly Vote

Session 3, Topic 1:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

Session 3, Topic 2:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

Session 3, Topic 3:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

11:45 am Session 4: Human Factor and Infrastructure Assembly Vote

Session 4, Topic 1:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

Session 4, Topic 2:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

Session 4, Topic 3:

- 5 minutes: Listing and Description of Options
- 15 minutes: Open Floor for Discussion and Assembly Vote

12:45 pm General Discussion and Closing Remarks

Drs. Achene Melaku and Armando Hoet

Appendix B

UoG FOCUS FORWARD SECTIONS

FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 1: CURRICULAR MAPPING

❖ TOPIC 1: MISSING COMPETENCIES

- ▶ GAP: Three OIE Competencies Missing
 - General Certification Procedures (2.10)
 - Inspection and Certification Procedures (3.2)
 - International Trade Framework (3.7)

-----QUESTIONS-----

- 1) Do we need to include these competencies in the Ethiopian Veterinary Curriculum?
- 2) How should the competencies not covered in the current curriculum be included?
 - a) Do you incorporate the new content in the current classes or do you open electives?
 - i. If they are incorporated in the current curriculum, how do you integrate them? And what content would you remove from the curriculum to make space for this new content?
 - ii. If adding electives, how do you incorporate flexibility to the current curriculum?
 - Short Term (for students currently in the system)? Summer courses? General Certification Training outside the curriculum?
 - Long Term (changes to the national curriculum)? Elective tracks based on national interest?
 - Pro/Con of electives?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 1: CURRICULAR MAPPING

❖ TOPIC 2: OIE MISSING CONTENT

- ▶ GAP: Major OIE Missing Content
 - Risk analysis
 - Drug withdrawals times and drug residues (including testing and impact)
 - Environmental health and biological waste management
 - Outbreak investigation and outbreak management

-----QUESTIONS-----

- 1) Do we need to include these topics in the Ethiopian Veterinary Curriculum?
- 2) How should these topics be included in the current curriculum?
 - a) Do you incorporate the new content in the current classes or do you open electives targeting these content and related competencies?
 - i. If they are incorporated in the current curriculum, how do you integrate them? And what content would you remove from the curriculum to make space for this new content?
 - ii. If adding electives, how do you incorporate flexibility to the current curriculum?
 - Short Term (for students currently in the system)? Summer courses? General Certification Training outside the curriculum?
 - Long Term (change to the national curriculum)? Elective tracks based on national interest?
 - Pro/Con of electives?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 1: CURRICULAR MAPPING

❖ TOPIC 3: COURSE MISALIGNMENT

- ▶ GAP: Courses are taught in a different sequence as that proposed by OIE
 - Animal Welfare (currently in the 5th year => ideally 1st or 2nd year)
 - Biostatistics (currently in the 5th year => ideally 1st or 2nd year)
 - English (Communications) (currently in the 1st year => ideally across the program)

-----QUESTIONS-----

- 1) Should Animal Welfare be relocated in the curriculum? Advantages and disadvantages?
- 2) Should Biostatistics be relocated in the curriculum? Advantages and disadvantages?
- 3) Should additional English (Communications) courses be added to the curriculum? Advantages and disadvantages?
 - a) How to include communication and language training throughout all years of the curriculum?
 - i. Should it be integrated into all courses or added as an additional separate course?
 - ii. What other ways could it be included in the education?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 2: OIE SPECIFIC COMPETENCIES

❖ TOPIC 1: INFECTIOUS DISEASES RELATED COMPETENCIES

- ▶ GAP: Low levels of confidence and proficiency across Transboundary Animal Diseases (2.2), Emerging and Re-emerging Diseases (2.4), Zoonotic Diseases (2.3) and Disease Prevention and Control Programs (2.5) in regards to:
 - How to identify or recognize infectious diseases, especially Transboundary Animal Diseases (TADs) and Emerging Diseases (EDs).
 - How to select the proper diagnostic technique and how to interpret their results.
 - How to identify proper therapeutic approaches and interventions to manage outbreaks by TAD and ED.

-----QUESTIONS-----

- 1) Why do you think there is a low level of proficiency in these OIE Competencies? Or do you think the students lack confidence but have the proficiency?
- 2) What can be done to improve their ability to identify or recognize (as early as possible) TADs and EDs?
- 3) What can be done to improve their ability to select the right diagnostic test and correctly interpret their results? What if a diagnostic technique is not available in Ethiopia?
- 4) How do we teach students to correctly select a specific treatment to deal with an infectious disease?
- 5) How will we teach outbreak management of TADs/EDs in a herd or population? Do we need to teach this to veterinary students? If yes, to what level?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 2: OIE SPECIFIC COMPETENCIES

❖ TOPIC 2: REGULATORY MEDICINE RELATED COMPETENCIES

- ▶ GAP: The average graduate is not sufficiently competent in regards to General Certification Procedures (2.10) to determine if an animal is healthy and how to generate a health certificate.
- ▶ GAP: The average graduate is also unsure of the proper authorities to report an incident event or outbreak of a TAD/ED, as well as the proper chain of reporting.

-----QUESTIONS-----

- 1) Should General Certification Procedures be included in the curriculum, even though health certificates are not currently needed to move animals inside Ethiopia?
 - a) If it is to be incorporated in the current curriculum, where will it be integrated? What content would you remove from the curriculum to make space for this new content? Or, should a General Certification Training be offered outside the curriculum?
- 2) How can we incorporate regulatory medicine into the curriculum?
 - a) When/what courses should be incorporated in the curriculum to teach Regulatory Medicine?
 - b) What methodology should we use? Case analysis? Scenario-Based? Dilemma/Decision Making? Problem-Based Learning? Debate? Public Hearing? Role-Play?
- 3) How could we reduce the knowledge gap in regards to reporting and authorities involved?
 - a) What methodology should we use? Case analysis? Scenario-Based? Dilemma/Decision Making? Problem-Based Learning? Debate? Public Hearing? Role-Play?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 2: OIE SPECIFIC COMPETENCIES

❖ TOPIC 3: GENERAL COMPETENCIES

- ▶ GAP: The students and recent graduates did not feel competent managing animal welfare related issues in common or routine situations.
- ▶ GAP: The recent graduates were also identified as insufficient or not competent in:
 - Proper use of veterinary products, especially in regards to withdrawal times,
 - Drug residue testing,
 - Issuing of Health Certificates,
 - Mobilization permits.
- ▶ GAP: Identifying up-to-date information regarding subjects related to OIE Competencies.

-----QUESTIONS-----

- 1) How should the students be taught how to handle Animal Welfare issues on a daily basis despite a lack of a legal frame work?
 - a) What/how will you teach them?
- 2) Should activities in which there are currently not laws or regulations in place be included in the curriculum (i.e. drug withdraw times, drug residue testing, health certificates, mobilization permits)?
 - a) If yes, how will you teach non-regulated activities?
- 3) How can we help the students gain access to up-to-date information resources?
 - a) How do we motivate them to find and use these sources?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 3: OIE ADVANCED COMPETENCIES

❖ TOPIC 1: ORGANIZATION OF VETERINARY SERVICES

- ▶ GAP: The average graduate is not sufficiently competent in regards to Organization of Veterinary Services (3.1), specifically in regards to the organization of veterinary services in Ethiopia.

-----QUESTIONS-----

- 1) How should the description of the structure and roles of the government authority responsible for ensuring national animal health be reinforced (or included) in the curriculum?
 - a) What methodology should we use? Regular Lecture? Seminars? Scenario-Based? Dilemma/Decision Making? Problem-Based Learning? Debate? Role-Play? Meet the Authority? Guest Lectures?
- 2) How should the identification of the laws and regulations that provide governmental veterinary services (VS) their authority be reinforced (or included) in the curriculum?
 - a) What methodology should we use? Regular Lecture? Seminars? Scenario-Based? Dilemma/Decision Making? Problem-Based Learning? Debate? Role-Play? Meet the Authority? Guest Lectures?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 3: OIE ADVANCED COMPETENCIES

❖ TOPIC 2: MANAGEMENT OF CONTAGIOUS DISEASE

- ▶ GAP: The average graduate is not sufficiently competent in regulatory components related to Management of Contagious Disease (3.3), specifically in regards to how to respond to outbreaks of contagious diseases (including TADs and EDs), such as:
 - Movement Control and Quarantine,
 - Traceability,
 - Humane Euthanasia,
 - Carcass Disposal,
 - Disinfection and Sanitization,
 - Zoning and Compartmentalization Principles.

-----QUESTIONS-----

- 1) Should we reinforce (or include) in the curriculum important advanced concepts associated with outbreak investigation and outbreak management of contagious disease as indicated above (i.e. Traceability, Large-scale Humane Euthanasia)?
- 2) Do we need to teach these areas in the professional curriculum? Should these components be taught at the graduate level?
 - a) If they are incorporated in the current curriculum, how do we integrate them? How deep should we go into this content? And what content would we remove from the curriculum to make space for this new content?
 - b) If adding electives, how do we incorporate flexibility to the current curriculum?
 - Short Term (for students currently in the system)? Summer courses? Or, General Certification Training outside the curriculum?
 - Long Term (change to the national curriculum)? Elective tracks based on national interest?
 - Pro/Con of electives?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 3: OIE ADVANCED COMPETENCIES

❖ TOPIC 3: INTERNATIONAL TRADE FRAMEWORK

- ▶ GAP: The average graduate is not sufficiently competent in regards to laws and regulations for international trade of animals and animal products.
- ▶ GAP: The average graduate is not sufficiently competent in regards to international intergovernmental agencies in regards to their roles and responsibilities.

-----QUESTIONS-----

- 1) Should international framework and regulations (i.e. terrestrial animal health code, aquatic animal health code, Codex Alimentarius) associated with trade, agriculture, animal health and public health) be included in the veterinary curriculum? Or should they be taught at the graduate level?
 - a) If these topics are incorporated in the current curriculum, how do we integrate them? How deep should we go into this content? And what content would you remove from the curriculum to make space for this new material?
 - i. If adding electives, how do we incorporate flexibility to the current curriculum?
 - Short Term (for students currently in the system)? Summer courses? Certification-based training? Online modules?
 - Long Term (change to the national curriculum)? Elective tracks based on national interest?
 - Pro/Con of electives?
- 2) Should the roles and responsibilities of intergovernmental organizations (i.e. OIE, WTO, FAO, WHO) associated with trade, agriculture, animal health and public health be included in the veterinary curriculum? Or should they be taught at the graduate level?
 - a) If these topics are incorporated in the current curriculum, how do we integrate them? How deep should we go into this content? And what content would you remove from the curriculum to make space for this new material?
 - i. If adding electives, how do we incorporate flexibility to the current curriculum?
 - Short Term (for students currently in the system)? Summer courses? Certification-based training? Online modules?
 - Long Term (change to the national curriculum)? Elective tracks based on national interest?
 - Pro/Con of electives?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 4: HUMAN FACTOR AND INFRASTRUCTURE

❖ TOPIC 1: STUDENTS

- ▶ GAP: Lack of motivation, proactiveness, and confidence were described by the students as major road blocks in their education. Some of the reasons provided were:
 - Students are assigned to DVM degree although this is not their professional passion (veterinary was not their first or second choice).
 - There are no clear career paths post-graduation – they have difficulty identifying relevant career options.
 - Strong hierarchical teaching structure which discourages student participation.

-----QUESTIONS-----

- 1) Should the admission process to Veterinary Colleges be changed?
 - a) If yes-
 - i. What should be the selection process and the profile of the admitted students?
 - ii. What will we do with the current students in the system in regards to motivation? How do we encourage the students to be more proactive in their education?
 - b) If not-
 - i. What can be done to motivate current and future students?
- 2) How do we teach them about possible career paths?
 - a) Alumni talks? Wet labs? Career Fairs? Internal competitions for development funds? Internships?
- 3) How do you propose to strengthen teacher-student relationships? What can be done to encourage communication and collegiality between faculty/instructors and students during lectures or classes?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 4: HUMAN FACTOR AND INFRASTRUCTURE

❖ TOPIC 2: TEACHING (Sub Group A) [Ignore questions highlighted in grey]

- ▶ GAP: Some of the issues identified, by both students and faculty, that are interfering with an effective teaching and learning environment are:
 - Pedagogy or instructional method problems (from course design to class delivery and evaluation).
 - Teaching methods are heavily classroom based.
 - Insufficient experience (especially by young faculty) in certain subjects.
 - Unenthusiastic students with little motivation to learn.

-----QUESTIONS-----

- 1) How can the Faculty/Instructors improve their teaching methodology or pedagogy?
- 2) Should the courses/classes be audited? How will it be implemented?
- 3) Should teaching be evaluated?
 - a) Are peer (faculty) evaluations performed?
 - i. If yes, how are they completed and used? Is the current system working? How can we improve them?
 - ii. If not, should a faculty peer-evaluation system be implemented and how will it work?
 - b) Are student evaluations performed at the end of every course?
 - i. If yes, how are they completed and used? Is the current system working? How can we improve them?
 - ii. If not, should a student evaluation system of faculty be implemented and how will it work?
- 4) How to make the courses more participatory and welcoming as well as less didactic?
 - a) Problem-based learning (PBL) experiences vs. lecture-based?
- 5) How we can provide more CE or advance training opportunities to the faculty?
 - a) Intra-college “exchanges”? Graduate Education? Sabbaticals?
 - b) What sources of funding are available for faculty/instructors to develop teaching/pedagogical and professionals skills?
- 6) Are working professionals and experts invited to teach or provide guest lectures in their area of expertise?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 4: HUMAN FACTOR AND INFRASTRUCTURE

❖ TOPIC 2: TEACHING (Sub Group B) [Ignore questions highlighted in grey]

- ▶ GAP: Some of the issues identified, by both students and faculty, that are interfering with an effective teaching and learning environment are:
 - Pedagogy or instructional method problems (from course design to class delivery and evaluation).
 - Teaching methods are heavily classroom based.
 - Insufficient experience (especially by young faculty) in certain subjects.
 - Unenthusiastic students with little motivation to learn.

-----QUESTIONS-----

- 1) How can the Faculty/Instructors improve their teaching methodology or pedagogy?
- 2) Should the courses/classes be audited? How will it be implemented?
- 3) Should teaching be evaluated?
 - a) Are peer (faculty) evaluations performed?
 - iii. If yes, how are they completed and used? Is the current system working? How can we improve them?
 - iv. If not, should a faculty peer-evaluation system be implemented and how will it work?
 - b) Are student evaluations performed at the end of every course?
 - iii. If yes, how are they completed and used? Is the current system working? How can we improve them?
 - iv. If not, should a student evaluation system of faculty be implemented and how will it work?
- 4) How to make the courses more participatory and welcoming as well as less didactic?
 - b) Problem-based learning (PBL) experiences vs. lecture-based?
- 5) How we can provide more CE or advance training opportunities to the faculty?
 - c) Intra-college “exchanges”? Graduate Education? Sabbaticals?
 - d) What sources of funding are available for faculty/instructors to develop teaching/pedagogical and professionals skills?
- 6) Are working professionals and experts invited to teach or provide guest lectures in their area of expertise?

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FOCUS FORWARD SECTIONS

Advancing Veterinary Medicine Education in Ethiopia

➤ SESSION 4: HUMAN FACTOR AND INFRASTRUCTURE

❖ TOPIC 3: INFRASTRUCTURE

- ▶ GAP: Many of the OIE Competencies are primarily theory-based teaching, especially those with a clinical component. Some of the reasons listed are:
 - There are no diagnostic or service laboratories at the university and the teaching laboratories are largely didactic due to limited resources.
 - There are not (or are very limited) field diagnostic tests (i.e. CMT) for practice and teaching purposes, as well as limited supplies and materials for field training (i.e. sample collection).

- ▶ GAP: One recognized gap that was present across the majority of competencies was insufficient or lack of competency among new graduates ability to identify updated national and international sources of information relevant to Day-1 Competency subjects.

-----QUESTIONS-----

- 1) What are the top laboratory limitations which affect the teaching of students?
 - a) How can we work around these limitations?
 - b) What diagnostic testing could be easily and affordably added that would be most beneficial for Day-1 practicing veterinarians?
 - c) What potential sources of funding for core lab improvement could be pursued? Regional Government? Central Government? Private Sector? International Agencies and NGOs? OIE Lab Twinning?
 - d) If we had improved funding, what would be the easiest and most significant means of improving the laboratory facility for clinical practice?

- 2) Are there structural problems that limit the students' access to information?
 - a) Do they have computer/internet access? Quality/reliability of that access?
 - b) Online access to journals? International agencies (i.e. OIE, WHO, FAO, WTO) web sites?
 - c) Continuing education opportunities for current students and recent graduates?

- 3) How could we solve these identified problems?

- 4) How are we teaching the students to search for up-to-date information online?
 - a) A course on how to search taught as a pre-career requirement during orientation? Incorporating exercises in the courses showing the weakest levels of competencies?

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Appendix C

Focus Forward

Summary of Identified Problems, Solutions and Prioritization Vote

FOCUS FORWARD

**ADVANCING VETERINARY MEDICINE
EDUCATION IN ETHIOPIA**

University of Gondar
The Ohio State University

**OIE Veterinary Education
Twinning Program**



**University of Gondar, Faculty of Veterinary Medicine
Curriculum Mapping and OIE Day-1
Competency Evaluation Report**



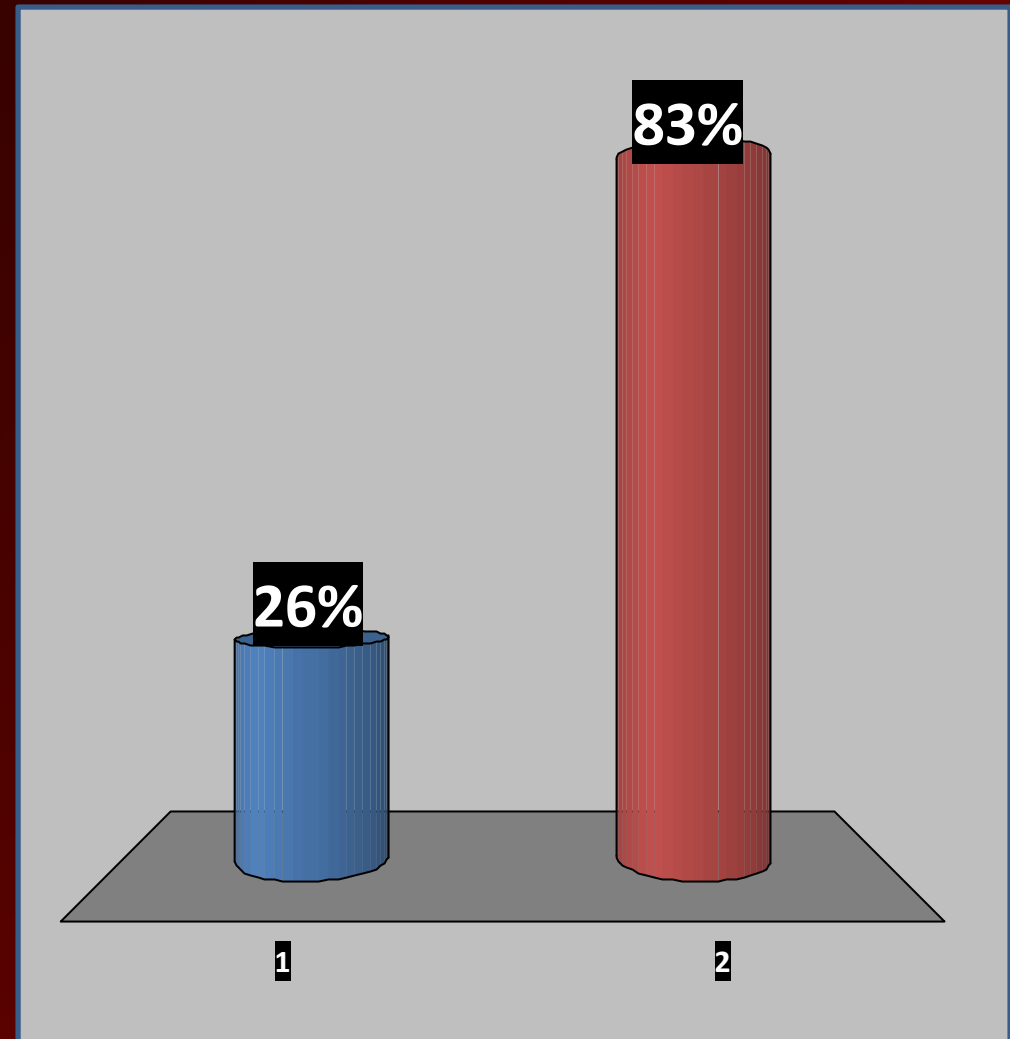
Oie WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future

Testing the Polling System

What is your gender?



1. Female
2. Male

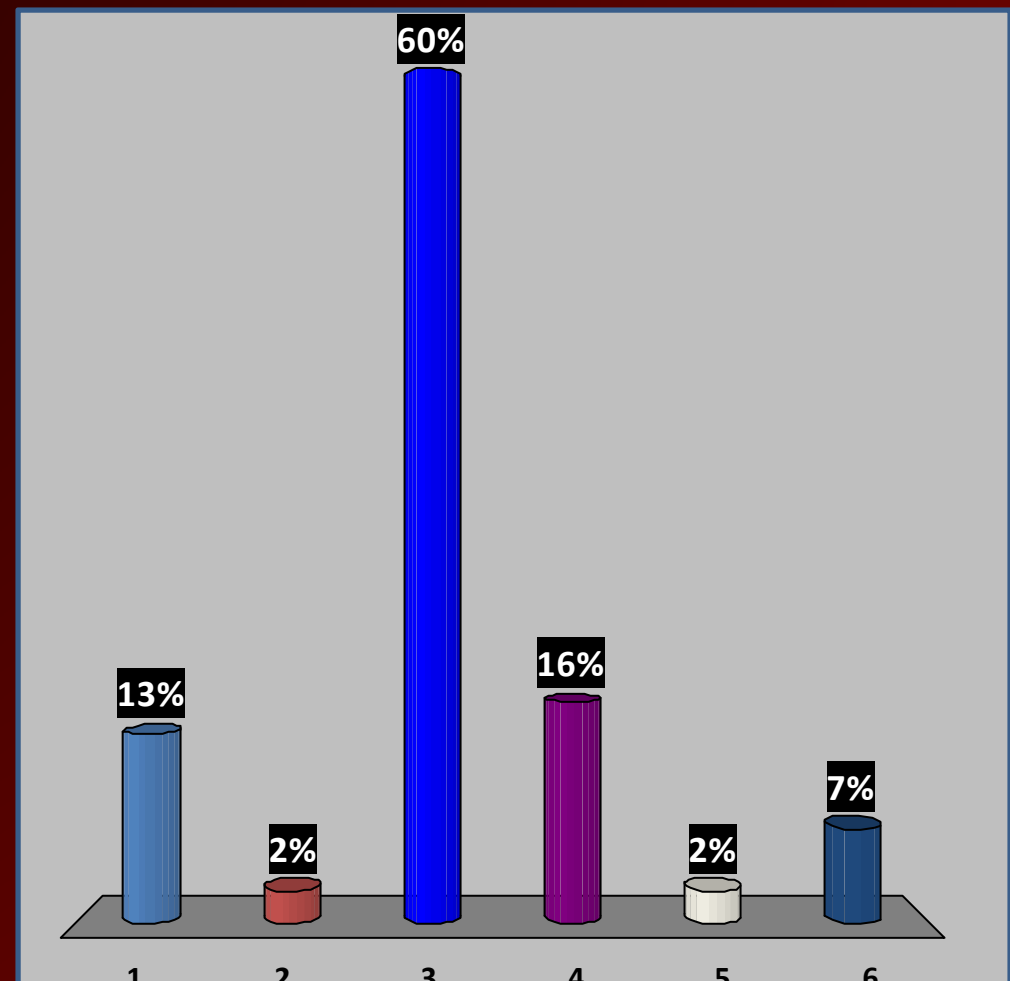


Testing the Polling System

What is your primary role in veterinary education



1. Student
2. Recent graduate
3. Instructor/Teaching
4. Administrator
5. Employer of vets
6. Other Stakeholder

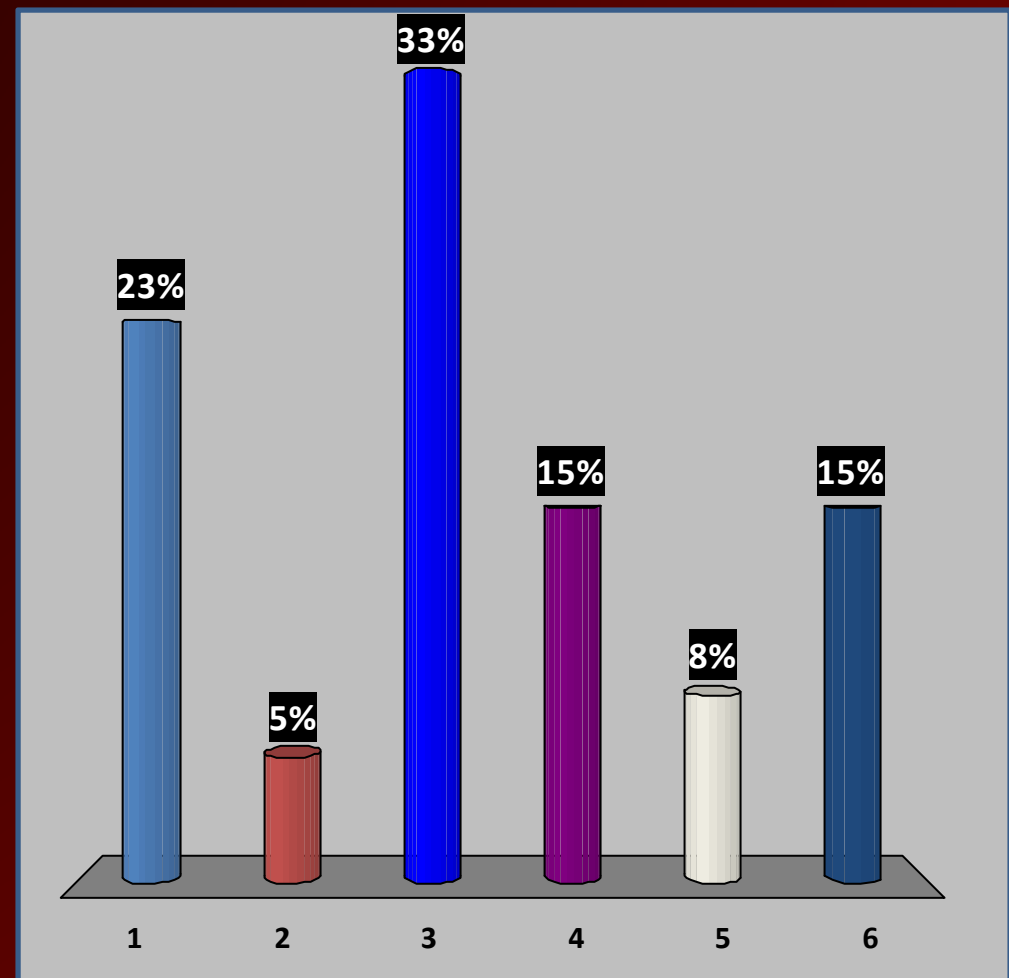


Testing the Polling System

How many years of Experience do you have?



