1

The Gold Standard, Standards of Care, and Spectrum of Care: An Evolving Approach to Diagnostic Medicine

Ryane E. Englar

1.1 Defining the Gold Standard

Imagine that you are knee-deep in your fifth consecutive overnight shift at a 24-hour walk-in clinic when a four-year-old male castrated Ragdoll cat presents to you on emergency for evaluation of acute onset of stranguria. The client discloses that the patient was "fine" this morning, when they left for work; however, they returned home to find the patient frantically vocalizing while straining over the rug in the foyer. Despite 20+ trips to the litter box within the past two hours, the cat has produced only a few dribbles of urine. When the cat refused his evening meal and vomited bile, the client became concerned and transported the cat to the clinic. Physical examination discloses a painful, turgid urinary bladder and a urethral plug at the tip of the erythematous penis. Your working diagnosis is urinary tract obstruction (UTO).

How should you proceed with case management? Which paired diagnostic and therapeutic plans are most appropriate for this patient? What will you present to the client as your recommendations for next steps?

As students, we are trained to provide the gold standard when it comes to health care delivery, but what defines this approach to the practice of medicine and from where did this term originate?

The term, gold standard, is rooted in the discipline of economics [1]. Gold standard refers to an antiquated exchange rate system in which currency has a value that is directly linked to gold [1–3]. Any country that subscribed to the gold standard set a fixed price for gold [1–3]. That fixed price determined how much paper money was worth [1–3]. For example, one ounce of gold cost $20.67 in the United States and £4.24 in the United Kingdom during the late nineteenth and early twentieth centuries [2–4]. The value of the US dollar was therefore said to be roughly 1/20th of an ounce of gold [2]. If someone wished to convert one British pound to US dollars based upon this exchange rate, they could. The exchange rate between the US dollar and the British pound was calculated by $20.67/£4.247 = $4.867 to £1. This allowed for ease of comparisons between currencies in the arena of international trade.

When the gold standard first appeared within the medical literature in a 1962 anonymous commentary in *The Lancet*, it did not carry the same meaning [1]. Instead, the penned article, *Toward a Gold Standard*, was quite literal with the term, and called upon physicians to support the practice of administering gold salts to patients with rheumatoid arthritis [1].

It was not until 1979 that the term took on its present-day meaning in an editorial by Peter Rudd, M.D. that appeared in the Archives of Internal Medicine [1]. Rudd acknowledged the challenges of practicing medicine in the face of noncompliance when he shared that [5]:

> With the help of strong societal pressures, we are learning to acknowledge several nontraditional factors in medicine. We must now consider relative costs, absolute effectiveness, and "informed" patient-consumers. These new concerns form part of a larger trend to translate more directly the dramatic scientific advances of recent years into the practical arena. Amid cries for parsimonious medicine and maximized benefit, compliance has emerged as a major issue.

Rudd went on to state that [5]:

> The problem of noncompliance is hardly new. But its recognition and acknowledgment have come haltingly, apparently since few health professionals considered it worthy of attention and, probably more importantly, because few of them believed in their responsibility.

Low-Cost Veterinary Clinical Diagnostics, First Edition. Ryane E. Englar and Sharon M. Dial.

Rudd tasked the medical profession with developing a gold standard for compliance that would facilitate case management [5]. The term has since appeared in over 10 000 publications since 1995 [1] despite concerns from some that "because the phrase smacks of dogma its use should be discontinued in medical science. After all, the financiers gave up the idea of a gold standard decades ago" [6].

P. Finbarr Duggan, who expressed this sentiment in 1992, explained that he was "taken back" by the use of this term since [6]:

> As a practising [sp] biochemist for nearly 40 years I had never heard these words used to describe any biological test. Because the subject is in a state of perpetual evolution gold standards are, by definition almost, never reached.

1.2 Limitations of the Gold Standard

Fast-forward to the present day in both human and veterinary healthcare. There is ongoing debate about the realities and practicalities of the gold standard approach to practicing medicine. Gold standard care implies that which is the best available under reasonable circumstances. Likewise, a gold standard diagnostic test refers to the most accurate assessment that can be performed without restrictions.

On paper, the gold standard implies that patient care is comprehensive. For instance, in his 2005 article in Veterinary Clinics of North America: Small Animal Practice, Benjamin Colmery III, DVM, outlined the gold standard of veterinary oral health care to include [7]:

- thorough physical examination and history
- preoperative blood profiles, including blood gases
- inhalation anesthesia with sevoflurane
- regional and local nerve blocks
- concurrent intravenous fluid therapy
- blood pressure, electrocardiography (ECG), pulse oximetry, respiratory monitors, and body temperature monitors
- intraoral dental radiology
- air-driven high-speed dental equipment and complete hand instrumentation
- trained dental operator
- complete dental charting
- home care
- rechecks.