1. < 3 years
2. 3-5 years
3. 6-10 years
4. 10-15 years
5. 15-20 years
6. >20 years



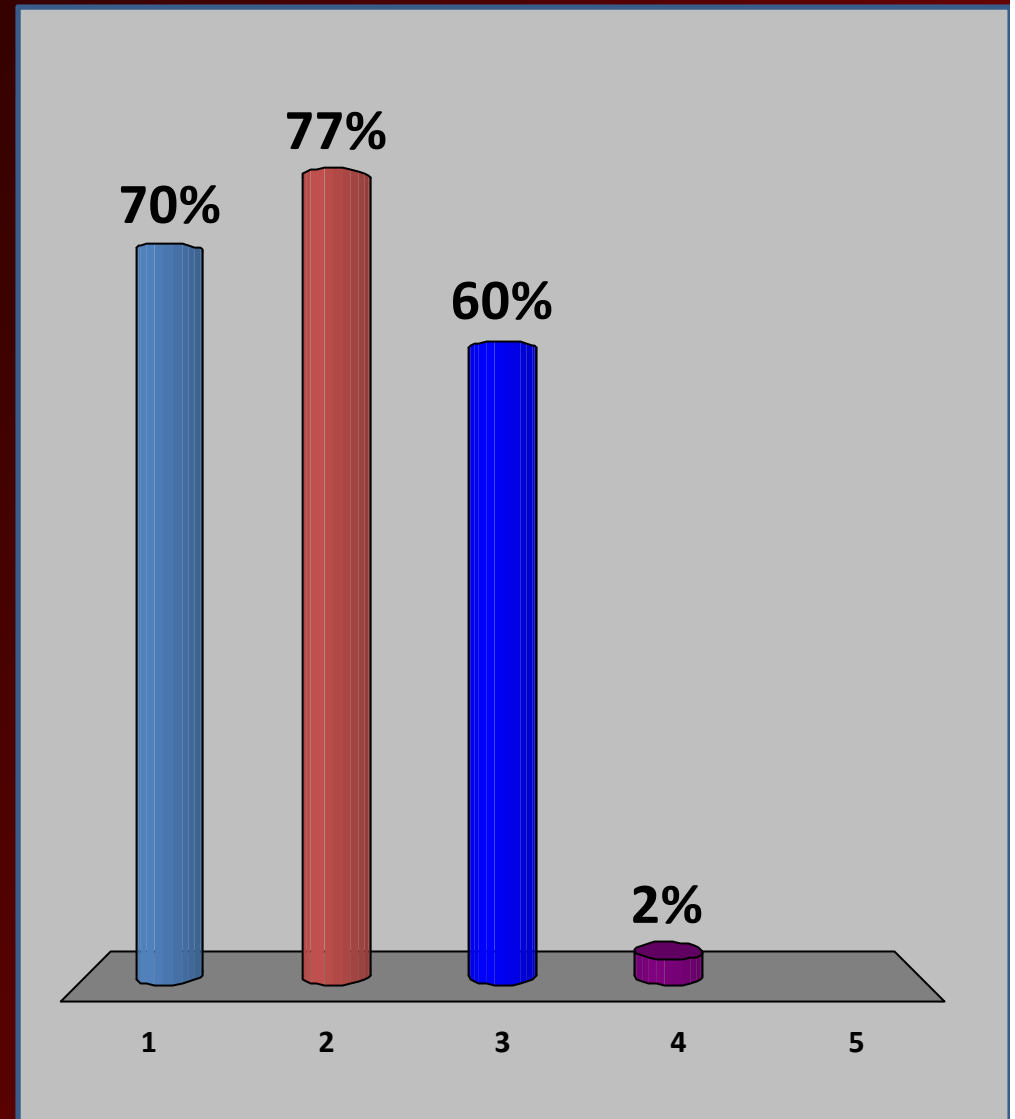
LET'S GET BUSY!!

TOPIC 1: MISSING COMPETENCIES

- ▶ **GAP: Three OIE Competencies Missing**
 - **General Certification Procedures (2.10)**
 - **Inspection and Certification Procedures (3.2)**
 - **International Trade Framework (3.7)**

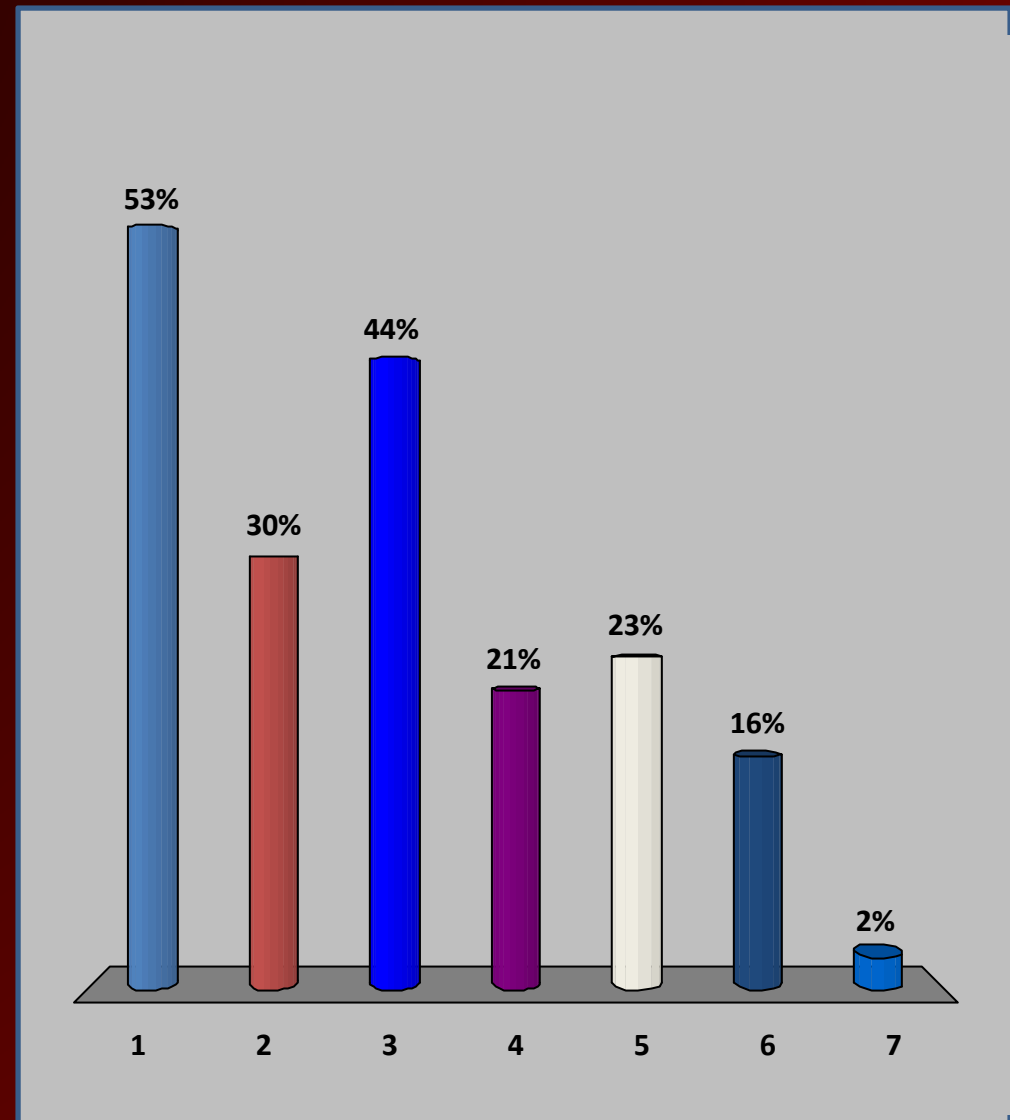
Which of the following should be added to the current curriculum (Pick up to 3)

1. General Certification Procedures (2.10)
2. Inspection and Certification Procedures (3.2)
3. International Trade Framework (3.7)
4. None of the Above



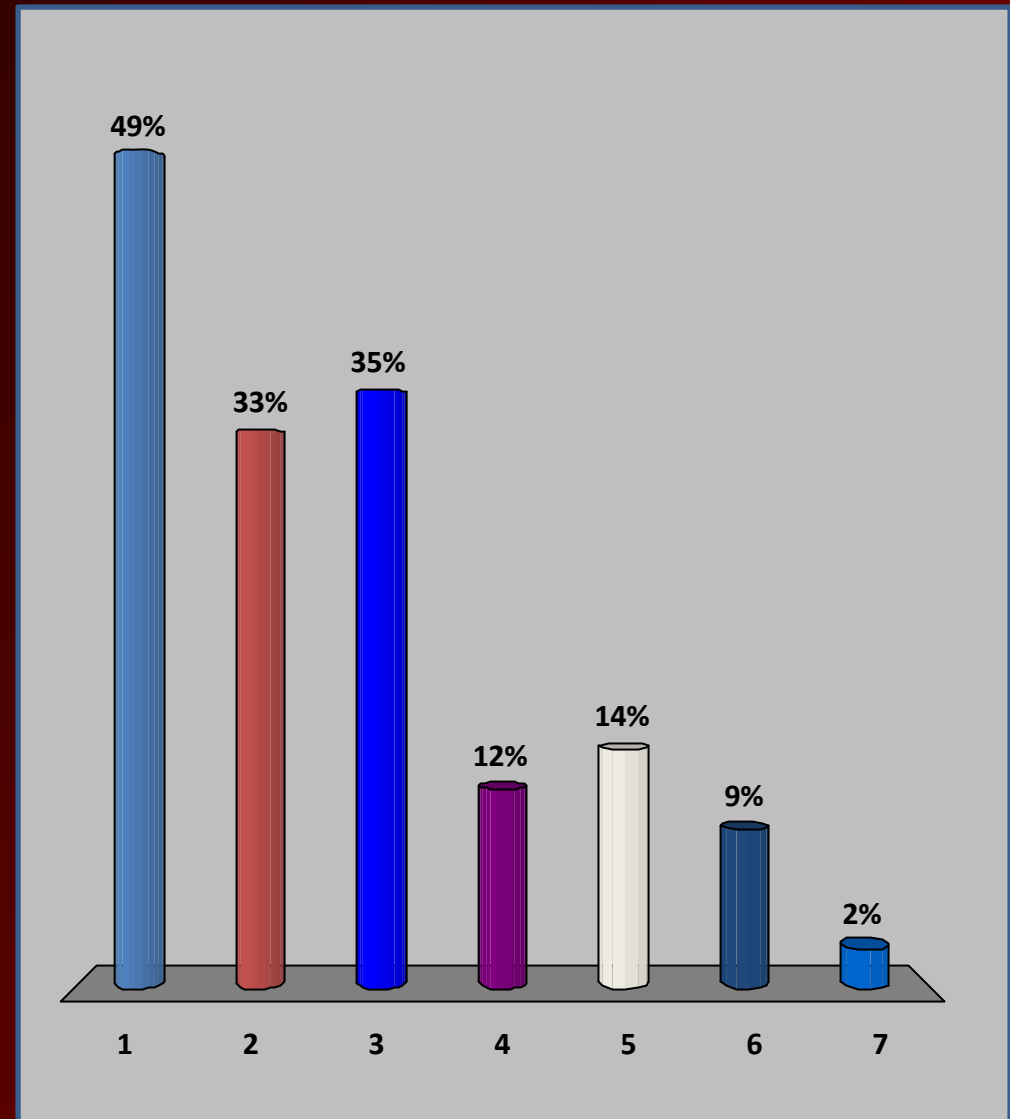
How Should General Certification Procedures (2.10) be Added? (Pick up to 3)

1. Add content to existing class(es)
2. Create new class later in the curriculum
3. Create new short-intensive class between 5th and 6th year
4. Create as new Summer Course
5. Add a separate module to current curriculum
6. Add content to post-graduate specialization
7. This should not be added at this time



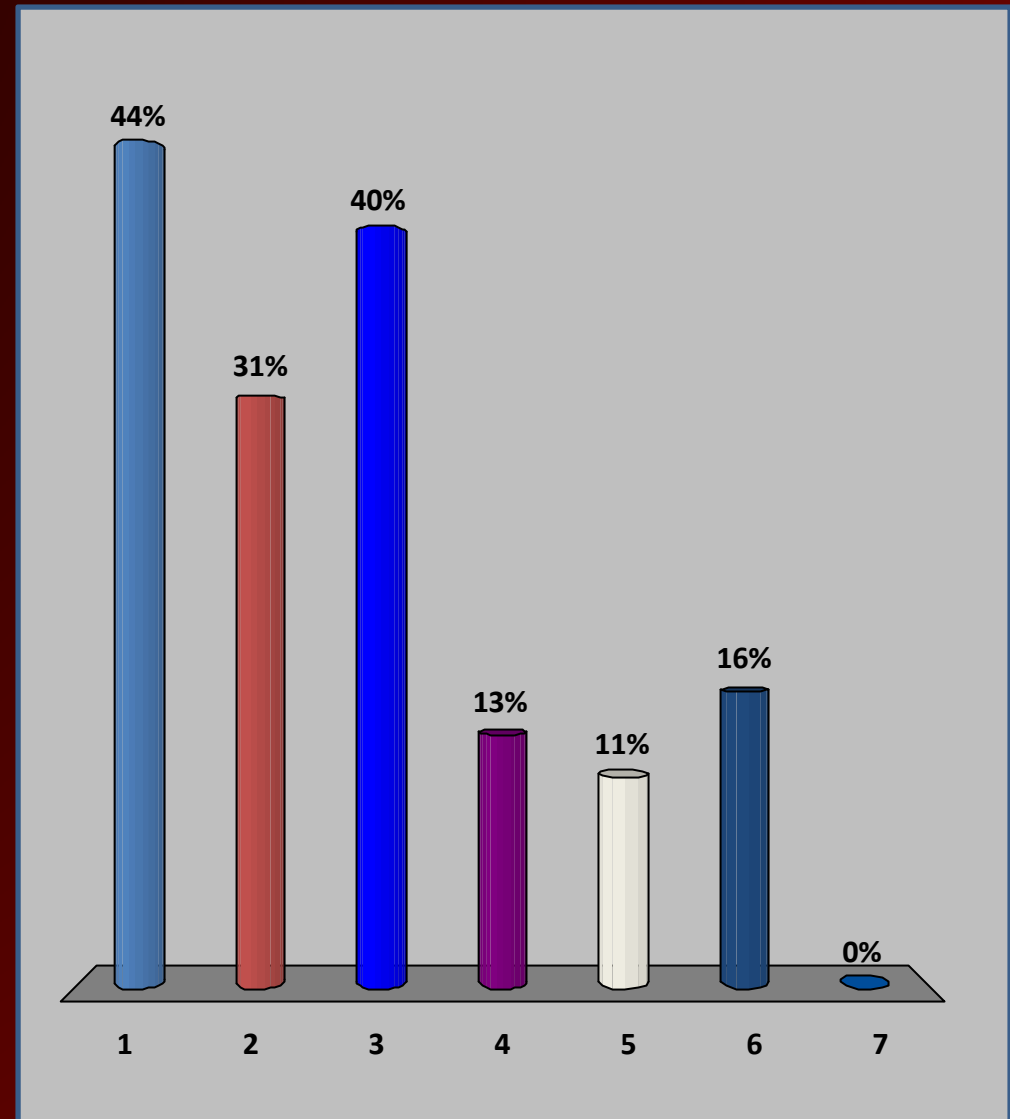
How Should Inspection and Certification Procedures (3.2) be Added? (Pick up to 3)

1. Add content to existing class(es)
2. Create new class later in the curriculum
3. Create new short-intensive class between 5th and 6th year
4. Create as new Summer Course
5. Add a separate module to current curriculum
6. Add content to post-graduate specialization
7. This should not be added at this time



How Should International and Trade Framework (3.7) be Added? (Pick up to 3)

1. Add content to existing class(es)
2. Create new class later in the curriculum
3. Create new short-intensive class between 5th and 6th year
4. Create as new Summer Course
5. Add a separate module to current curriculum
6. Add content to post-graduate specialization
7. This should not be added at this time

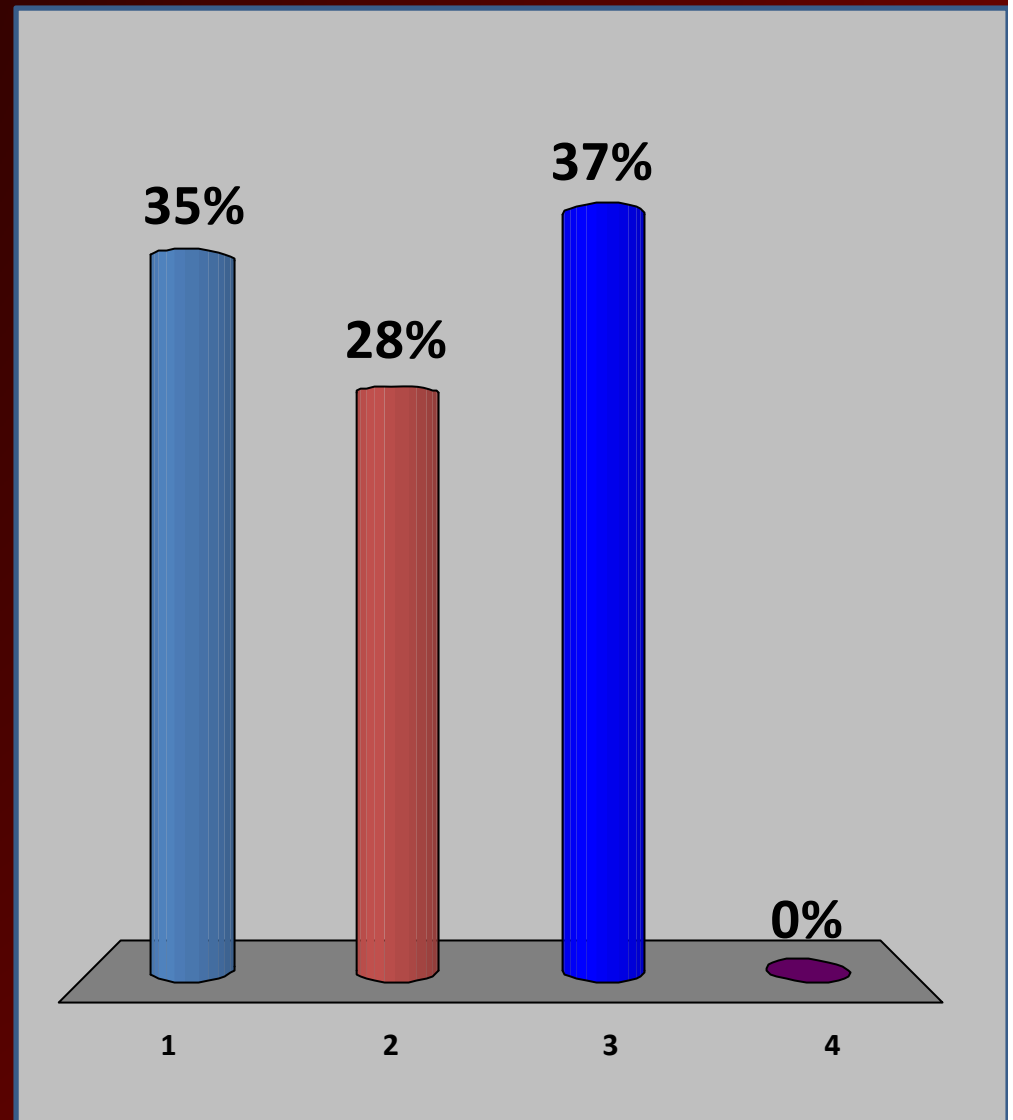


TOPIC 2: OIE CONTENT MISSING

- ▶ **GAP: Major OIE Content Missing**
 - **Risk analysis**
 - **Drug withdrawals times and drug residues (including testing and impact)**
 - **Environmental health and biological waste management**
 - **Outbreak investigation and outbreak management**

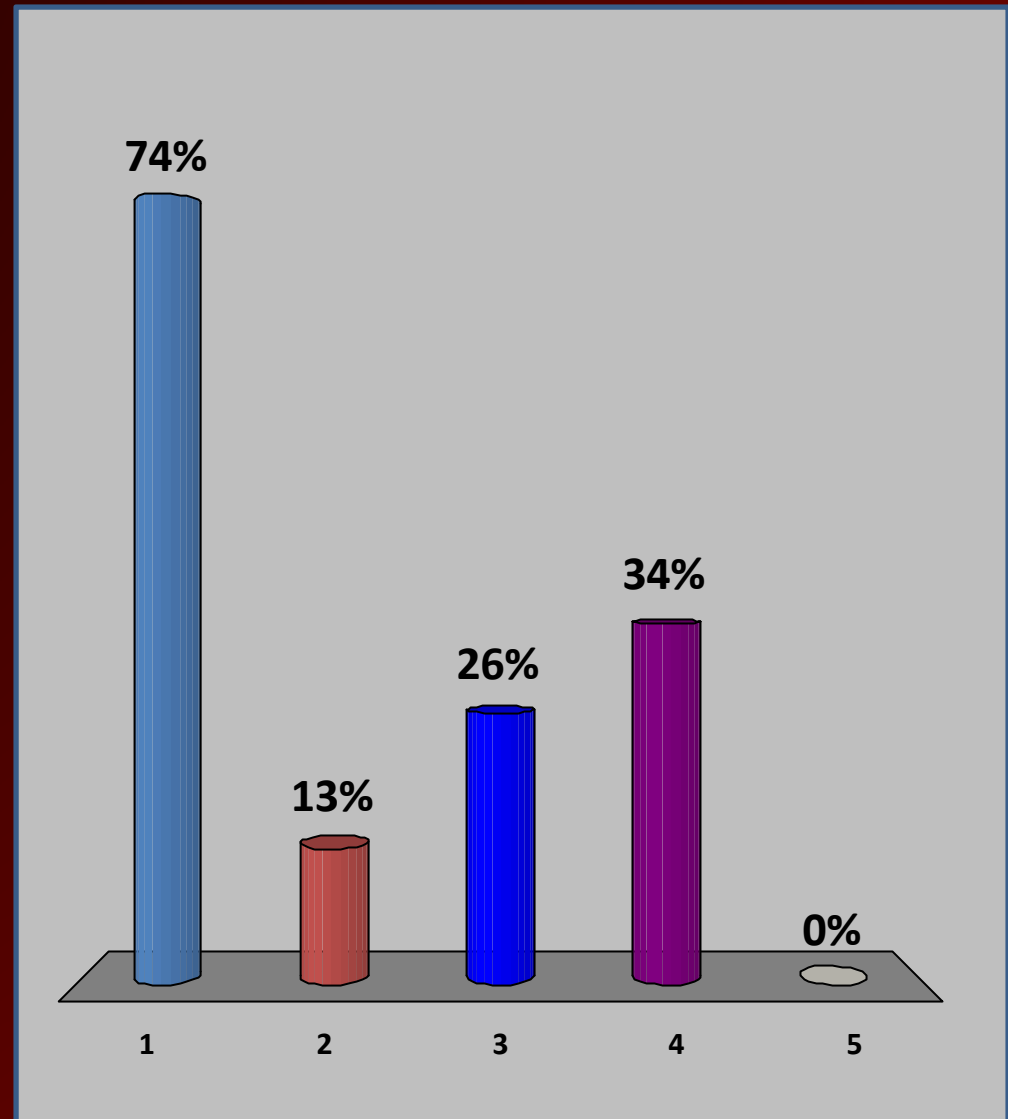
How Should Risk Analysis be Incorporated into the Curriculum?