Oral health care that is in alignment with this gold standard is deemed complete. Colmery's list is precisely that which we might aspire to provide to our patients.

However, we veterinarians are often restricted in terms of what we can provide by way of patient care. Delivering the gold standard may work well when we speak of theoretical cases, yet this level of care is not always within reach when we replace theoretical clients with actual ones [8]. Cost of care is a frequent barrier [8]. Even in the absence of financial constraints, our client may not comply with patient care recommendations [8]. Even if compliance is not an issue for our client, we may not be able to offer the industry standard. Maybe we do not have access to equipment for intraoral dental radiography, or maybe our team has not been adequately trained in procedural analgesia, including nerve blocks.

In these situations, it may feel as though our deviation from the gold standard offers a lower level of care, as if we are providing an economy experience instead of first class [9]. Even though we may feel that we are doing right by our client or patient, we may feel "trapped by the language we use" [9]. In this respect, "gold standard feels more like a marketing term than one suitable for patient welfare" [9].

This concern has led to a proposition that we shift the way that we approach care. Davidson explains it best when writing that [9]:

> Once we introduce real clients and patients then "the best available option" needs to be put into context of their needs and abilities. This is the skill of a medical care provider; not offering every possible combination of treatments, but listening to the client and assessing the patient.

1.3 Returning to the Case of the Cat with Stranguria: a Different Perspective on Standards of Care

Let's return now to the case that was introduced at the start of this chapter: a four-year-old male castrated Ragdoll cat presents to you on emergency for evaluation of acute onset of stranguria. Based upon history and physical exam findings, the patient's working diagnosis is UTO.

Gold standard care dictates that the following measures be taken to effectively manage the patient [10]:

- complete blood count (CBC)
- blood chemistry profile
- urinalysis (UA) with evaluation of the sediment
- urine culture
- intravenous (IV) catheter placement
- IV fluid therapy

- blood gas analysis
- sedation
- pulse oximetry
- blood pressure monitoring
- electrocardiogram (ECG)
- epidural nerve block during indwelling urinary catheter placement with closed collection system
- pharmacotherapy
- abdominal imaging: radiography or ultrasonography
- blood chemistry profile recheck
- electrolyte recheck
- blood gas analysis recheck
- follow-up urine culture after urinary catheter removal

> Is this the only means of case management?
> No.
> Might other means of case management be appropriate?
> Yes.

The case of urethral obstruction in a male cat is one of many clinical scenarios in veterinary practice in which a variety of treatment options are available [10].

Depending upon the situation, we might choose to proceed with one of the following approaches instead of the gold standard [10]:

- conservative management
  - sedation
  - analgesia
  - urinary catheter placement
  - subcutaneous fluid therapy
  - anti-spasmodic pharmacotherapy (e.g. prazosin)
  - discharge home with open-ended tomcat urinary catheter.
- hospitalization without urinary catheter placement
  - sedation
  - analgesia
  - cystocentesis
  - observation of cat until urination occurs.

Neither of these approaches is considered the gold standard.

Neither of these approaches is accepted as the universal standard of care [10]. In the eyes of the law, standard of care has been defined as that which is "required of and practiced by the average reasonably prudent, competent veterinarian in the community" [10]: in other words, standards outline that which constitutes legally acceptable care by competent healthcare providers [11]. Outside of the legal lens, standards can be considered guidelines or protocols that are evidence-based [11]. These protocols have defined steps that can be optimized and sequenced in such a way as to afford predictable outcomes [11].

Standards exist so that veterinarians, veterinary organizations, associations, and specialty colleges can hold each other accountable to deliver the same consistent quality of health care [11]. Yet not all standards are upheld [11]. Not all clients can afford all standards of care, just as not all practices can afford to implement them [11].

To muddy the waters further, not all clinicians agree upon the same standards of care, regardless of what overseeing bodies promote [11]. For example, the Advisory Panel of the American Association of Feline Practitioners (AAFP) advises that the feline leukemia (FeLV) vaccine be administered to all kittens regardless of lifestyle [12, 13]. However, not all veterinarians follow through with this recommendation. Some exclude indoor-only, single-pet households from this guideline out of concern for adverse effects associated with vaccination, specifically the risk of injection-site sarcoma. Does this mean that those unvaccinated kittens are receiving substandard care? Undoubtedly not. It means that the practice of medicine must allow for some degree of flexibility by offering incremental care options with the understanding that not all standards are appropriate for all patients in all circumstances [11].

Optimal care is not necessarily gold standard care. It is best defined within the context of real clients and their animals, based upon their needs and abilities. Within the context of this case, the male cat with UTO, either approach to care may be medically defensible, reasonable, and successful even though neither approach met the so-called "standard" [10].