1. Expand content already in Vet. Curriculum
2. Develop an additional reference /module for epidemiology
3. Add practical oriented teaching where it belongs
4. Should not be incorporated at this time



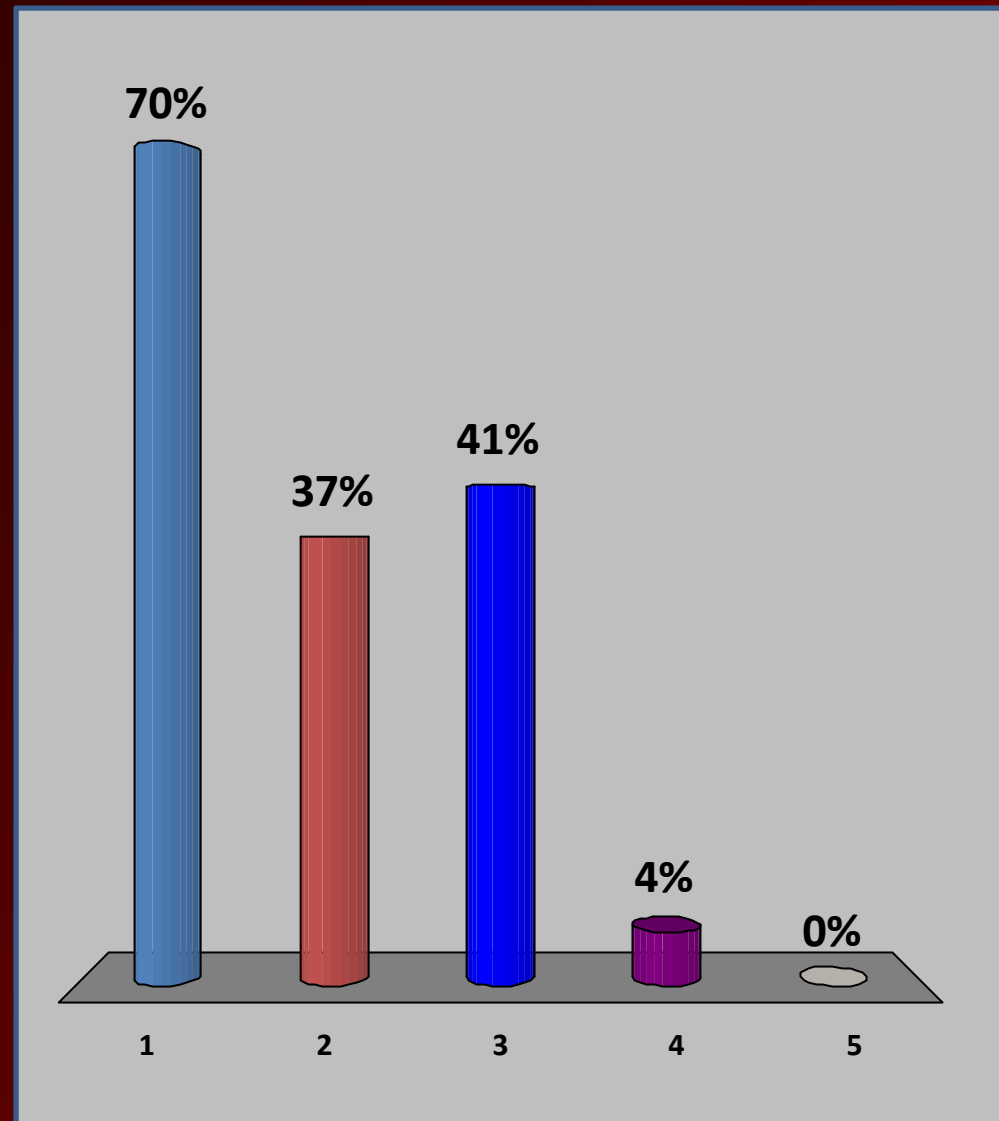
How Should Drug Withdrawal be Incorporated into the Curriculum? (Pick up to 2)

1. Revise existing material in pharmacology
2. In production classes add specifics when discussing Abx
3. 1 week certification for 5th yr with cases
4. When in clinical practice include withdrawal information on the prescription
5. Should not be incorporated at this time



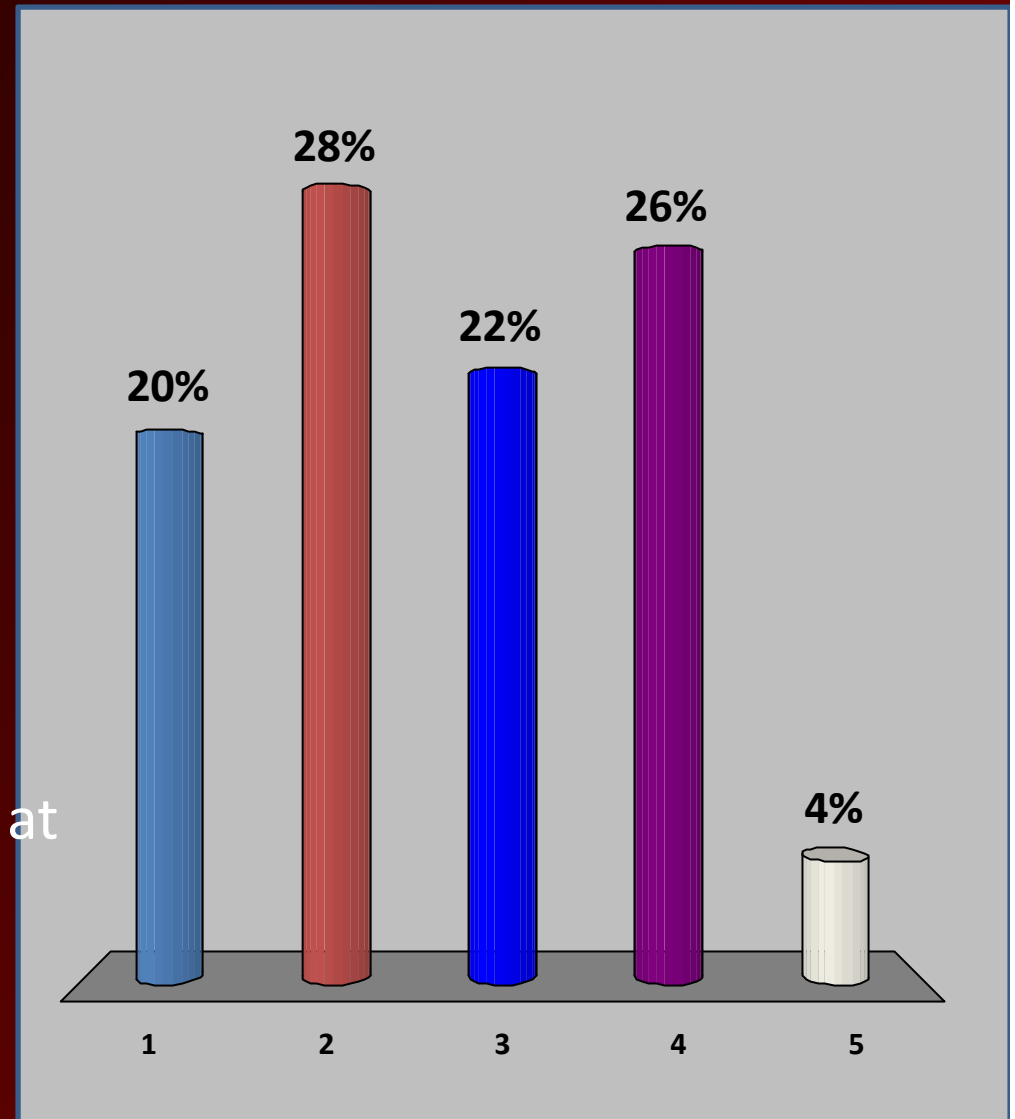
How Should Drug Residue Testing be Incorporated into the Curriculum? (Pick up to 2)

1. Include topic in Pub Health (food safety)
2. Include in Toxicology
3. Include testing opportunity (rapid test kit) in Pub Health Lab
4. Include testing opportunity with chemistry lab
5. Should not be incorporated at this time



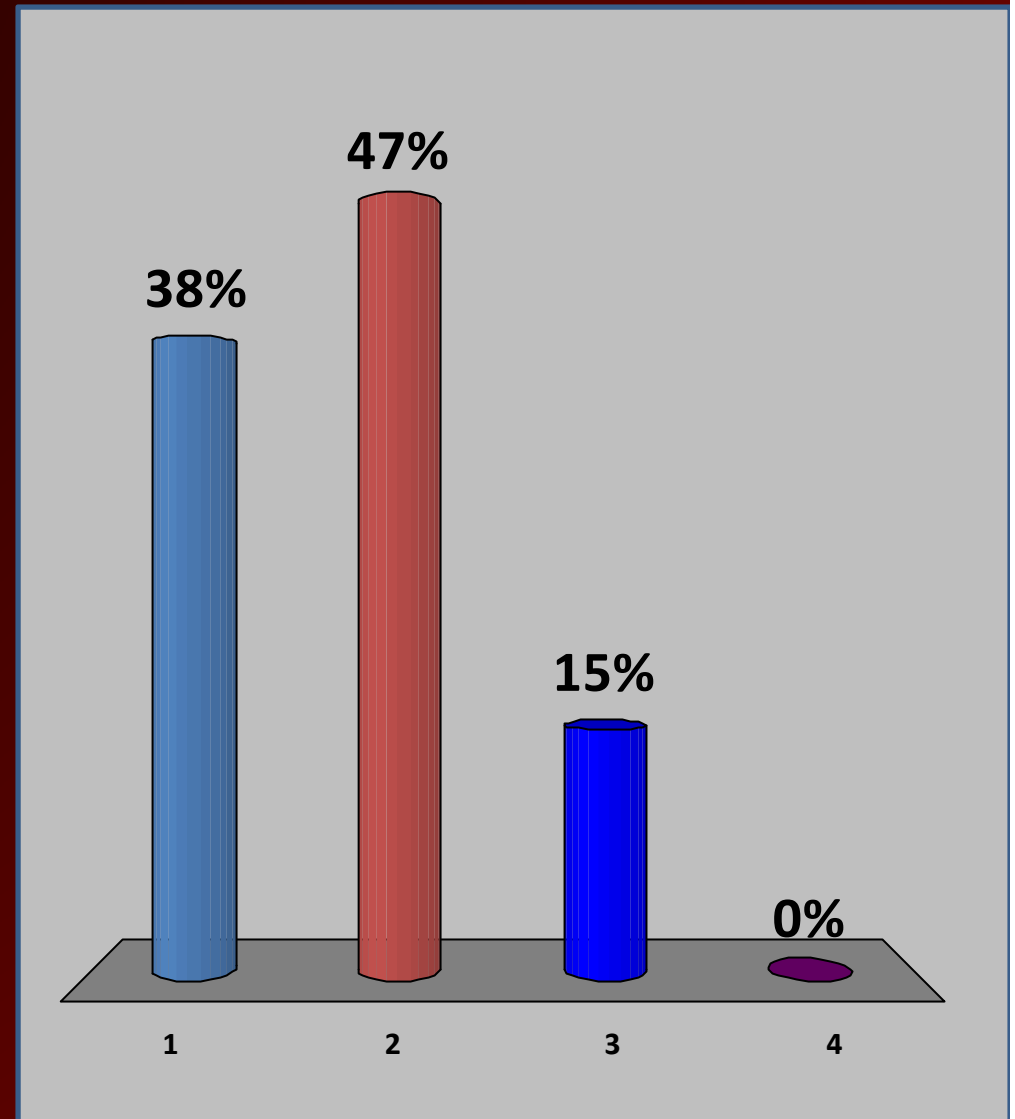
How Should Environmental Health and Biological Waste Management be Incorporated into the Curriculum?

1. Create separate semester course
2. Short -Term certificate training for summer
3. Incorporate in production courses
4. Include as part a new semester course on One Health
5. Should not be incorporated at this time



How Should Outbreak Investigation and Management be Incorporated into the Curriculum?

1. Add content to Prev Med, and reinforce in disease lectures
2. Expand existing content in epidemiology
3. Add to a new course on Advanced Outbreak Management (Session 3)
4. Should not be incorporated at this time

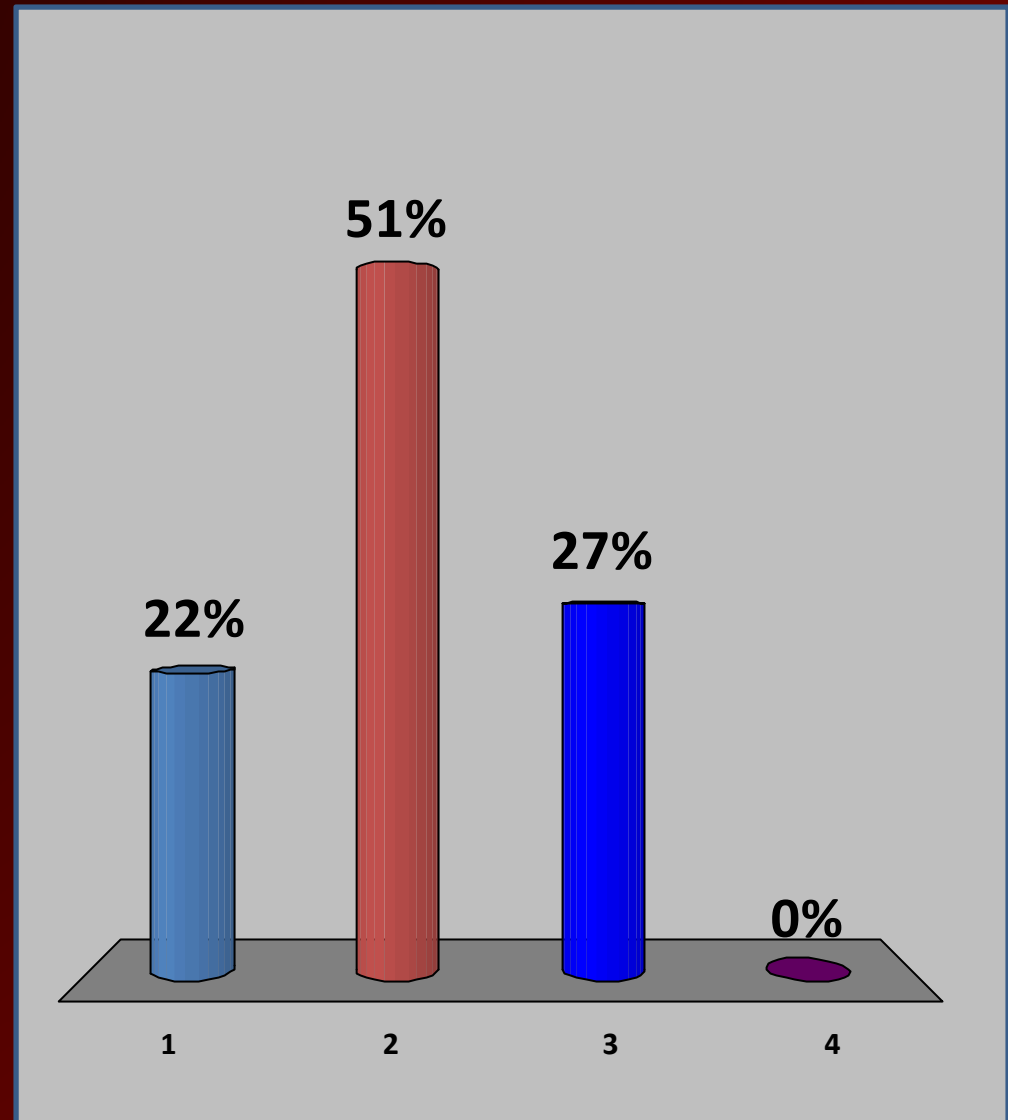


TOPIC 3: COURSE MISALIGNMENT

- ▶ **GAP: Courses are taught in a different sequence as that proposed by OIE**
 - **Animal Welfare**
(5th year => ideally 1st or 2nd year)
 - **Biostatistics**
(5th year => ideally 1st or 2nd year)
 - **English (Communications)**
(1st year => ideally across the program)

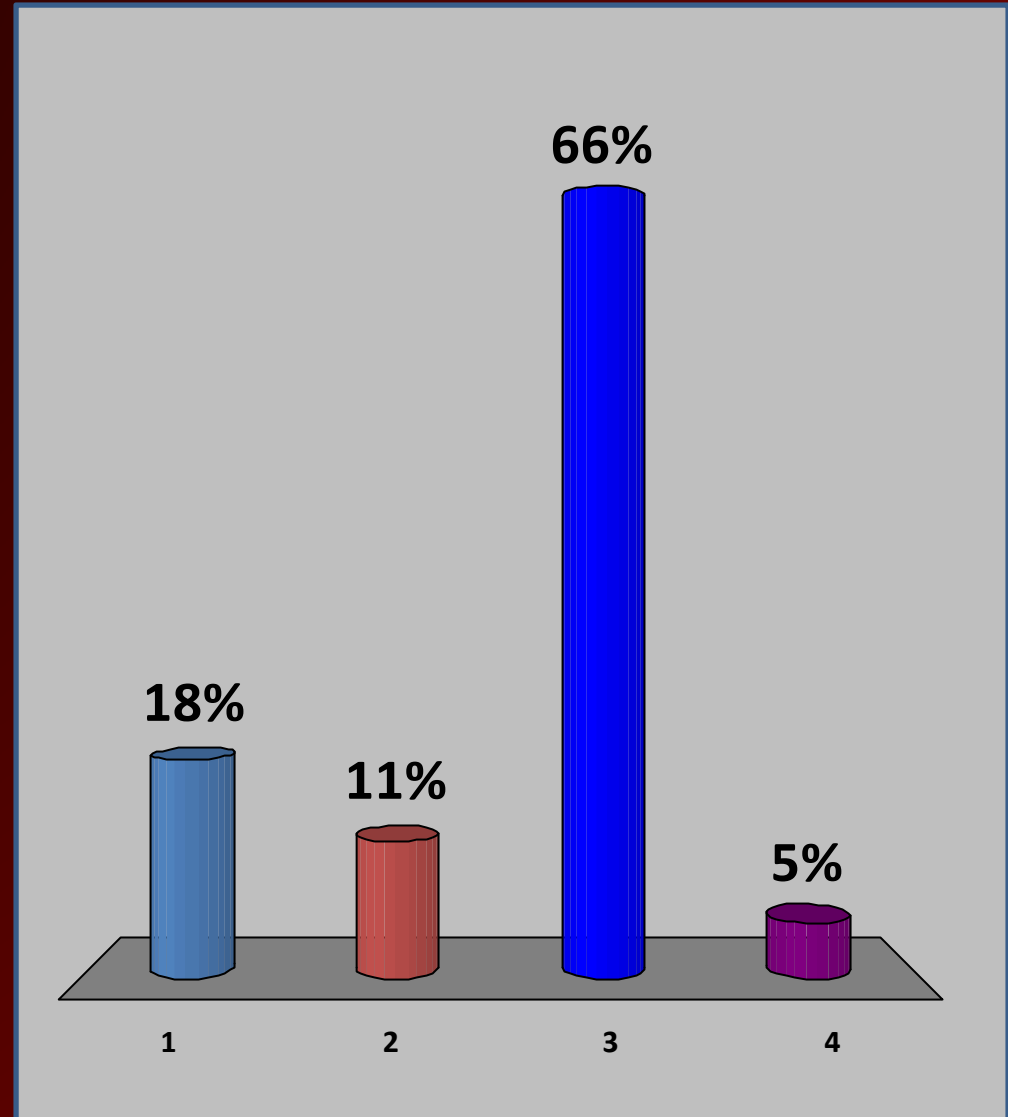
Animal Welfare Should. . .

1. Move to first yr
2. Move to second yr
3. Move to 3rd year
4. Remain where it is (5th yr)



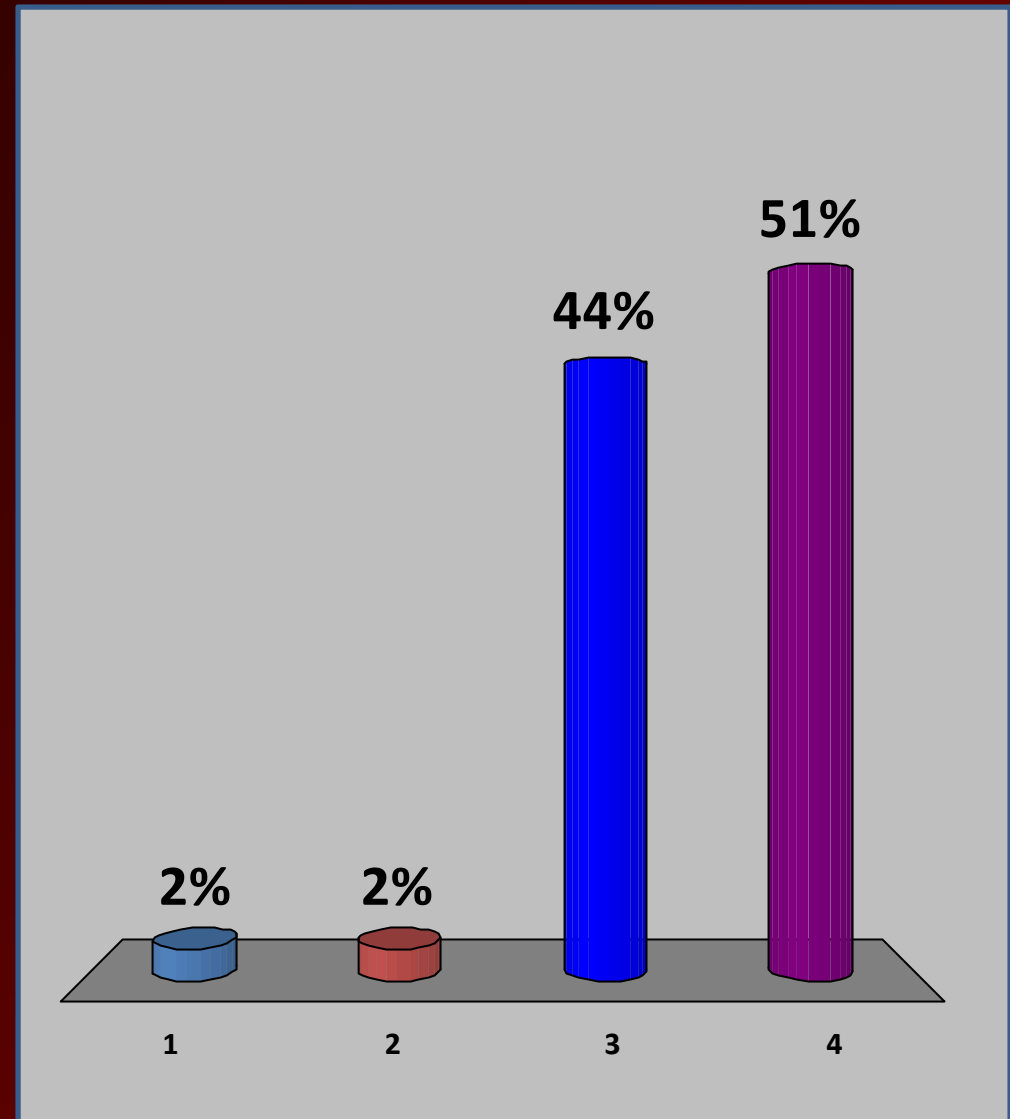
Introduction to Statistics Should. . .