1.4 Limitations to Standards of Care

Standards are intended to facilitate care, yet sometimes they have the opposite effect. As one colleague shared in a 2016 article, *Is the Gold Standard the Old Standard?* [14]

> Our profession sometimes emphasizes the 'best' care, and that sometimes turns into an insistence that all pet owners need to do this. . . Assuming the choices are medically appropriate, I think our profession has a responsibility to offer different levels of care.

Another colleague agreed that options, rather than edicts, are essential to veterinary practice [14]:

> Sometimes you don't have to even finish the 'I' at the end of MRI to know a client isn't going to pursue a neurologist consultation for a dog that suddenly does not have the use of the back legs. But it's with options C and D that a great veterinarian really shines. You have offered the standard practice, and

> it's been declined by the owner. You're left with the moral and ethical task of doing your best, and sometimes it is in these moments a general practitioner can shine with problem-solving skills.

Rather than insist upon a universally accepted medical definition of standard of care, we might instead consider that there is for every clinical scenario an acceptable continuum of care [10, 11]. This continuum is born out of the understanding that limiting the scope to standard of care hinders our ability to deliver health care [10]. A recent survey shared that roughly one out of every four pet owners in the United States has experienced an obstacle to veterinary care, and that barrier is often financial [15, 16]. If clinicians only offer standard of care, then we may price people out of owning pets [14].

Instead of tying the clinicians' hands by saying that they either rise to meet the standard or fall below it, we must recognize that there are multiple paths to achieve the same patient outcome. These multiple forks in the proverbial road are evidence-based and factor into the equation all players and their perspectives including [16, 17]:

- the anticipated patient outcome
- the provider's knowledge
- the provider's skillset
- the practice's resources, including team members and equipment
- the provider's comfort and confidence with procedural medicine
- the safety and efficacy of available treatments
- best-practice guidelines
- quality-of-life measures, coupled with treatment effectiveness
- practice-specific goals
- client's access to care
- client's goals and values
- client's expectations for care, including the diagnostic and therapeutic timeline
- client's ability to comply with health care recommendations
- client's ability to finance care

There is value to the customization of the practice of medicine so that we ultimately deliver client-driven, pet-specific care.

1.5 Spectrum of Care

There is an added layer of value to learning how to modify preexisting treatment protocols. This is not a skill that is typically prioritized by the traditional model of veterinary education in the United States and Canada [18]. Students are classically trained in best practices, which leads to a disconnect between the so-called ivory tower medicine and the real world. Students therefore only acquire a sample of the knowledge and skills they need to succeed in practice [18].

When students transition from clinical year to general practice, they may not always feel comfortable offering Plan B, Plan C, or Plan D approaches to care. They may feel that care is all or none. Either they can refer a canine patient with a broken leg to an orthopedic surgeon for open reduction/internal fixation or they are faced with the reality of euthanizing the patient [18]. This is a gut-wrenching ethical dilemma that is commonly faced in general practice. In fact, in a 2018 survey by Kipperman et al., 52% of respondents acknowledged that they experienced an ethical dilemma as DVMs at least once per week [19].

"No one should have to euthanize their pet because it can't be provided some level of care" [18]. Yet, this is a frequent occurrence among veterinarians and their clients. According to Stull et al., the challenge is that [16]:

> Given the highly sophisticated nature of procedures commonly taught and observed in veterinary colleges, veterinarians (most notably recent graduates) may be unaware of, and lack the knowledge and skills to offer, a wide spectrum of care options for a given condition and therefore may be unable to communicate to clients the relative effectiveness and costs of options along this spectrum.

Veterinary educators must shift their approach to preparing students for general practice by broadening evidence-based options for diagnostic and treatment plans [18]. Rather than prescribing one gold standard or one standard of care, instructors can demonstrate a continuum of acceptable care options that can meet the needs of a diverse clientele [18]. Spectrum of care is not just about overcoming financial constraints [18]. It is about applying evidence-based medicine to clinical casework in a way that incorporates the client's perspective so that we can be responsive to a broad range of needs [18].

If we were to apply gold standard care, then a middle-aged vomiting dog can be managed only one way [18]:

- CBC
- blood chemistry profile
- UA
- pancreatic-specific lipase immunoreactivity
- abdominal imaging
- IV fluid therapy
- hospitalization

- observation
- pharmacotherapy.