1. Move to first yr
2. Move to second yr
3. Move to forth yr
(before biostatistics)
4. Remain where it is
(5th yr)



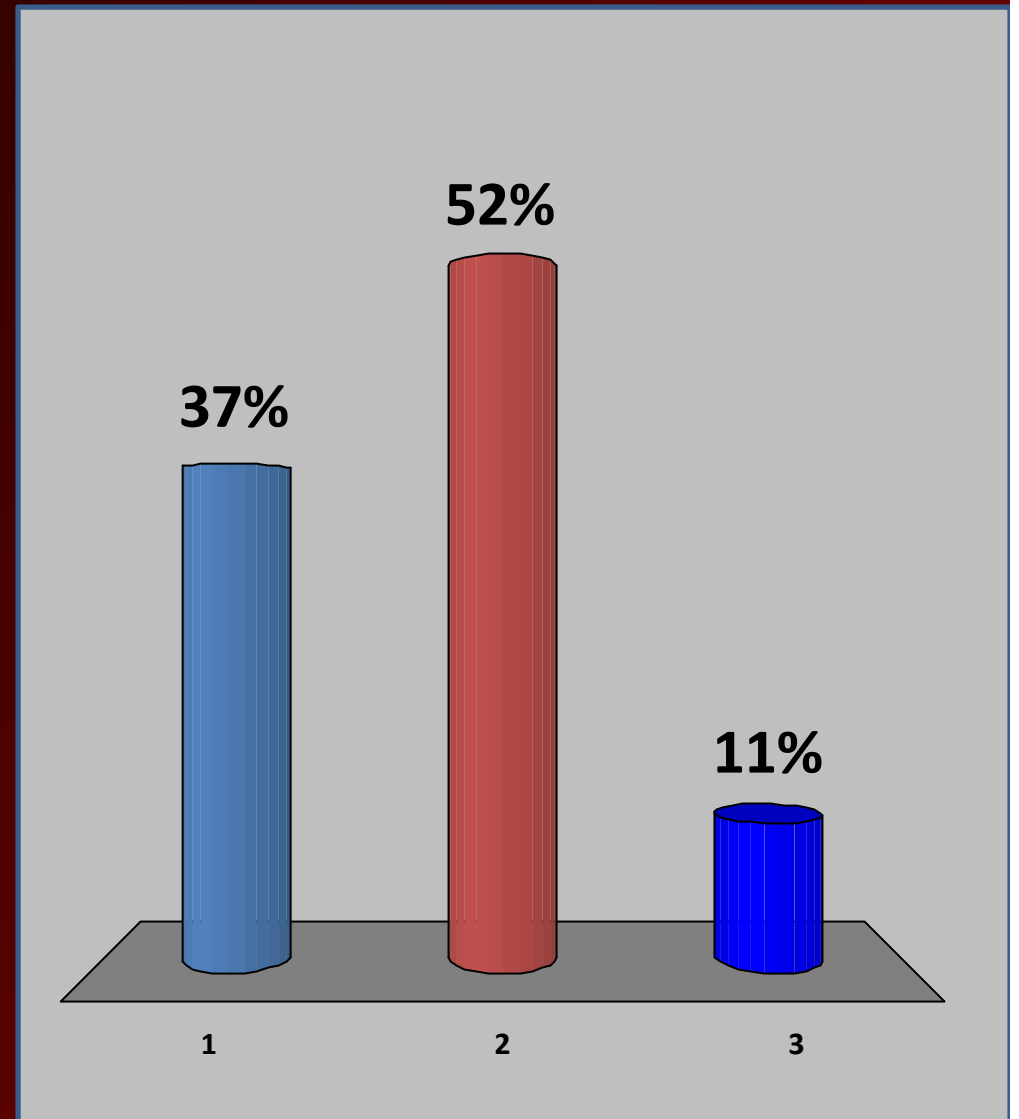
Biostatistics (Research Methodology) Should...

1. Move to first yr
2. Move to second yr
3. Move to forth yr
(before epi)
4. Remain where it is
(5th yr)



Communications Should. . .

1. Be added as an additional course (1st yr)
2. Be incorporated into other courses
3. Should not be added at this time



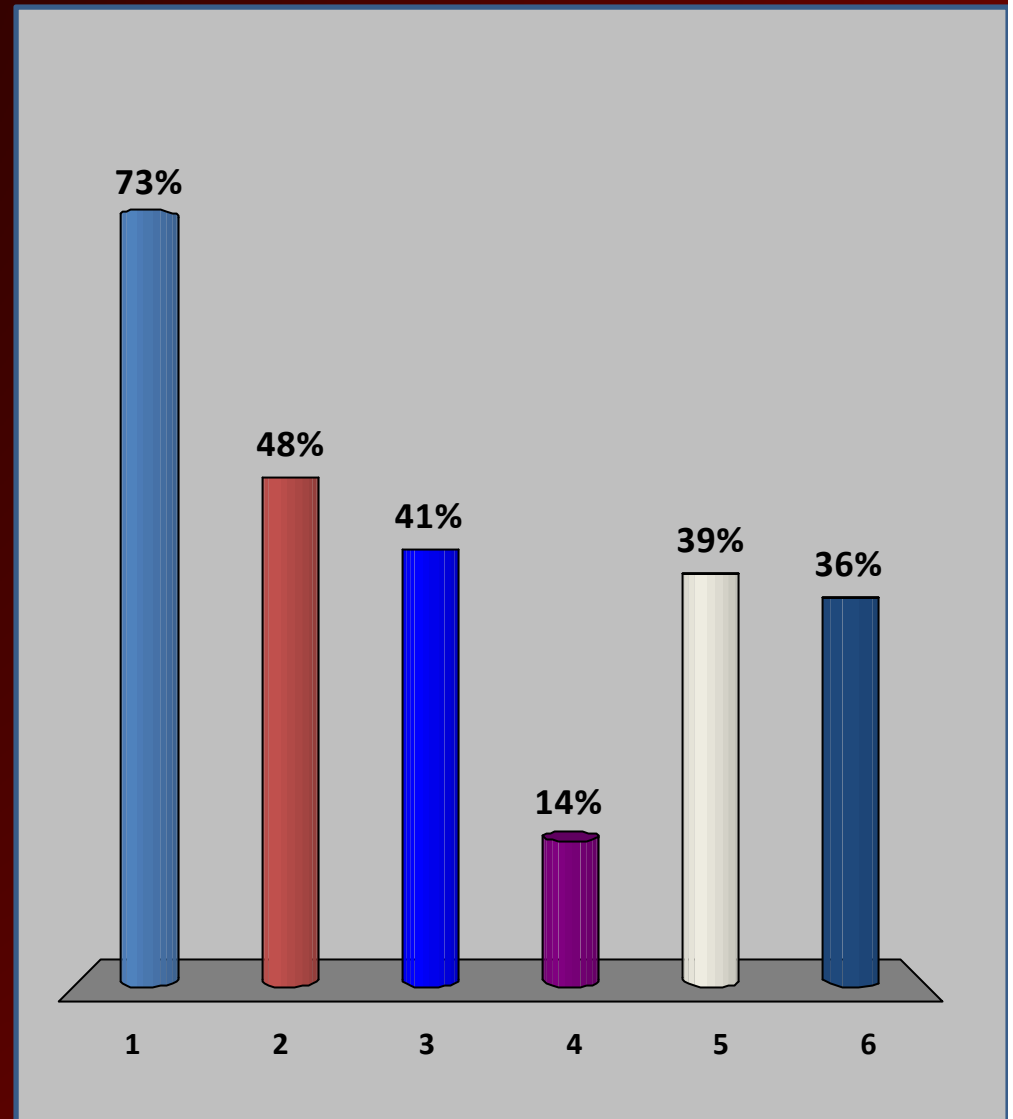
OIE Specific Competencies

TOPIC 1: INFECTIOUS DISEASES RELATED COMPETENCIES

- ▶ **GAP: Low levels of confidence and proficiency across Transboundary Animal Diseases (2.2), Emerging and Re-emerging Diseases (2.4), Zoonotic Diseases (2.3) and Disease Prevention and Control Programs (2.5) in regards to:**
 - **How to identify or recognize infectious diseases, especially Transboundary Animal Diseases (TADs) and Emerging Diseases (EDs).**
 - **How to select the proper diagnostic technique and how to interpret their results.**
 - **How to identify proper therapeutic approaches and interventions to manage outbreaks by TAD and ED.**

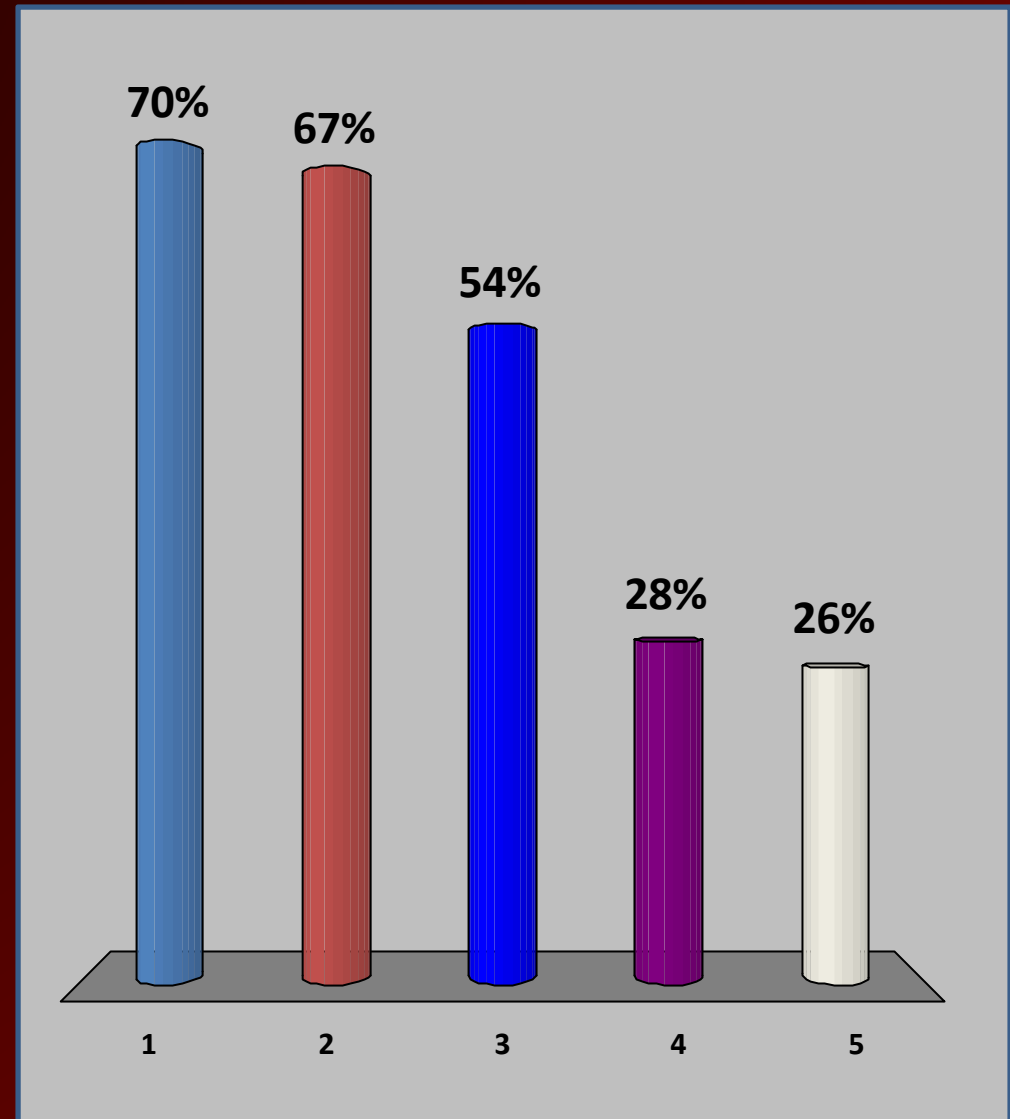
What should be done to improve students ability to recognize, diagnosis and manage TAD and ED? (Pick up to 3)

1. Add practical components to current classes
2. Increase collaboration with local district veterinarians
3. ID Key diagnostic techniques (TAD/ED/Zoo) to develop lab capacity
4. Have a specific core rotation off-site
5. Insert in the curriculum case-based outbreak scenarios
6. Create Video-Library of TAD/ED



What should be done to improve students ability to manage disease outbreaks? (Pick up to 3)

1. Add practical components to current classes
2. Increase collaboration with local district veterinarians
3. Insert in the curriculum case-based outbreak scenarios
4. On farm training exercises
5. Create Video-Library on Outbreak management



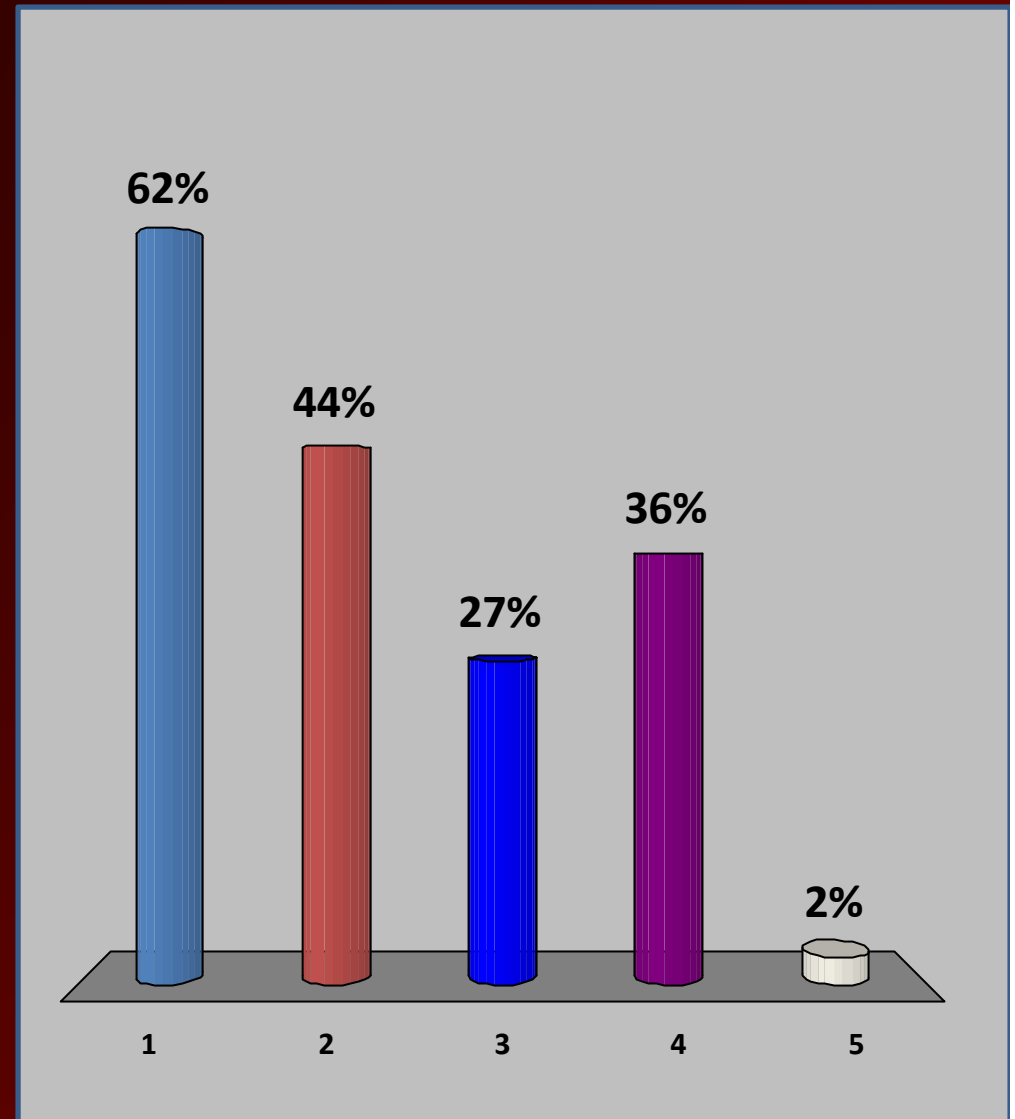
OIE Specific Competencies

TOPIC 2: REGULATORY MEDICINE RELATED COMPETENCIES

- ▶ **GAP: The average graduate is not sufficiently competent in regards to General Certification Procedures (2.10) to determine if an animal is healthy and how to generate a health certificate.**
- ▶ **GAP: The average graduate is also unsure of the proper authorities to report an incident event or outbreak of a TAD/ED, as well as the proper chain of reporting.**

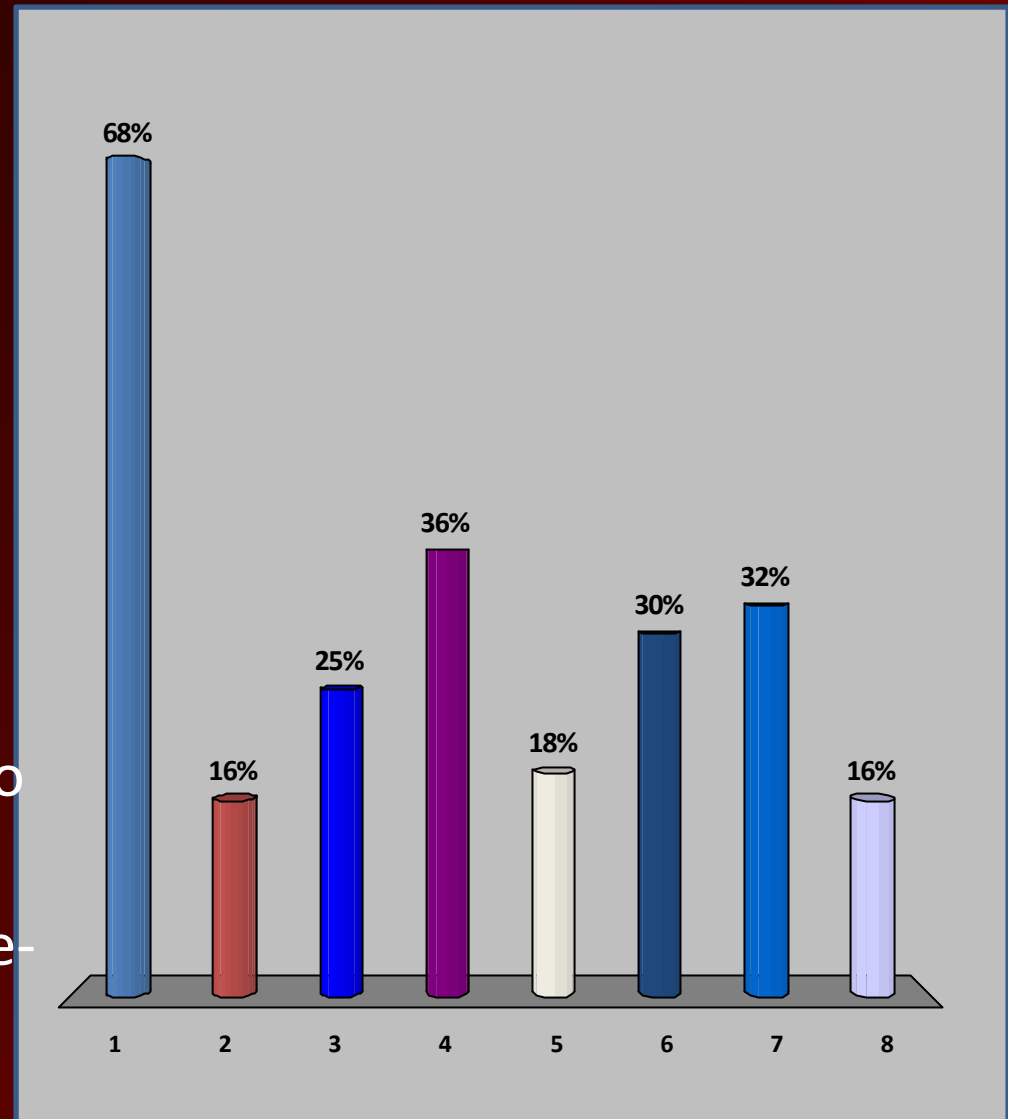
How Should the Gap with Health Certificates be Resolved? (Pick up to 2)

1. Add to Clinical Diagnosis and Practice
2. Add clinical case scenario to existing content in Ethics and Jurisprudence
3. Create separate course— Inspection, certification and international trade
4. Short certificate training
5. Do not add to curriculum, should be taught at hiring



How Should the Gap with National and International Reporting be Resolved? (Pick up to 3)

1. Seminars from regulatory authorities
2. Produce a radio program
3. Include in journal clubs
4. Include site visits in 5th year
5. Train faculty members
6. Short certificate training
7. Add practical components to current classes
8. Insert in the curriculum case-based outbreak scenarios



TOPIC 3: GENERAL COMPETENCIES

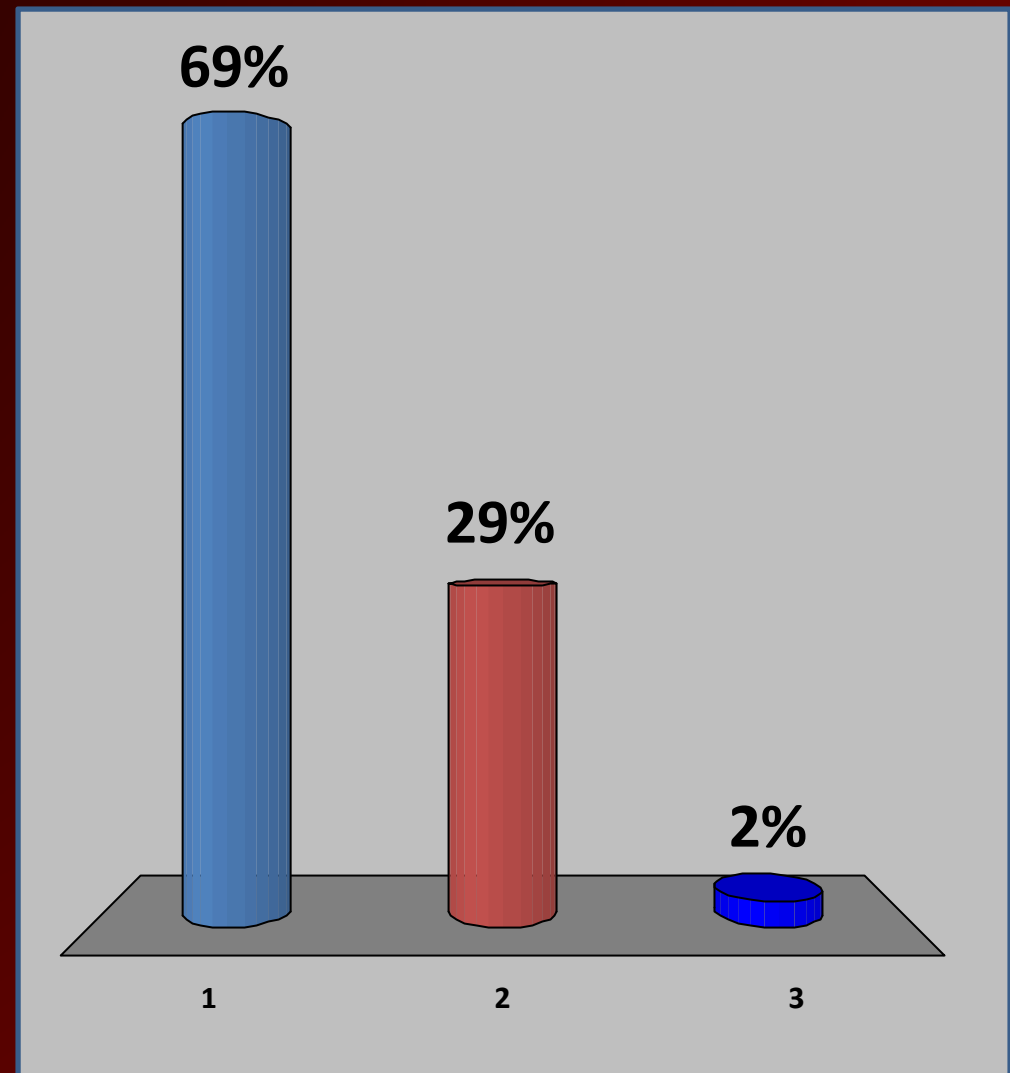
- ▶ **GAP: The students and recent graduates did not feel competent managing animal welfare related issues in common or routine situations.**

- ▶ **GAP: The recent graduates were also identified as insufficient or not competent in:**
 - **Proper use of veterinary products, especially in regards to withdrawal times,**
 - **Drug residue testing,**
 - **Issuing of Health Certificates,**
 - **Mobilization permits.**

- ▶ **GAP: Identifying up-to-date information regarding subjects related to OIE competencies.**

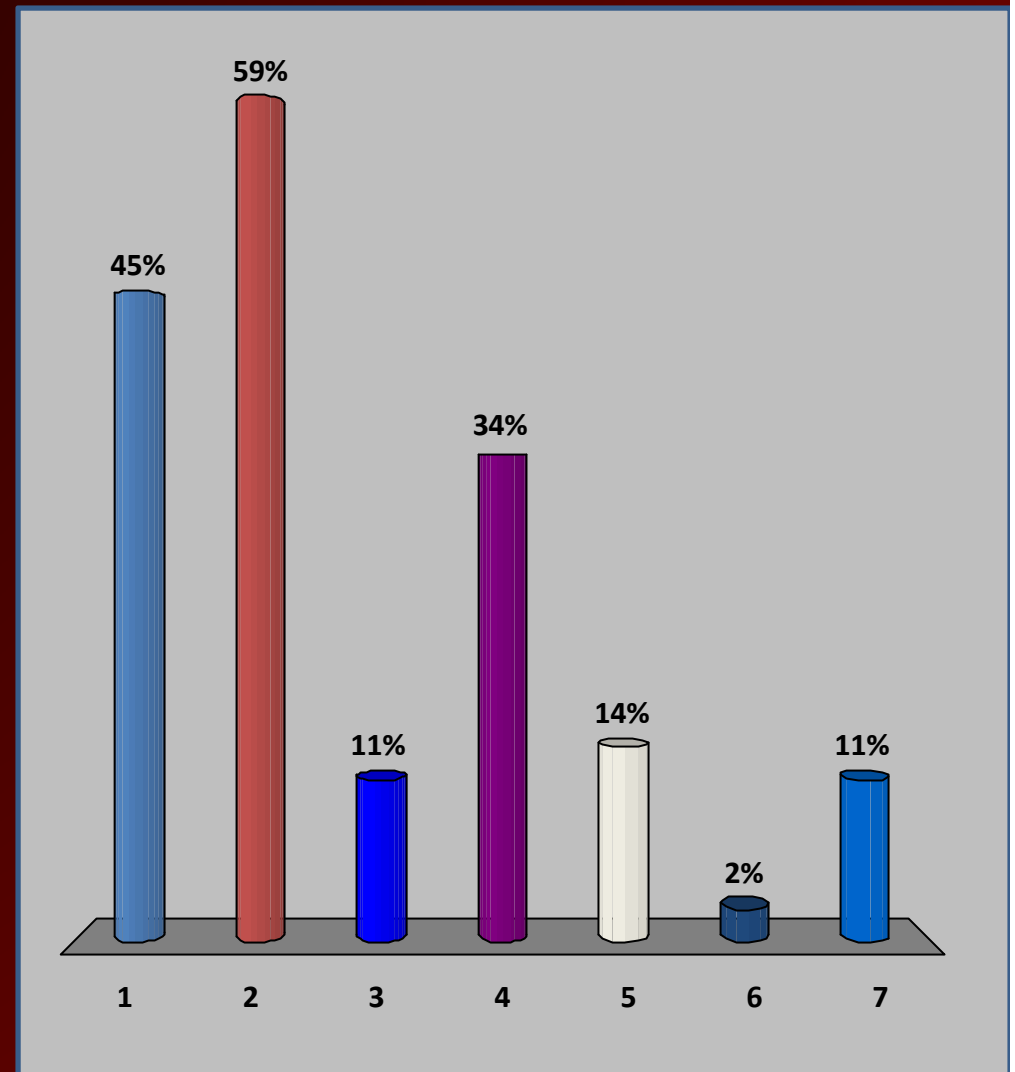
How should the students be taught how to handle Animal Welfare issues on a daily basis despite a lack of a legal frame work? You will teach...

1. International standards adapted for Ethiopia
2. Standards created by Vet Group/Colleges
3. Will not teach until Ethiopian guidelines



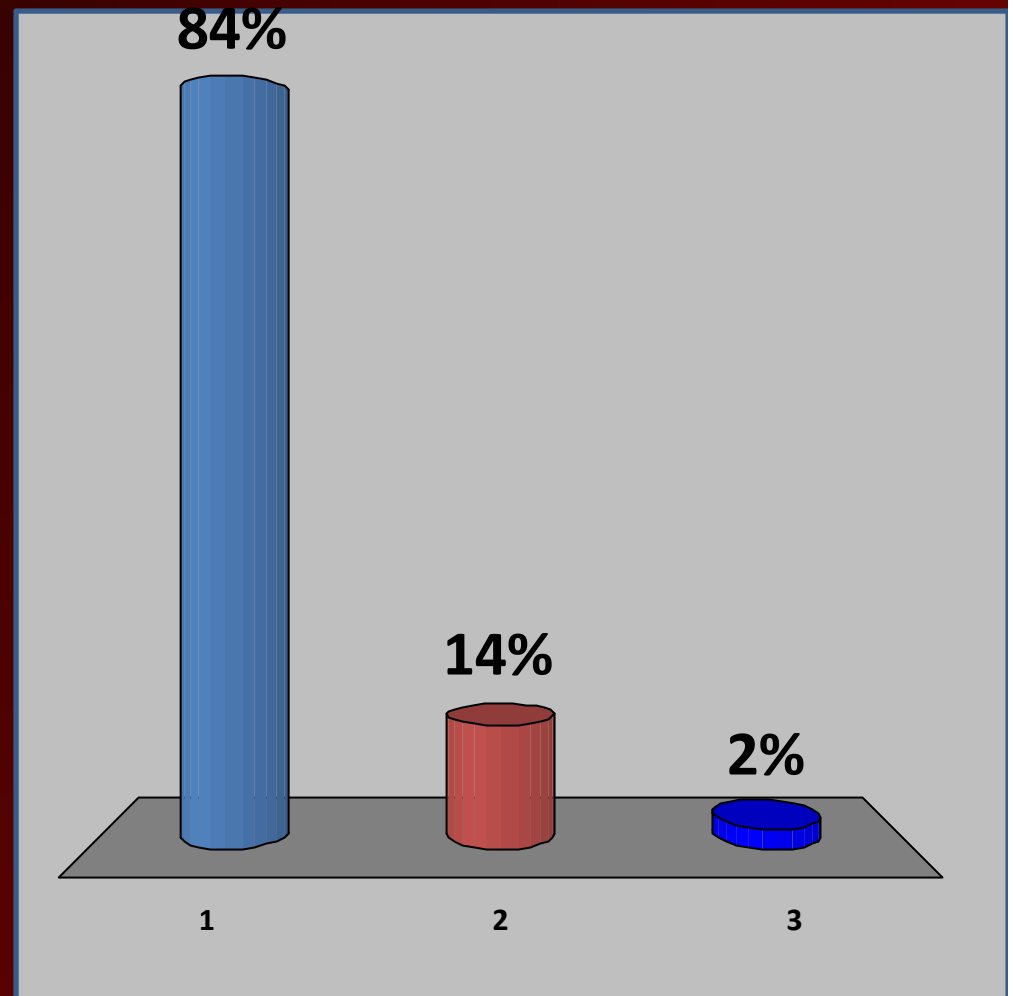
How should the students be taught how to handle Animal Welfare issues on a daily basis despite a lack of a legal frame work? (Pick up to 2)

1. On-farm exercise(s)
2. Add practical components to current classes
3. Create separate course on applied animal welfare
4. Incorporate with related subject
5. Guest lectures
6. Online
7. Role playing



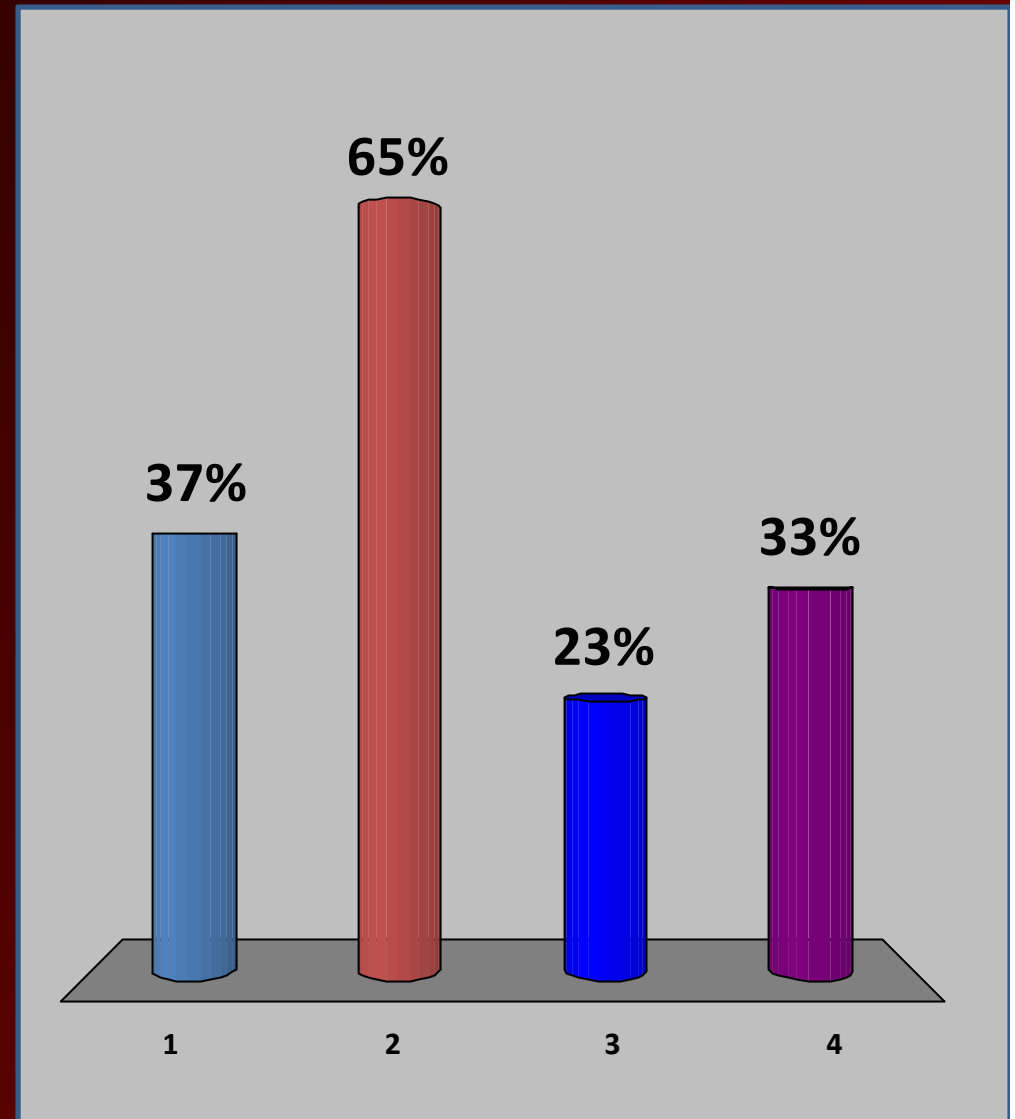
How should activities in which there are currently not laws or regulations in place be included in the curriculum (i.e. drug withdraw times, drug residue testing, health certificates, mobilization permits)?

1. Best practices from other countries
2. General information only
3. Should not be taught until regulated



How can we help the students gain access to up-to-date information resources and encourage their use? (Pick up to 2)

1. Add class assignments that require their use
2. Improve computer, internet, books
3. New course (health informatics)
4. New chapter (health informatics)

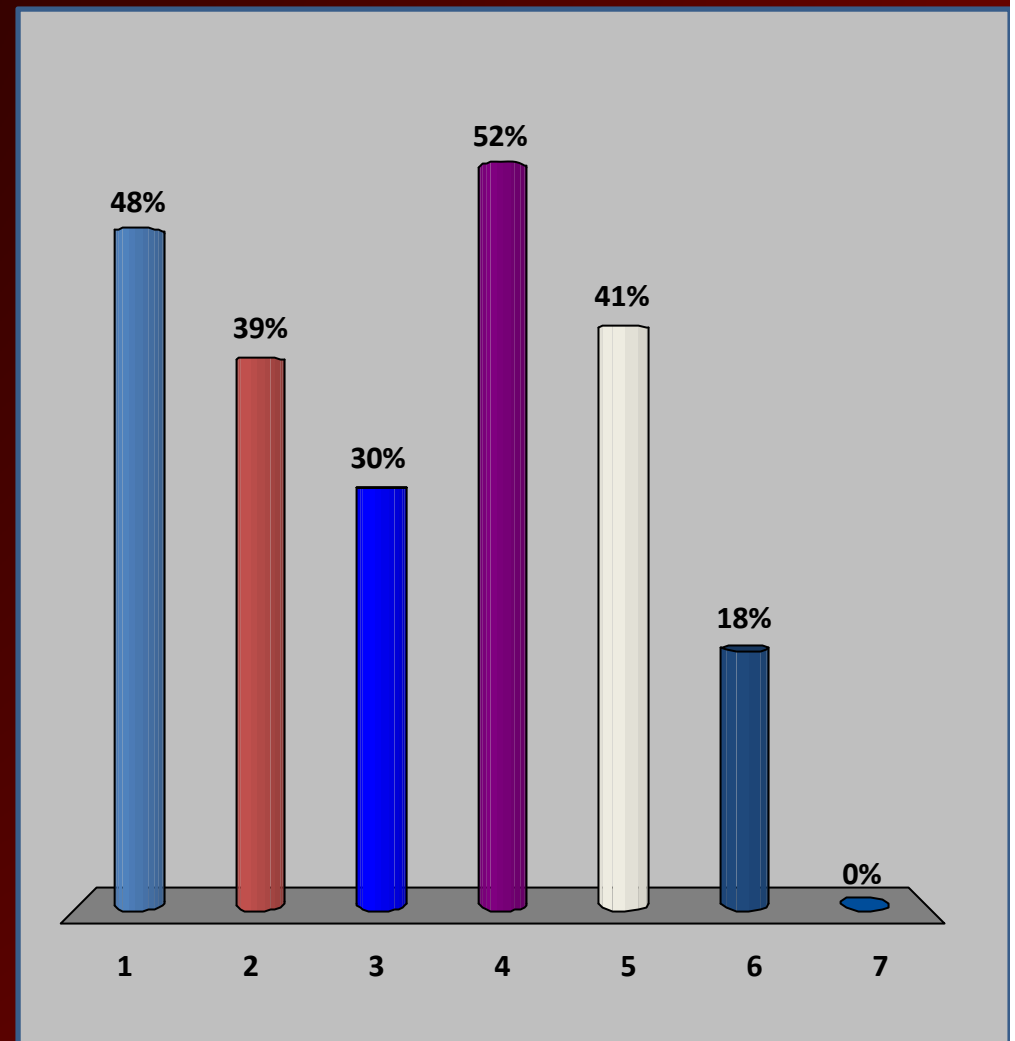


TOPIC 1: ORGANIZATION OF VETERINARY SERVICES

- ▶ **GAP: The average graduate is not sufficiently competent in regards to Organization of Veterinary Services (3.1), specifically in regards to the organization of veterinary services in Ethiopia**

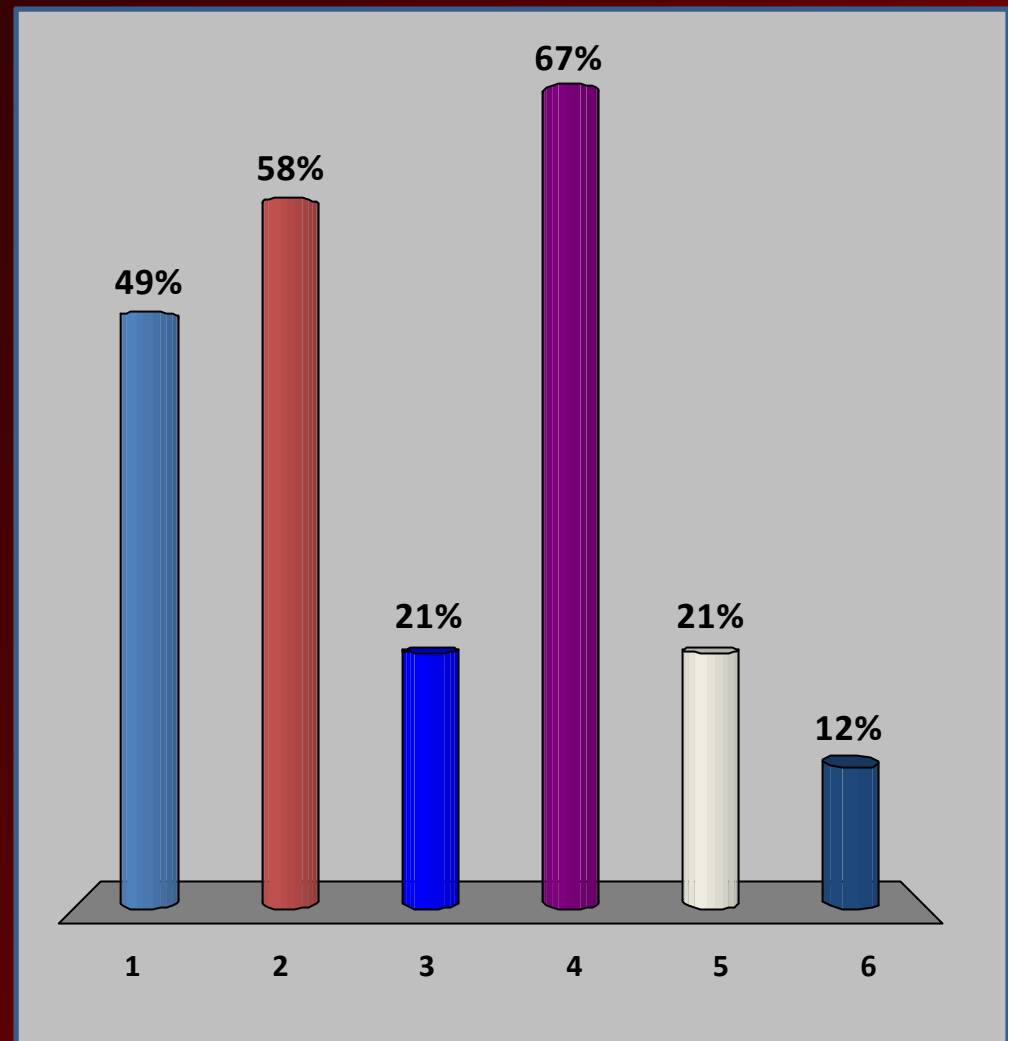
How should the description of the structure and roles of the government authority responsible for ensuring national animal health be reinforced (or included) in the curriculum? (Pick up to 3)

1. Invite external experts on the subject
2. Add content to course(s)
3. Short-Term Training late in curriculum
4. Regular Seminar/Guest Lectures from Veterinary Authorities
5. Regular Off-Campus Training focus on regulatory Medicine
6. Create printed materials on the subject
7. No to be included in Curriculum



How should the identification of the laws and regulations that provide governmental veterinary services (VS) their authority be reinforced (or included) in the curriculum? (Pick up to 3)

1. Invite external experts on the subject
2. Restructure Ethics and Jur. Course with new case based teaching methods
3. Short-Term Training late in curriculum
4. Regular Seminar/Guest Lectures from Veterinary Authorities
5. Regular Off-Campus Training focus on regulatory Medicine
6. Create printed materials on the subject

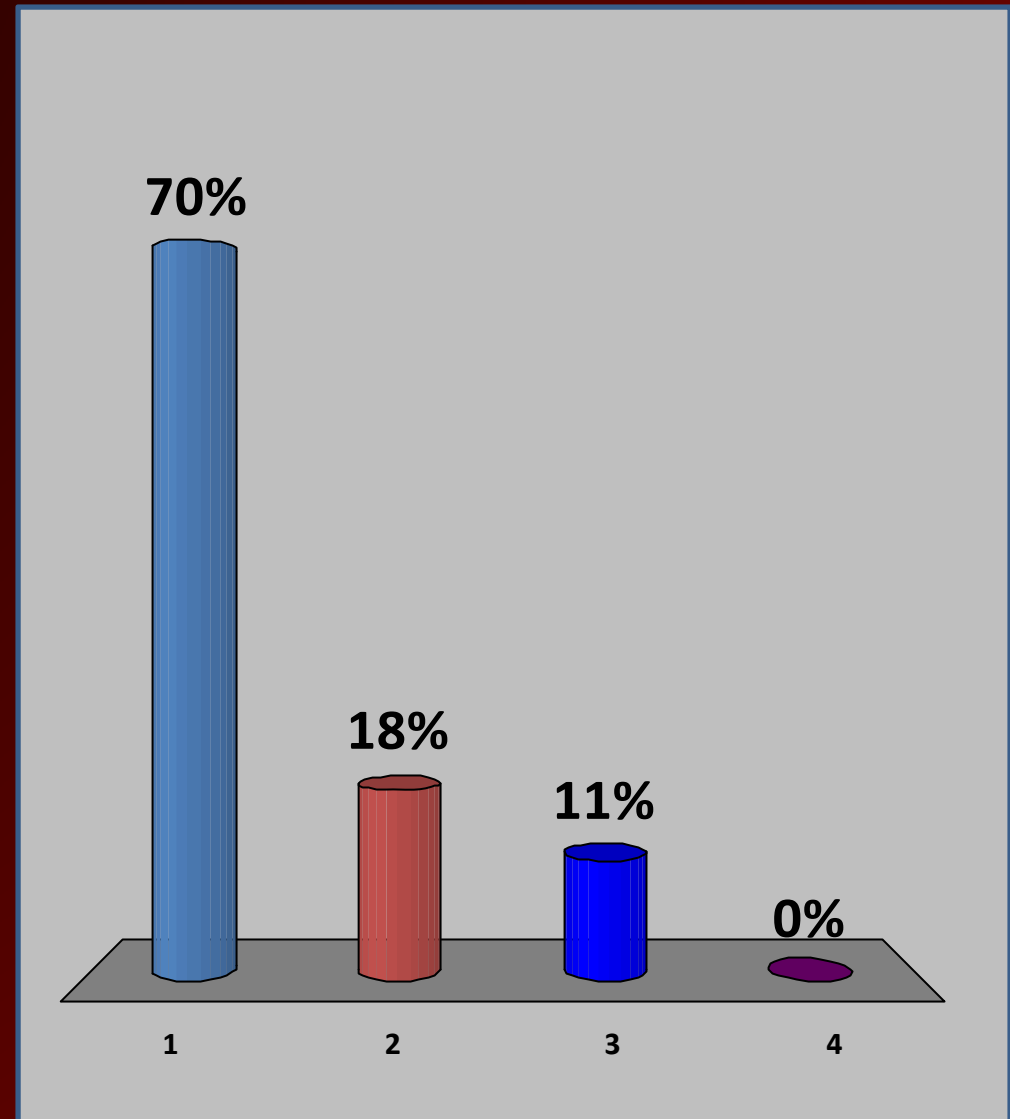


**TOPIC 2: MANAGEMENT OF CONTAGIOUS
DISEASE**

- ▶ **GAP: The average graduate is not sufficiently competent in regulatory components related to Management of Contagious Disease (3.3), specifically in regards to how to respond to outbreaks of contagious diseases (including TADs and EDs), such as:**
 - **Movement Control and Quarantine,**
 - **Traceability,**
 - **Humane Euthanasia,**
 - **Carcass Disposal,**
 - **Disinfection and Sanitization,**
 - **Zoning and Compartmentalization Principles.**

How do we teach Advanced Outbreak Investigation and Outbreak Management?