Yet, experienced practitioners all know that a vomiting dog can be managed in many ways [18]:

> An alternative approach, for example, would be to check the dog's [hematocrit] and total protein concentration to evaluate hydration status, submit a blood sample for biochemical testing to rule out diabetic ketoacidosis and uremia, and administer fluids SC. If the owner declines this approach, another option could be to administer fluids SC and send the dog home with instructions for the owner to give the dog nothing to eat except ice chips for the first 24 hours and to offer small amounts of water and a homemade, low-fat diet of boiled chicken and rice over the next 24 hours if vomiting subsides, but to return for additional diagnostic testing if vomiting continues.

Spectrum of care training opens the door to dialogue concerning which management approaches are appropriate for each patient – and why [18]. As explained by Fingland et al., spectrum of care training gives students "the knowledge needed to discuss with owners the degree of diagnostic certainty, likelihood of a favorable or unfavorable outcome, possible need for additional testing or treatment, and costs associated with each option" [18].

Spectrum of care, in this respect, values all parties and tailors the approach to meet the specific needs and circumstances in the moment.

It is out of respect for these principles that this text proceeds. Parts 2 through 5 of this text will outline how to maximize each diagnostic test that is performed in-house, particularly when a step-by-step approach to case management is employed. Part 6 will provide sample cases to test your clinical acumen as you apply what you have learned about diagnostic testing to real-life case vignettes.

References

1 Claassen, J.A. (2005). 'Gold standard', not 'golden standard'. *Ned Tijdschr Geneeskd.* 149 (52): 2937.

2 Roosevelt's Gold Program. Federal Reserve History [Internet]. (2013). https://www.federalreservehistory.org/essays/roosevelts-gold-program#:~:text=The%20law%20required%20the%20Federal,per%20ounce%20of%20pure%20gold.

3 Historical Gold Prices – 1833 to Present: National Mining Association (NMA). (2016). https://nma.org/wp-content/uploads/2016/09/historic_gold_prices_1833_pres.pdf.

4 Press A. (2020). Commentary: The gold standard and why the U.S. left it behind: Finance & Commerce; (2020). https://finance-commerce.com/2020/11/commentary-the-gold-standard-and-why-the-u-s-left-it-behind.

5 Rudd, P. (1979). In search of the gold standard for compliance measurement. *Archives of Internal Medicine* 139 (6): 627–628.

6 Duggan, P.F. (1992). Time to abolish "gold standard". *British Medical Journal* 304: 1568–1569.

7 Colmery, B. 3rd. (2005). The gold standard of veterinary oral health care. *Veterinary Clinics of North America: Small Animal Practice* 35 (4): 781–787. v.

8 Hicks, M. (2019). Striving for the gold standard in animal welfare. *Canadian Veterinary Journal* 60 (11): 1145–1146.

9 Davidson J. (2021) Defining gold-standard care. vettimes [Internet]. www.vettimes.co.uk/defining-gold-standard-care.

10 Block, G. (2021). A different perspective on standard of care. In: *Pet-Specific Care for the Veterinary Teams* (ed. L.J. Ackerman), 715–717. Hoboken, NJ: Wiley.

11 Ackerman, L.J. (2021). Standards of care. In: *Pet-Specific Care for the Veterinary Teams* (ed. L.J. Ackerman), 711–714. Hoboken, NJ: Wiley.

12 Scherk, M.A., Ford, R.B., Gaskell, R.M. et al. (2013). 2013 AAFP Feline Vaccination Advisory Panel report. *Journal of Feline Medicine and Surgery* 15 (9): 785–808.

13 Stone, A.E., Brummet, G.O., Carozza, E.M. et al. (2020). 2020 AAHA/AAFP Feline Vaccination Guidelines. *Journal of Feline Medicine and Surgery* 22 (9): 813–830.

14 Is the gold standard the old standard? dvm360 [Internet]. (2016). https://www.dvm360.com/view/gold-standard-old-standard.

15 Brown, C.R., Garrett, L.D., Gilles, W.K. et al. (2021). Spectrum of care: more than treatment options. *Journal of the American Veterinary Medical Association* 259 (7): 712–717.

16 Stull, J.W., Shelby, J.A., Bonnett, B.N. et al. (2018). Barriers and next steps to providing a spectrum of effective health care to companion animals. *Journal of the American Veterinary Medical Association* 253 (11): 1386–1389.

17 Block, G. (2018). A new look at standard of care. *Journal of the American Veterinary Medical Association* 252 (11): 1343–1344.

18 Fingland, R.B., Stone, L.R., Read, E.K., and Moore, R.M. (2021). Preparing veterinary students for excellence in general practice: building confidence and competence by focusing on spectrum of care. *Journal of the American Veterinary Medical Association* 259 (5): 463–470.

19 Kipperman, B., Morris, P., and Rollin, B. (2018). Ethical dilemmas encountered by small animal veterinarians: characterisation, responses, consequences and beliefs regarding euthanasia. *Veterinary Record* 182 (19): 548.