1. Organize and add practically oriented material to courses already containing this content (Prev Med, Pub Health, Animal Welfare)
2. Short-Term Training Certificate
3. Create new course on OM and reporting
4. Should not be taught at this time

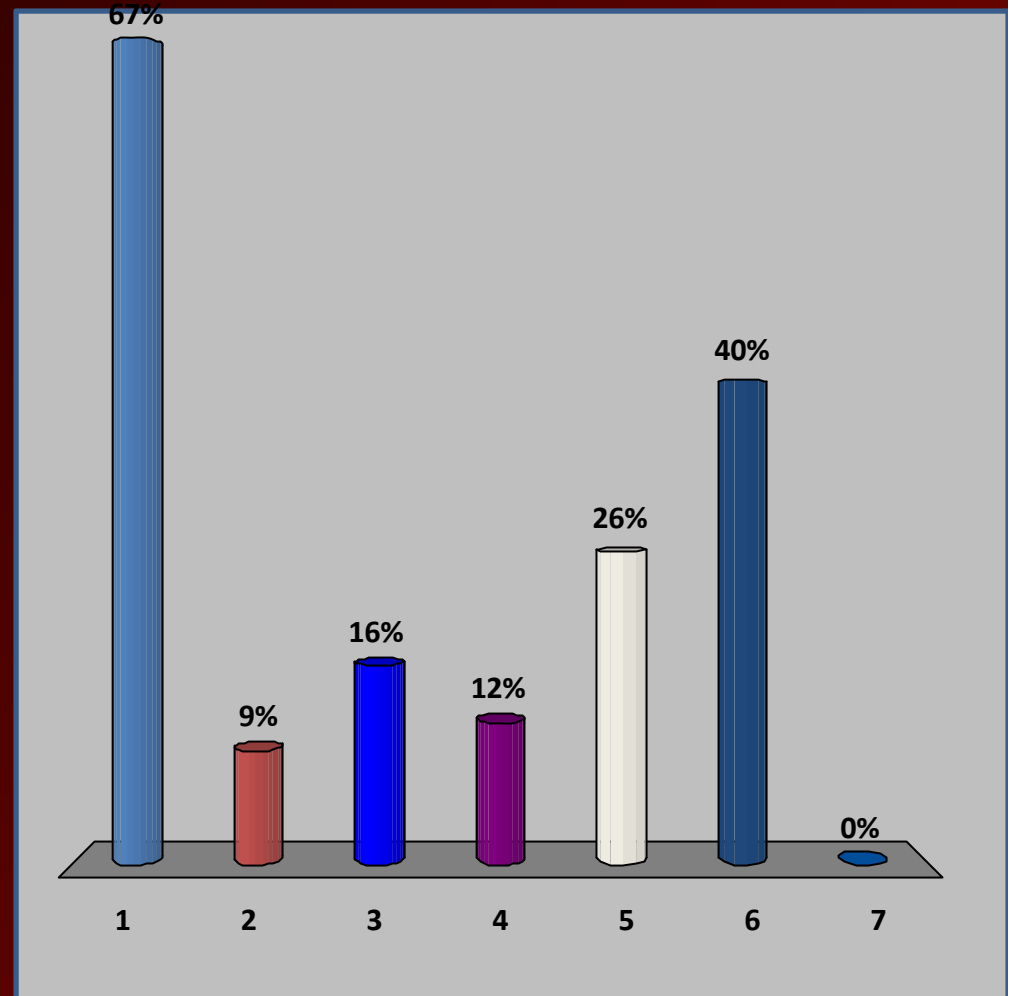


**TOPIC 3: INTERNATIONAL TRADE
FRAMEWORK**

- ▶ **GAP: The average graduate is not sufficiently competent in regards to laws and regulations for international trade of animals and animal products.**
- ▶ **GAP: The average graduate is not sufficiently competent in regards to international intergovernmental agencies in regards to their roles and responsibilities.**

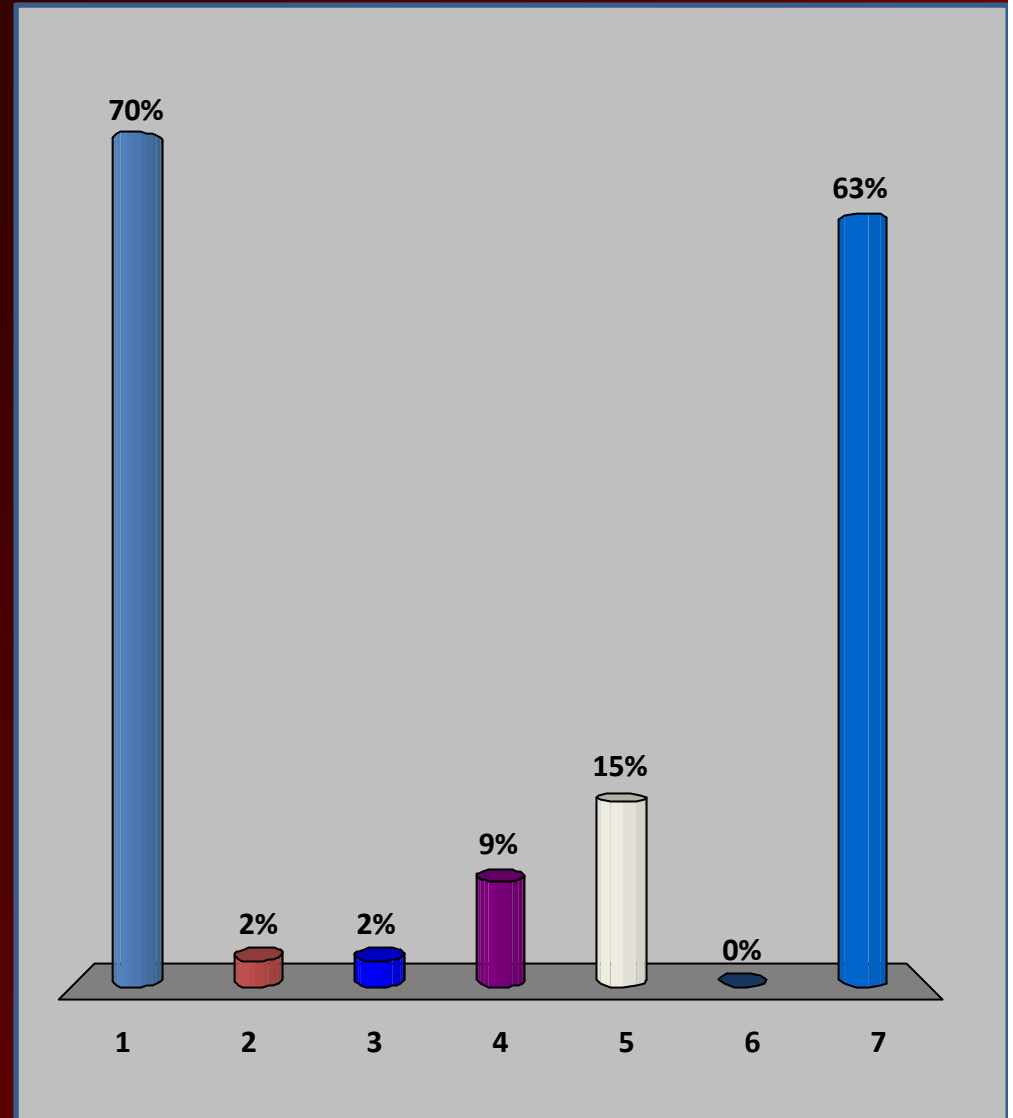
How should international framework and regulations (i.e. terrestrial animal health code, aquatic animal health code, *Codex Alimentarius*) be included in the veterinary curriculum? (Pick up to 2)

1. Add to existing course(s)
2. Create new core course
3. Put in graduate course
4. Add as an elective
5. Workshops/handouts
6. Module as short course with certificate
7. Should not be added at this time



How should the roles and responsibilities of intergovernmental organizations (i.e. OIE, WTO, FAO, WHO) be included in the veterinary curriculum? (Pick up to 2)

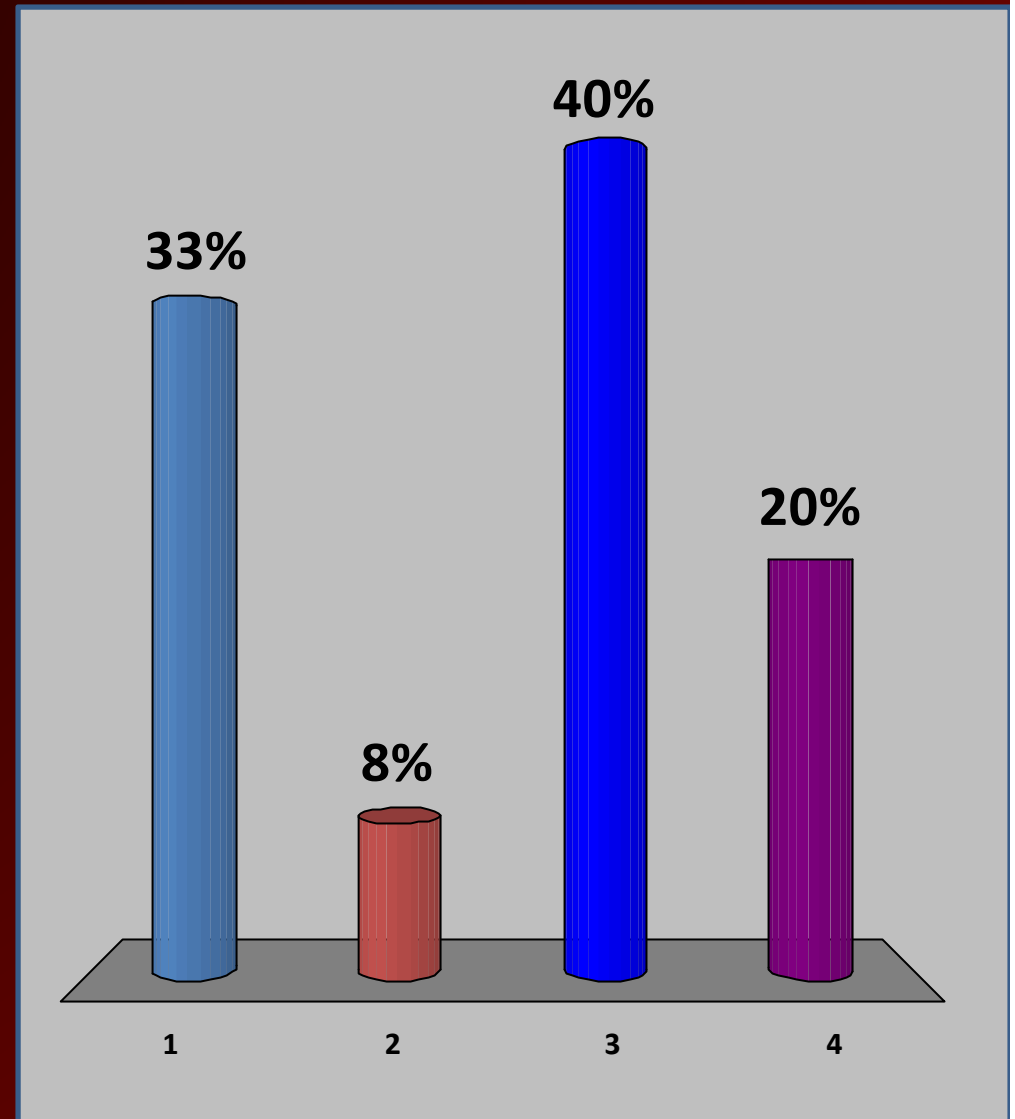
1. Add to existing course(s)
2. Create new course
3. Put in graduate course
4. Add as an elective
5. Module as short course with certificate
6. Should not be added at this time
7. Communicational Package Material



CROSS CUTTING GAPS

How Should Veterinary Curriculum Approach the Addition of Electives?

1. Electives should be offered
2. Short term electives should be offered before or after semester
3. Curriculum should be revised to allow one elective per year after 3rd year
4. There should be no electives

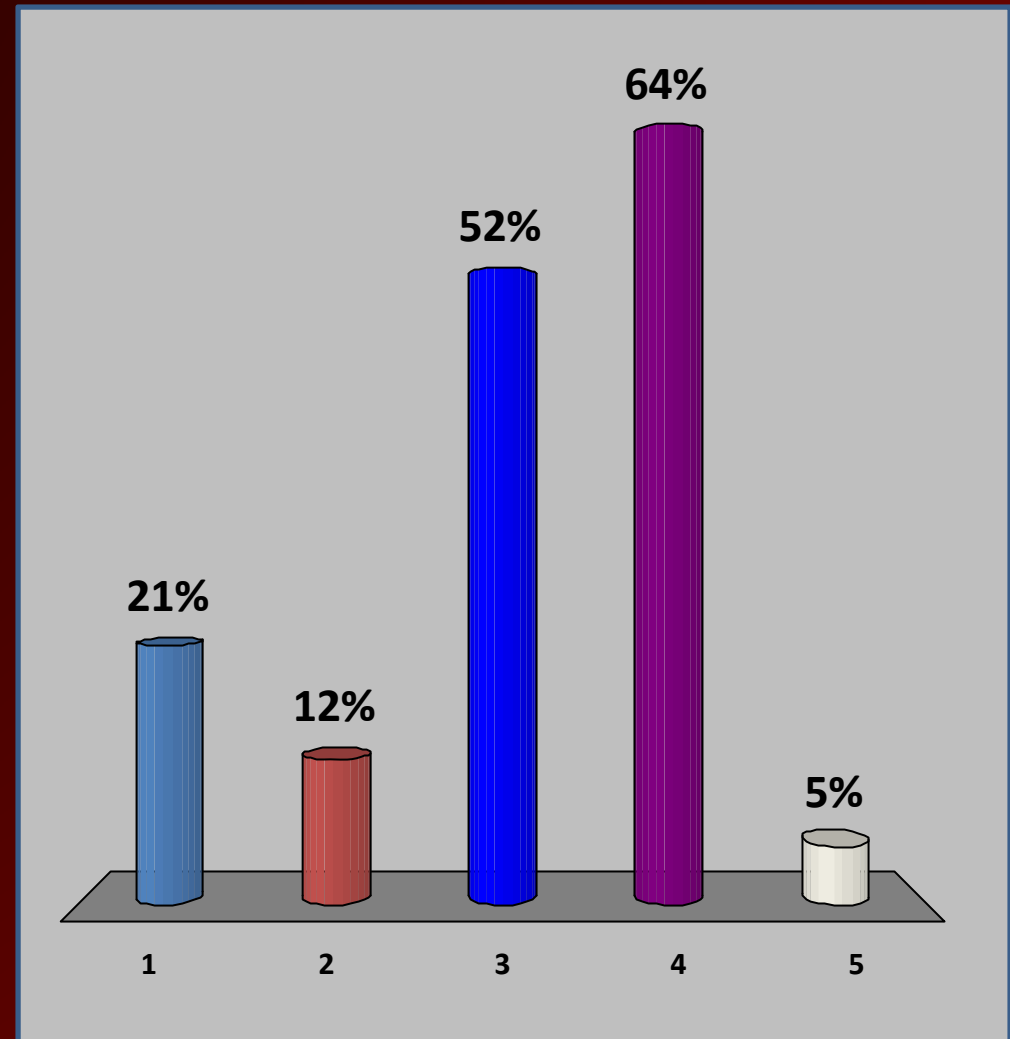


TOPIC 1: STUDENTS

- ▶ **GAP: Lack of motivation, proactiveness, and confidence were described by the students as major road blocks in their education. Some of the reasons provided were:**
 - **Students are assigned to DVM degree although this is not their professional passion (veterinary was not their first or second choice).**
 - **There are no clear career paths post-graduation – they have difficulty identifying relevant career options.**
 - **Strong hierarchical teaching structure which discourages student participation.**

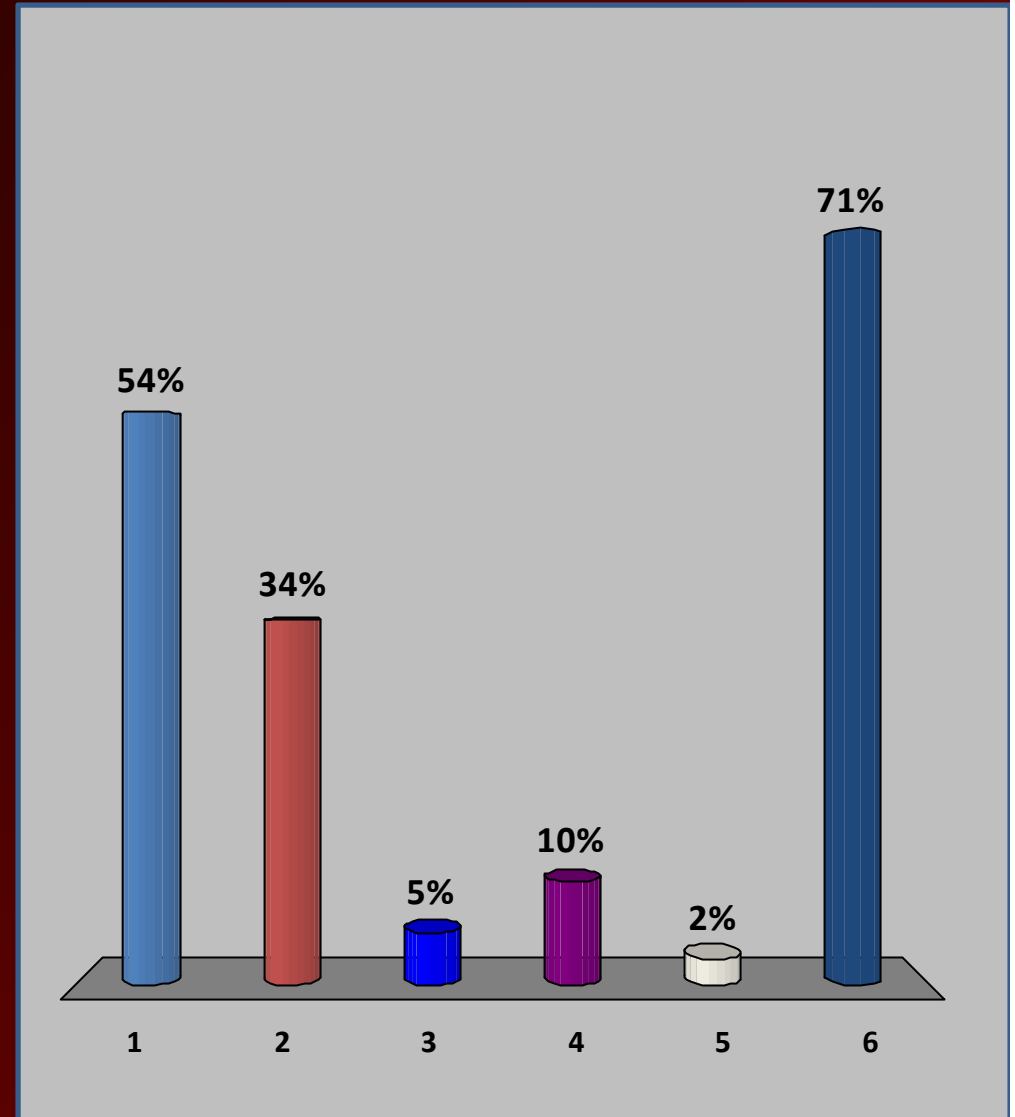
How should the admission process to Veterinary Colleges be changed so students who want to be veterinarians can matriculate? (Pick up to 2)

1. Set minimum profile for admission
2. Add an aptitude/attitude test
3. 1 and 2 combined
4. Only accept Veterinary Students that have vet med in their choices
5. No changes should be made



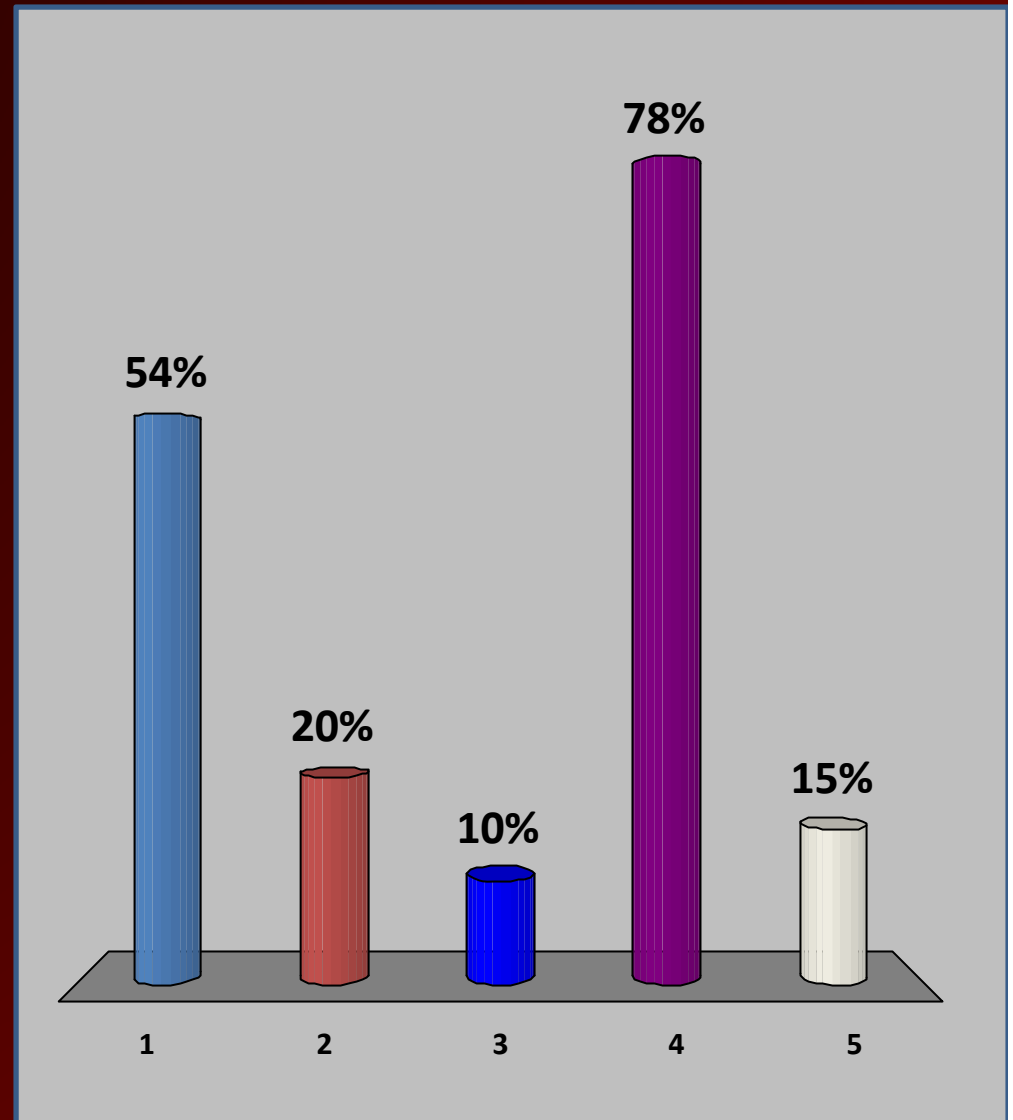
How should we better motivate current students? (Pick up to 2)

1. Create awareness program in early school years (HS)
2. Alumni talks by successful professional in all fields
3. Student Clubs /Extra-Curricular Activity
4. Local Campaign on the contribution and impact of Vet Med
5. Buddy System
6. Lobbying for better job opportunities and working conditions



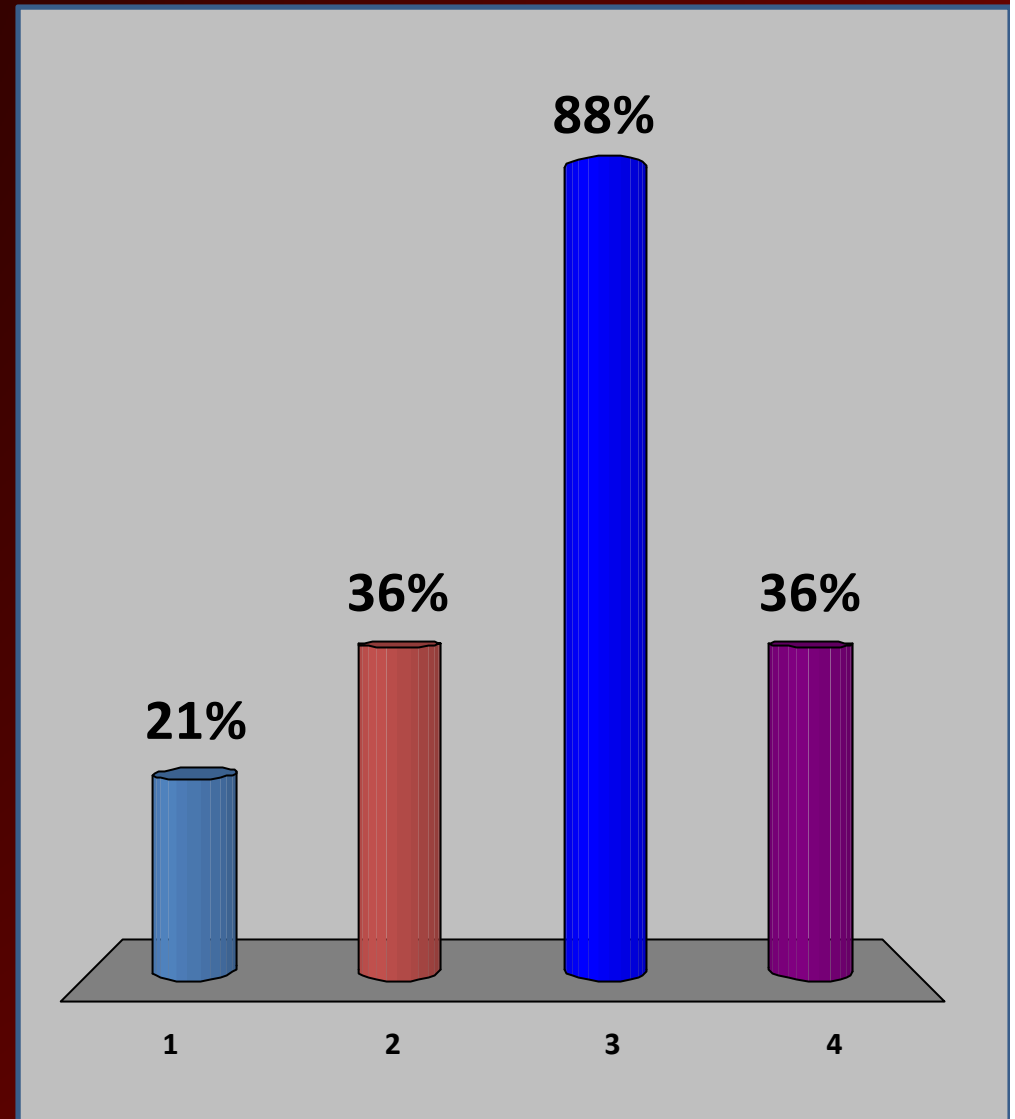
How should we teach students about possible career paths? (Pick up to 2)

1. Invited speakers currently working in various types of employment
2. Externships
3. Student clubs
4. Create a professional development office
5. Create Video-Library of career documentaries



How do you propose to strengthen teacher-student relationships? (Pick up to 2)

1. Training class representative
2. Reduce Class size (Teacher/Student Ratio)
3. Improve pedagogical skills of instructors
4. Create applied and/or practical content in each course

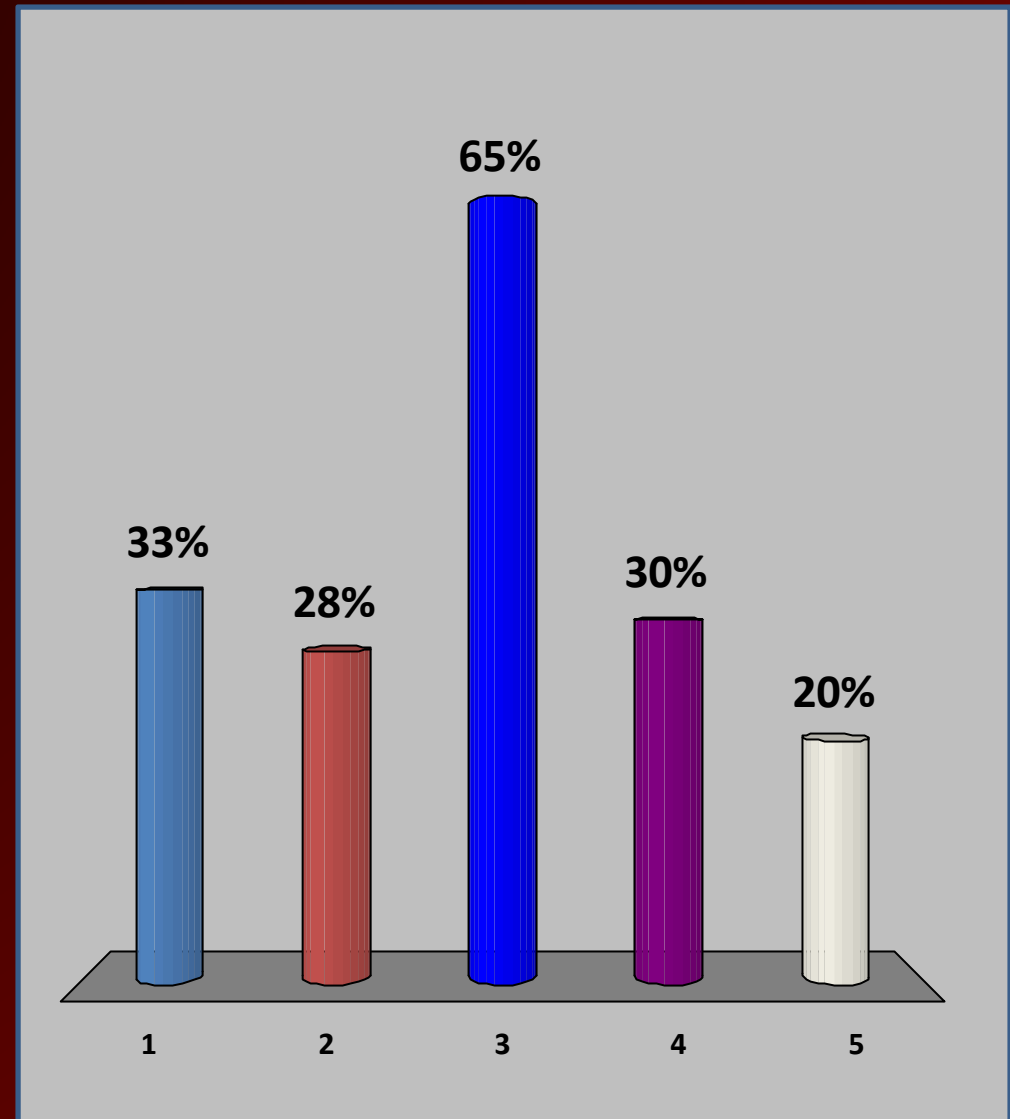


TOPIC 2: TEACHING

- ▶ **GAP: Some of the issues identified, by both students and faculty, that are interfering with an effective teaching and learning environment are:**
 - **Pedagogy or instructional method problems (from course design to class delivery and evaluation).**
 - **Teaching methods are heavily classroom based.**
 - **Insufficient experience (especially by young faculty) in certain subjects.**
 - **Unenthusiastic students with little motivation to learn.**

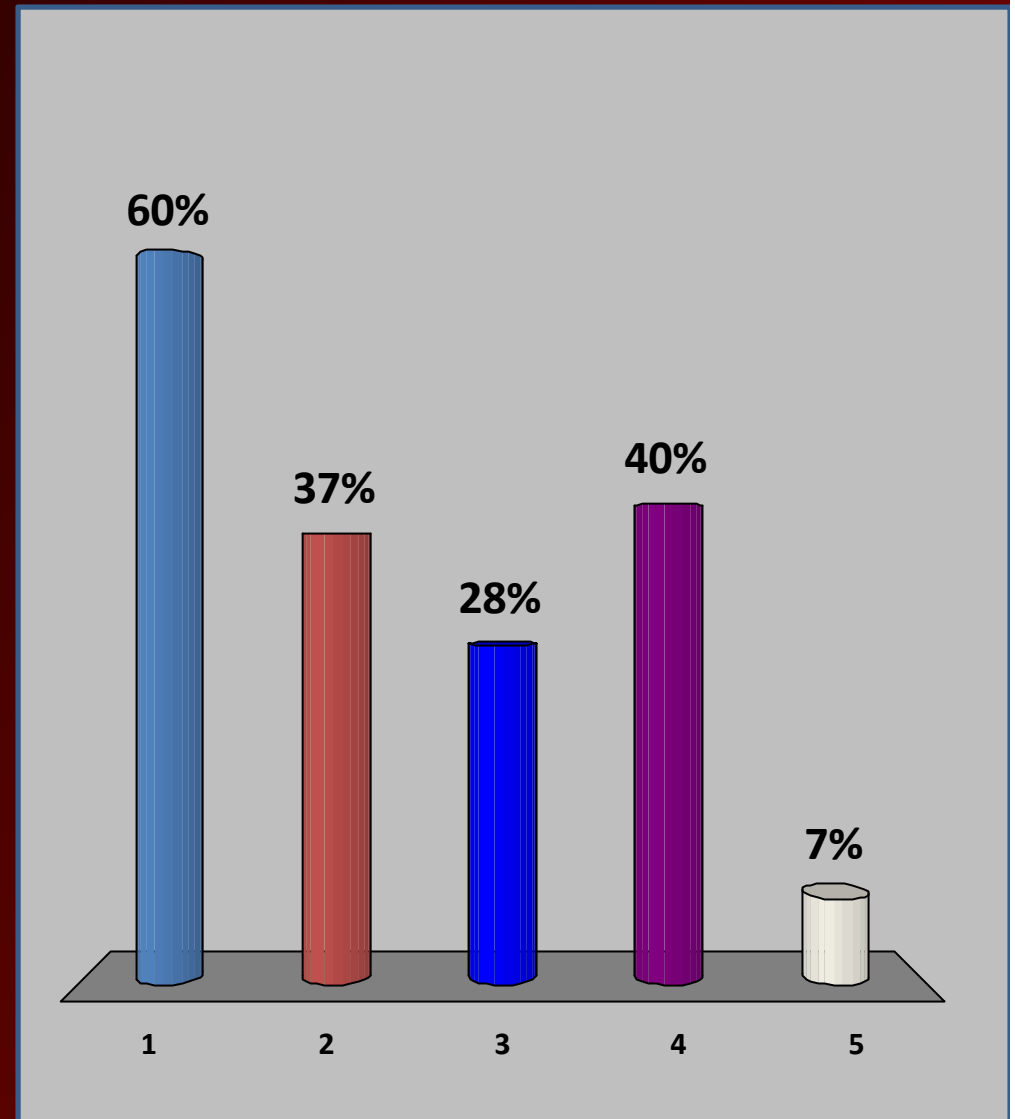
How should the Faculty/Instructors improve their teaching methodology or pedagogy? (Pick up to 2)

1. Online continuing education training through EVA and others
2. Seminar from invited expert in teaching methods
3. Expand HDP training so more faculty can participate
4. Expand induction training
5. Add annual training prior to beginning of fall semester



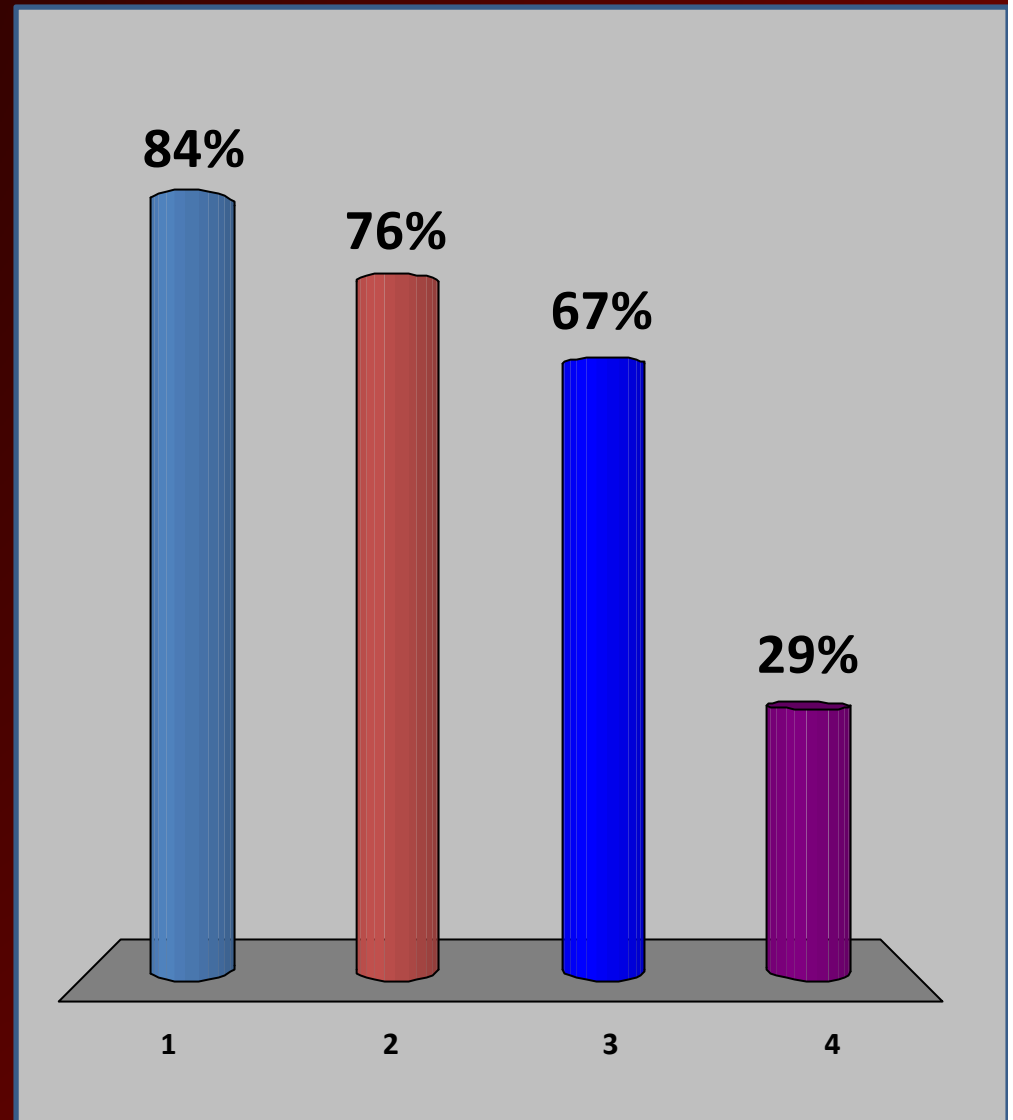
How should the courses/classes be audited? (Pick up to 2)

1. Students' Class Audits
2. Peer audit
3. Supervisor audit
4. UoG Quality Education Assurance and Audit Directorate (Delivery)
5. Audit is not needed



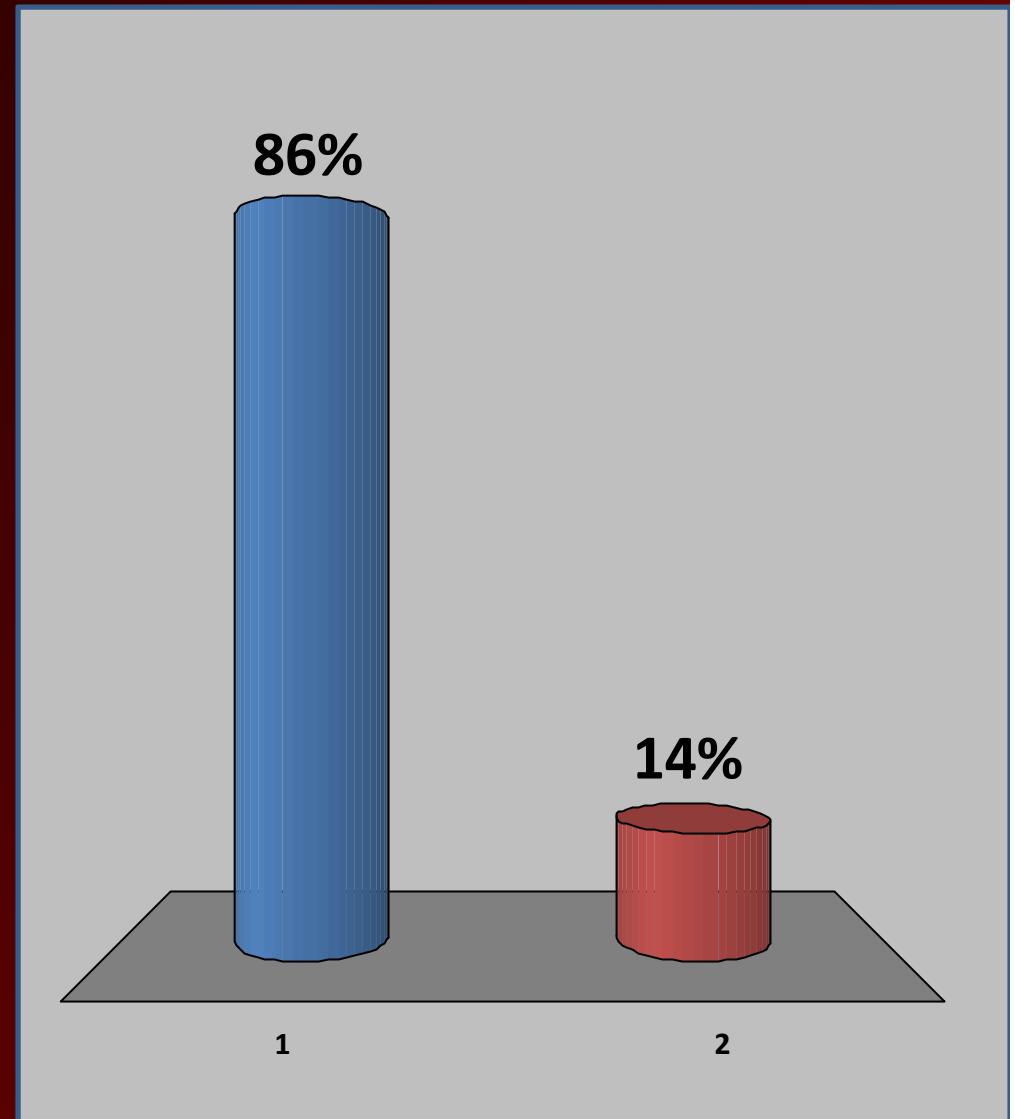
How should instructor teaching be evaluated? (Pick up to 3)

1. Student evaluations
2. Peer evaluations
3. Supervisor evaluations
4. UoG Quality Education Assurance and Audit Directorate evaluations



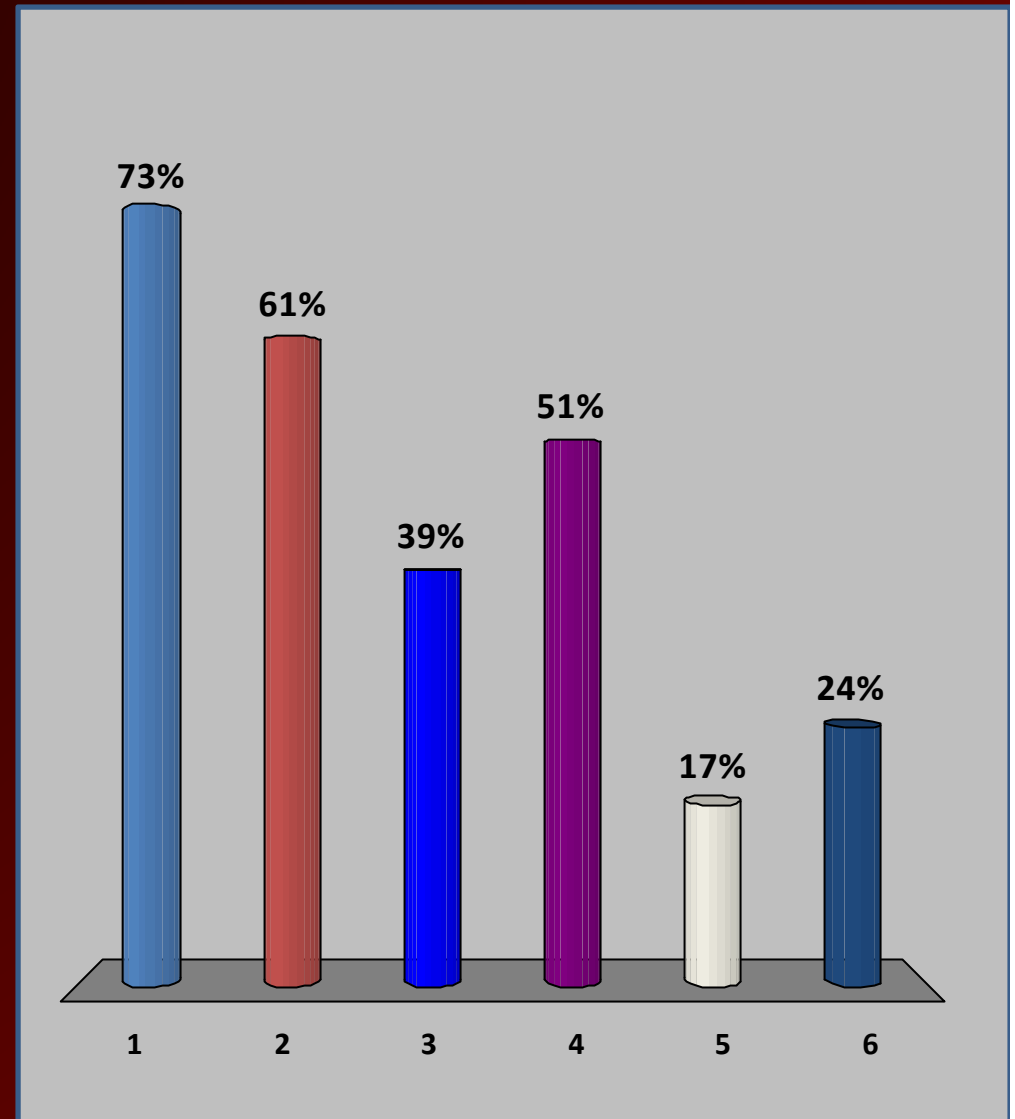
All instructors should have pedagogical training

1. Yes
2. No



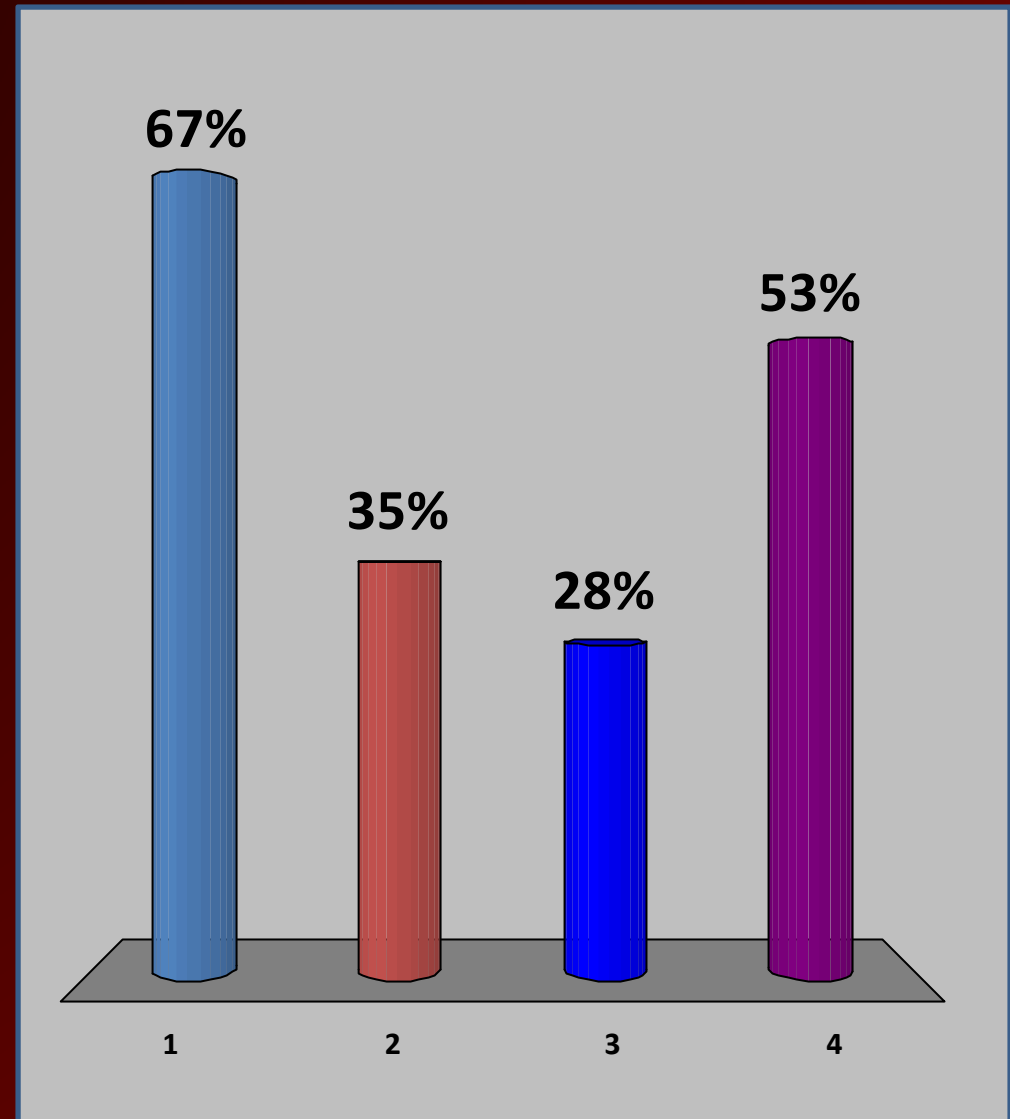
How to make the courses more participatory and welcoming as well as less didactic? (Pick up to 3)

1. Encourage students to express themselves, ask questions
2. Use interactive teaching aids (i.e. clickers)
3. Employ case and scenario based lessons
4. Use technology in teaching (i.e. videos)
5. Practice good time management
6. Create problem based lessons



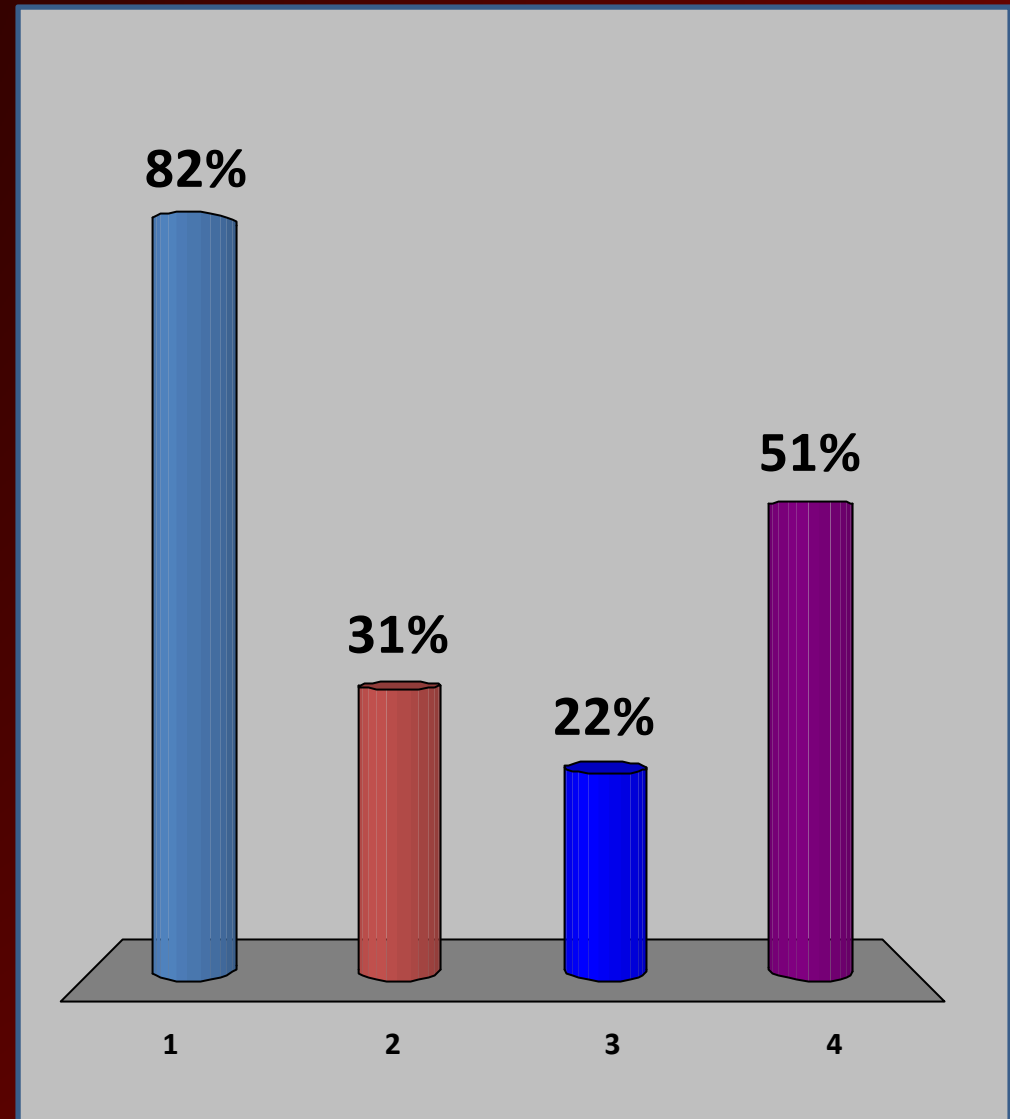
Identify Sources of Funding for Continuing Education (Pick up to 2)

1. Government
2. Create project based grants
3. Collaboration with other universities and agencies
4. International funding agencies



How to provide more teaching CE or advance training opportunities to the faculty? (Pick up to 2)

1. Faculty exchange
2. Online courses
3. Trainings from Quality Education Assurance and Audit
4. Seminars from external teaching experts



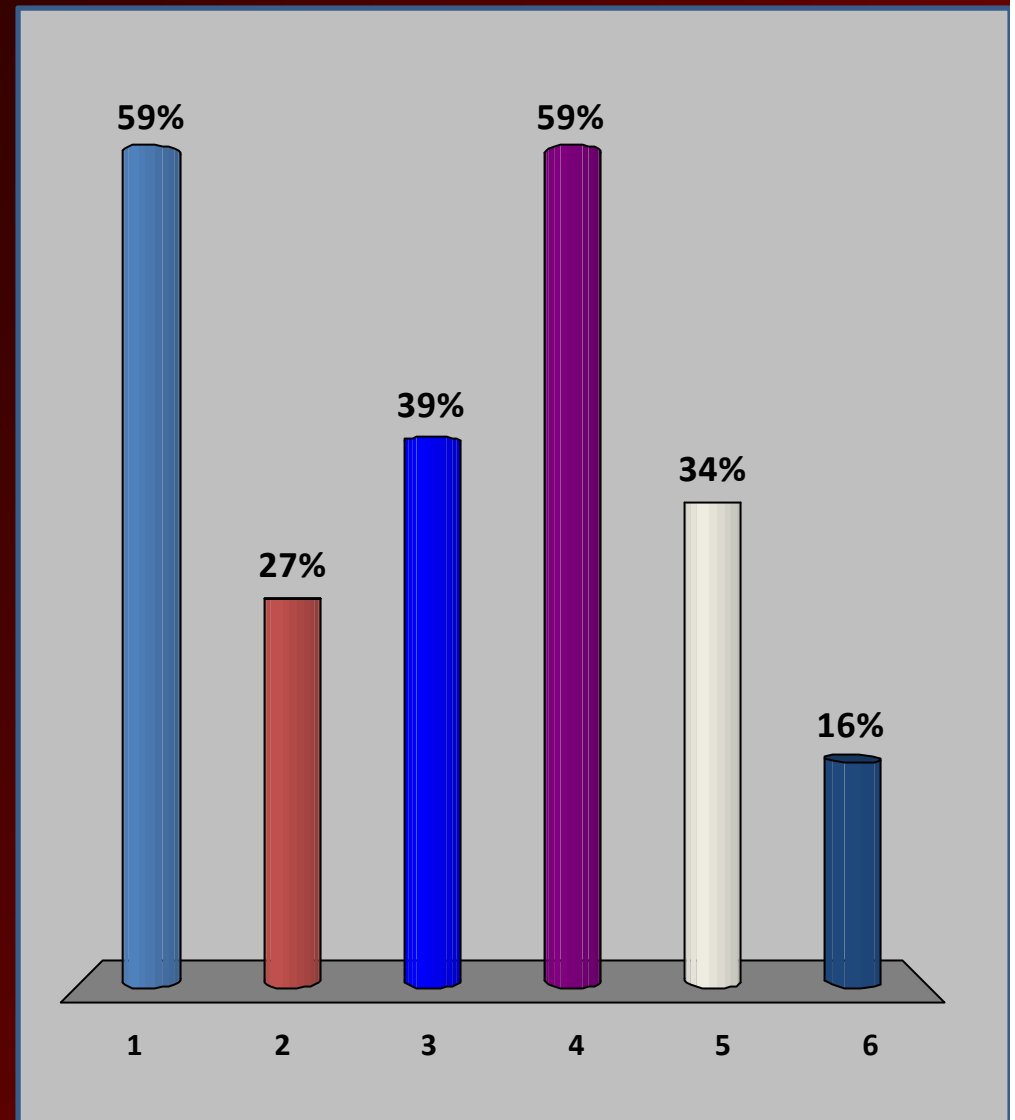
TOPIC 3: INFRASTRUCTURE

- ▶ **GAP: Many of the OIE competencies are primarily theory-based teaching, especially those with a clinical component. Some of the reasons listed are:**
 - **There are no diagnostic or service laboratories at the university and the teaching laboratories are largely didactic due to limited resources.**
 - **There are not (or are very limited) field diagnostic tests (i.e. CMT) for practice and teaching purposes, as well as limited supplies and materials for field training (i.e. sample collection).**

- ▶ **GAP: One recognized gap that was present across the majority of competencies was insufficient or lack of competency among new graduates ability to identify updated national and international sources of information relevant to Day-1 Competency subjects.**

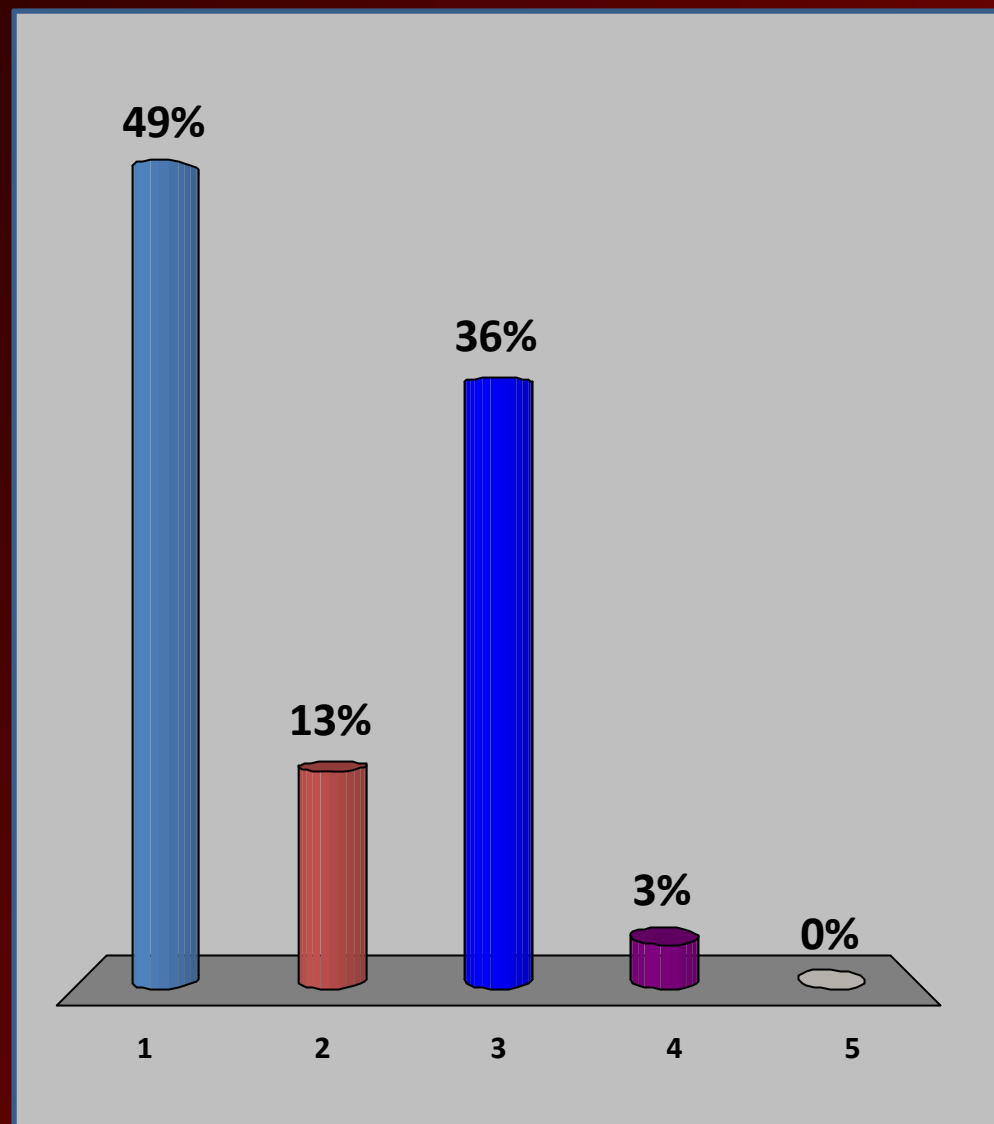
What are the top laboratory needs with respect to teaching of students? (Pick up to 3)

1. Reagents
2. Teaching materials
3. Experienced staff
4. Separate laboratories (bact, virus, etc)
5. Equipment
6. Create list of relevant Diagnostic Techniques for Day-1 instruction



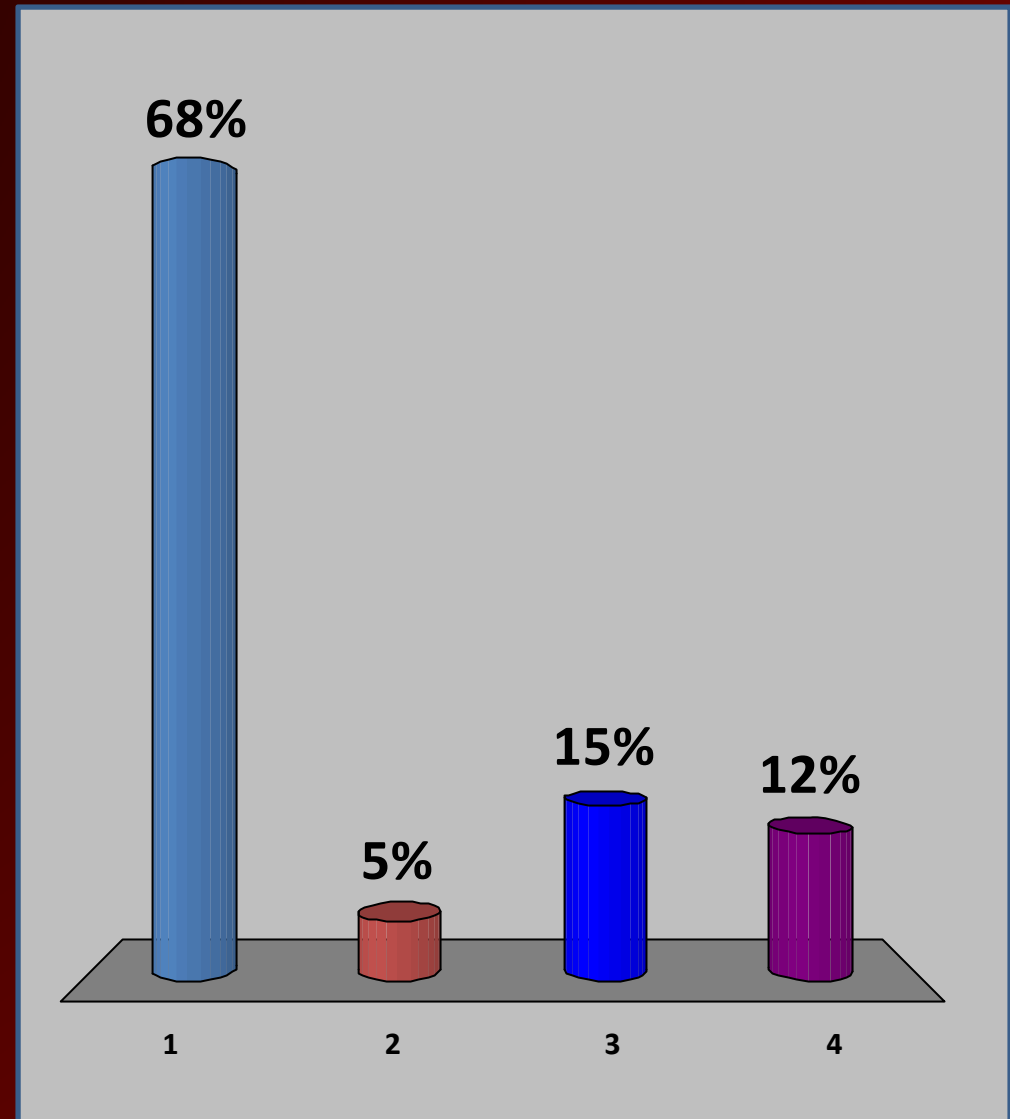
What potential sources of funding for core lab improvement could be pursued?

1. Grant for laboratory twinning
2. NGOs
3. Central Govt
4. Regional Govt
5. Private sector



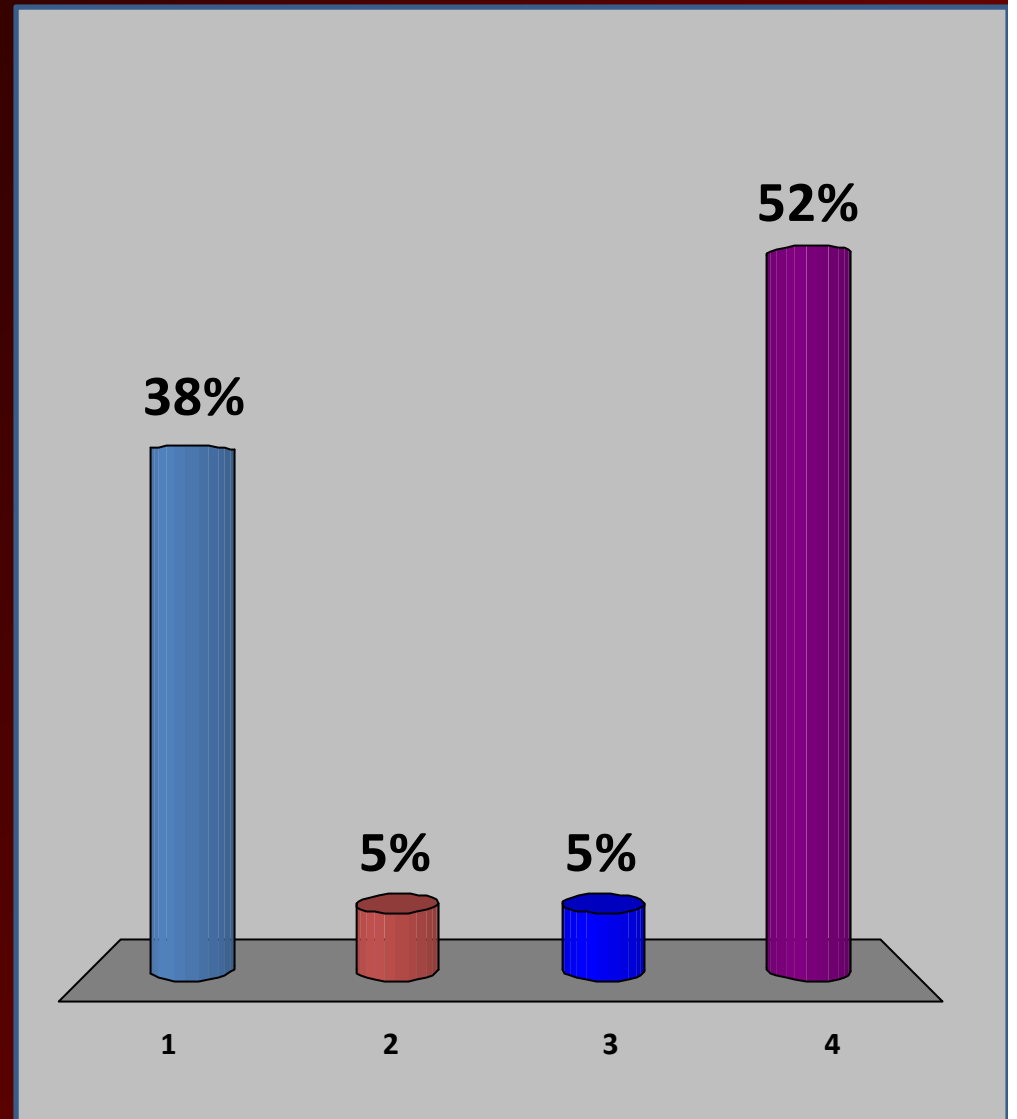
How can we improve the students' access to information?

1. Computer and internet access
2. Subscribed journals
3. Continued professional development
4. Add a course on Health Informatic



What is needed to teach the students to search for up-to-date information online?

1. Course assignments
2. Include dedicated chapter
3. Include dedicated course
4. List of recommended web sites



ACKNOWLEDGEMENT

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- Dr. Jason Stull

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University of Gondar - The Ohio State University
OIE Veterinary Education Twinning Program



THE OHIO STATE UNIVERSITY
COLLEGE OF VETERINARY MEDICINE

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Advancing Veterinary Medicine Education in Ethiopia



WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future